

WestminsterResearch

<http://www.westminster.ac.uk/westminsterresearch>

Museums for all: towards engaging, memorable museum experiences through inclusive audio description

Hutchinson, R.

This is an electronic version of a PhD thesis awarded by the University of Westminster.

© Mrs Rachel Hutchinson, 2019.

The WestminsterResearch online digital archive at the University of Westminster aims to make the research output of the University available to a wider audience. Copyright and Moral Rights remain with the authors and/or copyright owners.

**Museums for all: towards
engaging, memorable
museum experiences
through inclusive audio
description**

By

Rachel Hutchinson

**A thesis submitted in partial fulfilment of the requirements of the
University of Westminster for the degree of Doctor of Philosophy**

Department of Psychology

University of Westminster

December, 2019

“...I hope that audio description can be elevated from its current status as a segregated accommodation outside the general public’s awareness and launched into the new media – a literary/interpretative form with limitless possibilities.” – Georgina Kleege (1956 -)

Abstract

Museums seek to offer their visitors a rich and rewarding experience that is accessible and inclusive. Many museums rely on vision as a means of access to collections. Yet having vision does not necessarily mean that visitors are able to engage with exhibits. Audio Description (AD) has traditionally been defined as an access tool for people who are blind or partially sighted (BPS), which seeks to make visual information accessible through spoken language. However, AD could simultaneously provide ‘guided looking’ for people with sight. This interdisciplinary thesis sets out the first empirical investigation of AD in museums and its potential as inclusive design. Study 1 examines current understandings of museum AD, through an international practitioner survey. It reveals disagreement regarding whether AD should aspire to be an objective visual-verbal ‘translation’ or whether it should incorporate interpretative techniques in order to provide a rich experience. Study 2 explores the nature of the museum experience by analysing autobiographical memories for museum visits, demonstrating the importance of thoughts, feelings and personal context in museum memories and demonstrating an autobiographical memory coding model. Study 3 investigates the impact of AD on the experience, engagement and memorability of sighted participants, with AD resulting in richer memories compared to standard audio guides or minimal text interpretation. Study 4 compares sound enriched and standard AD on the experience, engagement and memorability of blind and sighted people, finding experience benefits for all and memorability benefits for BPS people. This research therefore concludes that AD should be taken out of its access ‘niche’ and considered as an inclusive interpretation tool to enhance engagement and access for all visitors. It argues further that the development of inclusive museum AD should be driven by a fuller understanding of the nature of the museum experience and its lasting impact.

Publications and Conferences:

Parts of this thesis have appeared in the following forms:

Journal Articles:

Hutchinson, R., & Eardley, A. (in press). Towards the Accessible Museum: Understanding International Museum Audio Description Practices. *JVIB*

Hutchinson, R., Loveday, C. & Eardley, A (Submitted). Remembering Cultural Experiences: lifespan distributions, richness and content of autobiographical memories of museum visits, *Memory*

Hutchinson, R., & Eardley, A. (2018). Museum audio description: the problem of textual fidelity. *Perspectives: Studies in Translation Theory and Practice*, 27(1), 42–57.

International Conferences:

Hutchinson, R., & Eardley, A.F., (2019). Making Memories: measuring the impact of AD facilitated experiences with Autobiographical Memory theory. Paper presented at the Audio-Visual Translation Intermedia Conference, Warsaw, Poland, 19-20th September.

Hutchinson, R., & Eardley, A.F., (2018). Audio Description in an Inclusive Museum. Paper presented at the Sensing Culture Conference, University of Bath, UK, 26-27th March.

Hutchinson, R., & Eardley, A.F., (2016). Enhancing Museum Visits with Audio Description: Challenges and Opportunities. Paper presented at the Art of Access conference on Audio Description. London, UK, 21st October.

Hutchinson, R., & Eardley, A.F., (2016). Audio description: Intermodal Translation in Museums. Paper presented at the Translation and the Creative Industries Conference. University of Westminster, London, 6-7th October.

Contents

Introduction to the thesis.....	1
Chapter 1: Introduction: a place for audio description in an inclusive museum?.....	5
Abstract	5
What is access?	6
The museum experience.....	7
What is engagement in the museum?.....	12
Barriers to engagement	14
What is the role of museum interpretation in overcoming these barriers?	15
Audio in museums: Audio Description.....	16
Audio in museums: Audio Guides	18
Could AD benefit sighted visitors?.....	20
Cognition in the museum: imagery, multisensory processing, and memorability..	22
How can the museum experience, including AD facilitated experiences, be evaluated?.....	29
Introduction to autobiographical memory, its functions, and importance to museums.....	29
Summary	33
The structure of this thesis.....	34
Chapter 2: Understanding museum AD: current practices, regional differences and implications	36
Abstract	36
Part A: Towards an understanding of international museum audio description practices: practitioner perspectives.....	37
Introduction	37
Method.....	40
Design	40

Participants.....	40
Measures	41
Procedure.....	41
Results	42
Qualitative analysis	42
AD duration.....	43
Use of touch	43
Role of museum AD	43
Imagery	44
Objectivity vs interpretation.....	45
Content and style.....	46
Cognitive prompts.....	47
Discussion	48
Part B: Translating the Museum: AD and the implications of textual fidelity	52
Introduction	52
Objectivity and the visibility of the describer-translator.....	53
The nature of the source text.....	56
The recipient experience	59
Discussion	61
Summary	63
Chapter 3: Autobiographical memories of museum visits: using autobiographical memory theory to explore museum experiences and their lasting impact	65
Abstract	65
Introduction	66
What is autobiographical memory?	67
Autobiographical memory and the self-memory system:	68
Autobiographical remembering: rehearsal and cueing:	69
Using autobiographical memory theory to evaluate impact:	71

Methods	74
Design	74
Participants	75
Materials.....	76
Procedure.....	76
Data coding	77
Results	80
Life-span distribution	80
Visitor differences	82
Memory details.....	85
Discussion	88
Conclusions	93
Summary	94
Chapter 4: ‘Guided looking’: supporting visual exploration of artworks with audio description	95
Abstract	95
Introduction	96
Barriers to access and AD as inclusive design.....	96
Engaging experiences: approaches to measurement	102
Methods	103
Design	103
Participants.....	104
Materials.....	105
Measures	106
Procedure.....	107
Results	108
Participant demographics and time taken to follow up.....	108
Experience and engagement.....	109

Memorability.....	116
Discussion	118
Standard audio guide, audio descriptive guide or visual exploration alone: similarities and differences in experience, engagement and memorability	118
The impact of AD on the participant experience, engagement and memorability: similarities and differences between SAG and ADG.....	122
Summary	126
Chapter 5: The impact of enriched audio description on the exploration of Henry Grant photography, in people with and without sight.....	127
Abstract	127
Introduction	128
Methods	136
Design	136
Participants.....	136
Materials.....	136
Measures	137
Procedure.....	139
Results	139
Participant demographics and time taken to follow up.....	139
Comparison of the impact of ADG and EDG, for BPS and sighted participants .	140
The overall AD experience: levels of engagement of BPS and sighted participants	149
Discussion	153
The impact of EDG and ADG on BPS and sighted listeners: experience and engagement	154
The impact of EDG and ADG on BPS and sighted listeners: memorability	156
The overall AD experience for BPS and sighted participants:	158
Summary	161
Chapter 6: Revisiting inclusive experiences facilitated through Audio Description....	162

Introduction	162
Discussion of the research findings.....	163
The purpose of museum AD	163
The long-term impact of the museum experience and approaches to evaluation .	165
AD as a tool for inclusive design	169
Inclusive AD: implications for practice and avenues for future research	175
Rethinking museum AD.....	179
Summary of contribution to knowledge:.....	181
Appendices.....	183
Appendix 1: Chapter 2	183
Appendix 1.1: Museum AD questionnaire.....	183
Appendix 2: Chapter 3	197
Appendix 2.1: Museum memories questionnaire.....	197
Appendix 2.2: Instructions and examples for second coder	207
Appendix 3: Chapter 4	214
Appendix 3.1: Henry Grant photographs	214
Appendix 3.2: Audio guide and audio description texts	219
Appendix 3.3: Time A questionnaire	235
Appendix 3.4: Time B questionnaire	248
Appendix 3.5: Instructions and examples for second coder	268
Appendix 4: Chapter 5	271
Appendix 4.1: Additional Henry Grant photo and AD text:.....	271
Appendix 4.2: Time A questionnaire	273
Appendix 4.3: Time B questionnaire	290
Glossary of Abbreviations	305
References.....	306

List of Figures

Figure 3.1: Distribution of specific memories across the life span; expected and observed data.....	81
Figure 3.2: Periods in participants' lives when they visited museums the most, by frequency.....	82
Figure 3.3: Percentage of memories up to age 40 by age at encoding, split by visit frequency, with five-year recency removed.....	83
Figure 3.4: Mean (SD) percentages of specific and general memories by participant groups.....	85
Figure 3.5: Mean (SD) percentage values for content categories.....	86
Figure 4.1: Mean (SD) frequencies of detail types recalled by participant group, at Time B.....	117
Figure 5.1: Mean detail counts for categories: content, event/activity/movement, spatial, reactions (participants' thoughts, emotions and memories), semantic information (socio-historical details and details about the photographer), emotion and atmosphere (including non visual imagery) and sound (references to sound and sound images) by participant group and stimuli type (ADG, EDG), at time B.....	148

List of Tables

Table 2.1	Median (Range) Recommended Durations in Minutes for Live and Recorded AD (single stops and full tours) by region.....	43
Table 2.2	Agreement ratings (median, range) for the role of AD for a museum visitor, where 5='strongly agree' and 1='strongly disagree.'	44
Table 2.3	Importance of Content and Style Variables by Region (Median, Range), where 5='extremely important' and 1='not at all important.'	47
Table 3.1:	Mean (SD) ages and genders of participant groups by age and visit frequency	75
Table 3.2:	Mean (SD) number of memories provided, by participant group.....	84
Table 3.3	The mean (SD) word count per memory for young and senior frequent and infrequent museum visitors.	87
Table 4.1	Age, gender, and number of participants (time A), by research condition	104
Table 4.2	Decision to look further and additional browse time (seconds), by participant group	110
Table 4.3:	Types of follow-up engagement, by participant group	112
Table 5.1:	Selection of most and least interesting photos: proportions with ADG and EDG, by participant group	141
Table 5.2:	Number of participants who selected EDG or ADG for the most/least interesting photo, and percentage thereof who reported experiencing emotion.....	142
Table 5.3:	Median (range) imagery clarity rating for the participants who reported experiencing mental images: BPS N=39 (most interesting photo), N=36 (least interesting photo); sighted N=39 (most and least interesting photo).	143
Table 5.4:	Audio preferences (percentages) by participant group (BPS, sighted) at times A and B.....	144
Table 5.5:	Recall of details for ADG or EDG only, and no recall of photos, by participant group	147
Table 5.6:	Enjoyment ratings (median, range) at times A and B, where the maximum score is 7.....	149
Table 5.7:	Likely re-engagement scores at times A and B (median, range) for BPS and sighted participant groups, where maximum score=5 (definitely).....	150

Table 5.8: Details of further engagement for the BPS and sighted participants who engaged with the content between times A and B	151
--	-----

Acknowledgements

Firstly, I would like to thank my supervisory team. Thanks to Alison Eardley for her fantastic supervision throughout the duration of this research. I have valued and benefited from Alison's wide-ranging interdisciplinary knowledge, ability to make connections and to see things in new ways, not to mention her contagious enthusiasm, appetite for research and generous support and friendship. My thanks to Peter Ride for his comments on drafts of my thesis and for his insight and contribution to our group meetings. I would also like to thank VocalEyes, in particular Matthew Cock, CEO, for the support for this project and the resources provided, without which it simply would not have been possible. I have also appreciated and learnt much from the on-going discussions with Matthew Cock, Anna Fineman, and all the VocalEyes describers that I have been lucky enough to meet. The partnership with VocalEyes hugely enriched the experience of doing this research. Thank you to the Museum of London, particularly Frazer Swift, for supporting my work with the Henry Grant collections, for providing space for my studies and helping with participant recruitment, all of which was invaluable and made the research possible. Thanks also to the Thomas Pocklington Trust for funding Study 4, and to both Thomas Pocklington Trust and RNIB for their helpful support in participant recruitment as well as providing space for me to conduct my research at their offices. I would like to thank Louise Fryer, whose academic research and practice has been a constant source of inspiration throughout this work. It was hearing Louise speak about AD at the *Blind Creations* conference in 2015 that sparked my interest and it has been a privilege to discuss various aspects of AD with her ever since. Thanks also to Louise and to Lindsay Bywood for reading drafts of this work at various stages throughout the project. Thanks to Joselia Neves for her input on the sound enrichment. A special mention of thanks to Matt Rubery, QMUL, whose encouragement made all the difference when I was a Master's student heading back into Higher Education after a decade away. Without his support and encouragement, I would never have discovered this fascinating field of research, or applied for a PhD, and so I will be eternally grateful for that. A huge thanks to all the people who took part in my studies, without whom the research would not have been possible, and from whom I learnt a great deal. And last but not least, I would like to thank my family. My parents, who are still always happy to proofread my work, even a couple of decades after such duties usually finish! Thanks to Andrew, who has more than repaid my proofreading of his thesis with his support with mine, through help with many technical aspects, as well

as being prepared to discuss it all with me when something was on my mind. And finally, thanks to Amy and Ben, for their interest and encouragement, and for simply being themselves.

Author's Declaration

I declare that all the material contained in this thesis is my own work.

Signed

Date 17/07/2020

(Rachel Hutchinson)

Introduction to the thesis

The overarching research question of this thesis is as follows: *how might AD support access to an engaging museum experience for visitors with and without sight?* The chapters of the thesis present the findings from a series of studies, each of which has its own individual research question or questions, and all of which inform on the central question specified above. The methodological framework used to approach this question is an empirical one, meaning that the findings are based on data that come from direct observations and/or measurements of the experiences of research participants.

The research takes an interdisciplinary approach to the core research question, engaging with, and contributing to, three key disciplines: psychology, museum studies and audio-visual translation (AVT). Within psychology, memory theory and cognition provide a crucial theoretical grounding for this work. This research is concerned with people, their experiences of objects and artworks and their experiences of museum visits, and the lasting impact that these experiences may have. From that perspective, the theories and tools in psychology that allow us to measure attitudes and recall are fundamental to the thesis. The use of psychological research methods is also what underpins the empirical framework. The contribution that the thesis makes to psychology is that it expands our understanding of human memory and of the nature of lived experiences with regards to culture. In that sense, the contribution is in applying psychological tools and theories to questions of real-world cultural experience.

Within museum studies, and more specifically museum studies practice, the specific contribution of the thesis is in using theory and methods from cognitive psychology to develop our understanding of the assimilation of inclusive interpretation, and how it relates to the visitor experience. Cognitive psychology is concerned with understanding and measuring the ways in which people process information, involving perception, attention, language, thinking, consciousness and memory. It therefore provides an optimal theoretical framework from which to understand audiences and their experiences in museums.

In AVT, this thesis extends the current understanding of AD, as it presents the first empirical work on AD in museums. Furthermore, the work broadens the way AD is conceptualised. It does this firstly by considering it in the context of inclusive design,

and secondly by bringing in insight from other disciplines (museum studies, psychology) that relate to the theory and practical measurement of the user experience.

The individual chapters implement this multidisciplinary approach by reviewing literature from across the key disciplines discussed above (and others), according to the specific research question. Some historical perspectives are touched upon where relevant, but the chapters do not seek to trace the evolution of discourse in these fields, rather they aim to bring together multidisciplinary perspectives to build a research rationale.

Whilst the specific methods used vary in the individual chapters, I use a mixed methods approach grounded in the empirical tradition, using quantitative and qualitative methods with human participants. Mixed methods research collects, analyses and integrates both qualitative and quantitative data (Creswell and Plano Clark, 2011). The rationale for doing so is that it allows researchers to explore diverse perspectives and the design is appropriate for answering research questions that neither qualitative or quantitative methods could answer alone (Shorten & Smith, 2017).

The quantitative data broadly consist of information such as rating scales and objective measures, but also includes data such as observed frequencies that have originated from free text responses from participants (for example, counts of the occurrence of particular information given by them). This kind of quantification of free-text uses coding models based on existing theoretical understanding developed from previous empirical research. What all of these quantitative measures have in common is the possibility for statistical inference tests to be applied to the resulting data, and for conclusions to be drawn regarding the likelihood of the findings occurring due to chance, or alternatively due to differences in the samples of participants, or in the experimental conditions such as different types of AD presented. In that sense, the conclusions from the quantitative data from a sample can be extrapolated to wider populations.

The research also uses qualitative research methods. In some instances, thematic analysis is used, where it was appropriate to use analysis that was data rather than theory driven (Chapter 2). In other instances (Chapters 4 and 5), qualitative analysis took the form of analysing themes in free text responses from participants and observed frequencies of certain types of information (opinions, reactions). This analysis was driven by theoretical understanding from the research literature. The strength of this mixed methods approach lies in the combination of the quantitative and qualitative

measures, and what each brings to the other. The quantitative data provide us with a level of confidence that the apparent patterns in the data have been subjected to rigorous testing, and that wider conclusions can usefully be drawn. However, what brings colour and richness to these data is the insight derived from the qualitative data. Both are needed in conjunction to give us the best insight into what it means to facilitate a museum experience through inclusive AD.

Returning to the central research question of the thesis: *how might AD support access to an engaging museum experience for visitors with and without sight?* This is addressed through the contribution of a series of specific research questions that form the basis of the chapters. Within each of the chapters that present a study, the presentation of information follows the standard format of an empirical thesis, with an abstract, introduction, method, results and discussion.

Finally, it is important to situate this thesis in terms of its understanding of the definition of ‘museum.’ The boundaries of such definitions are recognised to be constantly changing, with significant differences around in the world and between cultural contexts in terms of the understanding of what a museum is (Brown & Mairesse, 2018). In 2017, the International Council of Museums (ICOM) started the process of reviewing and revising their definition of the museum, initiating symposia that discussed the issue and engaged over five hundred people. This activity led to the proposal of a new definition, which sparked international debate and was hotly contested. At the time of writing, the vote on the new definition had been postponed, and the previous definition temporarily reinstated (ICOM, 2020). Thus, definition is by no means a straight forward process.

Nevertheless, the ICOM review process revealed the social role of museums as a paramount concern (Brown & Mairesse, 2018). This thesis is concerned with the investigation of inclusive, engaging museum experiences. As such, the research is visitor-centric, and seeks to be in line with the increasing focus on social aspects of museology. The concept of the museum in this research, therefore, is not restricted to any specific type of institution, whether in terms of size, scope, collections, provision or any other aspect. Indeed, it could be argued that the research should be applicable to broader cultural and knowledge-based institutions such as historic houses, science centres and zoos. As such, the concept of ‘museum’ is broadly understood in accordance with the ICOM current definition, namely as an institution which ‘acquires,

conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purpose of education, study and enjoyment' (ICOM, 2020). However, it should also be broadened to include institutions that may have similar goals and objectives as museums, but which may not fit comfortably into all aspects of the above definition. Thus, the potential for AD to support access to engaging museum experiences can be considered in the context of any institution that deals with the communication of the 'heritage of humanity'; in short, all institutions that seek to engage their visitors and provide a memorable experience through the telling of their stories.

Chapter 1: Introduction: a place for audio description in an inclusive museum?

Abstract

This chapter sets out the rationale to address the overarching research question of this thesis: *how might AD support access to an engaging museum experience for visitors with and without sight?* In order to do this, it brings together relevant insight from the theory and research literatures of psychology, museum studies and AVT. It discusses these inter-disciplinary perspectives to examine how access and inclusion can be understood in the museum context. If ‘access’ is access to a museum experience, then understanding the nature of this experience is crucial. It is also fundamental to explore how can engagement be understood in the museum context, and what are the potential barriers to engagement may be. The chapter examines the role of museum interpretation in responding to the challenges raised by these barriers and introduces the academic field and practice of museum AD. The chapter goes on to explore reasons why AD may be of benefit to all museum visitors, not exclusively those who are blind or partially sighted for whom it was originally intended. It presents relevant theory from psychology that addresses cognition in museums: imagery, multisensory processing, and memorability, and sets out reasons why these aspects of cognition are of relevance to a broader understanding of the visitor experience and to an exploration of AD specifically. Finally, the chapter discusses autobiographical memory theory from psychology and its relevance to museums. It presents the rationale for using memory theory to develop measures addressing the impact of museum experiences facilitated through AD. The chapter concludes by presenting the structure of the thesis and the specific research questions posed by each of the subsequent chapters.

What is access?

In the late 18th century, museums for the general population developed as institutions where visitors came to look at artworks and objects in a reverential and authoritative environment (McClellan, 2008; Prior, 2003). In recent decades, a new understanding has developed amongst museum professionals and researchers about the function of museums in society, with the museum sector recognising the need to become more outward looking and audience focused (Sandell, 2003). Central to this new museology is the recognition that museums have the potential, and the ethical imperative, to become institutions that engender audience empowerment. At the individual level, this empowerment could take the form of increased creativity, enhanced self-esteem, confidence (Sandell, 2003) or wellbeing (Chatterjee & Noble, 2013; O'Brien, 2010). At the community level, this empowerment could take the form of social regeneration, enabling communities to grow in confidence and to take control over their lives and their environment (Sandell, 2003). Museums' social inclusion agendas also seek to drive change at the societal level, targeting positive change in areas such as poor health, high crime, low educational attainment and unemployment (Sandell, 2003).

However, what is essential to these ambitious aims for museums in the 21st century is access and inclusion. Without access and inclusion, individuals, communities and ultimately society will not be able to benefit from the progression that museums seek to make towards being audience-centric institutions. It is widely accepted that museums have an ethical as well as legal imperative to provide access and enable inclusion. The right to access, participate in and enjoy culture is a human right regardless of one's physical, sensory or cognitive ability, as formalised by Article 27 of the Universal declaration of Human Rights, 1948, and international legislation (e.g. American with Disabilities Act, 1990; UK, Equality Act, 2010). What is less clear is what access means in the museum context. To what exactly, must museums provide access, and how should they do it?

The expectation is that museums should be accessible to all visitors; intellectually, physically, socially, culturally and economically (Black, 2005). Access has traditionally focused on audience segments with sensory impairments, physical access needs such as wheelchair use, learning difficulties or conditions such as autism that may require careful management of the museum environment. One such access initiative is AD, which is provided for the use of BPS people in museums. AD is typically understood as

the provision of visual information in verbal language (Fryer, 2016; Synder, 2014), and thus framed, can be understood as a kind of physical access resource whereby the physicality of collections, i.e. the physical appearance of objects and artworks, is made accessible to BPS people. However, museums recognise that access can extend beyond the physical aspect, with museum research and practice focusing increasingly on the inclusion of diverse groups of visitors and non-visitors who may face various barriers (Dodd, Jocelyne & Sandell, 2001; Lang, Reeve, & Woollard, 2006; Leonard, 2010). If access means access to or inclusion in a broader experience of museum visiting, then what are the implications for an access initiative such as AD? If visitors are to have an equitable experience in the museum, then this necessarily requires a deeper understanding of what that experience is in order to provide that access. An examination of what is known about the museum experience is therefore pertinent to these questions, as is an exploration of how fields within cognitive psychology can illuminate both the nature of the experience, and approaches to its evaluation.

The museum experience

The museum experience, and in particular, sensory engagement with collections, has evolved and changed over time. The primacy of vision in relation to the other senses has also not been constant. Early collections, such as the wonder cabinets of the renaissance, were more about possession than display, and objects were not necessarily laid out for careful viewing (Greenblatt, 2018). Many people's encounters with these collections were entirely textual, rather than directly visual, as they relied on reading written reports about them, which were circulated as 'virtual equivalents' of the objects themselves (Greenblatt, 2018, p.29). Seventeenth- and eighteenth-century encounters with collections are also thought to have been characterised by sensory engagement beyond the visual, with it not being unusual for people to smell, taste and touch objects as well as look at them (Classen, 2017; Leahy, 2016; Levent & Pascual-Leone, 2014).

In the nineteenth century, the numbers of visitors to museums grew, and correspondingly so did concerns about damage to the collections (Classen, 2017). Touch was increasingly forbidden as part of a drive to subdue the behaviour of the 'masses' in the museum (Classen, 2017). Vision became privileged over the other senses, and observation and representation became key ways in which the world and its reality were understood and ordered (Macdonald, 1998). The foregrounding of visual access meant increasing focus on the display and arrangement of objects, with no

attention paid to the needs of individual visitors. Rather, they were treated as a mass, and expected to learn through visual access to collections, in a form of museum pedagogy which was one-way transmission: visitors would be led through a structured visual environment by which they could understand the museum's authoritative master narratives (Hooper-Greenhill, 2000). There was no consideration of individual visitor differences in the act of looking.

In the museology of the twentieth century, the act of looking and its relationship with art has been interrogated (Berger, 1972). The notion of looking as a neutral act that is the same for all visitors has given way to a constructivist understanding of looking as a 'reading' of collections which is highly contingent on the individual and their context (Hooper-Greenhill, 2000). In this sense, the emphasis in museums shifts from objects, as inherent holders of meaning, to visitors, as makers of meaning. Furthermore, for some museums and collections, the visuality of the object is relatively unimportant, and it is the story of how it came to be on display that can impact on the visitor. Greenblatt (2018) explains, for example, how the objects of the Jewish museum in Prague are unremarkable for their antiquity or their beauty, but their importance lies in their ability to provide access to people and memory. In this sense, aesthetic discrimination is not the point, and viewing takes second place to stories.

This recognition and questioning of the primacy of vision has led to a different understanding of visitors and their experience in the museum. It is now recognised that an authoritative model of museum pedagogy does not allow for individual interpretative processes (Hooper-Greenhill, 2000). Furthermore, exhibition design that does not specify specific audiences and seek to understand their needs may exclude visitors or make people feel inadequate (Hooper-Greenhill, 2000). It is no longer acceptable for museums to expect visitors to assimilate narratives purely through visual access (Hooper-Greenhill, 2000.) This has led to increasing focus on other forms of sensory engagement with many multisensory approaches in modern museums (Classen, 2017; Levent & Pascual-Leone, 2014). However, multisensory experiences are still the exception rather than the norm, and the majority of museums still rely on vision as the primary way for visitors to experience collections (Levent & Pascual-Leone, 2014). Although opportunities for multisensory engagement are not mainstream (Levent & Pascual-Leone, 2014), museology's understanding of sensory engagement in the museum has evolved, and looks set to continue to do so (Classen, 2017). Modern

interest in sensory engagement is also significant in that it foregrounds the visitor, their experience and their needs.

Understanding the broader nature of the museum experience is indeed central to the new museology and its focus on visitors, and has therefore been driving empirical research in Visitor Studies in recent decades (Chan, 2009; Chiappa, Andreu, & Gallarza, 2014; Dierking & Falk, 1992; Packer, 2008; Schorch, 2013; Soren, 2009). Pine & Gilmore's (2011) model of the experience economy provides a useful structure by which leisure experiences such as museum visits can be understood. The model sets out 4 realms of experience within the experience economy, namely education, entertainment, escapism and aesthetics. Empirical findings have demonstrated the relevance of this model to the museum experience, such as Radder & Han's (2015) study of data from visitors to South African heritage museums. This research confirmed the presence of three museum experience realms, 'edutainment' (education and entertainment combined), escapism and aesthetics. These three realms indicate the breadth and variety of the museum experience, with visitors coming to stimulate their curiosity, increase their knowledge, share social experiences with family and friends and have fun, interact with other visitors, have an unusual experience, situate themselves in another time or place, get away from sources of stress, and experience a pleasing physical environment (Radder & Han, 2015).

Consistent with this is the recognition in the wider research literature that museums are experiential products, in the sense that their *raison d'être* is to facilitate experience (Doering, 1999), and that people therefore visit museums for many reasons. Whilst some visitors may come in search of deep knowledge (Anderson, 2003) or to gain cultural capital (Prentice, 2001), many will view their time in museums primarily as a leisure activity (Doering, 1999; Foley & McPherson, 2010). Perceived benefits include escapism (Slater, 2007), having fun (Roppola, 2012) and achieving a sense of 'restoration' whereby they feel a sense of recovery from the stresses of everyday life (Packer, 2008).

Furthermore, 'learning' in museums is understood by researchers to be primarily experiential, with 'learning experiences' seen as valuable but hard to quantify, not least because they encompass the development of thinking skills as well as learning of 'facts' (Duke, 2010). Although learning in museums can be intentional, where people come in search of information, much 'learning' may be incidental: learning that just happens,

without too much awareness of it taking place (Kelly, 2002). Thus, models that inform on 'learning' in museums also inform on the nature of the experience. Falk & Dierking's contextual model of learning (Falk & Dierking, 2000) suggests that there are three main contexts to a visit that are dynamic and changing over time: the personal, sociocultural and physical contexts. The personal context indicates that learning will occur according to an individual's motivations and expectations, as well as their prior knowledge and experience (Falk & Dierking, 2000; Falk & Storksdieck, 2005). The sociocultural context emphasises the influence of interactions with others, and the physical context suggests that learning is a dialogue with the physical environment of the museum, with learning being contingent on how the visitor navigates and experiences the museum space (Falk & Dierking, 2000). All of these variables form part of the overall museum experience, and emphasise the experiential nature of 'learning'. Therefore, 'learning' in museums can range from 'highly complex conceptual understanding' to 'simple awareness of things' (Anderson, Storksdieck & Spock, 2007, p.198).

As museums become increasingly audience focused, this provides a corresponding opportunity for theory and methods from psychology to explore and understand behaviour and cognition in relation to the museum experience. One way in which researchers have explored the nature of the museum experience and its lasting impact is through examination of museum memories (Anderson, 2003; Anderson & Shimizu, 2007; Dierking & Falk, 1992; Falk, 2013; Falk & Dierking, 1990, 1997; Medved, Cupchik, & Oatley, 2004; Medved & Oatley, 2000). Whilst it is recognised that what someone remembers from a museum visit is not exactly the same as what is learnt during the visit, the relationship between memory and learning has driven interest in examining museum memories, and it has been argued that understanding what someone remembers from their visit is critical to understanding the entire museum visitor experience (Falk, 2013).

Museum memory studies have taken a variety of approaches from the disciplines of museum studies and cognitive psychology, drawing on both qualitative and quantitative methods. Quantitative methods are typically concerned with counting occurrences, volumes, or the size of the associations between variables, whereas qualitative research seeks to provide rich descriptive accounts of the phenomenon under investigation (Celo, Braakmann, & Benetka, 2008).

In the museum memory literature, there are a number of studies which have analysed the content of museum memories in order to examine which elements of a museum visit stay with the visitor over time (Anderson, 2003; Falk & Dierking, 1990, 1997; Medved & Oatley, 2000). Whilst the findings of these studies indicate what the long-term impact of a visit may be, there are various methodological limitations. Falk & Dierking's (1990) study, for example, presents findings of the content of visitor memories, such as social interactions, objects or exhibits viewed, aspects of the physical environment of the museums, emotion, and thoughts. However, this small, exploratory study with 12 museum professional participants, cannot, as recognised by the authors, present any generalisable findings, as the low participant numbers and the specificity of the sample mean the data cannot be meaningfully extrapolated to any wider population. Furthermore, the content elements were also determined by the researchers and directed the interviews, rather than allowing for free recall.

This was also the case in a study looking at the long-term impact of school trips by the same authors (Falk & Dierking, 1997), where interviews with pre-determined prompts were used to draw out recall of feelings experienced at the time, the physical context of the museum and social experiences (Falk & Dierking, 1997). Anderson's (2003) study also addresses content of memories, with interviews structured around pre-determined themes such as events, occurrences and happenings, memory for what was seen in displays, memories for details of the physical setting, social interactions, sensory experiences and emotions, visitors' recall of their agendas or socio-cultural identities at the time of visiting. Whilst these themes are more comprehensive in terms of understanding the breadth and details of the experience, the data were analysed qualitatively, thereby limiting a) the conclusions that could be drawn about the relative importance or weighting of these themes and b) the generalisability of the findings.

Research exploring 'learning' in a science centre (Medved & Oatley, 2000) considered the relationship between memories for information and concepts learnt in the museum (semantic memories) and memories for interactions with an exhibit (episodic memories). Semantic memory refers to our general knowledge about the world, and episodic memories are memories for specific events (Tulving, 1972). Findings showed episodic memories of exhibit interactions to be relatively stable, but semantic memories for information and concepts to be subject to deterioration over a month in one third of the sample, suggesting that the impact of 'learning' in visitor was highly variable over time (Medved & Oatley, 2000). Whilst this research shows evidence of impact in the

form of stable memories of exhibits, it did not consider other aspects of the museum experience, such as social interactions or recall of the environment in the form of sensory impressions.

Finally, Anderson & Shimizu, (2007) looked at long-term memories of an exhibition centre, and the behavioural and psychological factors that impacted on memory vividness, namely affect, agenda fulfilment and rehearsal, finding rehearsal (later discussion of the event with others) to be the most important. In this study, participant interviews captured a broad spectrum of details recalled about the experience, such as sensory information, emotions, events and thoughts. However, this detail was used to assign a vividness score in order to assess the richness of the memories, and the specific details of the content were then subsequently lost from the analysis.

Overall, this body of research therefore shows the potential for research methods and theory from cognitive psychology to work with insight from museum studies, in order to evaluate the nature and impact of the museum experience through analysis of memorability. However, there is a need for deeper and more consistent research (Eardley, Mineiro, Neves & Ride, 2016) at the intersection between these two disciplines, in order to fully exploit the application of memory theory to our understanding of the museum experience. Nonetheless, the existing literature opens up the question of what the museum experience may be, and how psychological evaluation of it can be developed. It also serves to emphasise that if access to a museum means inclusion in a cultural experience, with all the diverse aspects of experience that this implies, then this raises the question of what true access to the museum experience may be; whether it is being able to access information about the physical nature of collections (visual information), or whether it should seek to encompass emotional, social and cognitive engagement. On the premise that ‘access’ means access to an engaging experience, this chapter will now go on to examine the nature of engagement in museums.

What is engagement in the museum?

It has been suggested in the museum literature that engagement with art more broadly (Edmonds, Muller, & Connell, 2006) and in museums in particular (Taheri, Jafari, & O’Gorman, 2014) can be understood in multiple ways and resists straightforward definitions. Engagement with the arts has been discussed in the research literature as a state whereby visitors are engaged emotionally, cognitively and socially, enabling them

to make connections both within themselves and with the world (McCarthy, Ondaatje, Zakaras, & Brooks, 2004). The application of understanding from cognition allows for ways in which engagement can be characterised and measured.

Engagement requires a state of focused attention in the visitor (McCarthy et al, 2004; Sandell, 2003) and indeed the construct of attention is one aspect of cognitive psychology that can be usefully applied to a consideration of the nature of engagement. This is as applicable to museums as it is to the arts more widely. Firstly, the key aspects of attention are the fact that it can be captured, visitors can decide where to focus their attention (which also implies they may need support in knowing how to direct it), and that attention capacity is limited. It is crucial for museums to find ways to enable visitors to direct their attention in ways that are profitable to them, as otherwise, engagement and learning cannot follow (Bitgood, 2013). Furthermore, focused attention is believed to characterise the development of interest (Renninger & Hidi, 2015). Attention capture is required to trigger situational interest; in other words, when people are new to content, and they do not yet have an interest in it, attention must be captured in order for interest to develop. Although interest and engagement are distinct constructs, interest can lead to meaningful engagement (Renninger & Hidi, 2015). Attention and interest will therefore characterise engagement with a museum's collections and with specific exhibits.

However, engagement could also be considered in a broader sense in the museum context, in terms of enjoyment, or emotional involvement in the overall experience of visiting the museum. This is where taking a broad understanding of the museum experience is essential, as aesthetic, emotional, intellectual, or social stimulation may all contribute to a sense of engagement. This stimulation may stem from the exhibits themselves, be facilitated by the environment that the museum provides, or may simply form part of the experience that the visitor has that day. All of these scenarios can contribute to what we can usefully consider engagement. For museums, understanding the full spectrum of engagement can help to develop an understanding of how to help create rewarding experiences for their visitors. In this thesis, a working definition of engagement in the museum is that it can be understood as a cognitive and emotional response in the visitor, either in response to specific stimuli within the museum such as exhibits, objects or artworks, but also potentially in response to the wider context of the visit – in other words, the event of the visit and all of the emotional, cognitive and social aspects of which it may consist. However, it may not always be straightforward for

visitors to experience engagement within the museum. Multiple barriers can result in different levels of engagement amongst different visitors.

Barriers to engagement

Various access initiatives have been developed for people with specific sensory impairments and physical or learning needs, but it is well recognised that museums are a physically demanding environment for all visitors. Many museums are very large, with collections spread over multiple floors, they may be overcrowded, and therefore a difficult and tiring environment to navigate. These challenging environments have led to a research focus on the manifestation and causes of ‘museum fatigue’ (Bitgood, 2009; Petrelli, Not, Zancanaro & Finn, 1999).

Furthermore, museums typically present an array of visual stimuli which may overwhelm the visitor (Bitgood, 2013). This has led researchers to advocate reducing the number of exhibits that are visible at any one time, to encourage selection, and to urge a general ‘controlling of visual access’ in exhibition design (Bitgood, 2013, p.164). The overwhelming array of visual stimuli available in the museum tends to lead to what can be characterized as browsing behaviour, where people spend only a very short time in front of any one exhibit or artwork (Smith & Smith, 2001). Smith & Smith’s (2001) research in art museums has shown that, even where people have physically stopped at a work of art to look at it, the average time spent looking is only around 17 seconds. This suggests that for many visitors, a visit consists of many quick glances at artworks, rather than a lengthy contemplation of fewer pieces. The same authors recently repeated their study on viewing time, reporting a median view time of 21 seconds (Smith, Smith, & Tinio, 2017), again suggesting that visitors appear to ‘consume’ the works on display, rather than engaging deeply with them. Thus, it is possible for an artwork to capture attention, and for visitors to briefly focus attention, but for that attention to occur with minimal engagement.

Furthermore, differences between visitors influence how they direct their visual attention and therefore potentially the level of access that their vision gives them to collections. Eye tracking research, which tracks eye position and eye movement in response to a visual stimulus, has demonstrated different viewing patterns for art experts compared to novices who know very little about art (Koide, Kubo, Nishida, Shibata, & Ikeda, 2015; Vogt & Magnussen, 2007). Whereas the fixations of novices tend to centre on salient features, such as human faces, objects, or other recognisable features, visitors

with art expertise will spend less time on these features and more time examining structural or abstract features (Koide et al., 2015; Vogt & Magnussen, 2007). This indicates that there is diversity in how visitors are able to attend within the museum, according to their individual educational backgrounds and existing knowledge. This also implies diversity, therefore, in how well people will be able to access the museum and its collections.

Although multisensory museum exhibits are increasingly receiving attention in both research and professional contexts (Schorch, Walton, Priest, & Paradies, 2015; Levent & Pascual-Leone, 2014), the majority of museum interpretation, at least for permanent collections, is still typically delivered through written information in the form of gallery text or artwork labels (Whitehead, 2011) and accompanies the act of looking at a work of art. This reliance on vision is obviously a major barrier for visitors with low or no vision, but it may also be limiting for fully sighted people. If it is difficult for some visitors to know how or where to direct their visual attention, and how to gainfully prolong the time they spend engaging with an object or artwork, then this implies potential difficulties for engagement. If visitors are to have the level of cognitive, emotional and social engagement that many museums seek (Schorch, 2014), then they may require support in accessing this level of engagement, and hence in accessing a rich museum experience.

What is the role of museum interpretation in overcoming these barriers?

Museum interpretation seeks to communicate what curators consider to be significant information about the artwork, the artist, or the cultural context in which it was produced (Serota, 1996) and its function is to support engagement with collections by helping visitors connect to meanings (Gross & Zimmerman, 2010). Interpretation is already inherent in the process of selecting works or objects to be displayed, in how they are presented, and often takes the form of text-based resources such as labels or guided information. Whereas historically interpretation may primarily have consisted of scholarly displays, today, museums recognise that it should aim to invite audience participation and arouse curiosity (Gross & Zimmerman, 2010). Ultimately, it should link tangible objects (that can be perceived) to intangible meanings, and help people to learn new things or to confirm things they already think they know (Bitgood, 2013), as well as developing thoughts and ideas (Gross & Zimmerman, 2010). For visitors to focus attention, and for their interest to be triggered, museum need to make

interpretation available which provides the optimal environment for a state of engagement to occur.

The cognitive effort required to assimilate interpretation can, however, be significant, and exacerbated by the physical demands of the environment (Bitgood, 2009). For interpretation to facilitate the depth of processing that museums desire, its delivery must be carefully designed and managed, so that the effort required to focus attention is minimised and the rewards are great. In one study, for example, researchers found that dividing an interpretive label of 150 words into three short labels of 50 words each resulted in more than doubling the percentage of readers of the information (Bitgood & Patterson, 1993). One form of interpretation that does not expect visitors to rely entirely on vision is audio interpretation, in the form of audio guides. For visitors without specific access needs, audio guides are a potential form of interpretation, and are available in nearly all mid-size and large museums, either separately or built into the ticket price (Proctor & Tellis, 2003). For visitors who are blind or partially sighted, audio in the form of audio descriptive guides or AD delivered in a live tour is a crucial form of access.

Audio in museums: Audio Description

AD was introduced in the US in the 1980s, starting in theatre, for the purpose of translating visual elements into a verbal narrative for the benefit of BPS people. It has been in use in the UK since the late 1980s. The 1995 Disability Discrimination Act, since superseded by the Equality Act of 2010, has further formalised the growing industry of AD. The Equality Act of 2010 served to bring together a series of acts and regulations regarding anti-discrimination law and it now ensures that service providers, including museums, galleries and heritage sites, have a legal obligation to make 'reasonable adjustments' for people with disabilities. The notion that access is a right, rather than a privilege, has led to growth in the applications of AD and its use is now established in TV, cinema, theatre, museums, galleries, architectural and heritage sites as well as in live events such as the inauguration of President Obama and the Olympic Games. Delivery of AD depends on the situation. It may be delivered live by an audio describer sitting in a theatre booth, or through a live tour in a museum. Recorded AD can be inserted into gaps in a film's dialogue, or delivered in museums and galleries through headsets, in the same way as a traditional audio guide. In the UK, AD currently addresses the needs of a population of 360,000 people registered blind or partially

sighted (RNIB, 2017). Given the needs of an aging population, the applications and demand for AD seem set to increase.

In academic research, AD is a multidisciplinary field, although research to date is relatively limited in scope. AD research has typically been undertaken within translation studies and psychology, with activity also in museum studies, cultural studies, film studies, linguistics and disability studies. AD teaching in universities is usually situated in translation studies postgraduate programmes, as a component of AVT. This applies primarily to AD for screen (film and TV). Within translation studies, AD is regarded as a form of intersemiotic translation, which takes a nonverbal visual source text and translates it into a target text of spoken language (Jiménez Hurtado & Soler Gallego, 2015). As such, AD shares common ground with any standard inter-lingual translation, in that it cannot simply replace each visual element with a verbal one, but it must adhere to an internal logic in order to be a coherent text in its own right. In screen AD, issues of timing and coherence are primary (Braun, 2011), as AD must fit into the gaps between dialogue and sound effects. Screen AD research is also developing as an interdisciplinary field, with researchers working across AVT and cognitive psychology in order to explore the impact of AD variables on the user (Ramos, 2016; Fryer & Freeman, 2013; Fryer, Pring, & Freeman, 2013; Walczak & Fryer, 2017). Research has used the construct of ‘presence’ (feeling as though one is in the mediated environment) in order to examine the success of varying approaches in screen AD (Fryer & Freeman, 2013; Walczak & Fryer, 2017). Other studies spanning AVT and psychology have used physiological measures of emotion such as heart rate measurement in order to examine the effects of neutral or emotional language in AD (Ramos, 2016).

Museum AD forms only a peripheral element of university teaching, if it is included at all. In the museum context, formal training and teaching of AD practices is often situated within the museum itself, with external AD trainers brought in to train museum staff on how to write and deliver AD tours. This reflects the heavily practice-based nature of AD as a discipline. The number of studies on museum AD is correspondingly limited, and the studies that have been published are primarily from the discipline of AVT.

Research on museum AD to date has typically focused on translation related issues. These include questions such as how AD can approach the ambiguity of iconography in artworks (de Coster & Muehleis, 2007), or what the features of AD language may be,

when analysed through linguistic corpus analysis (Jiménez Hurtado & Soler Gallego, 2015, Perego, 2019). Questions have also been raised regarding whether museum AD is more usefully considered a process of transcreation, whereby an equivalent but yet new artform is created (Hutchinson & Eardley, 2018; Neves, 2012).

To date, the discipline of museum AD has not yet profited from collaborative and cross-disciplinary research from AVT and cognitive psychology in the way that screen research has done, and empirically driven reception studies in museum AD do not yet exist. Thus, no generalisable findings about the impact of AD on BPS museum visitors are currently available to guide its future development. Furthermore, questions regarding the level of access it should seek to provide, whether this should be physical access only or also emotional, cognitive and social access, remain as yet unanswered. Given the overall tradition of siting AD in a translation discipline, these questions stand to be complex and problematic, as in translation terms these various approaches would call into question the nature of the source ‘text’ (the object or artwork) and the function of the target text (the AD itself) – and then necessarily the relationship between the two.

The lack of empirical research on museum AD means that currently very little is known about how AD is received and assimilated by museum visitors. This applies to both AD delivered live in the museum or recorded AD, which is delivered via a device. It is recognised that the device, and indeed all aspects of it with which the visitor interacts, will have an impact on the user experience. In this sense, removing the content, i.e. the AD, and studying it in isolation, does not directly reflect the real-world experience of listening to AD within a museum. However, considering the lack of empirical understanding of museum AD, it was deemed critical to begin by isolating AD and its variables in order to develop a thorough understanding of the nature of AD itself, thus enabling the assessment of AD as inclusive design.

Audio in museums: Audio Guides

It has been claimed that almost every major and mid-sized art museum in the world has an audio guide for its permanent collection (Proctor & Tellis, 2003), and audio guides, alongside live tours, are arguably the main form of interpretation for visitors that does not rely on reading and vision. However, the research literature on audio guides consists of a relatively small number of predominantly qualitative studies, generally with low numbers of participants (e.g. Grinter & Woodruff, 2002) and there is correspondingly limited understanding about their wider impact on the visitor experience.

Conventional audio tours provide interpretation in the form of short bursts of information, typically 180 seconds per 'stop' (Aoki et al., 2002), and they have been shown to impact positively on visitor behaviour. One larger scale empirical study, using quantitative as well as qualitative methods, compared the behaviours of 42 students, half of whom visited the museum with an audio guide and half with no supplementary materials (Sung, Chang, Lee, & Yu, 2008). Observational data showed that the students with the guide stayed longer at exhibits and displayed more inquisitive behaviours than those without. Researchers have also observed that audio guides can help to draw attention to aspects of a display or setting that may otherwise go unnoticed, with one study observing that visitors crossed a large room to examine a detailed carving on a fireplace that was mentioned on the guide (Woodruff, Aoki, Hurst, & Szymanski, 2001). However, audio guides have also been subjected to various criticisms. They have traditionally required visitors to wear a headset, which some users find problematic, due to comfort and weight, (Grinter & Woodruff, 2002), and which can cause users to reject them quickly. The headsets are also said to impede the visitors' interaction with companions and with the museum environment (Aoki et al, 2002). This has historically led to concerns that audio tours can lock visitors into isolated experiential 'bubbles' (Aoki et al, 2002).

In short, audio guides can help visitors to engage in the museum, by helping to focus attention, but they have a fine balance to strike between three potentially competing elements; the information source, companions and the physical environment – the guide, the friend and the room (Woodruff et al., 2001). Commercial audio tours, according to researchers, have not yet been able to provide, simultaneously, individual content over audio control, the ability to converse with companions, and the ability to share content. Some innovative research projects have started to address this gap. One project developed audio that was played through speakers and could be shared between visitors, facilitating interaction, but it was recognised that this was problematic to use in a busy space (Woodruff et al., 2001). Further work has developed audio guides which employ technology that allows visitors to share audio with each other or to listen to their companion's audio, whilst listening with one earpiece only, permitting a sense of inclusion in the external environment (Aoki et al., 2002). The study from Aoki and colleagues (2002) observed companions engaging in more 'story-telling' behaviour, reporting more feelings of 'connection' and showing increased awareness of the room and its contents.

In summary, whilst audio guides are valued by museums and visitors as an educational resource and have responded to new innovations in digital and audio technologies, unanswered questions remain regarding their impact on the visitor experience. This is due to the relatively select number of studies, which have tended to undertake qualitative interviews with a small number of participants (e.g. Aoki et al., 2002; Grinter et al., 2002; Woodruff et al., 2001). Another potential issue with audio guides, yet to be addressed by empirical research, is the possible impact of the cognitive load placed upon users as they are required to attend to auditory information (what the guide is telling them) and visual information (what they see around them). Whilst audio guides may refer to prominent visual aspects of the work they are addressing, they do not systematically guide the user's eyes from one detail to the next. This means that they may actually divide attention and increase cognitive load by requiring the visitor to attend simultaneously to competing visual and auditory information. AD, in contrast, systematically describes visual information in order that a blind user may create mental images of the object in front of them. If a sighted visitor were to use AD, then it has the potential to guide their looking – meaning that whilst their eyes are looking at one aspect of a work, they are also simultaneously hearing auditory information about that same aspect (Eardley et al., 2017). That is one key difference between audio guides and AD in terms of the experience they could provide a sighted user.

Could AD benefit sighted visitors?

There are three key aspects of AD that could potentially benefit sighted users. Firstly, it could help visitors to select and focus their attention as a kind of 'guided looking' (Eardley et al., 2017). Secondly, the language and content used in its construction has particular features which may impact upon engagement. Thirdly, AD typically seeks to stimulate the listener's imagination through reference to all the senses (not just the visual).

'Guided looking:' When considering the potential benefits of AD for sighted people, AD becomes less about translation of the visual into the verbal, but rather a way of guiding visual attention, or providing 'guiding looking'. This is a process that we use instinctively in many situations where people need extra guidance on how or where to look; for example, when describing something during a phone conversation or when discussing a picture book with a child. In education, teachers or parents will describe in order to guide attention to details that may otherwise be missed; museum and gallery

staff will do likewise to encourage a visitor to stop longer at an artwork and to deepen their appreciation of it. In short, verbal description is something that we all do in everyday life.

As discussed above, museums present a myriad of visual stimuli leading to a potentially overwhelming visual environment and ‘browsing’ behaviour exhibited by visitors. AD, in contrast, could offer sighted visitors the opportunity to select fewer objects, and to focus their attention on them, potentially drawing their attention to visual information they might have missed, and offering a deeper level of engagement in terms of how they attend. AD could also use ‘guided looking’ as a way to support visitors in directing their vision, providing information to encourage fixations on features that might otherwise go unnoticed by the untrained eye, thereby mitigating against the differences in viewing observed between experts and non-experts in the eye-tracking literature which was discussed earlier. In short, AD could help visitors to attend differently in the museum, and for these different patterns of attention to facilitate greater engagement.

AD language and content: AD could potentially benefit all visitors through the style and content of the language it employs. AD practitioners are encouraged to use vivid and evocative language (RNIB, 2010). Investigations into the memorability of texts have found that content rated more highly by participants for emotion and imagery is better recalled (Sadoski, & Quast, 1990) and that emotional words are better remembered than neutral ones (Kensinger & Corkin, 2003). AD can also seek to stimulate curiosity through the use of narrative and thinking prompts which may encourage visitors to want to learn more; techniques which are advocated in the preparation of written interpretation material (Bitgood, 2013) and which have been suggested in AD (Neves, 2016). Curiosity has also been shown to enhance memory for novel information (Kang et al., 2009).

Multisensory information in AD: AD training courses run by AD organisations such as VocalEyes (UK) draw upon the expertise of practitioners to train museum staff in how to develop AD for their visitors. One technique that is frequently taught is the use of multisensory information in AD, with the aim of providing a kind of sensory stimulation that does not just rely on the visual sense. For example, when describing an image of a fire, an audio describer may talk about the smell of the smoke (olfactory information), the crackle and hiss of the flames (auditory information), rather than exclusively describing the colour of the fire and the light that it emits (visual

information) (VocalEyes training, 2016). Such techniques create imagery in the mind of the listener, which is important, as this provides a richer experience (engaging multiple senses), and can lead to better recall of the experience later (Eardley & Pring, 2006). Furthermore, some researchers and practitioners have started to experiment with enriching AD with other perceptual stimuli, such as sound (Eardley et al., 2017; Neves, 2012). Theory from cognitive psychology can usefully be applied to these questions and speculations about the benefits of AD for sighted visitors.

Cognition in the museum: imagery, multisensory processing, and memorability

What is imagery? Mental imagery is quasi-perceptual experience, which resembles perceptual experience but takes place without the external stimuli (Cattaneo et al., 2008; Kosslyn, Behrmann, & Jeannerod, 1995). Memories themselves are formed of highly detailed sensory-perceptual information, much of which is held in the form of images (Conway, 2001; Conway & Pleydell-Pearce, 2000) and indeed research has shown that imagery is a general predictor of memory specificity (Williams, Healy, & Ellis, 1999). Imagery is often predominately understood in everyday life as visual, with references to seeing ‘with the mind’s eye’; and in research, the emphasis on the relationship between imagery and memory has been on visual imagery (Brewer, 1986). However, imagery occurs across modalities (Eardley & Pring, 2014; McNorgan, 2012; Richardson, 1969), for example as auditory imagery (such as ‘hearing’ a piece of music in one’s own mind), tactile imagery (imagining the feel of something) or olfactory imagery (imagining the smell of something).

Imagery from other, non-visual, modalities has also been shown to be important for memory retrieval (Eardley & Pring, 2006). This is particularly pertinent to congenitally blind people, who have never experienced visual imagery. If imagery were predominately visual, then they would be disadvantaged in forming memories. Eardley & Pring’s (2006) study with sighted and congenitally blind people demonstrated that this is not the case. This study sought to establish to what extent cross modality imagery was able to evoke autobiographical memories. Autobiographical memories are memories for personally experienced events, and they relate to one’s sense of oneself in space, time, society and culture (Conway & Pleydell-Pearce, 2000). They can be specific memories (for specific events, ‘the day I...’) or general memories, (for general, often repeated events: ‘when I used to...’). This study’s interest was in the potential for

imagery to generate specific memories through the use of high-imagery cue words across the visual, auditory and tactile modalities. Results indicated that cue words in the visual and nonvisual sensory modalities all facilitated the generation of memories; generating more specific memories, and doing so more quickly, compared to the low imagery abstract cue words, which generated fewer memories in both the blind and sighted groups (Eardley & Pring, 2006). The effect of the imagery itself in memory retrieval could be isolated from an alternative theory of enhanced verbal processing in congenitally blind people, as no correlations were found between verbal ability and memory retrieval in either the blind or the sighted group. Therefore, imagery from nonvisual sensory modalities was shown to have generated memories in participants, regardless of their level of vision.

This has important implications with regards to all kinds of audio interpretation, as the aim is that such interpretation will stimulate the user's imagination through generating imagery. It is particularly important in AD, as AD uses imagery that stimulates multiple senses in its language to help BPS people form a mental impression of the object being described. This multi modal imagery is also potentially important to sighted users of AD, and could increase the long-term impact of the experience, as suggested by theories of multisensory processing.

Multisensory processing: The environment in which we live and learn is multisensory. Humans perceive their environment through multiple sensory modalities and integrate the information in order to make the most efficient and beneficial decisions. Historically, sensory modalities were thought to function independently and separately, with specific brain regions being dedicated to vision, audition etc, but these theories on the modularity of perception are increasingly being revised e.g. (Shimojo & Shams, 2001). Over the last 20 years, researchers have confirmed that multisensory processing occurs both in higher order brain regions, but also in primary perceptual cortices (Ghazanfar et al., 2006). Researchers now question whether any brain region can be fully and exclusively characterized through its interaction with any single modality (Ghazanfar et al., 2006). Further evidence for this is provided by studies on plasticity in development, where impairment or disruption may cause particular 'unisensory' brain regions to respond to alternative modalities: the auditory cortex being driven by visual inputs, for example (Shams & Seitz, 2008). Research has shown that blind people, with both congenital and later acquired blindness, may undergo a massive functional cortical reorganisation, with visual cortex being activated by inputs from other sensory

modalities, for a review see Cattaneo et al. (2008). On a very simple level, even when information is held distinctly within one sensory modality, it can be applied in another. For example, we can know a shape by touch and subsequently identify it by sight (Levent & Pascual-Leone, 2014).

Research has explored the impact on perceptual processing of presenting information in multiple sensory modalities, as opposed to in a single sensory modality, for example Laurienti, Burdette, Maldjian, & Wallace (2006). This study investigated whether multisensory presentation of stimuli would speed up perceptual processing time and improve accuracy in a discrimination task, in both younger and older adults. In this study, participants were asked to press a button indicating either 'blue' or 'red' in response to the stimuli shown. The stimuli were either unisensory, that is, entirely visual (a red or blue circle) or entirely auditory (the word red or blue verbalised); or multisensory (the circle and the verbalised word presented simultaneously). Multisensory presentation resulted in faster perceptual processing for both groups of participants. However, response times in older adults were improved in the multisensory condition to the extent that their performance was then equal to that of younger adults in the visual condition, which was the faster of the two unisensory conditions (visual and auditory). The findings for older adults have particular implications for the development of multisensory cues to reduce performance gaps between younger and older people.

Multisensory Stimuli and Memorability: The act of remembering involves reconstructing a memory of an event from the representations of its initial encoding (Rissman & Wagner, 2012). Retrieval can be spontaneous, whereby it is triggered, for example, by sensory-perceptual information related to the original event, e.g. smelling a particular smell (Conway & Pleydell-Pearce, 2000). Alternatively, it can follow from top-down conscious search processes ('when was the last time I...'); where the individual is in intentional retrieval mode (Conway & Pleydell-Pearce, 2000). When the perceptual stimuli that make up a representation are presented together, neural connectivity creates new associations that may facilitate future recall. In other words, stimuli that 'fire together, wire together' (Ward, 2014). Evidence shows that multisensory experience facilitates later retrieval of events (Gottfried, Smith, Rugg, & Dolan, 2004; Lehmann & Murray, 2005; Nyberg, Habib, McIntosh, & Tulving, 2000); which has important implications for learning. Research using fMRI demonstrates that multimodal stimulus combinations are neurally represented in the brain and become activated collectively even when the later stimulus is unimodal (von Kriegstein &

Giraud, 2006). This indicates that multimodal information facilitates the decoding of information from a single modality, which might in itself be insufficient for optimal retrieval (von Kriegstein & Giraud, 2006).

This has been demonstrated across modalities. Gottfried et al (2004) asked participants to form associations or 'stories' between objects and odours. They then observed neural activity with fMRI when participants were later asked to identify the objects as either old (seen before) or new. No odour stimuli were delivered during the retrieval task, but primary olfactory (piriform) cortex was activated when old objects were successfully identified, that is, the objects previously presented with an accompanying odour stimulus. These findings supported the hypothesis that multiple traces increase the probability of later retrieval by partial or incomplete cues, giving the memory system greater flexibility (Gottfried et al., 2004).

Similarly, the same benefits of cross modal learning have been observed in an auditory-visual task (Nyberg et al., 2000). Participants were presented with either visual words only, or visually presented words paired with an auditory stimulus. Activation was observed in auditory cortex at retrieval, even though only visual cues were given with no accompanying auditory stimulus. Additionally, word recognition was stronger when meaningful word-sound pairs were given. Therefore, research on multisensory learning demonstrates benefits at later recall, even when the presentation of a later stimulus is unimodal (Gottfried et al., 2004; Kim, Seitz, & Shams, 2008; Lehmann & Murray, 2005; Nyberg et al., 2000; von Kriegstein & Giraud, 2006). Later cues may reactivate similar cortical areas that were engaged during the encoding of the original event.

The benefits of multisensory stimuli may be contingent to some degree on the level of congruency between them, (e.g. Kim et al., 2008; von Kriegstein & Giraud, 2006). The greater the congruency, the greater the multisensory gain and therefore the potential improvement in learning. Lehmann & Murray (2005) presented participants with visual and auditory stimuli that were either congruent (e.g. image of dog and dog barking) or incongruent (image of dog and bell ringing). They hypothesized that multisensory performance gains would be greater with the congruent presentations, with results confirming that the images that had been presented initially with semantically congruent sounds resulted in greater discrimination accuracy later. When pairs were semantically incongruent, it was thought that the visual stimulus activated one object representation

and the auditory stimulus activated a different object representation, which resulted in inferior performance at recall (Lehmann & Murray, 2005).

A study by Kim et al. (2008) also investigated congruency in multisensory gains. Their participants were presented with a visual stimulus of an array of moving dots which were viewed with either no auditory stimulus present, or with congruent auditory stimulus (sound moving in the same direction as the dots) or incongruent auditory stimulus (moving in a different direction.) After presentation of a sequence with two intervals, the group trained with congruent auditory-visual stimuli showed faster learning over the training sessions, providing evidence for the benefits of multisensory learning. The study sought to assess the possibility that increased attention due to the presence of sound itself might account for improved learning. However, in this instance, incongruent sound should improve performance as well as congruent sound, and this was not the case. The research on congruency in multisensory processing therefore has important implications for museums wishing to maximise the opportunities of multisensory learning, as it appears likely that congruent multisensory stimuli would be optimal in order to maximise later recall.

Multisensory processing and learning in museums: It has been widely recognised that research on multisensory processing has important implications for learning (Dede, Salzman, Loftin, & Sprague, 1999; Kátaí, Juhász, & Adorjáni, 2008), and indeed there is a long history and broad acceptance of the value of multisensory approaches in education (Department for Education, 2010; Reynolds, Vannest, Fletcher-Janzen, 2013). It appears likely that restricting stimuli to one modality only (e.g. text labels in a museum which employs only the visual sense) may represent a missed opportunity for learning for all museum visitors. Unisensory learning may simply be suboptimal (Shams & Seitz, 2008).

Through utilising multisensory cues, museums may therefore improve the assimilation and subsequent recall of exhibitions in their visitors, with particular gains for older visitors; an important demographic in museum visitors, with a particular increase in some visitor segments such as grandparents with children (Beaumont & Sterry, 2005). A perceptual experience, such as smelling a particular smell, or hearing a particular sound, might trigger reactivation of a representation that in turn cues reactivation of other information (emotional, contextual) thus triggering the reconstruction of a memory.

Anecdotal evidence in museum research serves to illustrate these theories, with participants reporting memories linked to sensory representations such as the following: ‘the room was very dark and smelled strongly like a doctor’s office or hospital’ (visual and olfactory imagery), ‘I went with my family to the Museum of Science and Industry – a very large building of classical architecture; style with columns, many steps and large doors’ (spatial and visual imagery), ‘mainly I remember the cafeteria...I remember the waterfall. I had to sit facing it. I loved the colours of the cafeteria – green and black with spots of gold light’ (spatial and visual imagery) (Falk & Dierking, 1990, p.98). As these basic examples serve to demonstrate, if representations are stored across multiple sensory modalities (for example, perceptual traces of what was heard, smelt, touched, seen) then this creates more possibilities for reactivation and subsequent retrieval upon encountering the appropriate cues. However, as the examples discussed above indicate (Gottfried et al., 2004; Nyberg et al., 2000), it is essential to consider the role of non-visual imagery as well as visual imagery, especially in an inclusive museum environment which aims to offer experiences and opportunities for those with varying sensory abilities. The nature of the multisensory stimuli in museums should also be carefully considered with regards to the provision of congruent information.

In summary, psychological research on imagery, multisensory processing and its benefits for memorability all build the case to support the notion that AD could enhance the experience for all visitors, by increasing memorability and hence the lasting impact. In people who are blind and partially sighted, AD is a crucial form of access which uses rich, evocative language and sensory imagery to help visitors form mental impressions of collections. If AD were to be enriched with additional, perceptual stimuli such as extra sound, then this would provide a further layer of sensory enrichment for blind people. For sighted people, congruence is an important concept in the potential benefits of AD. As previously stated, in an AD facilitated experience, information would be delivered aurally as the sighted visitors’ eyes are being guided around the image. For example, as the AD draws attention to a particular visual feature, the visitor is hearing information about that feature. The congruent nature of AD presentation could therefore aid memorability, and this may offer an advantage over traditional audio guides where the visual and the auditory information are potentially competing rather than congruent. Perceptual enrichment, especially if congruent (e.g. sound of water to accompany an image of a lake), could enrich this further for sighted listeners also. Therefore, the body of research on multisensory processing and memorability in psychology adds weight to

observations and suggestions by practitioners that AD could benefit sighted as well as blind users (Synder, 2014). If this is indeed the case, then AD would have potential as an inclusive form of museum interpretation.

It is important to contextualise this in broader notions of accessibility, which has been conceptualised as universal or inclusive design, amongst others. There is as yet little or no consensus regarding these definitions and how they are distinct from one another (Persson, Åhman, Yngling, & Gulliksen, 2015), meaning it is important to state a working definition for this thesis.

Universal Design is generally defined as the concept of designing products and environments to meet people's needs, regardless of their age, ability or status in life (Persson et al., 2015) and the term has been used with reference to museum interpretation for blind visitors, in Art Beyond Sight's training materials (Art Beyond Sight, 2014). The concept of universal design is generally understood to have developed from architecture and the built environment (OCAD University, 2019; Persson et al., 2015).

Inclusive design, however, has developed from the digital realm (OCAD University, 2019), where multiple and flexible entry points into a product are often possible, allowing for the multifaceted nature of human beings. Inclusive design therefore refers to design that considers the full range of human diversity (OCAD University, 2019), however it recognises that it is not always possible to design one product to meet the needs of all (Cambridge University, 2019, OCAD University, 2019). Furthermore, whereas universal design describes the qualities of a final design, inclusive design focuses on the process behind a design, with strong emphasis on the consultation of excluded communities (Holmes, 2019). The Design Council in the UK has thus defined it as a process of breaking down barriers and exclusion that will often achieve superior solutions, that may benefit everyone (Fletcher, 2006).

AD, both as access and as a potentially inclusive form of museum interpretation, cannot seek to meet the needs of all visitors (for example, d/Deaf communities, or visitors who find language processing difficult.) It therefore seems appropriate, for the purposes of this research, to discuss the potential of AD as Inclusive Design, due to the possibility that a) AD when viewed as inclusive design may help to reduce the exclusion of BPS people in museums, b) the growing recognition in AD that reception studies are essential, thereby emphasising the contribution of user diversity to design of resources

and c) its potential to improve the user experience for a broader range of people. Exploring this possibility through empirical research is the central purpose of this thesis. This chapter will now go on to examine how the impact of an experience facilitated through AD, and a museum experience more broadly, can be measured and evaluated. This requires a deeper examination of memorability research in psychology, and specifically autobiographical memory.

How can the museum experience, including AD facilitated experiences, be evaluated?

This chapter has explored the nature of engagement in museums, and described how access to a museum experience, and to engagement, needs to consider not only physical access but also emotional, cognitive and social access. In order to understand how well access is being achieved, it is fundamental to seek out ways of evaluating the museum experience and levels of engagement. It is also important to develop measures that are generalisable beyond the sample of people within any given study, in order to be able to draw broader conclusions about the findings and to be able to provide robust recommendations to museums. Furthermore, this endeavour requires a set of measures that address the emotional, cognitive and social access needed to engage in the museum as well as the physical access.

The museum memory research examined above differentiates between different types of memories, such as memories for facts and information compared to memories for personally experienced events (Medved & Oatley, 2000). This can be developed further by drawing on memory theory in psychology, which allows us to examine the full content of that experience and of levels of engagement – encompassing not only recall of information, but sensory impressions, emotions, thoughts, social interactions, and establishing connections to oneself or others. Autobiographical memory theory in psychology gives us a framework from which to develop a set of evaluation measures to address the full access picture.

Introduction to autobiographical memory, its functions, and importance to museums

Autobiographical memories are personal records of our lived experience that are constructed and reconstructed throughout the life span, and which are fundamental to our sense of self and identity (Bluck, 2017; Conway, 2005; Kihlstrom, 2009).

Autobiographical memories are central to our everyday functioning, as they form the bedrock of our concept of self (Bluck, 2017; Bluck & Liao, 2013; Conway, 2005), our social interactions (Alea & Bluck, 2003) and our future thinking (Bluck, 2017).

The interdependence of self and memory has been described in the research literature where the self, or ‘working self’, is conceptualised as fluid and responsive to knowledge that one has about oneself (Conway & Pleydell-Pearce, 2000). Thus, autobiographical knowledge (knowledge about oneself) governs what the self can be in the present moment or in the future, and the working self in turn modulates access to autobiographical knowledge, suppressing or promoting memories that present as (in)compatible with the goals of the working self. In this way, memories help to both construct and moderate our sense of who we are in the world.

Similarly, autobiographical memories form the basis of our social relationships and an essential function of memory is to serve interpersonal communication (Cohen & Conway, 2007). We draw upon autobiographical memories in order to conduct our day-to-day conversations and interactions, to share experiences with others, and to be able to mentally ‘transfer’ ourselves to another’s context (Cohen & Conway, 2007).

Autobiographical memory is therefore fundamental to human relationships and to the ability to connect with others through social sharing and empathy. Research investigating participants’ reported uses of autobiographical memories found that the sharing of experiences with others, describing oneself to others and the sharing of information and advice were the most frequently reported uses (Hyman & Faries, 1992).

Underlying both the social and identity forming functions of autobiographical memory is its directive function. Autobiographical memories of past events will influence and guide current and future behaviour (Cohen & Conway, 2007) and are fundamental to our ability to imagine ourselves in a different time or context (Conway & Loveday, 2015). We therefore draw upon our autobiographical memories to understand our own identity, to interact with others around us, and to project ourselves into an imagined future when forming plans. Thus, personal autobiographical remembering is positive for human understanding and action (Bluck, 2017).

The importance of autobiographical memories for museums is manifold. Museums seek to present narratives of the past (or present) to members of the public. Indeed, it has been argued that a primary function of museums is to address the ethical imperative to remember, from the perspective of preventing future repetitions of violent or traumatic

histories (Arnold-de Simine, 2013). Curatorial practices therefore seek to create museum environments which bring visitors face to face with the memories of others past and present, and which thereby promote empathy and understanding (Arnold-de Simine, 2013.). In this sense, museums tell stories (Bedford, 2001) much as works of literature, film, theatre or music may do, and they have the ability to promote cultural transmission – passing stories on from the past into the present, or from one group of people to another. These stories, in turn, will enter the array of environmental and cultural stimuli that contribute to socially constructed schema and thereby act upon visitors' sense of identity. Museum research and practice thus recognises that museums have a role to play in various aspects of a visitor's identity (Falk, 2006, 2013, 2016). Furthermore, museums are recognised as being a place for social sharing and interaction, and museums actively seek to promote such interaction. In summary, memories are particularly important in a cultural environment like a museum, which seeks to preserve memories, and to create new memories for their visitors.

This thesis argues that the content of autobiographical memories is also key to understanding the impact of a museum experience, and the level of engagement with it. The content of these memories consists of multiple types of information. Firstly, autobiographical memories are always contextualised spatially and temporally (Conway & Pleydell-Pearce, 2000). This means that they are memories for specific events that took place in a particular location and are situated within the rememberer's sense of their own autobiographical chronology (when I was a child, last Tuesday, etc). Autobiographical memories are nearly always contextualised by information from the autobiographical knowledge base (Conway & Pleydell-Pearce, 2000), such as particular life-time periods (when I was at school, when I lived in X). This may be combined with semantic memory (knowledge about the world), personal semantic memory (knowledge about oneself) and episodic memories (memories for specific events). They are often rich with information from across sensory modalities (Brewer, 1986, Rubin, 2005, Greenberg & Knowlton, 2014, Conway, 2005, Eardley & Pring, 2006) and emotion (Holland & Kensinger, 2010) which theorists have termed SPAC: 'sensory-perceptual-affective processing' (Conway, 2009). These elements of sensory imagery and emotion are considered to be 'experience-near' and can lead to a sense of re-living or re-experiencing past events during the process of remembering (Conway, 2001).

Thus, autobiographical memories may combine general elements such as knowledge about oneself with very specific elements of the original event, such as imagery (what

was seen or heard) or what was felt at the time. The way that these elements will be brought together and the memory thus reconstructed will be contingent on rememberer's current concept of selfhood. The content of autobiographical memories therefore holds great potential for evaluation of the museum experience, and of also the aspects of engagement (physical, cognitive, social, emotional) that encompass access to the museum experience.

By asking people what they recall about a museum experience, we can examine several aspects of that experience. Firstly, we can explore how rich their recall may be in terms of semantic information recalled, in sensory-perceptual traces of things seen, heard, touched, smelt or tasted, or in specific details of events that happened during the experience. Secondly, we can examine to what extent their memory of the museum event has been contextualised by information about themselves, which would indicate that the experience has enabled them to form a sense of connection with what they experienced in the museum. Thirdly, we can examine memories for evidence of engagement and impact such as emotion, or higher-level cognitive processing in the form of thoughts and reflections about the experience. Finally, we can evaluate the presence of other information that indicates engagement such as social interactions with friends, family or other visitors. In summary, analysis of autobiographical memories of museum experiences can allow us to gain a broad and detailed picture of the extent to which visitors have been able to access and engage with the museum and its collections. Furthermore, the use of empirical methodologies with inference statistics means that conclusions can be generalised to wider populations.

Memorability measures can also be used to evaluate one component of what may be a broader memory representation of an overall experience; such as recall of a specific event within a museum visit. Different types of 'learning' may take place within a visit, such as incidental learning (what happens to be recalled) or intentional learning (i.e., what is encoded in response to instructions (Wagnon, Wehrmann, Klöppel, & Peter, 2019). The current research is interested in learning that takes place within a museum experience. For example, by allowing people to experience an exhibit, without any instructions, and then later asking them what they may recall about it, we gain insight into what people happen to remember in the context of everyday memory (Cohen & Conway, 2007). In such instances, 'learning' may not be intentional, but may be incidental to the experience. Learning in museums may of course be intentional in situations where a visitor has come in search of information or has been asked explicitly

to find and remember facts and information (such as a school visit.) Memorability measures may reveal evidence of incidental or intentional learning having taken place. Such measures arguably have relevance and ecological validity in terms of museum settings where learning is in a free choice environment.

Memories for a particular exhibit may also form part of a memory for an experience of a visit, which may be an autobiographical memory, if the episodic information has been integrated with knowledge about the self. Memorability measures, therefore, facilitate evaluation of both episodes (specific events in museums, such as seeing a particular artwork) and broader experiences (the overall event of a visit); with the potential to reveal evidence of learning and other forms of cognitive and emotional engagement. Such measures also allow for generalisation from samples to wider populations, thus responding to the challenge of expanding the unit of analysis beyond individuals, as discussed in the museum literature (Anderson et al., 2007)

Summary

This chapter demonstrated that a broad view of museum access should be taken, in view of the fact that many visitors may be primarily motivated by having an engaging experience at the museum. Access therefore needs to encompass the social, cognitive and emotional aspects of this experience, as well as physical access to collections. In order for visitors to have an enriching museum experience, engagement needs to occur. Understanding of levels of engagement can be developed through evaluation of aspects such as attention and interest, as well as enjoyment or emotional involvement. However, there are barriers to engagement, as suggested by the research literature. Most museums still typically rely on visitors looking at an object or artwork, with interpretation provided in the form of written labels. However, visitors may not know how to fully engage with a work just through the act of looking, whether or not they have sight. Visitors may also spend very little time at any one exhibit, suggesting that engagement can be minimal. Audio interpretation may enhance engagement through encouraging visitors to spend longer at exhibits. AD may offer an advantage to sighted users over traditional audio guides due to its ability to guide and prolong visual attention, as well as engaging the listener through multisensory imagery or perceptual enrichment. This therefore suggests its potential as a tool for inclusive design. Evaluation through memorability could provide valuable understanding about the nature of visitors' cognitive, emotional and learning experiences in museums and what the lasting impact

of those experiences may be. This may take the form of evaluating museum experiences through autobiographical memories, or specific experiences facilitated through AD, whereby episodic memory for a specific event is being explored. This research seeks to evaluate the impact of experiences: impact being defined here as the lasting memories of an experience, with evidence of cognitive or emotional engagement.

The structure of this thesis

Chapter 2: Understanding museum AD: current practices, regional differences and implications

This chapter is in two parts. The first part presents the findings of a survey with museum audio describers (Study 1) and addresses the question: *what experience is museum AD trying to facilitate and how can it do it?* The contents of the first half of this chapter form the basis of an article recently accepted by the *Journal of Visual Impairment and Blindness (JVIB)*. The second half of the chapter considers some of the debates raised by the results of the survey, and explores these in the context of AD's 'home discipline' of AVT. This part forms the basis of an article published in 2018 in *Perspectives: Studies in Translation Theory and Practice* (please see page ii). This first study reveals a spectrum of opinion regarding what AD is aiming to achieve in museums – whether it aspires to be an objective visual-verbal 'translation', or whether it should 'recreate' works and collections to provide a rich experience.

Chapter 3: Autobiographical memories of museum visits: using autobiographical memory theory to explore museum experiences and their lasting impact

This chapter presents a coding model for evaluation of museum memories, drawn from autobiographical memory theory. It presents the results of analysis of museum memories from 80 participants (Study 2), and discusses the types and content of autobiographical memories, their distribution across the life span, and the implications for our understanding of memories for cultural experience. The chapter seeks to explore the nature of the museum experience and the application of autobiographical memory theory as a tool for evaluation. It is therefore addressing the question: *how can the museum experience can be understood and measured?* An article based on the content of this chapter has recently been submitted for consideration by *Memory*.

Chapter 4: ‘Guided looking’: supporting visual exploration of artworks with audio description

This chapter presents results from an experiment exploring the use of AD by sighted people (Study 3). This study was conducted with 150 sighted participants and it considers the experience of, engagement with and memorability for a photography exhibition presented with either AD, a standard audio guide, or no audio. It investigates whether AD can facilitate a different kind of experience in sighted people, and if so, what benefits this may have. The research question of this chapter is: *does AD have an impact on the experience and engagement of sighted people, and on the lasting impact of the experience?*

Chapter 5: The impact of enriched audio description on the exploration of Henry Grant photography, in people with and without sight

This chapter builds on the findings of Chapter 4 by enriching the AD with perceptual stimuli. It compares sound enriched AD to standard AD, and examined the impact on the experience, engagement and memorability of 40 blind and 40 sighted people. Its research question: *would sound enrichment of AD have engagement and memorability advantages in the context of inclusive design?* It thereby explores what constitutes optimal AD for an inclusive audience.

Chapter 6: Revisiting inclusive experiences facilitated through Audio Description

This chapter draws together the research findings to re-evaluate the core research question: *how might AD support access to an engaging museum experience for visitors with and without sight?* It discusses implications of the thesis and avenues for future research.

Chapter 2: Understanding museum AD: current practices, regional differences and implications

Abstract

An exploration of the potential of museum AD as a tool for inclusive design needs to start with an understanding of current practices within museum AD, which is currently under researched. This chapter therefore addresses how museum AD is currently understood and provided around the world in order to explore how concepts of museum AD may support a broad notion of access as access to an engaging experience. The chapter is divided into two parts. Part A reviews the current guidelines for museum describers. It then presents the findings from a survey of international museum AD practitioners, examining practitioner perspectives on museum AD, in order to better understand the ways in which museum AD is used to enhance access. It explores regional differences (Europe, US) in AD traditions, focusing on imagery, meaning, emotion and degrees of objectivity. These findings demonstrate that European describers have higher agreement with the use of interpretation in AD than US describers. Part B undertakes a theoretical exploration of the debates and questions raised by the survey, including the principle of objectivity, in the context of AD's 'home discipline' of translation studies. It draws on what can be learnt from the AD screen literature and translation theory more widely, in order to explore the objectivity principle in the museum context.

Part A: Towards an understanding of international museum audio description practices: practitioner perspectives

Introduction

In order for museums to fulfil their obligations under the Equality Act (2010), they must make ‘reasonable adjustments’ in order to offer accessible services. However, despite the importance of AD as an access tool, an audit within the UK showed that only 5% of museum websites mentioned live AD tours and only 3% of museum websites mentioned recorded AD guides (Cock et al., 2018). Whereas screen AD is fully regulated by guidelines (Fryer, 2016) and the research literature is comparatively more developed, museum AD is a relatively niche segment of the overall AD provision. It has not yet been professionally developed to the same extent as screen AD. Despite the complexity of the museum experience, only a small number of international AD guidelines provide any museum-specific AD advice. European guidelines that address museums come from the pan-European ADLAB project (Remael, Reviere & Vercauteren, 2014) and the Spanish Standard UNE (RNIB, 2010). From the United States, there are recommendations from the Audio Description Coalition (ADC), 2009) and from Audio Description International (ADI) (see RNIB, 2010), the latter incorporating input from Art Beyond Sight and Art Education for the Blind. Comparison of these guidelines reveals points of regional commonality and differences.

Firstly, the guidelines reveal contradictory advice regarding the level of subjectivity that is acceptable in museum AD. The practice of AD in the US has typically placed greater emphasis on the requirement for objectivity (Mazur & Chmiel, 2012; Fryer, 2016) compared to European practice. This is often summarised as ‘WYSIWYS’ – ‘what you see is what you say’ – a phrase introduced by Joel Snyder (Snyder, 2014), Director of the American Council of the Blind’s Audio Description Project. Thus, US training materials addressing AD applications more broadly call for objective recounting of the visual aspects of an image (ADI, cited in RNIB, 2010), and US describers are cautioned against evaluation or interpretation (Mazur & Chmiel, 2012.)

The picture for museum AD guidelines is more mixed. Some US guidelines encourage describers to include subjective aspects, such as the mood or atmosphere of a piece (ADI, cited in RNIB, 2010; ADC, 2009), or to explore interpretative approaches to a work such as soundscapes (ADI, cited in RNIB, 2010). ADC also suggests its readers consider verbal description, which they distinguish from objective audio description owing to the inclusion of evocative information (ADC, 2009). However, objectivity is still urged in some US training materials for museums, by leading organisations such as Art Beyond Sight (Art Beyond Sight, 2014), and it is possible that the greater emphasis on objectivity in US AD may provide context for museum AD practice in this region.

European approaches to AD overall are understood to be more open to the use of interpretation, with acceptance of the idea that objectivity will always be hampered by individual ways of perceiving reality (Mazur & Chmiel, 2012). Museum AD guidelines are limited, but again may be contextualised by this different emphasis in European practice. For example, the ADLAB guidelines recommend ‘deconstructing’ a work and ‘recreating through suggestive language, sounds effects and music’, and explicitly state that interpretation is required along with contextualization and selection (Remael et al., 2014, p.71; see also Neves, 2012). In contrast, the Spanish standards explicitly state that personal interpretations should be avoided (UNE 153020, cited in RNIB, 2010). However, this statement is complicated by the advice that describers should focus on the most significant information for understanding the work, which is necessarily a matter of subjective interpretation.

The museum AD guidelines also differ in their approaches to AD construction and delivery. There is limited advice about the optimal length of a description. The American ADC recommendations (2009) emphasise that it takes more time to listen to information than it does to view or read it, and they encourage selection and focus on details that are pertinent to understanding and appreciation of the work. The ADLAB project suggests that a recorded description should be 1-2 minutes (Remael et al., 2014), in order to take account of visitors’ attention span. However, in the research literature, it has been suggested that a small number of works could be selected with twenty minutes dedicated to each (Soler Gallego, 2018).

Specific advice on content suggests AD should present a variety of information, including factual information (Remael et al., 2014), information about the artist’s technique, such as brushwork (Remael et al., 2014; ADI, cited in RNIB, 2010), and use

of colour and tone (ADI, cited in RNIB, 2010; ADC, 2009; Remael et al., 2014).

ADLAB recommend putting facts before description, saying that ‘description brings facts to life’ (Remael et al., 2014, p.81), although the authors recognise that sometimes different types of information should be interwoven. US guidelines, in contrast, tend to recommend keeping the verbal description distinct from other kinds of information (Art Beyond Sight, 2014; ADI, cited in RNIB, 2010).

The guidelines also address language and how best to structure a description. Language should be clear, simple, direct and precise (Remael et al., 2014; ADI, cited in RNIB, 2010) but simultaneously vivid and diverse (Remael et al., 2014). Interestingly, the US ADI recommendations for general AD practice describe it as a ‘literary art form...a type of poetry, a haiku’ (ADI, cited in RNIB, p.75), which seems to be at odds with the principle of objectivity, or ‘what you see is what you say’ (WYSIWYS), which is also advocated throughout the AD literature (see, for example, Snyder, 2014) . Nevertheless, the use of literary devices is not widely discussed, although ADC (2009) does caution describers only to use metaphor if it is likely to be familiar to the audience.

All guidelines (excepting the Spanish Standard UNE 153020) explicitly state that the description should move from the general to the specific. Various ways to structure a description are proposed (ADI, cited in RNIB, 2010, ADC, 2009; Remael et al., 2014), including the use of clock face numerals (RNIB, 2010, ADC, 2009), describing things in the order in which they appear (ADC, 2009), segmenting a painting by foreground, middle ground and background (ADC, 2009) or choosing a sequence that will highlight the work’s main features (Remael et al., 2014). ADC explains that it is important to help people to understand the ‘spatial relationship between things’ (ADC, 2009, p.21).

This emphasis on structure is related in some guidelines to the construction of mental imagery (ADC, 2009; Remael et al., 2014), with ADI explaining that the sequencing of information will allow ‘a blind person to assemble, piece by piece, an image of a highly complex work’ (ADI, cited in RNIB, 2010 p.99). The ADLAB recommendations refer to helping visitors who are blind to ‘see’, stating: ‘at times, the DG (descriptive guide) will lead to “seeing” through positioning, movement or touch’ (Remael et al., 2014, p.70). Likewise, ADI refer to appealing to other senses such as touch or hearing to help construct ‘highly detailed impressions.’ All the guidelines cited here furthermore advocate the accompanying use of touch in AD practice, where possible.

The guidelines recognise that offering BPS visitors a rewarding museum experience involves balancing a number of practicalities and artistic decisions. However, the advice specific to museum AD is limited and at times contradictory. Furthermore, the limited museum-specific advice means that museum AD is necessarily contextualised by a broader AD tradition with governing principles of objectivity, which may prove problematic, considering the sometimes ambiguous nature of museums' collections and the complex nature of the museum experience. In order to understand how AD may address a broad concept of access in the sense of access to an engaging experience, it is firstly essential to understand how museum AD is currently understood and provided. This study presents findings from a survey of museum audio describers, which explored the role of AD, as part of the museum experience, and the content of AD. Based on the different developments of AD in Europe and the US, responses were compared from regions to establish the degree of practitioner agreement.

Method

Design

A questionnaire, comprising of fixed choice and free-text responses, examined the experience and approaches of museum Audio Describers (please see Appendix 1.1). Quantitative analysis grouped participants into 'Europe' and 'US, comparing responses to questions based on a 5-point Likert scale. Where multiple tests were carried out, the Bonferroni-holm correction was used. Thematic analysis was used to analyse the qualitative data recorded in the free-text response boxes, due to its potential to uncover patterns of meaning across a dataset in a relatively under researched area (Braun & Clarke, 2006).

Participants

Forty-one describers and one AD trainer responded to an online survey. Describers were recruited through convenience sampling via VocalEyes, (UK), through Audio Description Association (ADA) directories (UK), the US based Audio Description Project (ADP), and via snowball sampling. Respondents were from 12 countries: UK (16), US (14), Spain (2), Portugal (2), and one response from each of the following: Brazil, Belgium, France, Ireland, Poland, Canada, New Zealand, and Italy. For the regional quantitative analysis, participants were grouped into Europe (25) and US (14), with insufficient data to permit a 'rest of world' category. All nationalities were

included in the qualitative analysis. All participants were active and current practitioners of museum AD, one offered training only. The research followed British Psychological Society ethical guidelines, and was approved by the University of Westminster Psychology Department ethics committee.

Measures

An online questionnaire (see Appendix 2.1) requested basic demographic information, and respondents were asked for the ideal duration for an individual description or ‘stop’ (live/recorded) and for an entire AD tour. Describers were asked to comment on the use of touch to accompany AD.

A series of statements about the role of AD were rated using a five-point Likert agreement scale. These addressed AD as a way of ‘seeing’ or ‘understanding’ an artwork/artefact, and whether it should explore meaning, give background information, create an emotional experience or an engaging narrative.

Participants used a 5-point Likert scale to rate the importance of aspects of content and style such as references to colour, the use of factual and contextual information, the use of multisensory imagery, inclusion of technical information, use of literary devices such as simile or metaphor, building a narrative, dealing with measurements (either by using standard metrics, or by relating the item to part of the body), and finally the use of ‘thinking’ or ‘conceptual’ prompts for the listener.

Respondents were given the opportunity to add comments and reflections in free-response boxes.

Procedure

Participants completed the questionnaire online, via Qualtrics. Once informed consent had been given, participants completed the questionnaire. No time limit was given, and the duration would have depended on the amount of free-text response that was provided. Further, although names were not requested, if participants wanted to receive a summary of the research findings, they were asked to leave their email address.

Results

Qualitative analysis

Online questionnaires were transferred into NVIVO software for coding. Thematic analysis was carried out within a constructivist framework, whereby it is not assumed that one ‘truth’ can be extracted from the data. Rather, knowledge is constructed by drawing patterns from the individual experiences and meaning described by participants. The creation of themes was nevertheless driven by a deductive approach (Braun & Clarke, 2006). Specifically, the areas of difference identified within the quantitative analysis were used as a starting point for the creation of themes within the qualitative data. As such, the qualitative analysis is used to elaborate on and enrich understanding of the quantitative analysis.

Data were first broadly examined in the context of areas of agreement and disagreement between audio describers. A second phase of analysis explored sub themes within agreement and disagreement. Within agreement these included themes of: 'selection for description', 'information sources', 'integration of information', 'role of curators', 'describing gallery space', 'structuring a description' and 'language and narrative.' Within disagreement, the themes included: 'neutrality and objectivity' and 'cognitive prompts'. The final stage of analysis extracted a broad theme of ‘interpretation’. This incorporated all the sub themes from the ‘disagreement’ category and the sub theme of ‘imagery’ within the agreement category.

AD duration

There was a wide range of responses on AD duration. Mann-Whitney U pairwise inferences tests for full tours and single stops for live and recorded indicated no significant differences across nationalities (all $p > .40$).

	Europe	US
Recorded Stop	4.12 (2.87)	6.25 (6.85)
Live Stop	7.27 (6.95)	10.50 (8.01)
Recorded Full Tour	50.18 (19.20)	57.08 (22.38)
Live Full Tour	74.82 (26.92)	65.00 (15.49)

Table 2.1 Mean (SD) Recommended Durations in Minutes for Live and Recorded AD (single stops and full tours) by region

Use of touch

Over half of the respondents in both the European and US groups commented on the importance of touch alongside AD. Both groups emphasised its sequential nature and the time needed to allow people to discover through touch. The European group recognised some practical difficulties, but emphasised that touch could ‘make objects come alive’, and enhance the tour’s narrative when well executed.

Role of museum AD

Table 2.2 shows that for the first four of the seven statements about the role of AD, the median value is the same or similar across geographical regions, indicating agreement in the US and Europe. Statistical inference tests (Mann Whitney U test) confirmed a lack of difference between these ratings (all $p > .1$).

'Role of AD' Variable	US	Europe	P-value
AD should provide a verbal substitute for visual information	5 (4-5)	5 (2-5)	p=.17
AD should create an engaging narrative	4.5 (3-5)	5 (3-5)	p=.52
AD should give background information about the artwork or artefact and its creation	4 (2-5)	4 (3-5)	p=.60
AD should provide the listener with a way of 'seeing' the artwork or artefact	5 (3-5)	5 (1-5)	p=.64
AD should provide the listener with a way of 'understanding' the artwork or artefact	3.5 (1-5)	5 (2-5)	p=.17
AD should explore the meaning of the artwork or artefact	3 (1-5)	4 (2-5)	p=.03
AD should create an emotional experience of the artwork or artefact	3 (2-5)	4 (2-5)	p=.03

Table 2.2 Agreement ratings (median, range) for the role of AD for a museum visitor, where 5= 'strongly agree' and 1= 'strongly disagree.'

The statement 'AD should provide understanding', had a higher mean value for European respondents, but a larger range of responses in the US, and did not reach the conventions for statistical significance: (U=122.50, N₁=24, N₂=14, p=.17). The Europeans attributed greater importance to the role of both meaning and emotions in AD. Mann-Whitney U tests confirmed these differences were significant (Meaning: U =91.00, N₁=24, N₂=14, p=.03; Emotion: U = 89.50, N₁=24, N₂=14, p=.03).

Within the qualitative theme of 'interpretation', sub themes relevant to the role of AD were: 'imagery' and 'objectivity vs interpretation'.

Imagery

There was broad international agreement that the primary function of AD was to facilitate the creation of a 'mental picture' of the artwork or object in the listener's

mind. Many comments referred to concise, vivid language that would be able to ‘create a full picture in the listener’s mind’s eye’ (#36, US). One European describer warned that other aspects of style should not be prioritised at the expense of the creation of imagery: ‘if it creates an engaging narrative but it doesn't give the listener a picture of the object, it's failed as AD even if it's succeeded as a narrative.’ (#25, UK). Another European respondent mentioned that creating mental imagery required a certain structure in the description, with each piece of information adding incrementally to the construction of a mental image: ‘It is important to keep a logical order in the description of the different elements, building relationships through them, in order to make a composition, or a mental image’ (#35, Spain). Various structures were proposed, with the clock numerals method favoured by US respondents.

Discussions about mental imagery were, for some, at the heart of what AD should set out to do. One such respondent was careful to distinguish the creation of imagery, which was specific to AD, as entirely distinct to discussions of context and meaning, which were considered the domain of the museum staff, not the describer: ‘The work of the audio describer is to audio describe. He or she is not there to replace the work of a docent. The describer must tell what the work looks like, he must use the tools to elucidate the image in the mind's eye of the constituent’ (#18, AD trainer, rest of world).

One European describer gave a different perspective on mental imagery, reporting that mental imagery creation, or even the desire for it, could vary widely between visitors. They suggested that AD should focus on providing a rich experience, rather than aiming to substitute visual information with an image: ‘The idea of AD... is not to say 'if you could see, you would see this'. That is terribly disabling. It's not possible for everyone to have the same picture in their mind, and AD will never achieve that, even if all blind and partially sighted people were making pictures in their minds, which they tell me they're not. It's not to remind them what they've lost, surely it's to introduce them to something they've never encountered before’ (#1, UK).

Objectivity vs interpretation

As shown in the quantitative data, there were significant regional differences of opinion regarding interpretative aspects of AD. However, the qualitative data revealed world-wide concern about keeping the right balance between objectivity and interpretation. Despite higher ratings in Europe for statements about meaning, understanding and emotion, there was still focus on maintaining objectivity and creating minimal

‘interference’ in the listener’s assimilation of an artwork: ‘I would go easy on the creation of an emotional experience – the artwork does that, not the describer’ (#23, UK). However, there was more emphasis amongst European describers on the role of story-telling in AD, with all mentions of narrative coming from European describers.

Describers from the US held much stronger views on objectivity, with many defining the role of the describer exclusively as a ‘translator’ of visual information, separating this entirely from a creative or artistic process, as expressed here: ‘The task of the describer is to describe the visual aspects of an object, production, or experience. Creating emotion alters the experience and is inappropriate for the describer. The describer is providing an assistive service and should not attempt to create or influence the artistic effect’ (#12, US). Many comments from US describers emphasised objectivity: ‘Audio description is speak what you see. In my opinion, the describer's interpretation should not be a part of the description’ (#38, US). For some, the ideal was for the describer to be a competent but essentially invisible agent by which the visual information is experienced by the recipient, leaving interpretative aspects to the museum professionals: ‘The audio describer is not there to explain what the work is, what it means. He or she is there to bring to the mind's eye of the recipient, the visual event he or she, audio describer, is seeing’ (#18, AD trainer, rest of world).

Content and style

Content and Style: Table 2.3 shows broad agreement across geographies on the importance of the majority of content and style variables. Only ‘cognitive prompts’ was identified as significantly different by Mann-Whitney U tests across nationality groups; considered to be more important in Europe than in the US (cognitive prompts: $U = 85.50$, $N_1 = 21$, $N_2 = 14$, $p = .04$; all other differences $p > .2$).

Content and Style Variable	US	Europe	P value
Colour	5 (4-5)	4 (3-5)	p=.40
Multisensory Imagery	4.5 (4-5)	4.5 (3-5)	p=.67
Factual and Contextual Information	4 (3-5)	4 (3-5)	p=.74
Technical Information	4.5 (3-5)	4 (3-5)	p=.82
Literary Devices	4 (2-5)	4 (3-5)	p=.30
Narrative	4 (2-5)	4 (2-5)	p=.18
Measurements related to body	4.5 (2-5)	4 (3-5)	p=.30
Standard Measurements	4 (2-5)	4 (1-5)	p=.34
Cognitive Prompts	3 (1-5)	4 (2-5)	p=.04

Table 2.3 Importance of Content and Style Variables by Region (Median, Range), where 5= 'extremely important' and 1= 'not at all important.'

International agreement across the majority of variables of content and style was broadly supported by the qualitative data. Specifically, there was agreement between describers in all regions that AD language must be simultaneously evocative and concise, and that vivid language would best generate mental imagery. There was also agreement between regions that the use of literary devices such as metaphor could be problematic, as they could generate competing mental images. However, there were interesting regional differences in the emerging theme 'interpretation', within the sub theme 'cognitive prompts':

Cognitive prompts

Comments from the US indicated that cognitive prompts were not a recognised part of AD. One US describer, for example, rejected the idea of 'thinking prompts' because they were outside the remit of an audio describer, and too close to interpretation: 'Incorporating "thinking" and "conceptual" questions is not, in my opinion, appropriate for a describer; that lies in the domain of a docent. (Keep in mind that I describe in the United States, and we emphasize respecting the integrity of the original material and

avoiding attempts to interpret it for the person who's listening to the description' (#12, US). For another US describer, thinking prompts were potentially problematic if they would result in a different experience: 'Embedding the description with thinking or conceptual prompts or questions should only be done if you are doing the same thing for your sighted patrons' (#40, US). In contrast, European describers seemed to view cognitive prompts as a creative aspect of description with the potential to enrich the listener's experience. One UK professional stressed the importance of finishing recorded description with a 'surprising or amusing fact', in order to leave the visitor with 'something memorable... to take away' (#30, UK). Similarly, another UK describer talked about how they liked to end their descriptions with something which would leave a hint of suggestion in the listener's mind – leaving them with 'something to ponder' (#21, UK).

Discussion

The aim of this study was to understand similarities and differences across international museum AD practices, with particular reference to the role of museum AD and its optimum content, style and duration. It drew on a mixed methods approach, using qualitative findings to deepen understanding of the quantitative findings. The results suggested that where international guidelines agree, for example on structure and language, international museum AD practices have much in common. International practitioners tended to agree that the average duration of an AD description could be longer than the 1-2 minute recommendation in the guidelines (Remael et al., 2014). The aspects of AD which were most contentious, such as observing strict objectivity, reflected some contradictory recommendations in the guidelines. The discussions around these issues highlighted some crucial international differences about what museum AD should set out to achieve.

Quantitative and qualitative responses from describers from the US indicated that most describers prefer to reduce subjective interpretation as far as possible. These describers considered their role to be the 'translation' of visual perceptual information (e.g. the colours, the shapes, the structure). This approach is more consistent with the US tradition of objectivity (WYSIWYS). On the other hand, Europeans were more likely to reference strategies that might evoke a deeper sense of meaning, for example, cognitive prompts, narrative, or seeking to evoke emotion. European describers also

placed more emphasis on touch as part of the AD experience and its potential to tie in to the story-telling function of a description.

Interestingly, the qualitative data suggested that one of the objectives underlying the use of cognitive prompts or emotions, was to make the experience more memorable. Curiosity has been shown to be instrumental in helping us to remember, as curiosity enhances memory for novel information (Kang et al., 2009). The use of cognitive prompts, if they stimulate curiosity, may therefore aid memorability. They have also been proposed by AD researchers exploring ways of enriching AD (Neves, 2016). The use of emotions also relates to the generation of meaning, and enhances memorability (e.g. McGaugh, 2003). The question of whether or not providing meaning is a didactic process, or a way of encouraging a deeper level of processing, is consistent with the broader museum interpretation debates. Such debates continue to question how much explanation is necessary or appropriate in the museum (Pekarik, 2004). Empirical research is needed to explore what effect this trade-off between objectivity, intervention and curiosity might have on the listener experience, and the resulting levels of engagement.

Although the use of mental imagery attracted much agreement internationally, it is interesting to note that many describers discussed enabling their listeners to create mental images of objects– ‘having a picture’ in one’s mind. This phrase, commonly used by respondents, is generally understood to mean a visual image. The focus on visuo-centric imagery is an interesting one. People who are late blind may have ongoing access to residual visual imagery in the form of memories, and partially sighted people may continue to form new visual imagery as they access new visual information through their residual sight. For individuals who are congenitally blind with no residual vision from birth, visual imagery is not possible. One might argue that the purpose of AD is not simply to provide people who have had vision with access to information which may be stored within memory, it is also to provide information to people which can be understood without ever having had access to vision.

As with our perceptual experience, mental imagery is experienced in all sensory modalities, including auditory, haptic, kinaesthetic and olfactory (Cattaneo et al., 2008; Eardley & Pring, 2006; Eardley & Pring, 2014). Within AD, imagery, like perception, can be multisensory. For example, grass has a visual form, but it also has a tactile form, a spatial form (covering a surface), and an olfactory form. Agreement with this

approach is reflected in the international agreement with the use of multisensory imagery in AD. These views are consistent with the US guidelines, which discuss ways in which tactile or auditory imagery can be embedded in order to create a richer description. However, in recommendations and materials for describers, it would be valuable to expand upon and illustrate the multisensory nature of imagery and its role in description wherever possible.

The role of spatial imagery was reflected in the findings by the comments of many on how they structure an AD. Research has demonstrated that people who are congenitally blind perform similarly on spatial imagery tasks compared to sighted individuals (Eardley & Pring, 2007; Eardley et al., 2016). How this spatial representation can then be enriched, or ‘brought to life’, can be achieved through the spectrum of non-visual sensory imagery (taste, smell, touch, movement) that is experienced by people who are blind and sighted alike (Eardley & Pring, 2014). However, providing the structure to facilitate a mental representation can take significant time and word count within an AD text, or live delivery (Jiménez Hurtado and Soler Gallego, 2015). Keeping in mind the challenges of retaining attention and not overloading the listener with information, it would be interesting to explore the tolerance of AD users in terms of the time and effort needed to process structural information in sufficient detail to form a mental representation. Some users may wish to do this, others may prefer to experience the artwork in a way that does not require them to invest significant mental effort in forming such a representation. Other tools such as simplified tactile images can help provide access to basic spatial representations, with AD then enriching the spatial structure.

Mental imagery formation has also been shown to aid memorability (e.g. Svoboda, McKinnon, & Levine, 2006), and an AD text that generates strong and enduring mental images could therefore provide a longer lasting and potentially more fulfilling experience. However, whilst multisensory engagement, such as enrichment with additional sounds, has the potential to explore meaning and evoke emotion, it requires a more interpretative approach and moves beyond a strict provision of visual information. Upholding the objectivity principle should therefore be critically reviewed in the context of providing a rich and engaging experience.

The results of the present research demonstrate broad international agreement on the building blocks of Museum AD, such as the use of colour, multisensory imagery and

the generation of mental imagery. At the same time, the conflicting views between regions on interpretation in AD foreground the many different things that AD could aim to do in a museum; provide verbal description of visual elements, create mental imagery, tell a story, explore meaning and evoke emotions. As guidelines for museum describers develop and the role of the describer continues to be professionalised (ADLAB Pro, 2019), exploring these tensions, which are so central to the source texts of museums and galleries, will be crucial in the development of museum AD. In summary, approaches to description will vary according to whether AD is understood as a visual to verbal translation, or as a museum interpretation tool which seeks to facilitate an experience. This chapter will now go on to examine this question in the context of AD's 'home' discipline of Audio-Visual Translation.

Part B: Translating the Museum: AD and the implications of textual fidelity

Introduction

The practitioner survey showed that there are divergent approaches between US and European describers with regards to interpretation in museum AD, and indeed the role of museum AD more broadly (Part A). The second part of this chapter explores this debate further in the context of the discipline within which AD historically sits (AVT). It considers what can be learnt from the screen AD literature, particularly with regards to cross-disciplinary reception studies. Furthermore, it considers the objectivity debate in the context of translation theory.

In translation terms museum AD is an intersemiotic translation, from nonverbal visual language to spoken language (Jiménez Hurtado & Soler Gallego, 2013), whereby the visual information of the artwork or object is the *source* text and the verbal language of the description is the *target* text (Jiménez & Soler Gallego, 2015; Soler Gallego, 2015). As with any form of translation, the process of translating the source text into a target text requires making a number of practical and artistic decisions. Translation decisions facing audio describers working in a museum context have received some, albeit limited attention in the research literature to date. Some of the translation processes undertaken by museum describers are revealed through corpus analyses of existing museum AD texts (Jiménez & Soler Gallego, 2015, Peregro, 2019). Jiménez and Soler Gallego's (2015) analysis, for example, compared an AD corpus with a corpus of audio guide texts for sighted visitors. Their finding showed that verbs in the category of 'position' were used more frequently in the AD texts, indicating more words being used to describe the spatial position of visual elements (eg 'stand', 'face', 'hang'). In contrast, the AG texts contained more verbs in the category 'cognition' (eg 'think'), suggesting that the increased use of lexical items related to visual composition and spatial position occurs at the expense of other word categories. Peregro's (2019) analysis revealed an unexpected level of complexity in AD language, with technical terms, heavy adjectival phrases and long sentences being frequent features. Other research on museum AD has considered translation decisions such as possible approaches to the translation of ambiguity in artwork (de Coster & Muehleis, 2007, Neves, 2012), or the use of tactile

resources to accompany AD and thereby provide intermodal coherence (Soler Gallego, 2018).

However, to date, the majority of research studies addressing the translation challenges facing audio describers have focused on screen (for example, Braun, 2007, 2011; Ramos, 2016; Matamala & Remael, 2014). Some of these explorations have crucial and concrete implications for museum AD, but some of the challenges for museum describers are different. The translation decisions addressed in the screen AD literature that have relevance to museums can be broadly grouped into three categories (although these categories are frequently interdependent): (1) those that relate to objectivity and the visibility of the describer-translator, (2) those that are specific to and contingent upon the source text and (3) translation decisions that have direct implications for the experience of the recipient. Here, the relevance of the existing screen AD research for the museum context is examined, and it is argued that the translation of the visual aspects of a museum's artworks and artefacts brings with it new considerations that are as yet largely unexplored, and that are central to the development of museum AD.

Objectivity and the visibility of the describer-translator

Some of the fundamental translation decisions faced by both screen and museum describers can be usefully contextualised within the wider discipline of translation studies, where they have been more broadly debated. These decisions relate to objectivity and the visibility of the translator in the provision of the target text; in other words, how the translator leaves traces of their translation decisions, and hence of themselves, in the texts that they create. These decisions are particularly pertinent to AD due to the requirements for objectivity that pervade the professional guidelines for screen (see RNIB, 2010). These recommendations equate objectivity in AD with quality, and state that interpretation on the part of the describer is obstructive and undesirable: 'the best audio describers objectively recount the visual aspects of an image. *Subjective or qualitative judgements or comment get in the way* – they constitute an interpretation on the part of the describers and are unnecessary and unwanted' (Audio Description International's proposed guidelines for Audio Description, cited in RNIB, 2010, p. 76. Emphasis in the original.)

In light of such guidelines, which are often contradictory in nature (Mazur & Chmiel, 2012; Ramos, 2016), AD, like any other form of translation, needs to consider its

position with regards to questions of subjectivity and interpretation, and to what extent the translator-describer could or should aim to be a silent voice in the provision of the target text. Considering its close association with translation studies, it is unsurprising that AD as a discipline has been grappling with the spectrum of objectivity and interpretation throughout its history (Fryer, 2016). This is consistent with the general principles of fidelity to the source text/author and principles of trust between the translator and the receiving audience that have dominated translation ethics and practice for hundreds, if not thousands, of years (Chesterman, 1997). Indeed, professional translation bodies today continue to require translators to work by the principles of objectivity and equivalence, with this ethical position of translators being taken somewhat for granted (CIOL, 2017; Van Wyke, 2010). Historically, it has been argued that translators should be ‘invisible, a window through which the original could shine unimpeded’ (Chesterman, 1997, p. 152).

However, these demands on translators have been more critically examined in the light of post-modern thinking, which claims that translation is always a transformative act (Venuti, 2003). If meaning is not regarded as a stable entity embedded in texts, ready to be extracted (Fish, 2006), then it becomes something that is attributed to texts, via an act of interpretation (Van Wyke, 2010). In this view, translators (describers) cannot be invisible facilitators through which a target text is made available to audiences; rather, they are agents of change, each ‘in a unique life-situation with a unique state of knowledge and cognition, with unique personal history’ (Chesterman, 1997, p. 149). If translators inevitably leave traces of themselves and their decisions in their texts, then this reverses the traditional understanding of ethics in translation and instead calls for reflexive examination of their visibility. As Van Wyke emphasised, if

...translators embrace the fantasy that they can be completely objective and invisible, then they will not critically look at the role they are actually playing. By acknowledging their visibility, translators can begin to [...] examine the role their work plays in cultural mediation.

(Van Wyke, 2010, p. 113). Nevertheless, although it may be argued that complete objectivity is impossible in AD, there is still significant debate within the screen AD literature regarding the degree of subjectivity that is permissible. What constitutes subjectivity is, of course, in itself subjective. In a small-scale study with AD users,

Mazur and Chmiel (2012) found that whilst 54% stated that they did not accept subjective interpretations, there was a spectrum of opinion regarding the subjectivity of various examples ('smart shoes', for example).

Furthermore, there are differences in AD practice across regions, with the American AD tradition tending to advocate a stricter view of objectivity – often quoted with the acronym WYSIWYS – than is the case in European-based practice (Fryer, 2016; Mazur & Chmiel, 2012). In their consideration of interpretation in AD, Mazur and Chmiel (2012) recognised that although subjectivity is generally regarded as undesirable in the AD guidelines, there may be instances in which a certain degree of interpretation can ease the cognitive load on the visually impaired viewer. In order to examine the binary nature of the objective–subjective discussion and evaluate the objectivity of the narrative accounts given, they performed an analysis of the narrative behaviour of sighted viewers of a film sequence from the Pear Tree Project. Their findings showed that whilst moral judgements were rare, a certain amount of interpretation occurred across all three scenes analysed, leading the researchers to suggest an objectivity–subjectivity scale in AD, rather than a binary understanding of the two.

The objectivity principle has been further discussed in the screen AD literature in the context of new methodological approaches such as audio narration (AN), which has been explored as an alternative to AD. Drawing upon the principles of narratology, AN keeps the emphasis on the what, as opposed to the how, of audio description. AN requires the describer to select the discourse elements that are considered to hold the most narrative force and to contribute most significantly to the mental model that the describer constructs as they view the film (Vandaele, 2012). The aim of the AN approach, as Vandaele (2012) described it, is that describers will develop a self-reflexive awareness of their mental state and the triggers that helped to generate it. Once these triggers have been identified, the describer will be better equipped to create an equivalent mental state in the blind or partially sighted viewer. As Vandaele (2012) recognised, narrative force is therefore based as much upon the state of mind of the film's recipient (starting with the describer) as it is upon the discourse of the film itself.

Additionally, the elements that contribute most strongly to mental narrative models may not consist of the dominant visual features of what is seen on screen; they may be minor, subtle or elusive, but yet pivotal in building states of uncertainty, curiosity and

suspense. Therefore, the identification and prioritisation of such triggers inevitably introduce an inherent level of subjectivity to an AN approach.

Debates regarding subjectivity are intensified in the context of museum AD, where the existing research recognises the urgency of addressing issues of ambiguity and subjectivity (De Coster & Muehleis, 2007) and acknowledges that museum AD must be developed and addressed in a different way to film AD, where objectivity has historically been the aim (Neves, 2012). In museum AD, questions of objectivity and the visibility of the describer are particularly pertinent due to the nature of the source text itself.

The nature of the source text

One key difference between museum AD and screen AD is the interdependence between source and target text. In screen, the target text must be seamlessly integrated with the source text, which requires it to fit exacting timing constraints as the AD should not typically interfere with the dialogue or soundtrack of the film or programme (see RNIB, 2010). This integration poses several challenges for the describer. The time available for the AD utterances may be short, and will therefore put pressure on language choice. Some timing-saving devices may be regarded as overly interpretative, and so are actively discouraged in international AD guidelines (see RNIB, 2010). For example, evaluative adjectives such as 'beautiful' or 'ugly' may be advantageous in terms of concision, but are open to criticism in terms of the layer of interpretation that they bring (Mazur & Chmiel, 2012). Similarly, the naming versus the describing of facial expressions presents the same tension between concision and interpretation. However, it has also been argued that some emotional states or facial expressions are universal enough to merit the short-cut of naming them (Mazur & Chmiel, 2012) and furthermore, that naming them (versus describing the pieces of information of which they consist) can reduce the processing load of the audience (Braun, 2007; Mazur & Chmiel, 2012).

Closely linked to the problem of timing is coherence, which must be preserved in the audio-described film, as indeed it must in any other translation (Braun, 2011). In screen AD, this means addressing not only the visual elements of the film, but helping the recipient to make sense of the relationships between the film's audio and visual elements. Screen AD therefore aims to convey cross modal links between images and

sound and image and dialogue, without which the sense of the film may be lost (Braun, 2011).

The translation challenges are very different in a museum context. Whereas screen AD is never designed to be a stand-alone product, museum AD often will be. The description may be hosted online, and accessed outside the museum, or it may be delivered to a visitor with no sight in the museum, who is likely to be standing in front of an untouchable object behind glass. Even in the instances when a visitor may make use of residual vision in conjunction with hearing the description, there is not the same need to integrate the target text with audio elements of the source text. The source text in a museum, whether an artwork or an object, does not provide the same challenges of coherence and timing of utterances, although timing is still a concern in terms of the duration of the AD text and its ability to retain the listener's attention, with estimates of optimal duration ranging widely (Part A) and as of yet untested by empirical research.

Despite the apparent differences between the source texts of films and the source texts of museums' collections, some of the source-text related translation challenges addressed in the screen AD literature are relevant to museum AD, in terms of the process and its relationship with objectivity. These relate to the selection of material and the emphasis given to it. In screen AD, visual features appear on the screen simultaneously, whereas the verbal description that seeks to represent them is linear, requiring describers to make decisions about which aspects to describe, in what order, and which links (if any) to make between them (Braun, 2011). In a narratology-based approach to film AD, selection of material must also consider the narrative relevance of visual information, which must create the balance needed between realized and hypothesized action if states of curiosity, suspense or surprise are to be initiated in the viewer (Vandaele, 2012).

Decisions regarding the selection of material and the emphasis given to it are also at the heart of museum AD, where practitioners aim to create an experience for the BPS visitor that is comparable to that of their sighted counterparts. Selection and prioritisation of the source text(s) is multi-layered as museum describers must select objects at both a macrotextual (exhibition as text genre) and microtextual level (objects and their relation to one another) (Jiménez Hurtado & Soler Gallego, 2013). These decisions present a number of pragmatic and artistic challenges. Firstly, the sheer number of potential objects for description, and their diversity, is overwhelming.

Describers often work with museum staff to select source texts that a) are believed to best represent the museum's exhibition narrative, b) which also lend themselves to vivid description and c) are believed to most accurately represent the experience of sighted visitors. Weighing up these (sometimes conflicting) aspects is a complex decision-making process, often involving multiple stakeholders, not just the describers themselves.

Not only must describers select source texts within the museum, but they must then decide which aspects of visual information within them are key to the blind visitor's assimilation of that particular artwork or artefact. Professional museum AD guidelines urge describers to select 'pertinent details' (see RNIB, 2010, p.100) but with limited advice to suggest how this might be understood or applied. Furthermore, the nature of the source texts in museums and galleries, typically artworks and artefacts, may be visually complex and/or highly ambiguous, presenting a challenge to any visitor in terms of their assimilation.

This has led to a focus in the limited museum AD research literature on possible approaches to ambiguity and subjectivity (see Eardley et al., 2017). In their exploration of intersensorial translations of visual art, de Coster and Muehleis (2007) consider the spectrum of 'visual intensity' of artworks. They suggest that whereas some clear signs can be named in words in a relatively straightforward manner, ambiguous elements may be best represented in another sensorial field such as touch or hearing. Similarly, Neves (2012, p.1) questions whether 'words are sufficient to convey the subtleties of art' and calls for visual ambiguity to be conveyed through another sense like touch or non-verbal sound such as music. These approaches indicate that museum AD may share common ground with transcreation, the term used to describe the re-creation of multimodal texts, for example corporate websites (Rike, 2013). Similarly, 're-creation' is proposed as an alternative to a literal translation in poetry translation (e.g. Jones, 2011), indicating that differing source texts may lead translators to differing solutions. However, translation decisions such as these stand to place the describer-translator at odds with the AD and translation traditions which have historically advocated objectivity.

Furthermore, it could be argued that the source texts in museums and galleries are not only the artworks and artefacts themselves, but the sensory experience of looking at them. In other words, our understanding of 'source text' in a museum context might be expanded to include the space and architecture of the museum, the experience of being

in the space and interacting with others within it, in other words, the wider experience of visiting a museum.

The recipient experience

Increasingly, reception studies in screen AD research have been placing the emphasis on the recipient's experience of the target text. This emphasis resonates with thinking in Translation Studies such as Skopos theory (Reiss & Vermeer, 2014), which suggests that the translator should focus on the end-user of their translation, and take decisions based on the text's skopos or purpose, thereby positioning texts as 'communicative occurrences whose form is determined by the situation in which they occur and by the persons who use them' (Nord, 2010, p.127). In screen AD research, where audiences are central to a large number of studies, the question of purpose is increasingly recognised as broader and more complex than the provision of access to visual information.

The experience of watching a film is likely to be much more than a comprehension of the narrative as it unfolds on screen. The artistic decisions of the director, such as the filmic techniques used, may also influence the impact of the film on the sighted viewer and their level of immersion. Fryer and Freeman's (2013) analysis therefore addressed the recommendations of Ofcom (2017) to avoid filmic terms by comparing the reception of a standard AD with a cinematic AD. The latter not only used filmic terms but also utilised the audience viewpoint in the first-person plural ('towards us' etc.), thereby promoting a sense of the social experience of viewing that occurs in theatre or cinema. Congenitally blind people preferred the standard AD (83%). However, visually impaired recipients who had lost their sight after the age of 35 unanimously preferred the cinematic AD. Furthermore, participants with no useable vision reported stronger engagement and higher levels of spatial presence and ecological validity with the cinematic AD, in other words, the addition of filmic techniques gave them a stronger sense of immersion in the film and thereby a more rewarding experience (Fryer & Freeman, 2012). In further research, the use of cinematic AD was combined with subjective descriptions in a 'creative' AD, and compared with a 'standard', neutral AD that drew upon the WYSIWYS principles (Walczak & Fryer, 2017). 'Creative AD' was preferred by 67% of participants and resulted in higher reported presence levels, that is, having the subjective experience of being in the depicted environment (Walczak & Fryer, 2017).

Understanding how best to create an equivalent filmic experience for visually impaired viewers involves seeking a better understanding of how sighted audiences make narrative meaning from audio-visual texts (Kruger, 2012). Using eye-tracking with sighted viewers of the 'Pear Tree' film (Chafe, 1980), Kruger (2012) recorded the participants' fixations on varying visual elements and comparing these with the depth of understanding as reported through their retrospective accounts of the narrative. The findings showed higher cognition scores for participants who looked more frequently at visual elements that were low in terms of visual salience (less prominent on screen) but high in narrative salience (of importance in understanding the development of the narrative). If narrative salience should be prioritised over visual salience in order to best promote an equivalence of experience (Kruger, 2012), then this analysis also challenges the oft-quoted maxim of WYSIWYS, as saying what is predominately seen may not be what is most important when it comes to giving blind audiences access to a filmic experience (see also Finbow, 2010).

The recent emphasis on the audience experience within screen AD research has also led to investigations of the importance of emotion (Ramos, 2016; Ramos, 2015). Ramos (2016) compared an AD for film, written in a neutral style, to an audio narration (AN) which was embedded with more emotional language, thereby permitting the use of inferences, literary devices such as metaphor, and subjective evaluation of the describer in order to address the crucial question of whether emotional content could help to stimulate the 'powerful emotional experience' offered by the cinema (Ramos, 2016). Heart rate measurements and user evaluation measures revealed significant differences in the reception of 'neutral' AD and 'subjective/emotive' AN, with recipients having a stronger emotional reaction to the AN for scenes of fear and sadness. Such results suggest that the benefits of a focus on the audience response may outweigh the benefits of a traditional strict observation of the objectivity principle.

This emphasis on experience as the desired outcome of AD raises the question of whether AD should be an 'informative or descriptive text', or whether it should take a 'more active role in meaning-creation' (Ramos, 2016). These are key questions to examine in a museum context, and relate closely to the discussion of the source texts in museums. If museum AD seeks to offer not just access to visual information, but access to a museum experience, then the nature of that experience needs to be fully evaluated. This raises the question of whether AD may consider expanding its remit beyond the provision of visual information.

Four categories of experiences in museums proposed in an early study on the museum experience (Pekarik, Doering & Karns, 1999) raise interesting questions for the further development of museum AD, as a means of accessing an engaging museum experience:

(1) Object experiences focus on something outside the visitor, and include seeing ‘the real thing,’ seeing rare or valuable objects, and being moved by beauty.

(2) Cognitive experiences include the interpretive or intellectual aspects of the experience, such as gaining information or knowledge, or enriching understanding.

(3) Introspective experiences consist of private feelings and experiences, such as imagining, reflecting, reminiscing and connecting.

(4) Social experiences focus on interactions with friends, family, other visitors or museum staff.

By these categorisations, if museum AD is understood primarily as a translation of visual information, or even as a vehicle by which the listener constructs mental imagery, as encouraged in AD guidelines (RNIB, 2010), then it seems designed above all else to address the category of ‘object experiences’—enabling visitors to ‘see’ rare or valuable objects. However, if AD also aims to impart knowledge, or enrich understanding, then it addresses cognitive experiences, and if it is aiming to evoke emotions in the listener, then it has a role to play in introspective experiences. An interaction with the describer or fellow listeners in live AD also forms a social interaction in the museum setting. If AD wishes to provide access in the sense of facilitating an experience for BPS visitors, then all of these categories of experience must be brought into consideration. From this perspective, the remit of AD may extend beyond the translation of visual to verbal information, necessitating further exploration of what AD stands to gain or lose if it moves away from traditional translation ethics of strict objectivity. Furthermore, this requires further analysis of the role of the describer-translator, and the extent of the visibility of their translation decisions.

Discussion

The possibility of accurate and objective representations of visual information (fidelity to the source ‘text’) must be held up to examination, and balanced with fidelity to an alternative source ‘text’ – the museum experience itself. Similarly, the visibility or presence of the describer (translator), rather than being minimised and discouraged,

might be usefully explored in the context of the translation ethics debates where visibility and traceability of decisions can be regarded as an alternative, and advantageous, ethical position (Chesterman, 1997; Van Wyke, 2010). Although museum AD is generally considered by academics as ‘on the fringes’ of traditional AVT (Díaz Cintas & Neves, 2015), translation theory, particularly with regards to translation ethics, may provide useful frameworks for future thinking.

Poetry translation theory holds particular relevance for museum AD, with its concerns of ambiguity and subjectivity, and the comparison between AD and poetry is by no means a new one (Fryer, 2017; Santos, 2015). Just as poetry has textual features (such as linguistic patterning, word play and ambiguity) that a translator may want to preserve, it also has a ‘communicative function’, which may be to ‘entertain, or to give a heightened emotional or intellectual experience’ (Jones, 2011, p.117). In the same vein, the museum itself can be considered a communicative event (Jiménez Hurtado & Soler Gallego, 2013) and many museum ‘texts’ will have textual ‘features’ – either linked to their materiality (form, shape, size, colour, texture), their method of construction, display, or their intended use. Similarly, these texts or objects may have a communicative function, either in and of themselves, or one assigned by the museum in order for the object to play its part in constructing a narrative for the museum visitor (Dudley, 2012). How these communicative functions are interpreted and assimilated will always be highly contingent on an individual’s socio-cultural context and circumstances (Dudley, 2012, Dierking & Falk, 1992). Describers need to balance the tensions between the contingency of human experience and the materiality of the museum context, as Dudley (2012, p.12) neatly frames it:

Two different people will certainly demonstrate the subjectivity and contingency of experience by responding to the same object in different ways... but for both of them, part, at least of their engagement with the object will be determined by its material characteristics – *their reactions would not be as they are (whatever they may be) if the object were not what it is*” (emphasis in the original).

The discipline of poetry translation proposes various frameworks to navigate these tensions between textual features and communicative functions, such as literal translation, adaptive versions and recreative translations (Jones, 2011). In poetry translation, ‘re-creation’ may try to ‘recreate a source poem’s semantic and poetic features in a viable receptor-language poem’ (Jones, 2011, p.118). The word ‘viable’ is

particularly pertinent to museum AD where the target text needs to be able to stand entirely alone, in the case of a description that is delivered to someone with no sight, or delivered remotely via online hosting. However, the fuller sense of what constitutes ‘viability’, and how a successful description may be assessed, is a complex question that might be usefully approached from multiple angles. The potential that AD holds to create access not only to the materiality of an object but to its communicative function means exploring access not only to things but to engagement. In other words, if an AD aims to provide the recipient with equivalent access to an experience in the museum, which may be comprised of both elements of materiality and elements of communicative function, then the evaluation of museum AD needs to move beyond an assessment of its success as a visual to verbal translation.

Museum AD, at first glance, appears to have little in common with its older sibling of screen AD, with the latter’s historical focus on objectivity and textual coherence. However, in the screen AD research literature, increasing attention is being paid to the recipient experience, with the use of psycho-physiological measures in conjunction with traditional AD reception surveys, and new creative approaches to description itself. For museum AD, research with visitors will need to explore what AD needs to do to create access to experiences which may range from assimilation of visual information such as hues, structure and shape, through to emotional and cognitive experiences of viewing art, social interactions with family and friends, learning experiences, entertainments and escapism. Practitioners of museum AD will need tools at hand to help them navigate the tensions between fidelity to the ‘source text’ and providing access to the museum ‘experience’. Assessing this experience in full could mean extending the traditional view of AD as a visual to verbal translation and embracing the creative possibilities of re-creation for museum AD, exploring the success of new approaches in the context of visitor engagement and memorability.

Summary

This international survey of museum audio describers presents the first empirical exploration of museum AD practices around the world. The findings revealed differing opinions about interpretation in AD between two major AD traditions: the US and Europe, with European describers giving more importance to factors such as addressing meaning or creating emotion in AD, or using cognitive prompts. It is likely that these differences are underpinned by the pervading emphasis given to the objectivity principle

in the wider discipline of AD, particularly in the US. Furthermore, there is contradictory advice in the museum AD guidelines regarding interpretation. The resulting challenge for museum describers is how to make optimal translation decisions that best convey their 'source text'. In translation terms, this means considering whether the source text is restricted to the artwork or object itself or whether it addresses the wider museum experience. If the source text is to be understood as the museum experience, then this requires a potential shift in current thinking about museum AD purely as a translation of visual information. AD may need to incorporate a broader view of access as access to an engaging experience, comprising of cognitive, emotional and social elements as well as physical access to the visual appearance of the collections. If AD is to address the broader museum experience, then this necessitates a deeper understanding of what that experience is and how it may be measured. In order to develop this further, this thesis will now turn to an investigation of the nature of the museum experience, through analysis of personal memories for museum visits.

Chapter 3: Autobiographical memories of museum visits: using autobiographical memory theory to explore museum experiences and their lasting impact

Abstract

The previous chapter challenged the nature of the ‘source text’ of museum AD, by arguing that AD should facilitate access to the broader ‘museum experience’. However, before this can be achieved, the museum experience itself needs to be better understood. The museum memory literature is yet to develop measures that allow for generalisable conclusions to be drawn about the museum experience and its impact. This chapter explores the museum experience through analysis of participants’ memories for museum visits, using measures drawn from autobiographical memory theory. Autobiographical memory, namely our memories for events throughout our lives, is first contextualised within a broader explanation of human memory. Its key features and functions are presented, and their relevance to museums is discussed. The chapter then presents a coding model developed from the autobiographical memory literature, and discusses the findings following analysis of 80 participants’ museum memories; with participants grouped according to age and the frequency with which they visit museums. The distribution of museum memories across the participants’ lifespan is discussed. Memory specificity, the presence of ‘special’ memories and memory content are also explored. The results on the life span distribution of memories suggest the importance of our leisure activities for our identity and social interactions, and differences between frequent and infrequent visitors suggest the importance of early experiences in museums. Results on the content of memories demonstrate that there is consistency between visitors in terms of the content recalled, indicating a hierarchy of content that makes up the enduring impression of a museum visit. Within this hierarchy, information about what is experienced and learnt in the museum, contextualising information which relates this to the rememberer’s knowledge about themselves, and personal reflections are particularly salient. Some variations between participant groups in the content recalled and the types of memories are consistent with the research literature on autobiographical memory and ageing.

Introduction

In order to understand autobiographical memory and the rationale for its use in museum evaluation, it is first necessary to contextualise it within the wider field of memory research. Autobiographical memory is part of the long-term memory system. Long-term memory covers time periods from just a few minutes ago to as far back as we can remember (Goldstein, 2011) and it can take the form of either *declarative* memory (explicit, conscious memory), or *nondeclarative* memory (implicit, non-conscious) (Nyberg & Tulving, 1996; Squire, Knowlton, & Musen, 1993). Whereas declarative memory is memory for facts and events, nondeclarative memory is memory for skills, habit learning, classical condition and priming and nondeclarative memories are expressed through performance rather than through recollection (Squire et al., 1993). This thesis is interested in understanding what memories visitors retain of a museum visit, hence the focus on long-term, declarative memory. Whilst a museum visit could undoubtedly have a non-conscious impact on a visitor, such nonconscious memory traces are outside the scope of this research.

Within long-term, declarative memory, there are distinct types of memories. Semantic memory refers to general knowledge about the world. It is the memory necessary for the use of language, and it has been likened to a mental thesaurus, as it is a complex organisation of one's knowledge of words and other verbal symbols, their meanings and the complex relations between them (Tulving, 1972). Semantic memories are decontextualized and are not temporally defined. For example, a semantic memory of a pen might typically include its visual features (colour), visuo-haptic features (such as its shape, its weight in the hand) and information such as where one typically sources a pen (shops) and its function (to write with). Semantic memories therefore contain knowledge about the world; its people, places, objects and the meanings of things, and it is also knowledge that can be shared culturally. As such, the retention of such knowledge has been considered an important measure of learning for museum research (see Koran, Koran & Ellis, 1989, for a review).

In contrast to semantic memories, episodic memories are contextualised, through being defined both spatially and temporally. Episodic memory is memory for events, and each experienced event occurs at a particular spatial location and in a particular temporal

relation to other past, simultaneous or future events (Tulving, 1972). Furthermore, these memories are records of sensory-perceptual-conceptual-affective processing which are derived from working memory (Conway 2005). Episodic memories are important for the experience of 'recollective experience', which is the sense of the self in the past. This is due to their highly sensory-perceptual nature. The role of episodic memories in 'recollective experience' is a key one, as they are believed to help the rememberer to understand that what they are recalling is a memory of a real, lived event, rather than a dream, plan or fantasy (Conway, 2001). However, the distinction between episodic and semantic memory is blurred, as semantic knowledge can be accumulated by abstraction from personally experienced events or episodes (Cohen & Conway, 2007). Thus, the two are regarded as being in an interactive and interdependent relationship (Cohen & Conway, 2007).

What is autobiographical memory?

Considering a memory for a personally experienced event helps to illustrate the different aspects of memory. For example, knowing that Paris is the capital of France is an example of semantic memory. Recalling a visit to Paris with a friend, or an event within that visit, such as a museum visit or meal out, would likely involve multiple episodic memories in the form of memories of sights and sounds, personal reflections and social interactions. The memory of the visit overall would also be an autobiographical memory, as it would be likely to integrate recall of events within a broader framework of knowledge about oneself (e.g. 'friendship with x' or 'when I was studying French').

Autobiographical memories are memories for personally experienced events, which may be general, repeated events (going to the park as a child) or specific events (the day that I started school). They are typically reconstructed from multiple types of information, including semantic memory (knowledge about the world) personal semantic memory (knowledge about oneself) and episodic memories (memories for events which have a spatial and temporal context). They may be rich with imagery from across sensory modalities which can provide a sense of re-living past events (Conway, 2001). However, autobiographical memories typically fade over time, becoming less vivid and accessible.

The theoretical life span curve of autobiographical remembering consists of three components (Conway & Pleydell-Pearce, 2000). Firstly, childhood amnesia, which

shows a decline in access to autobiographical memories typically before the age of 5 years (Conway & Pleydell-Pearce, 2000). Secondly, the reminiscence bump, which shows a robust concentration of memories between the ages of 10-30, and has been widely documented in the research literature (Conway, Wang, Hanyu, & Haque, 2005; Janssen, Chessa, & Murre, 2006). Thirdly, a period of recency, which shows a powerful effect of availability of recent memories (Conway & Pleydell-Pearce, 2000).

Autobiographical memory and the self-memory system:

Autobiographical memories are thought to be constructed from an underlying knowledge base that is comprised of various layers of information and themes (Conway & Pleydell-Pearce, 2000). The multiple structures that comprise the autobiographical knowledge base contain specific types of memories. Episodic memories are one layer of information (e.g. *handling replica dinosaur bones – how they looked and felt*), but it is also contextualised within general events (repeated events – e.g. *school trips to museums*) and lifetime periods (e.g. *when I was at secondary school*). Autobiographical memories will typically be comprised of many, if not all, of these elements, which have been interlinked during the process of memory construction (Conway & Pleydell-Pearce, 2000).

In Conway & Pleydell-Pearce's model (2000), episodic memories form part of the hierarchical structure of the autobiographical knowledge base and they are generally involved in the first step of memory reconstruction. Cues constantly generate transitory patterns of activation across this multi-layered autobiographical knowledge base. In order for an autobiographical memory to be reconstructed, an episodic memory, or group of episodic memories, must link to a general event, and then to a lifetime period. Cues can result in an autobiographical memory being retrieved, either directly (it spontaneously 'occurs' to the rememberer) or through generative retrieval (it is accessed through a conscious search process). However not all cues will result in memory retrieval. Central control processes modulate these patterns of activation, preventing some from reaching consciousness, as they may be disruptive to current cognitive activity. Others are not inhibited and therefore may form a memory. Memories that are retrieved multiple times (rehearsal) will be accessed more readily and the future reconstruction of them will be faster.

In the model of the Self-Memory System, it is the interaction of the working self and the autobiographical knowledge base that generates autobiographical memories (Conway

2005). The concept of the working self is understood as a combination of active goals and self-images, which are mental models of the self, in relation to past, present and future goals (Conway 2005). The notions of correspondence and coherence are central to this model of the self-memory system. Correspondence demands that memory should be consistent with experience. However, memory cannot retain records of every moment of experience, as this would be overwhelming and could not sustain effective storage and retrieval. Coherence, in contrast, requires that memories should be consistent with the goals and self-images of the self. A key function of the working self is to balance the competing demands of correspondence and coherence (Conway, 2005).

Goals operate as control processes and they will only facilitate a memory entering into consciousness if it is consistent with the working self (Conway & Pleydell-Pearce, 2000). As activation patterns are triggered across the autobiographical knowledge base, current goals of the self will moderate or inhibit further processing depending on its compatibility with the individual's current self-schema. Goals may be implicit or explicit and research has indicated a relationship between an individual's goals (both implicit and explicit) and the memories that they retrieve (Woike, Gershkovich, Piorkowski, & Polo, 1999). Memories that are incongruent with a person's current self-schema may be repressed (in order to avoid the destabilising effect that such memories would have on the working self) and those that are consistent with it, in contrast, may be more accessible.

In Conway & Pleydell-Pearce's model of the Self-Memory System (2000), episodic memories are formed when there is a major change in goal structure, e.g. switching from one activity (driving to work) to another (making a cup of tea). In any day, goals, and changes in goals, will generate many episodic memories but only a few of these will remain accessible; those that are aligned with current goals and those which have been linked to knowledge structures in the autobiographical knowledge base. In summary, episodic memories provide a short-term record of progress in current goals processing (Conway, 2005).

Autobiographical remembering: rehearsal and cueing:

Memories that have been repeatedly accessed will be more easily and readily accessed in future recall. Rehearsal can take the form of thinking about an event later, or talking about it with others. The role of parents in rehearsing memories of events with their children has been shown to be instrumental in the ability of children to create more

richly detailed representations of events, thus indicating that the parents' role in reminiscing impacts on their children's development of autobiographical memory (Fivush et al., 2006). Rehearsal has also been suggested as a possible explanation for the clustering of memories in the reminiscence bump, due to the more frequent rehearsal of these memories, which tend to be 'first-time' experiences (Conway & Pleydell-Pearce, 2000; Conway et al., 2005). The relationship between goals, as conceived in the Self Memory System, and rehearsal, is also one of interdependence, as events that engage the working self and are consistent with its goals are more likely to be events that are subsequently revisited and talked about (Conway & Pleydell-Pearce, 2000).

Cues constantly generate patterns of activation across the autobiographical knowledge base (Conway & Pleydell-Pearce, 2000). Cues may consist of different types of information. Imagery is known to cue autobiographical remembering (Svoboda et al., 2006). Mental imagery is quasi-perceptual experience, which resembles perceptual experience but takes place without the external stimuli (Cattaneo et al., 2008; Kosslyn et al., 1995). It may be visual (visualizing, or 'seeing' with the 'mind's eye') or auditory (such as 'hearing' a piece of music in one's own mind) or tactile (imagining the feel of something) Richardson (1969), p3. Episodic memories themselves are formed of highly detailed sensory-perceptual information, much of which is held in the form of images (Conway, 2001; Conway & Pleydell-Pearce, 2000).

Upon activation, highly detailed, sensory-perceptual information may link to other structures in the autobiographical knowledge base, thereby generating an autobiographical memory. Imagery is therefore considered to play an essential role in facilitating the retrieval of autobiographical memories and indeed research has shown that imagery is a general predictor of memory specificity (Williams et al., 1999). It is thought that autobiographical memory retrieval draws on imagery to recall visual details that were encoded at the time of the event, and that these long-term visual representations, or images, facilitate reactivation of other information relevant to the event (Svoboda et al., 2006).

Although the emphasis in autobiographical memory research has been on visual imagery (Brewer, 1986), imagery from other modalities is also important for autobiographical memory retrieval (Eardley & Pring, 2006). Imagery is generally accepted to be a cross-modal experience, with images experienced and reported in all modalities (Eardley & Pring, 2006), and research has shown that cues across visual and

nonvisual modalities can all facilitate the generation of autobiographical memories, in both sighted and congenitally blind people, in whom visual imagery is not possible (Eardley & Pring, 2006).

Emotion also plays a key role in autobiographical remembering. Memory research indicates that those events that are embedded with emotion are the ones that we will remember most effectively. Emotional response takes on a physiological form, with the release of glucose and adrenal hormones into the bloodstream. Events that trigger this physiological response are more likely to be encoded in memory more deeply (Holland & Kensinger, 2010). The museum literature has reported that both positive and negative emotion strengthen autobiographical memory retrieval (Anderson & Shimizu, 2007). In psychological analysis, affective experiences can be described by a two-dimensional space consisting of valence, i.e. how positive or negative an emotion is) and arousal (as distinct from the strength of an emotion) i.e. how exciting/agitating/soothing or subduing. Research indicates that the level of valence of an event can impact on how well an autobiographical memory will later be remembered, and with what degree of accuracy (Holland & Kensinger, 2010). Positive valence is generally more strongly associated with greater recall, a trend that might be accounted for by the fact that people's self-schemas are generally positive, so positive emotions may be more likely to be consistent with the working self (Holland & Kensinger, 2010).

In summary, autobiographical memories typically draw together multiple types of information, with emotion and imagery being particularly important for cueing autobiographical memories. The working self and the active goals of which it consists will either promote or inhibit specific memories in accordance with the rememberer's current sense of self, or identity.

Using autobiographical memory theory to evaluate impact:

Autobiographical memories are tightly bound up with concepts of self and identity (Conway, 2005, Bluck, 2017, Bluck & Liao, 2013), conversation and social interactions (Alea & Bluck, 2003) and projected imagining and planning for the future (Bluck, 2017). As a form of leisure activity, museum visiting may form part of our social interactions and our sense of who we are. For example, conversations and social interactions relating to museum experiences are one way in which memories of such experiences are rehearsed and revisited. Therefore, through social interaction and conversations about recent cultural experience, museums' narratives and museum

experiences may act upon visitors' senses of identity. Museum research and practice thus recognises that museums have a role to play in various aspects of a visitor's identity (Falk, 2006, 2013, 2016).

Studying autobiographical memories of museum visits offers a unique opportunity to explore not only the impact of museums across the lifespan, but also the potential role of museums in cultural transmission and social cohesion. Autobiographical memory is particularly useful to museums as it provides a broader picture of the impact of a visit, compared to studying semantic recall only, for example. Whilst studies of museum memories to date have been heavily informed by memory theory (Anderson, 2003; Anderson & Shimizu, 2007; Falk & Dierking, 1997; Medved et al., 2004; Medved & Oatley, 2000), there has not yet been a systematic exploration of memories of cultural events such as museum visits which is derived from the structure and content of autobiographical memory theory. This chapter seeks to address this gap, through analysis of the life-span distribution of memories for museum visits, the types of memories, and their content.

Firstly, examining the lifespan distribution of autobiographical memories could provide important understanding about the impact of museum visits upon a visitor. For example, if memories for museum visits display a reminiscence bump, it could reinforce museum visits for school children and families as a 'critical period' for impact on society. It is also important to examine the life span distribution, as well as the types and content of autobiographical memories, in the context of differences between varying types of visitor. Museums traditionally segment their audiences based on their motivations for visiting, for example, explorers, facilitators, experience seekers, professional/hobbyists and rechargers (Falk, 2016). Whilst the underlying memory processes of these segmentations are unlikely to differ, there are some factors which could result in differences in the autobiographical memories of visitors.

Autobiographical memory research generally suggests that older people recall more general memories (Levine, Svoboda, Hay, Winocur, Moscovitch, 2002) with fewer sensory perceptive details (Piolino, Desgranges, Benali, & Eustache, 2002; Piolino, Desgranges, & Eustache, 2009). Similarly, people who visit museums frequently may report 'reisodes', where many similar events converge in general memories (Cohen & Conway, 2007). Conversely, unusual events are often better recalled (Cohen & Conway, 2007) and may be more vivid, meaning that infrequent visitors may have more specific

memories and memories that are richer in detail. However, as frequent visitors attend museums more often, they may have more specific memories as there may be simply more memories of visits available to be accessed. Events that are personally important, emotional or surprising are also likely to be better remembered (Cohen & Conway, 2007) and when integrated with important autobiographical knowledge, the resulting memories may indicate moments of transition, first time or self-defining experiences.

Understanding the content of such memories will provide museums with real insight about their lasting impact. Memory details such as imagery associated with the original perceptual experience of visiting a museum can indicate not only how vivid the memory is likely to be for the rememberer, but also enables the institution to assess the impact of the physical environment and exhibits through which they seek to tell their stories.

Similarly, contextualising details such as time, place, or details of other people or social interactions can help an institution to understand how a visitor has subsequently woven the visit into their own narrative, for example with reference to a lifetime period (Conway & Pleydell-Pearce, 2000), such as ‘when I was in a relationship with x’, or simply through providing the ‘back story’ of the event’s context ‘It was the first time I had been abroad with x’. The presence of autobiographical knowledge in such memories could suggest that conceptual frames are structuring the memory (Conway, 2001, 2009) and that episodic information has been integrated with the individual’s knowledge about themselves.

Semantic information pertaining to the event may be retained, and may indicate that some kind of ‘learning’ has taken place. Both positive and negative affect are associated with increased autobiographical memory recall (Yong-Chun Bahk & Kee-Hong Choi 2017) and emotional memories have been shown to be more detailed than neutral ones (St Jacques & Levine, 2007). The full spectrum of emotions may be salient in the context of cultural institutions; an exhibition of Monet’s works could inspire awe and happiness, whereas an exhibition addressing the Holocaust would be more likely to inspire feelings of fear, anger or disgust.

Finally, cognitions both experienced at the time and in the process of remembering would be indicative of the impact of the museum visit on the individual and may also indicate the ways in which memories for cultural events may inform the identity, social connection or future planning functions of memory. Emotion and cognition could together be considered to contribute to our understanding of visitors’ personal

reflections and reactions following a visit, and are recognised in the museum literature to be a useful marker for impact (Falk, 2016).

Autobiographical memory research has developed coding systems to address the content of autobiographical memories and the prevalence of certain features, such as details of time, place, happenings, thoughts/emotions, semantic information and perceptual information from across modalities (Levine et al., 2002). The coding system used in this research combines the coding for content used by autobiographical memory researchers (Loveday & Conway, 2011; Levine et al., 2002) with the understanding of types of memories (general/specific/special) set out by Conway & Pleydell-Pearce (2000).

This study addressed three research questions. The first examined whether memories for museum visits would follow the theoretical life-span curve. The second question explored the possible impact of visitor differences on memory for museum visits. Within this, we examined a) the impact of visit frequency on the distribution of the reminiscence bump; and the impact of age and visit frequency on: b) the specificity of autobiographical memories, and c) on the occurrence of special memories. Thirdly, we examined what elements make up the content of a memory for a museum visit, including the prevalence of certain types of memory details, and we also considered the richness of memories. The research explored whether the visitor characteristics of age and visit frequency would impact on the content or level of richness of the memories.

Methods

Design

For the research question regarding the life-span distribution, an independent design was used, examining the specific memories for frequent and infrequent museum visitors (frequent or infrequent was based on frequency of visits in the last five years) across the life-time periods (segmented into time bins of 10 years).

For the analysis of memory specificity, special memories and memory content, a mixed design was used. Within-subject variables were memory content; special memories and specificity. Between-group variables were visit frequency (frequent/infrequent), and age (young/senior). For each category, percentages were calculated of the number of memories/content across all memories given by individual participants.

Participants

Forty young participants (30 years and under) and forty senior participants (40 years and over) were recruited via the University of Westminster’s Psychology Research Participation Scheme for undergraduate students, through the University of the Third Age, and through snowball sampling. Participants were classified into frequent and infrequent visitors, based on their museum visiting habits in the past five years. Using a median split, those who currently visited museums at least once every six months were classified as frequent museum visitors. Those who visited museums once a year or less were classified as infrequent museum visitors.

There was no difference in the ages of the senior participants ($t=.015$, $df=38$, $p=.90$). There was a difference in the ages of the young participants, with infrequent visitors being significantly younger than frequent: ($t=2.26$, $df=38$, $p=.03$). The mean difference was -1.85 (95% CI: -3.5 , $-.19$).

		Age	Gender
Young	infrequent visitors	19.7 (1.34)	18 females 2 males
	frequent visitors	21.6 (3.41)	18 females 2 males
Senior	infrequent visitors	57.9 (13.43)	16 females 4 males
	frequent visitors	58.5 (11.24)	18 females, 2 males

Table 3.1: Mean (SD) ages and genders of participant groups by age and visit frequency

For the research question exploring life-span distribution, only participants aged 40 and over were included. Two participants provided only general memories and was excluded. Of the resulting sample of 38 participants, there were 20 frequent (mean age in years=58.15, SD=11.70), 18 infrequent (mean age in years= 55.39, SD=11.72)

museum visitors. A t-test confirmed no significant differences in the ages of the frequent and infrequent visitors: ($t=0.73$, $df=36$, $p=.47$).

The study was carried out in line with British Psychological Society ethical guidelines, and was approved by the University of Westminster's Psychology Ethics Committee. All participants gave informed consent and were debriefed upon completion.

Materials

Autobiographical memory questionnaire: The questionnaire invited participants to share up to 6 memories of museum or gallery visits. 'Museums and galleries' was left open for participants' own interpretation and not qualified or restricted. Participants were instructed to just select the first 6 memories that came to mind, or as many as they were able to recall (if less than 6). The general probes used to develop memories were 'please tell us about up to 6 museum or gallery visits that you remember.... Please just select the 6 that come to your mind now.' 'please try to describe at least three specific things that you remember about the experience'. Participants were then prompted to provide at least three specific things that they remembered about the experience, such as something about the museum or gallery itself, its artworks or exhibitions, a feeling they experienced, a conversation they had, or any specific moment they recalled about the visit. They were told that these things could be clear events, or just fragments of a memory. They were also asked to give the approximate age they were at the time of all visits recalled.

Museum experience questionnaire: Participants were asked about their museum visiting habits, past and present, including the life period in which they visited museums most frequently. (please see appendix 2.1 for a copy of the questionnaire)

Procedure

The questionnaire was hosted on the Qualtrics platform and was distributed via an email link. It was completed online, meaning that participants spent variable amounts of time completing it and they took part in a variety of locations. Upon completion, participants were debriefed and thanked for their time.

Data coding

Each individual autobiographical museum memory provided by a participant was categorised across two domains – specificity and importance. All memories were then analysed for content.

Memory specificity and importance:

Autobiographical memories were firstly categorised as either a non-memory, a general memory, or a specific memory. Specific memories only were included in analysis of the reminiscence bump.

Non-memory was selected if the text given by the respondent did not constitute any kind of autobiographical memory, for example a generic comment such as ‘I like the Science Museum’, or just the name of museum itself. These were coded as non-memory and not analysed further.

General memory was selected if there was no information in the memory that enabled it to be situated in a specific day or moment. General memories could be an amalgamation of many different visits, perhaps typifying a life period, or they could be descriptive memories without a spatial-temporal context.

Specific memory: memories were classified as specific memories if they contained some detail which indicated a particular day or moment, such as a reference to the time when the visit happened, or to something specific that happened there.

Grammatical tenses and their use in memory classification: The use of tenses, and shifts from one tense to another, were instrumental in the categorisation of memories. For example, the use of the present tense throughout was an indicator to classify the memory as ‘general’. Similarly, some memories were all the past tense, as this example: ‘The V&A - I really liked that for most of the things displayed there they had an audio information if you are interested to hear more about what are you looking at.’ In cases such as these, the use of the past tense throughout could indicate two scenarios. Firstly, that the memory did indeed refer to a specific moment in the past. I ‘liked’ it (on that day that I visited). Secondly, it could indicate an opinion of a series of multiple visits over a period of time. As it could not be determined which scenario applied, these types of memories were classed as general.

Changes in tense were taken as an indicator that a memory was moving from a general memory to a specific moment, for example with a shift from present to past tense. In the following memory, the fragment contains a shift from the present tense, to the present perfect (*'has recreated'*) to the introduction of a specific detail in the past simple tense (bold type): 'Preston Park Museum, Stockton. Good place to take children as it is in a parkland setting. ... Museum has recreated street of shops... **Also had a valuable painting...**, housed in a darkened room by itself, very reverential, made you feel you could only whisper'. This shift in tense through to a specific moment in the past was considered adequate to classify such fragments as a 'specific memory.'

Memory fragments with no verbs were by definition classed as general, as there was no verb construction to link detail to any specific moment: 'Saatchi Gallery. Wonderful exhibition by young new artists.'

Special memories: Specific and general memories were coded for importance (special/non-special). '*Special*' memories included memories that had an emotional element that indicated an enduring relevance and salience for the participant (Conway & Pleydell-Pearce, 2000), such as 'first time, 'self-defining', 'culture-defining' or 'transitional' memories. All other memories were categorised as '*Non-special*.'

Memory content:

General and specific memories were broken down into discrete segments and scored for content. Participants' counts for each category were summed and a percentage calculated for each type of content that they recalled.

Scoring for content addressed categories: 'event-specific acquired knowledge', 'context', 'time', 'place', 'person', 'social interactions', 'event', 'sensory-perceptive', 'emotions' and 'cognitions.' A segment of text was based on units of meaning, and could range from a single word to an entire sentence. However, the codes were mutually exclusive, so once a segment was coded it was not considered for inclusion in another category. The texts were coded and 10% of the sample was coded by a second, independent rater. The second-coder was given detailed instructions, including examples (see appendix 2.2). Inter-rater agreement was 95.66% for the sample.

Event-specific acquired knowledge: this category included details internal to the event (visit), for example objects or artworks seen, such as 'Queen Victoria's wedding dress',

‘the Mona Lisa’, and details of them, such as the ‘different expressions and postures’ of the Terracotta Army soldiers. This category also included physical features of the exhibition, its displays or facts/concepts recalled. This type of information is semantic information, but specific to the event being recalled.

Context/time: This included a) abstract, thematic knowledge that contextualised other information in terms of the rememberer’s personal history (Conway et al., 1992). This category also included information from participants that was too broad in scope to count as a specific detail, for example: ‘there was a lot of stuff to do with the world war’, or comments from participants that qualified the visit in some way: ‘there was plenty to see and do’. It also included b) time details that place the museum visit in the participant’s sense of autobiographical chronology as well as details on perceived duration.

Place: details of the physical environment of the museum, such as references to the different floors of the museum, the shop or café, or physical features such as ‘a grand hall’. Mention of the location (city, region). Where the participants gave a title to their memory, e.g. ‘the Natural History Museum’, this was not coded for place, as treating these as part of the memory text would have overly inflated the place counts. However, if specific information was given within the title ‘eg Australian Impressionists at the National Gallery’, then this would receive one count for ESAK’. Multiple identical references to the same part of the museum, e.g. ‘the rooms’ were coded for ‘place’ the first time, but not with every repeated use.

Person/social interaction: This category included a) detail to do with a person or people known to the rememberer at subsequent recall e.g. friend or family member, teacher, or tour guide, and b) social interactions with others, known and unknown.

Event: In line with other autobiographical memory coding systems (Levine et al., 2002), this category includes happenings ‘we lost my son’, ‘there was a book reading by an author’, ‘we had a guided tour’, as well as weather conditions ‘It was raining’. It also includes references to people present who were not known to the rememberer ‘there were hosts in pink shirts’, or mentions of crowding in the museum e.g. ‘it was too crowded to see much’. Emotional reactions or physical actions of others were coded as ‘event’: ‘She was fit to burst with pride’, ‘I watched a man draw.’

Sensory-perceptual (SP) categories: these categories were used to capture detail in memories that presented as imagery from across modalities: such as visual, auditory, olfactory, spatial, or taste, in accordance with the experience-near episodic elements described in the autobiographical memory literature (Conway, 2009; Conway & Pleydell-Pearce, 2000; Conway et al., 1992). Two further perceptual categories were defined: ‘pain’ (including discomfort and fatigue) and ‘kinaesthetic’ (including movement).

Emotion: any mention of emotions experienced were coded in this category, whether reported directly as a feeling or state: ‘I was very emotional’, or whether reported indirectly: ‘wonderful exhibition’, or ‘the atmosphere was incredible.’ Reports of the emotions of others were included in the category ‘event,’ (Levine et al., 2002).

Cognition: details classed as thoughts or implications were coded in this category. This included thoughts relating directly to the exhibit or its subject matter: ‘stunning, exceptionally high quality photos’, thoughts relating to the overall experience: ‘I remember thinking about how grand it all looked’, thoughts generated in response to the event (visit): ‘For the first time in my life, I had mixed feeling towards my faith’ and thoughts relating to the rememberer themselves and their autobiographical memories: ‘reminded me of flying my kite with my dad.’ Cognition also included expressions of interest. Cognitions were not coded for the content within them, to avoid double coding the texts.

Results

Life-span distribution

A total of 210 memories were provided by 40 participants aged 40 and over. General memories were excluded, leaving a sample of 128 specific memories from 38 participants. These memories were sorted into 10-year bins, and the age at encoding was plotted against the numbers of memories observed and the number of memories that would be expected. The expected value was determined by evenly distributing the number of memories provided by the participant across their life span, for example a 40-year-old who provided two memories would have an expected value of 0.5 in the first four time bins (Loveday, Woy, & Conway, in prep.), see Figure 3.1:

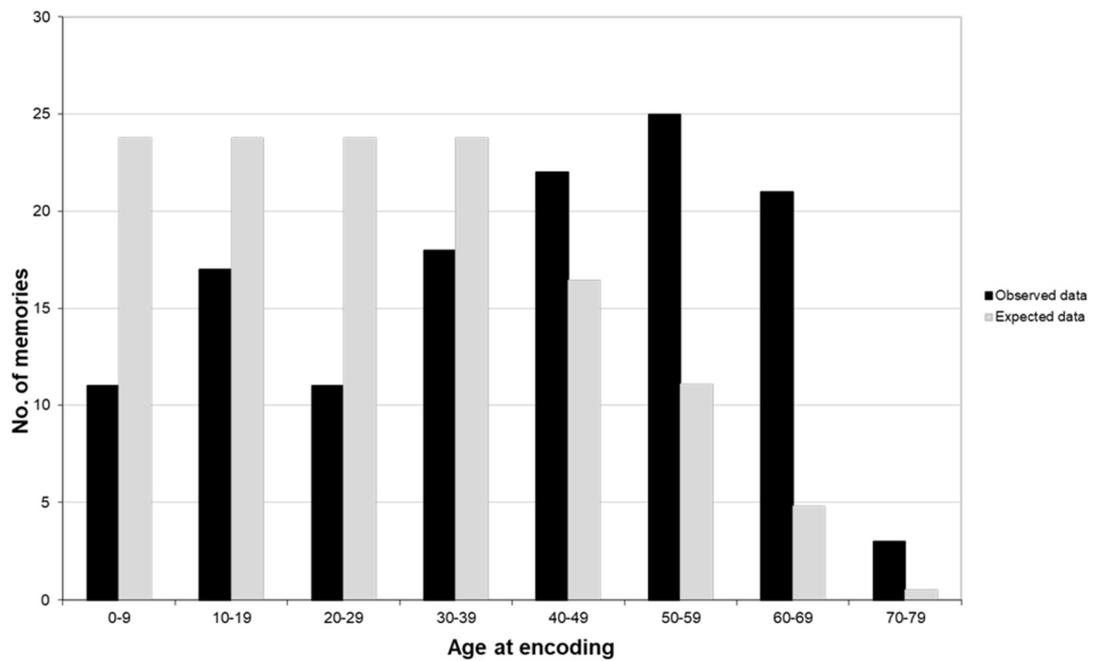


Figure 3.1: Distribution of specific memories across the life span; expected and observed data

A chi-square analysis confirmed that the patterns of expected and observed data were significantly different: $\chi^2=103.00$, $df=7$, $n=38$ $p<.001$. Figure 3.1 suggests that, although relatively more memories were encoded in one of the reminiscence bump decades of 10-19, fewer memories in the first four decades of life were encoded than may be expected. In contrast, more memories were encoded than expected from the 40-49 decade and upwards, indicating a strong recency effect for the sample (where the mean age was 56.84 years).

Data were collected to examine the life period in which people visited museums most frequently. As demonstrated by Figure 3.2, the strong recency effect observed above does not appear to reflect the periods in people's lives when they were visiting museums the most.

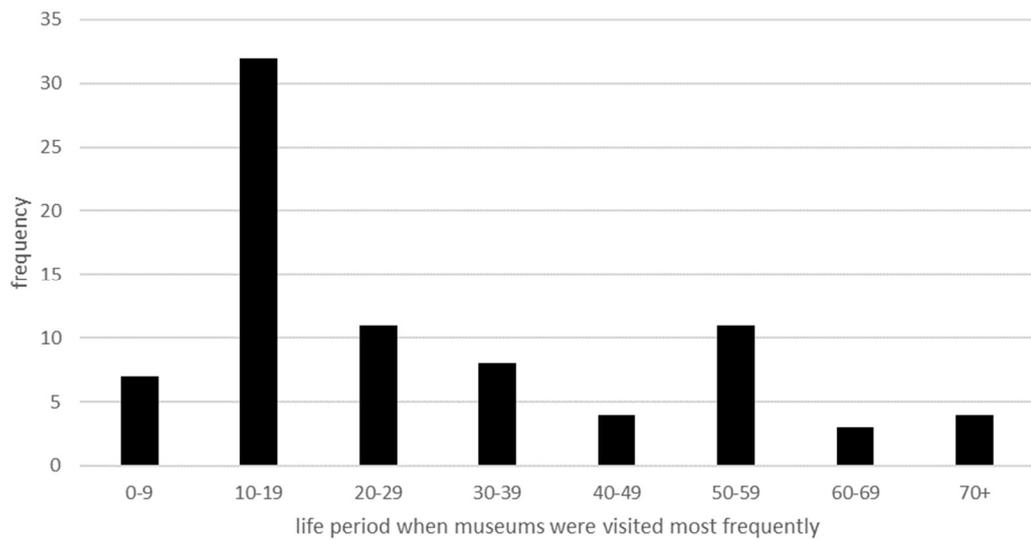


Figure 3.2: Periods in participants' lives when they visited museums the most, by frequency

Visitor differences

Reminiscence bump

The life-span distribution data was split by frequent and infrequent visitor groups. This resulted in a total sample of 18 memories for frequent visitors and 33 for infrequent visitors. Only memories encoded before age 40 were examined, as this represented the period within which all participants could generate memories. This is standardly the period considered to represent the reminiscence bump. All memories within five years of the participants' ages were excluded.

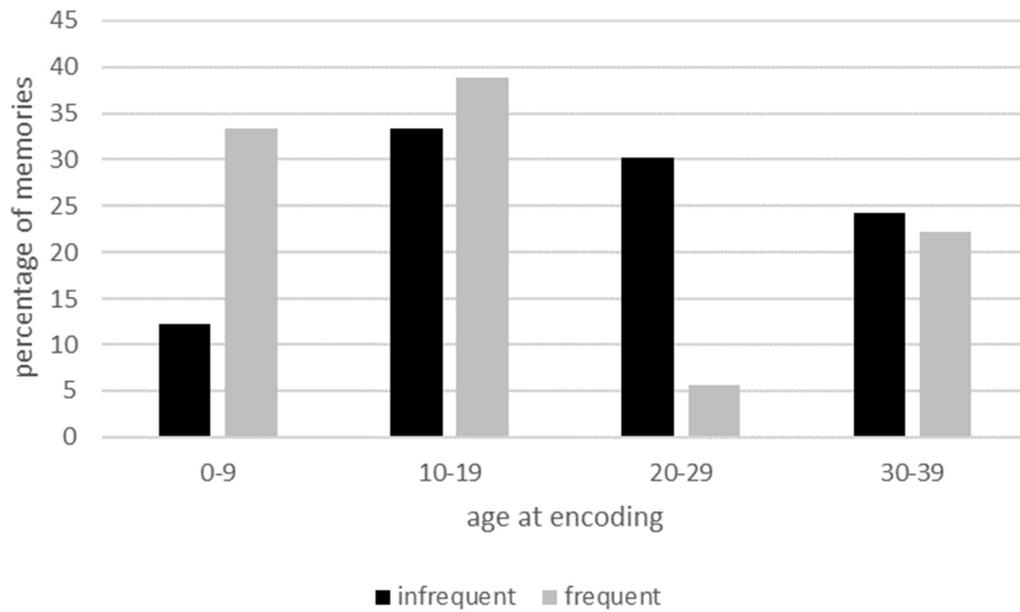


Figure 3.3: Percentage of memories up to age 40 by age at encoding, split by visit frequency, with five-year recency removed

The pattern of encoding in Figure 3.3 suggests an earlier peak for frequent compared to infrequent visitors. This is despite the fact that the median ages of encoding for the first museum memories was comparable in both groups. The median age of encoding for the first museum memory was 8 years (range =24) for frequent visitors and 8.75 years (range =45) for infrequent visitors. A Mann-Whitney U test confirmed no difference between these two groups: ($U=574.00$, $N_1=36$, $N_2=36$, $p=.406$).

Memory specificity

Memory specificity, special memories and the content of memories was analysed to establish the effects of age and visit frequency. Firstly, the number of memories provided by each group was calculated:

		Number of Memories
Young	infrequent visitors	4.65 (1.27)
	frequent visitors	5.35 (1.10)
Senior	infrequent visitors	5.55 (0.89)
	frequent visitors	5.45 (1.00)

Table 3.2: Mean (SD) number of memories provided, by participant group

The mean number of memories for both frequent and infrequent older adults, and the frequent younger visitors was close to ceiling of 6 memories (see Table 3.2). The younger, infrequent visitors appeared to have fewer memories, on average, than the other three groups. However, a Mann-Whitney U test confirmed no difference in the number of memories between young infrequent and frequent museum visitors: ($U = 139.00$, $N_1 = 20$, $N_2 = 20$, $p = .076$.), suggesting no differences between groups overall for the number of memories produced.

From the 420 memories generated by participants, 3 were non memories. These were excluded from the data and not considered further. The percentage of each participant's memories that were specific and general were calculated and these values used to calculate the mean for each participant group.

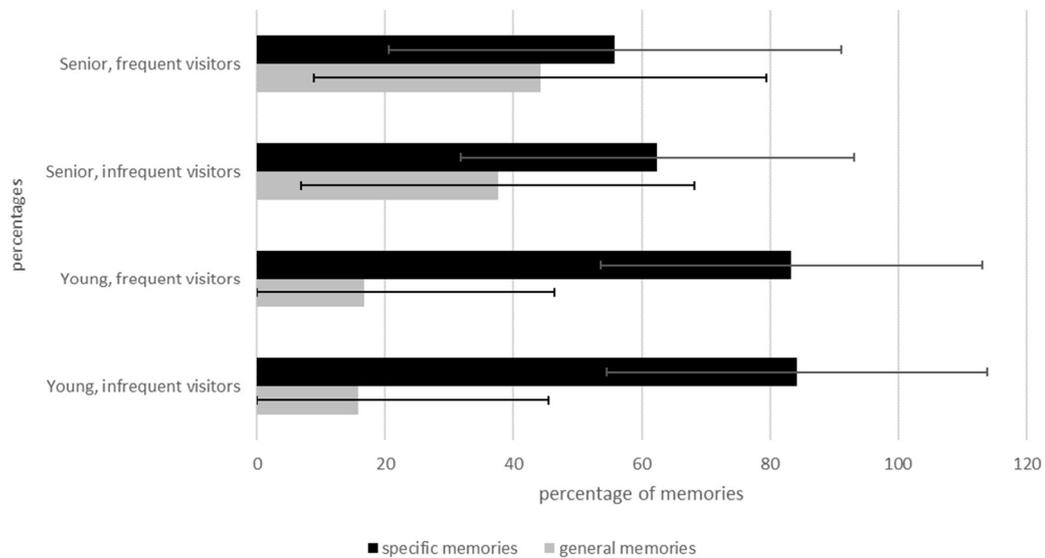


Figure 3.4: mean (SD) percentages of specific and general memories by participant groups

Figure 3.4 shows that general memories appear more prevalent in the older participant groups. As the normality of the data distribution did not permit use of ANOVA, a Mann-Whitney U test was performed on the proportion of participants' memories that were specific: ($U = 421.00$, $N_1 = 40$, $N_2 = 40$, $p < 0.001$). This showed that the proportion of specific memories was significantly higher for younger participants (median=1, range=1) than older participants (median =.67, range=1). However, there was no significant difference between frequent and infrequent visitors ($U=766.50$, $N1 = 40$, $N2 = 40$, $p=.74$).

Special memories

Transitional, self-defining and 'first-time' museum memories were rare, with no culture-defining memories within the sample. All these memories were combined into one 'special memories' category. Although the mean percentage of special memories was slightly higher for senior infrequent visitors (mean= 8.75%, SD= 16.99) compared to all other groups (all means $\leq 4.58\%$, s.d. ≤ 9.92), the numbers were extremely low, and too low for further analysis.

Memory details

A total of 417 memories provided by the 80 participants were coded for content, and percentages recorded for content types for each participant. Mean percentages of the

total number of details were then calculated for the participants for each detail type and are shown in Figure 3.5.

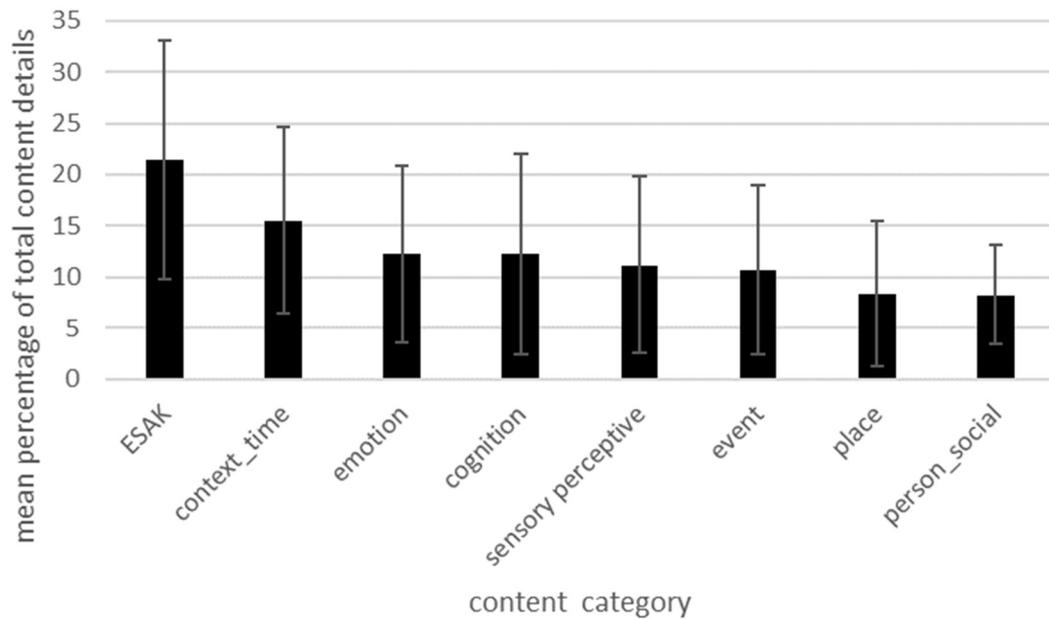


Figure 3.5: Mean (SD) percentage values for content categories

The data distributions of the finalised 8 content categories was rendered suitable for parametric analysis by means of a square root transformation. Where sphericity could not be assumed, the Greenhouse-Geisser correction was applied. A mixed ANOVA (2 x 2 x 8) was performed on the mean percentages of content types. The between subject factors were age (young/senior) and visit frequency (frequent/infrequent). The within subjects variable was content type (ESAK/context-time/emotion/cognition/ sensory-perceptive/event/place/person-social). There was no significant main effect of age ($F(1, 76) = 0.58, p = .45$) or visit frequency ($F(1, 76) = 0.54, p = .47$), There was a significant main effect of content categories: ($F(5.6, 427.12) = 13.23, p < .001$). There was also a significant interaction between age and content types: ($F(5.6, 427.12) = 3.12, p = .006$). There were no other significant interactions (all $p > .1$).

From Figure 3.5, event-specific acquired knowledge (ESAK) appears to be the most prevalent type of content, followed by context-time. Repeated measures contrasts were conducted on the square root transformed variables to examine the main effect of content category. These indicated that there was a significant difference between ESAK and Context-time ($p = .006$). The mean difference was 0.72 (95% CI: 0.21, 1.24). There was a significant difference between Context-time and Emotion ($p = .033$). The mean difference was 0.50 (95% CI: 0.04, 0.95). There was no difference between Emotion

and Cognition; Cognition and Sensory-perceptive; Sensory-perceptive and Event (all $p > .66$). More Events were recalled than Place ($p = .033$), mean difference 0.45, (95% CI: 0.04, 0.87) but there was no difference between Place and Person/Social Interaction ($p = .62$).

It is worth noting that when emotion and cognition were combined into a ‘reactions’ category, then the mean (SD) value for this category was 24.46 (14.67). A t test confirmed no difference between ESAK and reactions: ($t(79) = .63, p = .53$).

In order to explore the interaction between age and category type, t -tests on the square root transformed variables of the 8 detail types were performed, with age as a grouping variable. Bonferroni-holm corrections were applied for multiple tests. There was a significant difference between age groups for emotion: ($t(73.64) = 2.04, p = .045$), with a mean difference of -0.67 between transformed emotion scores for young and senior (95% CI: -1.22, -0.02). For event, there was a significant difference between groups: ($t(78) = 4.12, p < .001$), with a mean difference of 1.12 between transformed event scores for young and senior (95% CI: 0.59, 1.65). No other t -tests were significant, all $p \geq .22$.

Memory richness

		Word count per memory (mean, SD)
Young	infrequent visitors	66.85 (35.41)
	frequent visitors	80.87 (53.74)
Senior	infrequent visitors	63.02 (32.72)
	frequent visitors	63.76 (36.22)

Table 3.3 The mean (SD) word count per memory for young and senior frequent and infrequent museum visitors.

A 2 (young/senior) x 2 (frequent/infrequent) between subjects ANOVA looking at participant's mean memory word count confirmed that there were no significant effects of age ($F(1,76) = 1.34, p=.25$) or visit frequency ($F(1,76) = .67, p=.42$) and no interaction effect ($F(1,76) = .54, p=.46$).

In order to compare the richness of memories for each participant the total number of details was divided by the number of memories to get the mean number of details. The resulting data were rendered suitable for parametric analysis by means of a square root transformation. An ANOVA was performed on the mean details provided. There was no main effect of age (young, senior) on the mean details provided: ($F(1,76) = 0.002, p=.97$), and no main effect of visit frequency (frequent, infrequent) on the mean details provided. ($F(1,76) = 0.160, p=.69$). There was no significant interaction ($F(1,76) = .46, p=.50$).

Discussion

This study explored autobiographical memories for museum visits throughout the life-span. The study sought to establish what the impact of visit frequency might be on the life-span distribution of these memories, and what the impact of visit frequency and age might be on their specificity, 'special' nature and content.

The first research question addressed the life span distribution for specific memories of museum visits. For the sample as a whole, the distribution of memories differed significantly from the expected distribution. Whilst the whole group sample suggests a small reminiscence bump in the teenage years, what is most striking about this data is the strength of recency effect. This pattern differs from other explorations of the distribution of lifespan memories (Conway & Pleydell-Pearce, 2000, Munawar, Kuhn & Haque, 2018). The current study suggests that autobiographical recall of museum visits is biased towards recent experiences rather than the earlier identity-forming years. In other words, memories of museum visiting do not tend to be 'stand-out' memories that are hugely important in terms of identity development during the reminiscence bump period.

It is possible that the observed recency effect may reflect the importance of social sharing. Museum-going is an activity or interest, often carried out in a social group, which may provide content for social interaction and interpersonal communication (Alea & Bluck, 2003, Cohen & Conway, 2007). As such, it is part of social sharing,

which has also been closely linked to identity (Pasupathi, 2001). This finding is also important from the museum perspective, because it suggests that museum visits not only provide opportunity for social sharing and interaction during the visit (Falk, 2016), but also the memory of that visit forms part of interpersonal communication which may have links to identity. This type of sharing of experiences or interests with others may be what keep recent memories accessible (Conway & Pleydell-Pearce, 2000).

Furthermore, if one is a keen museum-goer, and this forms part of one's current identity, then memories of museum visits may be privileged by the memory system. This would be in accordance with the theoretical understanding of the relationship between the current self and working goals (Conway & Pleydell-Pearce, 2000, Conway, Singer & Tagini, 2004). It is therefore possible that the recency effect observed here is indicative of museums continuing to feed into visitors' sense of identity throughout life, which would support the importance of the relationship between museums and identity as explored in the museum literature (e.g. Falk, 2016). An alternative explanation for the recency effect is that people are more likely to go to museums when older, and so have more recent accessible memories in these later decades. For example, research has indicated that 41% of all visitors are over the age of 55 (The Audience Agency, 2018). However, in our sample, participants self-reported as visiting museums most frequently earlier in life.

The second research question addressed the question of the impact of visit frequency and age on autobiographical memory for museum visits. An exploration of the distribution of memories across the lifespan suggested that frequent visitors had a higher proportion of memories in early childhood, despite the fact that there was no difference between frequent and infrequent visitors in terms of the age of the first museum memory. Whilst it is not clear if the frequent visitors had more visits during early years, if the visits were simply more memorable, or whether it is a combination of both; it is worth noting that this finding is consistent with research that shows an earlier reminiscence bump for music in musicians compared with non-musicians (Loveday, 2016). It is also worth noting that while there appears to be a reminiscence bump, the overall frequency of observed memories was lower than the expected distribution of memories within that period. Nevertheless, these findings are in line with observations from the museum literature, which have identified the importance of museum visiting in childhood as a grounding for future museum visiting habits in later life (Falk, 2016). Our results are also in line with previous research that has demonstrated that older

individuals produced more general memories than younger people (Dikmen et al, 2014, Levine et al., 2002, Piolino et al., 2009). No differences were found between memory specificity between frequent and infrequent visitors.

The third research question concerned the content of autobiographical memories for museum visits, with a consideration of the possible impact of age or visit frequency. Our coding model was designed to distinguish between different types of content within both general and specific autobiographical memories. The pattern of content of museum memories was similar across all participants, with only minor differences relating to age or museum visiting habits.

The results for content showed a hierarchy of content categories in the memories across the sample. These content categories can be understood as the ‘building blocks’ that contribute to the reconstruction of a memory of a cultural experience, and to the re-telling of that memory. When participants’ emotional and cognitive reactions to the museum visit were combined into ‘personal reactions’ (see Levine et al., 2002), the most prevalent categories were the latter and event-specific-acquired knowledge –what was seen and learnt in the museum environment.

The next largest category was context-time. Much of this information encompassed participants’ ‘back story’ to the event they were describing. The prevalence of this category is consistent with the understanding of autobiographical memory’s importance in social functions, including social sharing and telling one’s own story (Cohen & Conway, 2007). Thus, participants ‘told the story’ of their memories of museum visits, as demonstrated across the sample: ‘I’m from Hastings and we have several museums as we are a historic town’ (young, frequent visitor); ‘This was the first museum I visited when I came to London’ (young, infrequent visitor). The importance of context or ‘back-story’ also suggests that a memory of a museum visit is integrated with hierarchies of information that are personal to the rememberer, such as ‘when I went on school trips’, or ‘when I was in a relationship with x.’ Furthermore, it seems likely that memories of events (i.e. visits and events within them) are also contextualised by conceptual knowledge, such as ‘I remember this day really well because as a child I was really interested in astronomy.’ This category is therefore consistent with the contextualised and thematic nature of autobiographical memories (Conway & Pleydell-Pearce, 2000).

These findings show that the detail of what was seen or learnt, personal reactions, followed by the context of the museum visit, were the most important categories in these memories. This indicates both that some form of ‘learning’ took place in the museum, that cognitive and emotional reactions took place, and that visitors contextualised their memory of the visit within their autobiographical knowledge about themselves. The tendency to contextualise is also indicative of the social sharing function of autobiographical memory, as it forms a key explanatory part of narrative.

That emotion should be salient is unsurprising, given that emotion is frequently expressed in the retelling of events (Alea, Bluck, & Semegon, 2004). Events that trigger emotional responses are more likely to be encoded in memory more deeply (Holland & Kensinger, 2010) and both positive and negative emotion have been shown to strengthen autobiographical memory retrieval in the museum literature (Anderson & Shimizu, 2007, Falk, 2016). Furthermore, emotional memories have been shown to be richer in detail (St Jacques & Levine, 2007). Thought-provoking museum visits are likely to involve encounters with unusual or unfamiliar content, or with content that forms some kind of connection to the visitor’s personal experience. It therefore seems likely that such encounters may stand to be discussed (rehearsed) more often, thus rendering these cognitive details more accessible later when the event of the visit is reconstructed. Higher levels of both emotional and cognitive content arguably infer that a deeper level of processing has taken place. The salience of emotional and cognitive reflections is consistent with the discussion of meaning-making in the museum literature which describes how visitors reconstruct memories of their visit from the array of thoughts, emotions and visiting contexts (Falk, 2016).

The next levels of the hierarchy all had a relatively small level of content. Sensory perceptive detail and event were followed by place and social interaction. Museum researchers contend that social interactions are a strong influence in the visitor experience (Ellenbogen, Luke & Dierking, 2007, Falk & Dierking, 2000, Falk, 2016). Therefore, it seems surprising that content about people and social interactions should be at the lowest end of the hierarchy. Following Levine et al (2002), we analysed social interaction with known individuals separately from observations or interactions with people not known to the participant (classed within event). It is possible that combining all references to other people into a broader ‘people’ category may have resulted in a larger overall category. Further research on the nature of memories for experiences,

particularly cultural experiences, is needed to contextualise this finding, and provide a benchmark for the importance of social interactions in memories for experiences.

Just as the detail categories were broadly consistent across participant groups, so too was the level of richness of the memories, in other words, the total number of details recalled. Although older people had more general memories than younger people, the prevalence of general memories did not impact on memory richness. Inclusion of details that are not necessarily linked to a sense of re-experiencing through memory specificity may account for this.

There were some differences as a result of age and visit frequency. Analysis confirmed a higher proportion of emotional content in older participants, and higher proportion of event content in younger participants. It is possible that the higher proportion of emotional content recalled by older adults could be due to the relationship between emotion and autobiographical remembering, that is, that museum visits that evoked more emotion were more likely to endure across the life span (Holland & Kensinger, 2010). However, increased emotional content could also be due to changing relationships with emotion in aging. Research has suggested that older adults process and retain emotional material more deeply than younger adults (Carstensen & Turk-Charles, 1994), and that older adults recall more thoughts and feelings than younger adults (Luchetti & Sutin, 2017, Hashtroudi, Johnson, & Chrosniak, 1990).

In contrast, details of event content were more prevalent in younger visitors. These details made up the experience of the day, such as participation in activities, playing games and interacting with displays, making purchases in the shop, taking photos, or recalling details about other visitors in the environment. Such content, when present, enriches memory specificity. It is likely that the event content in our results was an aspect of specificity which contributed to the higher proportion of memories being coded as specific in the younger participants. This finding is consistent with the research literature that has demonstrated higher levels of specificity in younger adults and more general memories in older adults (Dikmen et al, 2014, Levine et al., 2002, Piolino et al., 2009). Therefore, the findings for emotion and event in this research are consistent with what is known about autobiographical memory and ageing. This suggests that the pattern of content of memories was predominately similar for all visitors, regardless of age and visit frequency.

Conclusions

The exploration of the distribution of memories for museum visits across the lifespan highlighted the importance of recency in the lifespan distribution of museum memories. This finding is suggestive of the importance of museum visits to the social sharing function of autobiographical memory. If one partakes in cultural activities in the form of leisure activities, interests and hobbies, then it seems likely that the memories of these activities will form part of the current sense of self and one's social conversations, thereby promoting the accessibility of these memories through coherence and rehearsal. It is also likely that early positive experience in museums impacts on visit frequency later in life, reinforcing the importance of time invested in programming with children and young people.

The results also demonstrated that all visitors presented similar patterns of recall in terms of content, with the exception of variations in specificity and in emotion content which are consistent with the literature on autobiographical memory and ageing. This suggests that the content of museums memories as it endures over time is less subject to individual differences in the museum visiting experience, but is rather structured by the hierarchical nature of autobiographical memory and the effects of ageing. This finding adds weight to observations in the museum literature that museum memories share structural commonalities and that all memories are constructed from a small number of basic elements (Falk, 2016). For museums, this suggests that visitor demographics may not be the key metric in understanding impact, as all visitors present similar patterns of content in recollections. Rather, museums could more usefully consider the types of content recalled, and what this may mean for the impact that they have and the way that they engage.

Key features of autobiographical remembering were demonstrated in this research; the presence of knowledge acquired during the event, contextualising details that suggest the integration of such information with higher order conceptual frameworks, affect, and more limited episodic information such as experience-near sensory perceptive elements. This research also demonstrates that museum memories are embedded with thoughts and emotions that endure strongly enough over time to present in a remote recall task that was not heavily prompted or directed. For museums, this suggests that finding ways to help visitors relate 'learning' to their own experiences and sense of self stands to create enduring memories. Understanding how a visit might become part of a

visitor's personal narrative in years to come is crucial, and programming and interpretation that invites the visitor to embed the visit into their own personal narrative may help to develop the potential for long-lasting memories. Visitors' memories show that they integrate the visit into their own personal history, their sense of who they are, and that their reactions (thoughts, emotions) to the visit are what endure. The application of understanding from autobiographical memory theory will only serve to enrich our understanding of memories for cultural events and their function in human memory.

Summary

Evaluation measures drawn from autobiographical memory theory are able to provide generalisable understanding about museums' impact on their visitors. This analysis based on autobiographical memory measures suggests a number of ways in which museums impact on their visitors over the life span. The strong recency effect suggests the importance of inter-personal communication and social sharing in autobiographical memories for recent cultural experiences. The importance of early experiences in museums is also suggested by the findings with frequent museum visitors. The analysis on content provides understanding about the lasting impact of a museum visit. It reveals a lasting impact of information encountered in the museum, the ways in which visitors contextualise the museum experience in their own personal narratives, and the salience of personal reflections about the experience. The hierarchy of content recalled is primarily the same across visitor differences, with the variations that are observed being attributable to what is known about autobiographical memory and ageing. The coding model used here thereby enables exploration of the long-term impact of museum experiences. This brings context to the discipline of museum AD by setting out the salient features of the experience that AD is seeking to facilitate. Having looked in depth firstly at museum AD practices and AD's function as access, and secondly at the museum experience in the form of memories, this thesis will now turn to an exploration of the impact of AD on the experience and memorability of sighted people.

Chapter 4: ‘Guided looking’: supporting visual exploration of artworks with audio description

Abstract

This chapter explores the impact of museum AD on the experience and engagement of sighted people. It is the first empirical study to do so. The chapter briefly revisits the rationale for exploring the use of AD by sighted visitors in the context of access, inclusion and inclusive design, before expanding upon the ways in which ‘experience’ and ‘engagement’ can be understood and measured. In this study, sighted participants viewed a photography exhibition, either with a standard audio guide (SAG) an audio descriptive guide (ADG), or no audio interpretation. Their experience of the exhibition was measured at the first stage of the experiment (time A) and one month later (time B). At time B, participants were also asked to recall as much detail about the photos as possible. The findings showed that the experience of viewing the photos was broadly similar for participants regardless of whether or not they listened to SAG, an ADG, or nothing at all, although subsequent engagement (activity related to the experience that took place in the month after viewing) was higher in those who listened to audio texts. SAG and ADG participants recalled more photos than NA participants, but memorability was richest for participants who listened to AD, indicating that AD increases the lasting impact of the artworks presented. An ADG therefore has potential as a tool for inclusive interpretation in museums, as it is enjoyed as much as standard audio guides, and it results in more detail being recalled about the artworks. It could also be used by people with or without sight, reducing the need for separate access resources and segregation of visitor groups.

Introduction

The central concept of this thesis is that ‘access’ in the museum means not only physical access to collections, but access to an engaging experience, with elements of emotional, social, and cognitive engagement. This distinction is of fundamental importance to museum AD, as it has implications for the content of AD, what it seeks to address, and the level of interpretation that may be permissible (see Chapter 2). If ‘access’ is restricted to the concept of physical access to collections, then AD would logically describe only the physical details of an object or artwork. However, museum memories demonstrate that whilst the content of what is seen and ‘learnt’ in the museum is important, so are personal contexts, thoughts, and feelings, traces of which can endure even after many years (Chapter 3). The findings of the thesis thus far suggest that a broader understanding of the remit of AD could be more consistent with facilitating experiences that are emotionally and cognitively stimulating as well as providing essential access to visual information for people unable to perceive it for themselves. This suggests a need to evaluate and understand the full breadth of AD facilitated experiences, including their cognitive, emotional and social elements. Furthermore, whilst there is a clear need for AD to facilitate museum experiences for people who are blind and partially sighted, there has been little exploration of the use of AD by sighted people. This chapter will now go on to consider what impact AD may have on this population’s level of access to museums’ collections.

Barriers to access and AD as inclusive design

It is important to re-visit the reasons why the use of museum AD by sighted people should be explored. Findings in the research literature on the museum experience suggest that having sight does not necessarily equate to having access in the museum (Koide et al., 2015). There may be a number of barriers to access. Firstly, the visual environment of the museum can be overwhelming (Bitgood, 2013), with an array of visual stimuli competing for visitors’ attention. This may lead to ‘browsing’ behaviour, whereby visitors spend only seconds in front of each exhibit viewed, moving swiftly from one to another, with limited time spent in front of any one piece. This has been demonstrated through studies of visitors’ behaviour in art museums. Smith & Smith (2001) observed 150 visitors in the Metropolitan Museum of Art, finding that visitors spent a median time of 17 seconds viewing a single artwork. In 2017, this study was replicated in the Art Institute Chicago (Smith et al., 2017) with observations of 456

visitors, recording a median time of 21 seconds. These studies raise the question of how much meaningful engagement can take place in such a short time.

A second potential barrier consists of the variation in people's knowledge about art and objects, and how to explore them visually. Research comparing viewing patterns of visitors who are art experts and non-experts has shown that although visitors with sight can see a work of art, they may not know how to use that vision to look in ways that draw out its specific cultural or artistic significance, context, or meanings (Koide et al., 2015; Vogt & Magnussen, 2007). This means that whilst novice museum visitors can see, they may not know to what they should pay attention in order to create a memorable or engaging experience (Csikszentmihalyi & Robinson, 1990). For example, art experts may scan for composition and form, whereas visitors with little knowledge of art are more likely to be drawn to recognisable features (Koide et al, 2015). This research suggests that visitors' ability to undertake a visual exploration of a stimulus is variable according to experience. It then follows that visitors may benefit from information on where to direct their visual attention, and knowing how and where to look, in order to enrich cognitive and emotional stimulation.

Some museums are responding to these barriers by seeking to control visual access by encouraging visitors to slow the pace of their looking and to be more selective in the number of objects they choose to look at. The curator of Tate Modern's 2018 Pierre Bonnard exhibition, Matthew Gale, has been reported as suggesting that visitors might look closely at just two or three works, allowing them to see things that they might otherwise miss (Brown, 2018), and increasing attention is being paid to 'slow-looking' both in the research literature and the media (Roberson, 2011; Rosenbloom, 2014; Tishman, 2017). However, such slow-looking workshops are currently a minority rather than a mainstream offering.

The majority of the support that museums offer visitors in terms of helping them to engage comes from more traditional museum interpretation, in the form of text labels and panels. In order for visitors to have an engaging experience, this interpretation has to capture visitors' attention and then hold it (Bitgood, 2013, in the hope that in so doing, their attention will be focused long enough for interest to be triggered (Renninger & Hidi, 2011, 2015; see Chapter 1). The busy and visually complex environment of many museums may pose a challenge to this capture of attention and development of interest. Furthermore, interpretation such as text labels and panels still require visitors to

combine their reading of these with a visual exploration of a work of art, meaning that engagement is still likely to be contingent on both the initial focusing of attention and the ability to explore artworks visually. Museum interpretation may be missing out on the opportunity to fully engage the visitor, if it assumes that sighted visitors have the visual literacy needed to direct their attention, in order to access what they are seeing (Eardley et al., 2017). It has been recognised that interpretation can support the visitor in recognising significance and deriving meaning from an experience, and that without this support, fulfilment is likely to be low (Bauer-Kroesbacher, 2013).

Interpretation that is delivered via the auditory channel, in the form of traditional audio guides, may help to support the reading of an image, and guides are therefore regarded as ‘anchoring’ texts in the museum (Christensen, 2011). Audio guides are known to impact on visitors by encouraging them to attend differently in the museum; prolonging their time spent at exhibits (Bauer-Kroesbacher, 2013), increasing inquisitive behaviours (Sung et al., 2008) and increasing engagement (Bertens & Polak, 2019). The use of a guide can therefore provide a way to navigate the myriad of visual stimuli on offer in the museum and to engage more deeply and cohesively with chosen exhibits.

Psychological theories of levels of processing (Craik, 2002; Craik & Lockhart, 1972; Ekuni, Vaz, & Bueno, 2011) may help to explain some of the benefits of audio guides to visitors. Firstly, levels of processing theory suggests that processing of a stimulus can occur at different levels, ranging from ‘shallow’ processing, which is based on the perceptual experience (colour, form, brightness, loudness etc) to ‘deep’ processing, whereby the stimulus incites personal analysis of meaning, inference and implications (Craik, 2002). Deeper processing is associated with increased memorability of the stimulus, both in working memory and autobiographical memory (Ekuni et al., 2011). In psychology, levels of processing and the relationship with memory are explored through tasks which require participants to recall words originally presented in different ways, ranging from the ‘shallow’ perceptual presentation (e.g. the word presented in different font colours) to ‘deep’ presentation (e.g. asking participants to engage with the semantic meaning of the word, by asking them to determine whether it fits in a certain sentence) (Ekuni et al., 2011).

In the museum context, these investigations may imply potentially different outcomes in terms of memorability depending on the original presentation of the stimulus (the artwork or exhibit). Perceptual presentation only (visual exploration) may result in

‘shallower’ processing than semantic or ‘deeper’ processing, where interpretation is provided that enables the user to interweave information about the stimulus with their existing knowledge. In the context of a museum, the deepest levels of cognitive engagement may be stimulated by the information or ‘story’ that could be provided by an audio guide. Furthermore, the provision of information through a guide can help users to make connections between the information they hear, and their existing networks and hierarchies of knowledge, a process known as elaboration (Craik, 2002). The provision of audio interpretation, therefore, may impact on memorability through helping to achieve a deeper level of processing and a greater degree of elaboration. Memorability benefits have been claimed by providers (Hinz, 2019), and have been the subject of theoretical exploration (Bertens & Polak, 2019), although such benefits have not yet been tested in empirical research.

However, despite the potential benefits to attention and engagement, the uptake of audio guides in museums is generally regarded as low (Lee, 2017). One audio guide study reported that 1 in 5 (of 40 participants) used audio guides ‘often’ but 65% of the group said they use them ‘rarely’ (Bertens & Polak, 2019). Another study on the uptake of audio guides in palaces in France and South Korea found that the use of guides was 5% and 1% respectively (Lee, 2017). In the UK, it has been reported that guides are used by 3% of visitors in the British Museum, despite significant investment and provision (Mannion, Shelley, Sabiescu, Amalia, Robinson, 2015).

Proposed reasons for this low uptake include practical issues such as not knowing they are available, or whether or not they are included in the ticket price, or not wanting to queue for one (Bauer-Kroesbacher, 2013; Lee, 2017). In Bauer-Kroesbacher’s (2013) investigation, 1 in 5 participants said that guides take too long, and indeed Lee (2017) found that only 27% of visitors used the guide until the end of the tour. Other criticisms have been raised regarding audio guides and their isolating effect (Aoki et al., 2002; Bauer-Kroesbacher, 2013; Lee, 2017) and it has been suggested that they hamper the visitor’s ability to enjoy the exhibits with full independence of thought (Bauer-Kroesbacher, 2013) (see also Chapter 1). Audio guides have also been criticised for being too detailed or distracting (Bauer-Kroesbacher, 2013). Therefore, the potential benefits of the audio guides to engagement and memorability have to be contextualized with the current low uptake that seems to pervade, and the disadvantages suggested in the research literature.

There are, however, compelling reasons why AD may differ to traditional audio guides and why it may potentially have a greater impact on memorability. A key difference between traditional guides and AD is that the purpose of traditional guides, whilst drawing attention to salient visual features, is not to systematically direct visual attention. Their role is rather to provide background information and context. AD, in contrast, would offer a kind of ‘guided looking’ for sighted people (Eardley et al., 2017), due to its anticipated ability to help people to direct, and importantly, prolong their visual attention. This difference between the two provisions has been demonstrated in AVT research, where corpus analyses have been undertaken on audio description and audio guide texts. Findings have demonstrated that spatial and visual positioning words were prevalent in AD texts, but not to the same extent in audio guide texts (Jiménez Hurtado & Soler Gallego, 2015), indicating the lower incidence, or absence, of ‘guided looking’ in traditional audio guides.

The use of the traditional audio guide is therefore likely to consist of two separate and simultaneous activities, exploring an artwork or object visually whilst listening to relevant information. It is therefore possible that audio guides could divide attention and increase cognitive load by requiring the visitor to attend to competing visual and auditory information. In contrast, AD would provide congruent visual and auditory stimuli to sighted people, as the nature of audio description would mean that users’ eyes would be guided to a visual feature by way of the verbal explanation, which is delivered aurally. This may reduce cognitive load, and indeed enhance memorability, as congruent stimuli are known to increase later recall (Kim et al., 2008). Indeed, psychologists advising museum practice have emphasised the importance of semantic congruence in museum interpretation (Ward, 2014).

There are other features of AD which suggest it could stimulate engagement levels even above and beyond those of traditional guides. Firstly, AD has the potential to create a multisensory experience through its use of sensory imagery, which would stand to increase memorability in sighted and blind people alike (Eardley & Pring, 2006). Secondly, it could provoke emotional and cognitive responses not only through the information it presents, but also its use of cognitive prompts and narrative (see Chapter 2 for discussion of these techniques). Creating a story is known to help recall of content (Bellezza, Richards, & Geiselman, 1976), as this is thought to help to organise ideas during encoding (Craik, 2002). In short, the techniques inherent to AD and its potential

effect on sighted visitor attention might impact positively on the nature and level of engagement for sighted visitors, and the resulting memorability of the experience.

Investigations into the use of AD with sighted people are limited, but research in film suggests attention benefits, with an eye-tracking study with children demonstrating that the use of AD led to more fixations in the areas of interest (Krejtz, Szarkowska, Krejtz, Walczak, & Duchowski, 2012). Museum AD practitioners also report that AD can benefit sighted people in a museum (RNIB, 2010; Synder, 2014), leading practitioners and researchers to speculate that it has potential as inclusive interpretation for all visitors (Eardley et al., 2017; Neves, 2016; RNIB, 2010). Inclusive Design principles seek to ensure not only that experiences are accessible to the widest possible group of people, but also that they are enriching and satisfying (MW2016, 2016). The creation of museum interpretation which could benefit more than one group of visitors would be in line with such principles, as well as furthering museums' desire to be inclusive organisations (Sandell, 2003). Furthermore, if museums were to provide audio guides that were fully inclusive for both blind and sighted visitors, then this would help to avoid the current situation whereby blind visitors have to use separate resources, resulting in a sense of segregation from other visitors (Reich et al., 2011).

However, the drawbacks of traditional audio guides such as isolation from companions, loss of independence of thought, distraction or unnecessary levels of detail (Aoki et al., 2002; Bauer-Kroesbacher, 2013; Bertens & Polak, 2019; Lee, 2017; Woodruff et al., 2001) could also apply to AD. There is therefore a need to explore the impact of museum AD on experience and engagement, a question not yet addressed in the research literature. There is also no data on how AD is received by sighted users in museums. The findings of this thesis so far have suggested that the potential benefits of AD should be analysed and considered in the context of a broad understanding of experience and engagement, as museum visits have been demonstrated to leave multiple traces of experience including emotional and cognitive aspects (Chapter 3).

Furthermore, an understanding of access should incorporate social, emotional and cognitive engagement as well as physical access, meaning that analysis of museum AD as Inclusive Design should allow for identification and measurement of all of these elements.

Engaging experiences: approaches to measurement

Museum research and practice have sought to facilitate and measure engagement (Herz, 2017; Taheri et al., 2014). However, engagement is in itself a complex term that resists straightforward definitions: various aspects of engagement may need to be measured in different ways (See Chapter 1). Firstly, having an engaging experience in a museum consists of cognitive, emotional and social aspects, as demonstrated in Chapter 3 (see also: Anderson, 2003; Anderson & Shimizu, 2007; Falk & Dierking, 1990, 1997; Medved et al., 2004). Cognitive aspects may consist of the assimilation of semantic information, such as socio-historical narrative or concepts learnt in the museum. It could also include people's expressions of interest. Furthermore, engagement in the museum is not purely cognitive but could also mean having an enjoyable or moving experience, which suggests the importance of understanding visitors' emotional responses to museum experiences. Understanding the nature of social interactions can provide further insight into how engaging the experience was for the visitor. Therefore, approaches to measuring the level of engagement in a museum experience must necessarily be manifold. There cannot be one straightforward measure of engagement, but rather multiple measures can be brought together to address these diverse aspects of engagement, such as attention, enjoyment, interest, and emotion.

However, a full exploration of engagement also requires an understanding of the lasting impact of a museum experience, thus suggesting the importance of longitudinal studies (Anderson, 2003; Anderson & Shimizu, 2007; Falk & Dierking, 1990, 1997; Medved et al., 2004; Medved & Oatley, 2000). Memory traces are known to require time to become consolidated (McGaugh, 1966, 2000). By assessing what traces of information or what aspects of the experience remain in a visitor's mind weeks or months later, and combining these with an understanding of attention, interest and emotion, conclusions can be reached regarding levels of engagement.

As demonstrated in Chapter 3, measuring memorability is a holistic way to explore impact, as autobiographical memory theory can be used to analyse the fully experiential nature of museum visits. It also arguably provides a way to understand the impact of a museum visit, on the basis that if something is retained in memory, then it has made some degree of impact upon the individual. If a visitor has been fully engaged in the museum, then the result may be a rich autobiographical memory, which may combine details of the museum environment and events specific to the visit with emotions,

cognitions, and conceptual knowledge related to the museum's collections. Such responses, and the subsequent creation of memorable and rich experiences, would typically be considered evidence of 'engagement' in the museum. Evaluating memorability about an aspect of a museum experience, such as recall of a particular exhibit, also develops understanding of the level of engagement with that particular exhibit and whether or not learning (incidental or intentional) took place. Increased memorability would also be indicative of a deeper or broader level of processing having taken place (Craik, 2002).

This study therefore seeks to compare three ways of experiencing an exhibition. Firstly, through vision only, with minimal text labels, thereby replicating a typical experience of a museum's permanent collections. Secondly, through viewing the artworks whilst listening to a standard audio guide (SAG), which provides factual and contextual information. Thirdly, through viewing the artworks with an audio descriptive guide (ADG), which guides the viewer's attention around the image, builds a narrative, employs multisensory imagery and also provides semantic information. This study explores the experience and levels of engagement both immediately after the event (time A) and one month later (time B), incorporating measures of attention, interest, enjoyment and emotion. Furthermore, it applies an adapted version of the coding model set out in Chapter 3 to participants' memories of the photos as an important way of exploring the experience of seeing the photos, and to ascertain to what extent the experience was engaging. The study brings these aspects together in order to address the following research question: whether using AD to present an exhibition would have an impact on the experience and engagement of sighted people, when evaluated through a series of enjoyment, interest, attention, emotion and memorability measures.

Methods

Design

This was a longitudinal study (time A, time B) with an independent groups design. The independent variables were time (exit, 1 month) and experience: no audio (NA); audio guide (AG); audio description (AD). The dependent variables were measures of attention, enjoyment of the experience, desire to reengage and actual reengagement, emotion, thoughts and memories evoked during the exhibition, the experience of listening (for AG and AD participants), recall of the photos and richness of recall. A

mixed methods approach included thematic coding of participants' answers to free-text responses. For the photo recall text answers, the texts were coded to provide counts for various content detail categories, which were as follows: visual, spatial, event/activity/movement, emotion (perceived emotion of photo subjects) and atmosphere (including nonvisual imagery), participants' reactions (emotions, thoughts, and memories mentioned during photo recall), and semantic recall (socio-historical information/context and information about the photographer). The data were analysed using ANOVAs, but where the data distribution of the DVs was not normal, and normality could not be achieved using transformations, nonparametric tests were applied.

Participants

149 participants were recruited via the University of Westminster's Psychology Research Participation Scheme; the University of the Third Age (U3A), the Museum of London's Friends of the Museum mailing list, and through snowball sampling. One participant had a high level of familiarity with the photographs and was excluded from the sample.

Participants were approximately matched for age and gender, and then randomly allocated to one of three conditions: no audio, SAG, and ADG (see Table 4.1).

	No audio	SAG	ADG
<i>N</i>	52	47	49
Age (mean, SD)	50.29 (25.65)	52.74 (24.76)	52.68 (19.90)
Gender	11 males, 41 females	14 males, 33 females	17 males, 32 females

Table 4.1 Age, gender, and number of participants (time A), by research condition

A one-way between subjects ANOVA confirmed that there was no difference in age across groups ($F(2, 142) = .17, p = .84$).

Materials

Selection of the photographs: Photographs were selected from the Museum of London's Henry Grant archive. Through discussion with the curator, 9 photos were chosen that were all: a) taken between 1950 and 1970 b) taken outside, c) black and white, d) containing people, but with a clear focal point (e.g. crowd scenes were avoided); e) considered optimal for the use of multisensory imagery in the texts of the audio descriptions. The photo shown below is an example of one of the 9 selected:

Sample image: *Londoners relax on Tower Beach, 1952.*

Henry Grant collections, copyright Museum of London



Please see appendix 3.1 for the rest of the photos.

Audio Interpretation: SAGs and ADGs were produced for the study. The AD texts were quality controlled by the organisation VocalEyes to ensure they were considered representative of professional-standard AD provided in museums and galleries. Please see appendix 3.2 for examples of the texts.

Factual and Contextual information: The two audio conditions included an audio introduction with some biographical information about the photographer and his practice. An excerpt of this information was summarised and presented on the initial

slide for the ‘no audio’ condition. Both SAGs and ADGs provided factual and contextual information, which was gathered in consultation with the Museum of London’s photography curator. This information was given in a more expanded form in the SAG and was condensed for the ADG, but wherever possible, the same semantic information was presented in both texts. The SAGs referred to some visual features of the photos but they did not systematically guide visual attention in the way that the ADG texts did.

Duration: the mean (SD) durations in seconds were as follows: SAG=2 minutes 35 seconds (17.8 seconds), ADG=3 minutes 41 seconds (26.8 seconds). The shortest SAG was 2 minutes 4 seconds, the longest 3 minutes 9 seconds. The shortest ADG was 3 minutes 2 seconds, the longest 4 minutes 16 seconds. The ADG texts were necessarily longer than the SAG texts, to allow for the provision of the description as well as equivalent semantic information.

Measures

Two questionnaires (time A, time B) were designed for the experiment (see appendix 3.3 and 3.4). One was administered in person after the participants had viewed the photos. The second was sent one month later, and was completed online via a link to the questionnaire hosted on the Qualtrics platform. The questionnaire at both times A and B addressed the participant’s experience and engagement levels, with the questionnaire at time B also addressing memorability for the photos.

The first questionnaire (time A) collected the following information through a combination of quantitative and qualitative measures:

Demographic information: age, gender, level of education, whether English was their first language and level of English if not. Participants were asked about their museum visiting habits. They were asked to select from a 6-point Likert Scale to confirm their frequency of museum visits over the last 5 years.

Experience and Engagement measures: At time A, the time spent by participants on each photo was logged, and their time spent reviewing the photos, if they chose to do so. Participants gave likings ratings for the photos on a 7-point Likert Scale, where 1=hated it and 7= loved it. They also completed the 7-item motivation scale of the IMI Intrinsic Motivation Inventory, which has been validated for the measurement of enjoyment and engagement (Ryan, 1982). The scale asked participants to rate aspects of

enjoyment, fun and interest, and to what extent the activity held their attention, on a scale of 1-7 where 1= not at all true and 7=very true. Furthermore, they stated how likely they would be to want to view more of the Museum of London's photography collections, based on a 5-point Likert scale, where 1= don't know, 2= definitely not and 5= definitely. Participants were asked if they experienced any emotion (s), and if so to name their emotions by selecting from a list, and if so, to rate emotions for valence and strength on ten-point Likert scales (where 1= negative and 10=positive for valence, and 1=barely noticeable and 10=as strong as I have ever felt, for strength). They rated their mental images of the photos for clarity on a ten-point Likert scale (1= no image, just know I am thinking about it, and 10= as clear as if I were actually looking at the photo) and described any memories evoked during the exhibition, and rated their vividness, again on a ten-point scale. The listening experience was assessed through participants (SAG, ADG) rating their experience of the audio by rating 4 items about the audio guides on ten-point Likert Scales (1=really hated it, 10=really loved it), namely information, delivery, speed and their enjoyment of it. They were also asked how they would describe the audio guide to a friend. Finally, participants described their thoughts during the exhibition, whether related to the activity or not. At time B, participants were asked whether they had engaged further with the content of the exhibition since the experiment, by either thinking about the photos, talking to someone about them or trying to find out more.

Memorability measures: The Time B questionnaire asked participants to recall the photos by describing them, giving as much information as they could, and by rating each one for liking and mental image. Responses were coded for content (for the types of content, see Design) Participants in the SAG and ADG groups repeated the audio evaluation measures.

Data Coding: 10% of the photo recall texts were coded by a second, independent rater. The second coder was given detailed instructions, including examples (see appendix 3.5). Inter-rater agreement was 92.17% for the sample.

Procedure

Participants were all tested in a quiet room with no external distraction, either at the Museum of London, a laboratory at the University of Westminster, or in their own home. All 9 photographs were presented in a fixed order to participants in a PowerPoint presentation on a laptop or desktop computer with a minimum screen size of 13.5

inches. For the audio conditions, an embedded Mp3 file accompanied each photo, and commenced playback automatically as the slide was reached. Participants listened through headphones. For the SAG and ADG conditions, participants were invited to check the headphone volume was comfortable, then they were asked to open the PowerPoint presentation when they were ready and to move on to the next image once the audio had completed playback. Participants in the no audio condition were invited to look at the images for as long as they would like to, before moving on to the next. All participants were told that they would have the chance to look again at any of the images at the end of the presentation, and the final slide contained thumbnails of all 9 images which they could use to navigate the photos as they wished. No time limit was set for their exploration of the images.

Once they had indicated that they had seen enough, participants completed a paper questionnaire about their experience. They were then thanked for their time, and reminded that they would receive a link by email in a month's time to the follow up questionnaire, after which time they would be debriefed.

Results

Participant demographics and time taken to follow up

One hundred and twenty-seven participants responded to both stages of the experiment. The distribution across conditions was: NA= 44, SAG=38, ADG=45.

In the NA (no audio) group, the mean (SD) age was 51.75 (25.09); 9 males and 35 females. In the SAG group, the mean (SD) age was 48.79 (25.03); 11 males and 27 females. In the ADG group, the mean (SD) age was 51.43 (19.95); 15 males and 30 females. A one way between subjects ANOVA confirmed no difference in age between groups: ($F(2, 122) = .19, p = .83$).

The mean (SD) number of years of education of participants was NA= 15.14 (3.98), SAG=15.39 (3.77) and ADG=16.33 (3.33). A one way between-subjects ANOVA confirmed no difference between participant groups for the number of years of education they had received: ($F(2, 120) = 1.28, p = .29$). Thirteen per cent of NA participants did not speak English as a first language, compared to 32% of SAG participants and 18% of ADG participants. For non-native speakers of English, the median (range) levels of English were: NA=4 (3), SAG=4 (1), ADG=4 (2), with 4

meaning 'fluent', which was the maximum value. A Kruskal Wallis test confirmed there was no difference between groups in terms of the level of English of non-native speakers: (chi sq=0.42, df=2, NA N=5, SAG=12, ADG=8, $p = .81$).

All participant groups were, on average, frequent visitors to museums, with the median response being 5 (once a month), with slightly more variability in the NA group (range 4) than in the other two groups (range 3). A Kruskal Wallis test confirmed there was no difference between groups in the frequency with which they visited museums over the last 5 years: (chi sq= 3.44, df=2, NA N=27, SAG N= 22, ADG N=32, $p=.18$).

Finally, the mean (SD) number of days between Time A (exit) and B (follow-up) was as follows: NA=32.70 (4.96), SAG=31.61 (4.25), ADG=32.53 (5.61). A Kruskal Wallis test was performed on the data which confirmed no differences between groups for the time taken to follow up: (chi sq= 1.26, df=2, NA N=44, SAG N= 38, ADG N=45, $p=.53$)

Experience and engagement

Attention

Participants in the audio groups listened for the duration of the audio introduction and photo descriptions; 25 minutes 18 seconds for the SAG and 35 minutes 10 seconds for the ADG. Participants in the NA group (N=43) spent a mean time of 2 minutes 50 seconds (SD=1 minute 23 seconds) looking at the photos in the first instance (total view time). All participants were then invited to look again, if they wished. The frequency of participants who continued to browse the photos and their mean additional browse time is shown below:

	NA	SAG	ADG
	<i>N=44</i>	<i>N=38</i>	<i>N=45</i>
Chose to look again	34 (77%)	11 (29%)	8 (18%)
Additional browse time in seconds (mean, SD)	64.19 (54.48)	36.25 (18.73)	55.29 (54.10)

Table 4.2 Decision to look further and additional browse time (seconds), by participant group

Enjoyment of the experience

Time A: The mean (SD) Intrinsic Motivation Inventory scores for the three conditions were similar, although there was more variability in the NA group: NA= 35.34 (14.84), SAG=38.37 (8.56) and ADG=38.31 (9.42) (max score=49). A Kruskal Wallis test confirmed there were no differences in IMI scores between groups: (chi sq=1.35, df=2, NA N=44, SAG N=38, ADG N=45), p=.508.)

The mean liking scores for the 9 photos was calculated for Time A and B. At time A, the mean (SD) liking score for the NA group was 5.27 (0.58), it was 5.43 (0.68) for the SAG group and 5.43 (0.66) for the ADG group. At time B, the mean (SD) likings rating continued to be similar between groups: NA (n=38) mean= 6.43 (3.55), SAG (n=36) mean=5.23 (1.77), ADG (n=45) mean = 5.36 (1.76). Kruskal -Wallis tests confirmed no difference between the three groups either at Time A: (chi sq=.089, NA N=44, SAG N= 38, ADG N=45 df=2, p=.64), or Time B: (chi sq= 0.93, df=2, NA N=38, SAG N= 36, ADG N=45, p=.63).

This analysis suggests that enjoyment of the experience and the photos was similar across participant groups.

Desire to reengage and actual reengagement

Time A: When asked how likely they would be to want to view more photos, the median score for the NA group was 4 (probably), with a range of 2. In the SAG condition, median and range were 4.5 (2) and in the ADG condition 5 (2), where 5=definitely. A Kruskal-Wallis test showed no significant differences between conditions: (chi sq= 1.50, df=2, NA N=42, SAG N= 38, ADG N=45, p=.47).

Time B: At follow up, participants were asked whether they had thought about the photos or talked to anyone about them since, if they had tried to find out any further information, or engaged further with the museum. In the NA group, 40% gave a positive response to this question, compared to 68% in the SAG group and 60% in the ADG group. A multi-dimensional chi-sq test confirmed that there was a relationship between participant group and follow-up engagement: (chi sq (2, N=125)= 7.37, p=.025). For the 70 participants who reported follow up engagement, the breakdown was as follows:

The breakdown of engagement types by participant group is displayed in table 4.3:

	NA	SAG	ADG
	N= 17	N= 26	N=27
<hr/>			
Thoughts:			
thought about the photos or audio guides	76%	85%	74%
<hr/>			
Conversations:			
talked about the photos, audio guides, or the experience	88%	85%	93%
<hr/>			
Content engagement:			
researched the photos or photographer online	12%	31%	41%
<hr/>			
Museum engagement:			
visited the museum physically or online	29%	12%	19%

Table 4.3: types of follow-up engagement, by participant group

Emotion

Time A: Participants were asked to think about their favourite and least favourite photos, and then to report whether they experienced any emotion. The presence of emotion reported was similar across groups. In the NA group, 88% of participants reported emotion for their favourite photo, compared to 95% for the SAG group and

87% for the ADG group. For the least favourite photo, these findings were 55%, 41% and 52% respectively.

Participants selected emotions that they experienced whilst looking at the photos, with focus on the favourite and least favourite photos. In the NA condition, the mean (SD) number of emotions recorded was 2.7 (1.42) for the favourite photo. In the SAG condition, it was 3.14 (1.84) and in the ADG condition it was 3.19 (1.72). A one-way ANOVA confirmed no significant differences between research conditions for the number of emotions recorded for the favourite photo: ($F(2,116)=1.04, p=.36$). This indicates that participants' emotional responses were similar across groups.

Memories, Memory Vividness and Mental Imagery

The majority of participants across groups stated at Time A that the Henry Grant exhibition evoked memories: 91% of participants in the NA group, 97% in the SAG group and 95% in the ADG group. Participants across groups recalled similar number of memories when responding to the questions 'did any memories come to mind?' and/or 'what were you thinking about during the exhibition?'. In the NA group, the mean number of memories recalled was 1.55 (1.55), in the SAG group 1.37 (1.26) and in the ADG group 1.73 (SD=1.71). A Kruskal-Wallis test confirmed no differences between groups ($\chi^2=0.509, df=2, NA N=44, SAG N=38, ADG N=45, p=.78$). The vividness ratings for these memories was similar across groups: NA (n=38) median 8, range 9, SAG (n=37), median 9, range 5 and ADG (n=41) median 8, range 8. A Kruskal-Wallis test confirmed no difference between groups in terms of the vividness of memories evoked: ($\chi^2=0.24, df=2, NA N=38, SAG N=37, ADG N=41, p=.89$). Thus, participants in all three groups recalled similar numbers of memories with similar levels of vividness.

Participants' rating of the clarity of their mental images for their favourite photo was similar for NA and SAG, with a slightly higher rating and less variability in the ADG group: NA (n=44) Median =8, range=6, SAG (n=38) median =8, range=9, ADG (n=45) median=9, range=4. A Kruskal-Wallis test confirmed there was a significant difference between groups: ($\chi^2=8.15, df=2, NA N=44, SAG N=38, ADG N=45, p=.017$), suggesting that ADG participants reported clearer mental images. When asked to consider their least favourite photo, clarity ratings were as follows: NA (n=44) median 6 range 8, SAG (n=38) median 8 range 9 and ADG (n=45) median 8 range 6. A Kruskal-Wallis test confirmed there was a significant difference between groups: ($\chi^2=8.15, df=2, NA N=44, SAG N=38, ADG N=45, p=.017$), suggesting that ADG participants reported clearer mental images.

$sq= 23.913$, $df=2$, $NA N=44$, $SAG N= 38$, $ADG N=45$, $p<.001$), suggesting that participants who had listened to audio had clearer mental images. There were no differences between groups for mental image vividness of the photos they recalled at time B as confirmed by a one-way ANOVA: ($F (2, 115) =1.38$, $p=.26$). Therefore, the effect of clearer mental images for ADG participants at time A was not sustained by time B.

The Listening Experience

For participants in the SAG and ADG groups, the mean (SD) audio evaluation scores at Times A and B were calculated by totalling the four measures taken (enjoyment, delivery, speed of guide, information provided), with the maximum possible score being 40. The audio evaluation score had a Cronbach's alpha of .83, indicating high internal consistency. For SAG participants, the mean total audio evaluation score was 29.66 (8.21) at Time A, and 25.55 (9.22) at time B. For ADG participants, the mean total audio evaluation score was 31.79 (6.76) at Time A, and 28.26 (7.91) at time B. A mixed 2 (Time A, Time B) x 2 (participant group SAG, ADG) ANOVA showed a main effect of time: ($F (1, 78) =37.64$, $p<.001$), but no main effect of participant group ($F (1, 78)=2.05$, $p=.16$), and no interaction effect ($F (1,78) =0.219$, $p=.64$). In other words, the evaluation scores were lower at Time B, but there were no differences between SAG and ADG participants in terms of their appreciation of the audio guides.

Qualitative analysis of the listening experience: Participants in the SAG and ADG groups answered the question 'Thinking about the Audio Guide that you heard, if you were to describe it to a friend, what would you say?'. Within these answers, there were 6 references to duration from the SAG group (16%) and 6 from the ADG group (13%), in all cases reporting that it was too long. Seven SAG and 7 ADG participants (18% and 16 % respectively) commented on the impact of the guide on independence of thought whilst listening. In both groups, 4 participants referred to a negative impact, and 3 to a positive impact. Negative comments indicated that the audio inhibited independence of thought: 'coloured the opinion I might have otherwise formed myself on the people in the picture' (ADG participant), 'Left little to the viewer's imagination' (SAG participant). Positive comments indicated that the audio facilitated imagination: '(helped) to make the audience imagine what the environment was like for the subjects captured' (ADG participant), '(the audio) expanded upon the initial thoughts I had when looking at the photo' (SAG participant). The incidence of negative observations

regarding the guides' duration and its negative impact on the participant's own person response were relatively low (all 16% or under).

Participants' response to this question were also coded for participant reactions, which included thoughts and emotions. In the SAG group, there were 65 reactions from 33 participants (87% of SAG sample), compared to 110 reactions from 43 participants in the ADG group (96% of ADG sample). To understand the types of reactions, and thereby the nature of the experience, the reactions were broken down into three groups: negative, neutral and positive. In the SAG group, 74% of participants recorded a positive reaction, 21% a neutral reaction and 16% a negative reaction, with 21% of participants having mixed reactions. In the ADG group, 78% of participants had a positive reaction, 31% a neutral reaction and 24% a negative reaction, with 27% having a mixed response.

Positive reactions included expressions of enjoyment and interest or other positive reflections on the guide, such as 'Overall enriched the experience of the material' (ADG participant) or '(the guide) showed a side of photography I had not previously considered' (SAG participant). Neutral reactions included observations such as the guide was informative or precise or comprehensive. Negative reactions included 3 instances of boredom or irritation with the guide (all from SAG participants) and the rest of the category predominately consisted of observations that the content was too detailed or that the participant would have designed it differently (for example more or less historical information.) In summary, positive and negatively valenced responses were fairly evenly spread across the ADG and SAG groups, but the ADG participants had more reactions to the guide. Some participants also commented that the audio helped them to understand the composition of the photos: 27% of the ADG group and 5% of the SAG group. Finally, there were 23 thoughts recorded that were generated by the audio guide, 7 from SAG participants (18%) and 16 (36%) from ADG participants. These included reflections about London and about changes over time: 'Made me think about how London is an iconic city with a very rich history' (ADG participant) '(I was) thinking of how things had changed' (ADG participant)

Thoughts during the exhibition

Analysis of participants' thoughts indicated that they were similar across groups. Participants in each group were thinking about the past; 15 in the NA group (34%), 16 from the SAG group (42%) and 22 from the ADG group (49%). Some of these thoughts

were autobiographical memories and others referred to memories being evoked (but without stating what they were). A small number of people from each group were thinking about the future; 8 from the NA group (18%), 5 from the SAG group (13%) and 4 from the ADG group (9%). These comments included the desire to see more photos, and wondering how friends/family might react to the photos.

Most of the participants' reactions (thoughts and emotions) were related to the task and its content. Positive reactions included expressions of enjoyment and interest, and positive thoughts about the photos and the subject matter. Neutral reactions included emotions that were not positively or negatively valenced such as surprise or nostalgia and thoughts that were neutral observations about the subject matter, such as 'how similar to contemporary London some pictures looked' (NA participant) or 'I was thinking about the lives of the people in the photos' (ADG participant). Negative reactions included boredom with the audio (1 SAG participant) and a mixture of negative reactions to the photos themselves (for example distaste at the subject matter such as eels or pigeons).

Memorability

Photo recall

The mean (SD) number of photos recalled was as follows: NA: 3.86 (2.10), SAG: 5.46 (2.06), ADG =5.58 (2.37). A one-way ANOVA on photo recall confirmed a significant effect of research condition: ($F(2, 123) = 8.27, p < .001$). Bonferroni corrected post hoc comparisons confirmed a difference between both SAG and NA: mean difference = 1.60, (95% CI: 0.41, 2.78), $p = .001$, and ADG and NA: mean difference = 1.71, (95% CI: 0.59, 2.84), $p < .001$. There was no difference between SAG and ADG ($p = .808$).

Richness of photo recall and content types

The mean word count provided in the recall of the photos was also analysed. The mean (SD) word count provided by participants in the NA condition was 24.70 (14.59), in the SAG condition it was 32.30 (22.15), and in the ADG condition it was 39.38 (26.97). A one-way ANOVA confirmed an effect of participant group: ($F(2, 121) = 4.72, p = .011$). Bonferroni corrected pairwise comparisons confirmed the word count of ADG participants was higher than that of NA participants: mean difference = 15.56, (95% CI: 4.00, 27.12), $p = .003$. No other differences were significant (all $p > .13$).

The photo recall texts were coded for content details and the mean total details recorded. Three participants in the NA group followed up but did not recall any photos and so were excluded from the content analysis. The mean (SD) total details recalled were as follows: NA (N=41) 25.24 (17.49), SAG (N=38) 39.45 (22.32), ADG (N=45) 57.31 (43.39). A square root transformation was conducted on the total details variable to render it suitable for analysis by means of a one-way ANOVA, which confirmed a significant effect of participant group: $F(2, 121) = 11.14, p < .001$. Bonferroni-Holm corrected pairwise comparisons on the square root transformed variable confirmed that ADG participants recalled more details compared to NA participants, mean difference 2.29 (95% CI: 1.33, 3.25), $p < .001$. ADG participants also recalled more details than SAG participants: mean difference 1.05 (95% CI: 0.7, 2.03), $p = .036$. More details were also recalled by SAG participants compared to NA participants: mean difference 1.24 (95% CI: 0.24, 2.24), $p = .032$.

Finally, participants' recall of the photos were scored for detail types. Mean counts by participant group are presented in Figure 4.1:

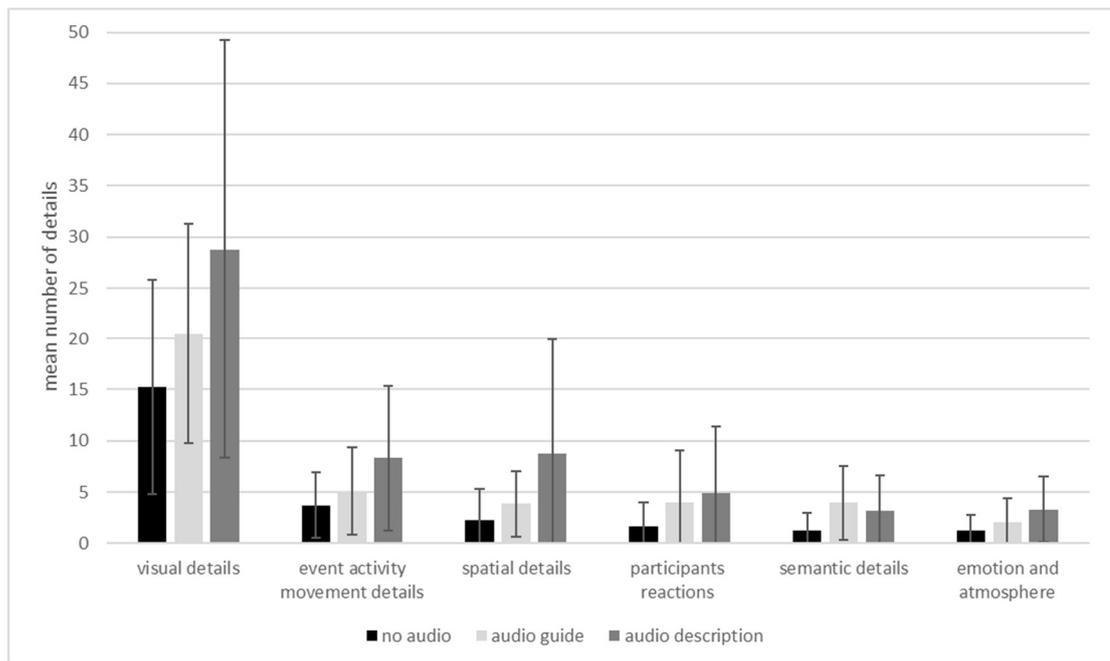


Figure 4.1: Mean (SD) frequencies of detail types recalled by participant group, at Time B

Figure 4.1 suggests that content related details (visual details) was the most salient category for all participant groups, with the other categories being comparable in size. The amount and distribution of data points within the categories did not permit further analysis.

To address the possibility that the richer recall with AD was due to the fact that participants spent longer listening to the ADG than the SAG, a correlation analysis was conducted on the total time spent looking at the photos and the number of details recalled at time B for ADG and SAG participants. It confirmed there was no significant relationship: $r_s = 0.038$, $N = 78$, $p = .74$. Therefore, ADG participants' recall of more details could not be attributed to the fact that the ADG audio files were longer in duration.

Discussion

This study sought to explore the impact of AD on the experience of sighted people viewing a photography exhibition. In so doing, it compared AD to two common ways of experiencing museums (for sighted visitors), namely visual access only to artworks, with minimal text presented alongside, and visual access accompanied by an audio guide for information and context. The nature of the resulting experiences, and the levels of engagement were examined. Overall, results indicated that the participants' enjoyment and emotional response was broadly similar, regardless of the experience group (NA, SAG, ADG) in which they took part. However, memorability findings revealed that participants who listened to audio interpretation recalled more photos than those who just looked. Furthermore, participants who experienced the photos with ADG had richer memories of the photos, compared to either those who had no audio, or the standard audio guide. It is therefore important to explore the impact of a) listening to audio (either SAG or ADG) and b) the impact of AD specifically.

Standard audio guide, audio descriptive guide or visual exploration alone: similarities and differences in experience, engagement and memorability

Firstly, there were a number of similarities in the nature of the experience for participants from all three groups, no audio, SAG and ADG. Enjoyment was similar across groups, as demonstrated by the IMI inventory (Ryan, 1982), the mean likings ratings for the photos, the audio evaluation and the qualitative data. In other words, participants enjoyed the experience similarly regardless of which group they were in. Furthermore, it was evident from the emotional responses to the artworks and the evocation of autobiographical memories that the experience had provoked responses in the participants across all three groups. The emotional response to the photos was

similar in all three groups, as were the numbers of autobiographical memories recorded across groups. There were also no differences in the level of vividness of these memories, suggesting that the audio was not interfering with the experience of reminiscing.

These findings present a different picture to other research on audio guides, which found that guides did not strongly elicit emotion or call up personal memories (Bertens & Polak, 2019). It is possible that the subject matter of the photos used in this study (London street photography) was quite evocative for the participants, many of whom were Londoners, living in or familiar with London. Further research would therefore be needed to explore the role of audio interpretation in evoking emotions and memories.

Interest levels were also assessed by asking participants to describe what they were thinking about during the task. Had participants described mostly unrelated thoughts, that would have suggested a lack of interest in the experience. However, the majority of participants across groups reported thoughts related to the task or the photos, which were similar across groups in terms of their positive and negative valence, suggesting similar levels of interest. The initial desire to re-engage with the subject matter was also the same across groups, with all groups expressing a relatively high interest in returning to the subject matter ('probably-definitely'). This is also indicative of a broadly consistent level of initial interest across the three participant groups.

At time B, it was notable that the pattern of content in the photo recall was broadly similar across groups, with visual details being the most salient, and other details categories being similar across groups in terms of salience. The presence of thoughts, emotions and the recall of semantic information indicated that a level of cognitive engagement took place across all three participant groups. This suggests that a certain level of engagement was possible through visual exploration alone, but this should be contextualised with the fact that an audio experience of the photos impacted more on the lasting memories of the artworks.

The key differences between the participants who listened to audio and those who did not were revealed through the measures of attention, memorability and subsequent engagement (between times A and B). Firstly, the NA group's average interaction with the photos was brief (a mean time of 18 seconds per image at first viewing) compared to the 25-35-minute total duration of the SAG or ADG experience. NA participants therefore had only a quick glance at the photos in comparison to the relatively lengthy

time spent looking and listening by the audio text participants. This is in accordance with previous research that demonstrated that audio guides help to hold attention, causing visitors to spend longer in front of exhibits (Sung, Yeo-Ting; Chang, Kuo-En; Lee, Yi-Hsuan; Yu, 2008), and that looking alone results in a short viewing time only (Smith & Smith, 2001; Smith et al., 2017). It therefore seems likely that the use of audio altered participants' patterns of attention, as they were encouraged to attend to the images for longer, and that the prolonged attention increased the opportunity to activate representations in memory (Renninger & Hidi, 2015).

Correspondingly, the use of audio interpretation resulted in higher recall of the photos at time B. It could therefore be suggested that the increased recall in the audio groups was due to the increased looking time. However, there was no significant correlation between details recalled and time spent looking. Levels of processing research has shown that further 'shallow' processing (for example, allowing more time on shallow processing tasks) does not increase recall (Craik, 2002). This suggests that it was the depth of processing permitted by the audio guides rather than the sheer time spent that was important. Depth of processing was not measured in this study, except indirectly, through memory. However, increased recall of the photos is suggestive of deeper processing at the time of encoding, and it seems reasonable to suggest that the semantic and narrative information provided in the guides would have supported the creation of connections and meaning, thereby forming memory traces (Ekuni et al., 2011). A more deeply encoded stimulus, involving more memory traces, would provide more opportunities for cues to stimulate later recall (Ekuni et al., 2011; Ward, 2014). Furthermore, the audio guides, through provision of information, would help to integrate the stimulus of the photos into participants' knowledge structure about the world and about themselves. This suggests the possibility that the use of audio could support processes of elaboration, whereby multiple aspects of meaning of an item are activated and thereby linked into the existing network of semantic associations (Bartsch, Singmann, & Oberauer, 2018).

Furthermore, there were differences between the no audio, SAG and ADG groups in terms of the amount of engagement that took place between times A and B. Participants in the no audio group were less likely than the SAG and ADG participants to have come back to the photos, either in terms of their thoughts, conversations or follow up research. This suggests that by providing participants with additional interpretation, and therefore support to engage with the photos, the likelihood of sufficient interest

developing for future engagement to occur was increased. In other words, this later engagement is indicative of the triggering of interest during the initial encounter with the photos at time A. This is consistent with the literature on the triggering of interest and its relationship with the development of engagement (Renninger & Bachrach, 2015; Renninger & Hidi, 2015), as well as the importance of supporting content for the development of interest (Renninger & Hidi, 2011) . It is also consistent with recognition in museum practice that meaning-making, or making sense of experience, is to be achieved through the process of interpretation (Hooper-Greenhill, 2000).

For those participants who did re-engage, the most common forms of re-engagement were conversations or thoughts about the experience, suggesting that sufficient interest had been triggered for social interactions related to the experience to occur, or for the participants to return to the experience in their thoughts even once they had returned to the course of everyday life. This provides further tentative support for the observations made in Chapter 3 about the importance of conversation and social sharing following a museum visit. Over a third of the SAG and ADG participants who chose to re-engage with the experience were interested enough to subsequently research the photos or photographer online. This suggests that the content of the audio guides was likely to arouse curiosity or a desire to learn more. Such indications of interest were lower in the 'no audio' group, again suggesting the importance of the level of support provided by the audio.

This is reinforced by the attention data, which showed that 77% of 'no audio' participants wished to look again at the photos, compared to 29% of SAG and 18% of ADG participants. Taken alone, this measure could suggest higher levels of interest in the photos amongst NA participants. However, when considered in conjunction with the other measures, it rather suggests that the initial visual encounter with the photos was felt to be in some way insufficient when it was not supported by audio interpretation, possibly due to its brevity. It is possible that the initial brief glance was not enough to access meaning, or a sense of having fully engaged with the photos. This would be consistent with the concept that processing based purely on perceptual experience is a shallower level of processing (Craik, 2002).

It is possible that the re-engagement measures suggest higher levels of interest and curiosity in participants who listened to audio, to the extent that this influenced future behaviour between times A and B. If this were the case, then it may also have

contributed to the enhanced memorability, as increased interest is known to enhance memory (McGillivray, Murayama, & Castel, 2015; Renninger & Hidi, 2015), and curiosity has been associated with increased memorability for novel information (Kang et al., 2009). Further work would however be needed to see if the effects of audio interpretation as suggested here could be replicated in other tasks and settings. In summary, whilst there were many similarities in the experience for participants, regardless of whether or not they listened to audio, the longitudinal nature of this study revealed important differences between those who listened to audio and those who did not, with regards to subsequent engagement and memorability a month later.

The impact of AD on the participant experience, engagement and memorability: similarities and differences between SAG and ADG

Whilst the use of audio interpretation (both SAG and ADG) clearly had an impact on the participants' assimilation over the month between times A and B, it is important to understand where there are similarities and differences between the standard audio guides and the audio descriptive guides, in order to understand fully the potential for AD as Inclusive Design. Firstly, it is worth noting that there was a higher proportion of non-native speakers of English in the SAG condition compared to the other two groups. Nevertheless, the median self-reported level of English of non-native speakers in all groups was fluent, with no difference in the spread of English level between groups. The audio resources (SAG and ADG) were designed to be linguistically accessible. For example, the guides did not contain technical vocabulary or complex sentences with multiple subordinate clauses. Part of the quality control performed by VocalEyes sought to ensure that the ADG and SAG texts worked for listeners, rather than readers. Whilst the number of non-native English speakers in the SAG group was higher than in the ADG groups, the preparation of the audio texts should have helped to mitigate this variation. No participants expressed any difficulty in following the audio and they were all able to complete both questionnaires.

There were a number of similarities between the SAG and ADG experiences, as demonstrated by the qualitative data on the participants' listening experience. The majority of participants in both audio groups reported positive reactions to their experience of listening to the audio, with around 3 in 4 participants stating that they enjoyed it and found it enriched their experience of the photos. The reported concern about the problem of guides 'telling you what to think' (Mannion et al., 2015) was only

reflected in 11% of SAG participants and 9% of ADG participants who commented that they felt the guide interfered with their independence of thought.

A similar number of participants felt on the contrary that the guides were useful for supporting the development of their own reactions to the photos: a split of opinion which was also found by Bertens & Polak (2019). There were negative comments in both groups (16% of the SAG group and 24% of the ADG group) regarding the experience more broadly. Many of these related to the guide being too detailed, which may indicate that both of the guides were at risk of being too cognitively demanding by overloading the listener with information. However, 21% of the comments made by SAG participants and 31% made by ADG participants were neutral reflections on the level of detail, precision or comprehensive nature of the guide, indicating that it was noticed but not disliked in many instances. In a real museum setting, participants would choose to move on to the next track if the level of detail became onerous, which would be likely to alleviate this concern.

There were low numbers of negative comments about the duration of the guides (16% in the SAG group and 13% in the ADG group). This was particularly interesting in terms of the ADG, which was the longest form of interpretation presented. These findings suggest that the relatively lengthy interpretation (up to 35 minutes for just 9 photos) was well tolerated by participants, although it should be recognised that they were comfortably seated in a quiet environment.

It is possible that the duration of the guides used in this study would be perceived differently in the context of museum fatigue (Bitgood, 2009), for example if the guides were in use in a busy museum environment where people were required to stand in front of an image. Several participants made comments to this effect. It has been suggested that ADGs can run between 45 and 60 minutes in duration (Chapter 2). However, duration should be critically reviewed in the light of research findings that suggest that audio guide users often do not complete an audio tour (Lee, 2017) and also that museum visitors typically spend 20 minutes or less in an exhibition, regardless of its size or subject matter (Serrell, 1997). It may be beneficial to limit the duration of both SAGs and ADGs and further research could usefully explore the optimal duration in various settings. The quantitative audio evaluation measure also confirmed that there were no differences between participants' appreciation of the two audio types, although this was slightly lower at time B. It is possible that the demands that the guides made of

participants in terms of the level of detail were too great and that this became apparent as participants reconsidered their views four weeks later.

Various barriers have been identified in the research literature with regards to the use of audio guides, including visitors' perception that they don't have enough time to use one (i.e. it will take too long), that they don't want to listen to an authoritative voice (Mannion et al., 2015), that guides have an isolating effect on the visitor (Aoki et al, 2002) or that they reduce independence of thought (Bauer- Kroesbacher, 2013; but see Bertens & Polak, 2019). The concerns about the use of time and isolation are hard to unpick in the context of this study, as all participants viewed the photos individually, regardless of which experience group they were in, and the SAG and ADG participants did not choose how much time they spent viewing, as they were asked to listen to the full duration of the audio. Nevertheless, the measures analysed here suggest that the experience of listening to the audio did not hamper the participant's personal reaction to the photos, or reduce their emotional response to them in any way.

In summary, the concerns regarding audio guides were not borne out in these findings, as the guides did not have any negative impact on enjoyment. Rather, they appeared to enhance interest as indicated by later re-engagement. Furthermore, the nature of the listening experience and its impact on enjoyment was broadly similar across the two types of audio. This suggests that using audio descriptive techniques in audio interpretation would create more inclusive materials and that this would not have any negative impact on visitors' enjoyment of the resources.

There were, however, important differences between the SAG and ADG with regards to memorability. Crucially, ADG participants recalled the largest number of details about the photos. This demonstrates that whilst SAG and ADG participants recalled similar numbers of photos, the ADG participants had richer memories of what they had seen, with higher numbers of details. As the correlation analysis demonstrated, the richer memories with ADG cannot be attributed to longer looking time. Rather, there are multiple possible reasons why presentation of the photos with ADG was more memorable than the standard audio guide.

The increased richness of memories may have been related to the 'guided looking' element of the ADG experience. It is possible that the congruent nature of the perceptual information and the semantic information delivered by the guide was able to support recall, with congruence in the presentation of stimuli being known to be

important in supporting recall in levels of processing tasks (Craik, 2002) . In contrast, traditional guides may stand to present competing auditory and visual information, which differs from the congruence of the ADG experience. Dividing attention is known to result in shallower encoding, as deeper encoding requires more attention (Craik 2002). This limitation of traditional guides could have led to the SAG texts in this study having less of an impact on memorability than the ADG texts.

Furthermore, when asked to rate their mental images of their favourite photos at time A, there was a difference in clarity ratings between participant groups, with participants in the ADG group reporting a higher average rating. This suggests that there was enhanced initial mental imagery formation in the ADG group. As visual imagery is known to be a predictor for memorability (Greenberg & Knowlton, 2014), this may also have contributed to the increased memorability in the ADG group. Exactly why AD should have led to the formation of clearer visual images initially cannot be determined, but it is possible that the guided looking allowed for a deeper assimilation of the visual content of the photos.

Other, linguistic features of the AD may have impacted positively on memorability, such as multisensory imagery, narrative, and cognitive prompts. These techniques are important in AD (chapter 2) and were accordingly foregrounded in the creation of the ADG texts for this study. The fact that the AD was embedded with multisensory imagery may have had a part to play in enhancing recall (Chu & Downes, 2000; Eardley & Pring, 2006; Gottfried, Smith, Rugg, & Dolan, 2004). The formation of mental imagery has also been employed as an elaboration strategy to enhance learning (Bartsch et al., 2018; Dunlosky & Kane, 2007). It is therefore possible that the use of multisensory imagery helped to create a richer imaginary landscape, with more images and associations that could later cue recall of the photo's appearance, content or socio-historical context.

The use of narrative was also important in the AD. Whilst narrative was to some extent present in both sorts of audio texts, the SAG texts focused more on the provision of semantic information, whereas the ADG focused more on the imagined experience of the photos' subjects, in order to build a story. It is possible that this use of narrative, alongside the use of cognitive prompts in the audio descriptions, may have aroused curiosity or interest, again with positive implications for memorability (Kang et al., 2009). In the museum literature, narrative is understood as storytelling which evokes

feelings, memories and curiosity, thereby creating engagement (Nielsen, 2017). It is therefore consistent with such definitions that the provision of narrative and cognitive prompts would be associated with curiosity, increased engagement and memorability in these findings.

This study does not allow us to dissociate between the effects of AD on attention ('guided looking') and the features of AD (multisensory imagery, narrative and cognitive prompts), therefore it is difficult to draw any conclusions about which aspects were most important for memorability. However, in practice, AD as an inclusive tool for museum interpretation would be likely to incorporate both guided looking for those with sight, and, to a greater or lesser extent (see Chapter 2) the features of multisensory imagery and cognitive prompts. Therefore, in terms of developing inclusive museum resources, this question is of theoretical rather than practical importance. As has been observed in the museum literature, the very purpose of meaning-making through interpretation is to create a memory (Nielsen, 2017). These findings suggest the ability of AD to do so to an extent previously untapped by standard audio guides.

Summary

This study was the first investigation of the impact of museum AD on the experience of sighted participants. The findings present a positive picture for the future use of AD in museums for sighted as well as blind visitors. Firstly, using audio encouraged participants to spend longer with the photos, and the use of audio increased re-engagement with the experience between times A and B. The use of audio did not have the potential negative impacts on the user that have been raised by the audio guide research literature, although the data do suggest a need for care in terms of duration and level of detail. Secondly, AD was shown to offer advantages over a standard audio guide, due to its ability to create richer memories for the users. These findings suggest a strong case for museums both to increase their audio resources and to incorporate AD in their creation. Making use of audio description techniques in preparation of audio resources would not only adhere to Inclusive Design principles, and thereby help to create a more inclusive museum environment, but it would also stand to enhance the long-term impact of the museum visit for all visitors. Having established that AD has potential as a tool for Inclusive Design in museum interpretation, this thesis will now go on to explore factors that may increase the impact of AD further, for both blind and sighted visitors alike.

Chapter 5: The impact of enriched audio description on the exploration of Henry Grant photography, in people with and without sight

Abstract

This chapter explores the impact that sound enriched AD may have upon users with and without sight, when compared to standard AD, thereby exploring the use of additional perceptual information in AD. It presents the results of a study comparing the use of an ADG (audio descriptive guide) with an enriched audio descriptive guide (EDG), in which the AD was enriched with congruent sound effects. Participants, both BPS and sighted, were presented with 8 photos, half with ADG and half with EDG, in a randomised order. Experience, engagement and memorability were assessed through a combination of measures directly after the presentation (time A), and approximately 4 weeks later (time B). Results demonstrated that the response to the experience was broadly similar for both BPS and sighted people, with high enjoyment levels and significantly more participants preferring the EDG. The photos presented with EDG were more memorable for BPS people than the ADG photos. Whereas sighted participants recalled more photos with ADG than BPS participants did, the BPS and sighted groups remembered equal number of photos and equal numbers of details for the EDG photos. This demonstrates that use of the EDG enhanced memorability in the BPS group to the extent that their recall was the same as the sighted group. The enjoyment of EDG in both groups suggests that it could be used within mainstream museum offerings as an inclusive tool, which would also enhance memorability and impact for BPS users who require the AD as access.

Introduction

Chapter 4 demonstrated that ADGs were well received by sighted participants, and that no significant differences in experience emerged between the use of the standard audio guide (SAG) and the ADG. However, the ADG resulted in richer memories one month after the photos were viewed. This suggested that AD could be used in museum interpretation, creating inclusive resources and increasing the impact of the artworks or exhibits for all visitors, regardless of their level of vision. Having established the benefits of standard AD for the sighted audience, this research now goes on to explore how AD could be designed in order to enrich the experience further, for both blind and sighted visitors.

One potential way to enrich AD is by adding sound effects. The use of sound in AD has been anecdotally reported by practitioners (Eardley et al., 2017) and AD specialists have suggested the mechanisms by which sound-enriched AD may be beneficial for their audiences. For example, Giansante (2013), an audio and AD producer for Art Beyond Sight (amongst others), encourages the use of sound in his AD training materials and claims that adding sound to AD can help to create mental images and memories of a sensory experience.

Potential benefits of sound have also been discussed by AD researchers in Translation Studies (de Coster & Muehleis, 2007; Neves, 2012, 2016). Neves' (2012) notion of 'soundpainting' proposes adding sound and music to AD on the basis that they may stimulate emotion, thereby encouraging a richer art experience. Building on soundpainting, Neves later proposed 'enriched descriptive guides' (2016), which offer factual information that 'has been "enriched" through the creative use of description, sound effects and music, to provide thinking prompts that fuel the senses, invite cognitive and/or physical exploration, and capture the uniqueness of the cultural context the guide relates to' (Neves, 2016, p.141). Crucially, such enriched descriptive guides (EDGs) would be intended for all visitors, not just those with a visual impairment.

Neves (2016) presents the process through which EDGs were created for Qatari artworks as part of the 'Art Translates Project.' In these EDGs, sound and music were used to suggest geographical context, location and ambience. She reports that the use of sound was commented upon by research participants and described as 'interesting' or 'rich', and suggests that the use of sound merits further research attention. It is notable

that empirical research comparing the use of sound-enriched guides with standard guides is rare, despite the fact that countless audio guides around the world make use of creative approaches to incorporating sound (Neves, 2016). Furthermore, there is no empirical research testing the presumed benefits of sound with regards to AD, through reception studies with blind and sighted museum visitors. This raises the question regarding the potential impact of sound on the cognitive experience of a museum visit.

Sounds are already an important element in museum interpretation, and may be considered either diegetic, meaning belonging to the world of the story that is being presented, or non-diegetic, meaning coming from outside the world of the story (Bubaris, 2014). Museums frequently choose to use sounds in their interpretation, either through an audio guide delivery or, more often, in sound 'zones' within the museum. Mobile technologies are moving fast and encouraging new uses of sound (Bubaris, 2014). For example, projects such as the LISTEN project (Zimmermann & Lorenz, 2007) have evaluated motion-sensitive technological developments that aim to integrate visual and aural perception and create an immersive audio-augmented environment for museum visitors. However, there is relatively little information on the impact of sound specifically on the user experience, although a number of assumed benefits such as attention, interest, imagination, emotion and memorability have been explored in the museum research literature, and in the research literatures of other media.

Firstly, sound is generally understood to help attract museum visitors' attention and develop their interest (Bubaris, 2014). For example, Marshall et al (2016) developed sound-enriched audio interpretation to aid exploration of a First World War site in the Italian Alps, which they compared to a more objective factual audio text. Observation data showed that sounds were successful in capturing visitors' attention and attracting them to areas of interest, and the qualitative data showed that participants who had listened to the sound enriched provision had a higher desire to know more about the content, suggesting higher levels of interest (Marshall et al., 2016). However, the use of sound was not isolated as a variable in this study, as the sound-enriched text also included different semantic content to the non-enriched text, such as personal accounts (Marshall et al., 2016). Furthermore, the sound-enriched interpretation was delivered through open-air listening stations, rather than audio guides, leaving the question unresolved of whether sound-enriched audio guides would have a similar impact on attention and interest.

Empirical studies from other media also contribute findings which suggest benefits of sound. Early studies in television (Calvert & Gersh, 1987) assessed the impact of sound effects on attention, by adding sounds to a difficult to understand dream sequence in a children's TV programme and comparing children's visual attention and comprehension with/without the sounds. Calvert & Gersh (1987) showed that the sounds increased visual attention and improved comprehension and, furthermore, they suggested they may also have increased interest in the content amongst the male participants.

Research in radio also brings insight to the use of sound. Rodero (2012) suggested that the use of sound effects in audio drama would stimulate and maintain attention and interest using established self-report measures. She compared audio drama with/without additional sound effects, finding that sound effects were effective at enhancing listener attention. Rodero concluded that sound effects might enhance memorability, although it was not directly measured in this study. Rodero (2012) suggested that the use of sounds creates a richer sensory experience that may help to generate mental imagery, which is of particular relevance to radio, where there is no visual perception. The study (2012) also addressed the impact of sound on the generation of mental imagery, finding not only that sound helped to increase mental imagery (as self-reported by participants through established imagery questionnaires) but also that there was a relationship between the generation of mental imagery and increased attention, as demonstrated through correlation analysis.

The potential of sound to enhance mental imagery creation is of particular potential importance for BPS museum visitors, for whom mental imagery may be one of the desired outcomes of listening to AD (see Chapter 2). Furthermore, research on radio advertising suggests that imagery used in radio advertising can engage memories of previous sensory experience, helping to make messages more personally relevant (Bolls & Lang, 2003). A comparison of high-imagery and low-imagery advertising also showed that participants reported higher involvement (attention, concentration and thinking) in response to the high-imagery condition (Bolls & Lang, 2003). It therefore seems possible that adding an extra layer of perceptual experience through sounds in AD would create easier opportunities for image creation, thereby stimulating imagination.

Increased image generation may create further connections with the listener's networks of existing semantic knowledge and memories, thereby providing more opportunities

for processes of elaboration to occur (Bubaris, 2014; Craik, 2002). This may also be expected to contribute to increased memorability (Craik, 2002). The additional perceptual experience and stimulation of imagination through sound may also enhance the experiential nature of being in the museum, bringing a sense of immediacy and participation (Bubaris, 2014) and help the visitor to imagine being in a different place or time.

The presence of emotion is known to enhance autobiographical memory as emotion has a role to play in the way events are both encoded and consolidated (Holland & Kensinger, 2010), with emotional arousal triggering changes at a neurochemical and cellular level (Holland & Kensinger, 2010). This would suggest that arousing emotion in museum visitors stands to increase the long-term impact of a visit. It has also been widely proposed in the museum literature that the use of sounds enhances emotional engagement with the visit (Bertens & Polak, 2019; De Jong, 2018; Marshall et al., 2016). This is deemed particularly important in today's museology with its emphasis on the experiential nature of museums, where 'feeling' is as important as 'learning' (De Jong, 2018; Radder & Han, 2015). Furthermore, emotion may help build empathy, whereby the visitor engages with the imagined feelings of people in times past (De Jong, 2018). Emotion may therefore help drive engagement, and thereby further museums' aim of providing their customers with sought after memorable events (Bubaris, 2014).

Although empirical investigations into the importance of sounds for arousing emotions and enhancing memorability in museums are very limited, research has suggested that the use of sound can increase visitors' emotional connections to the subject matter, when assessed through qualitative analysis of visitor comments (Marshall et al., 2016). Similarly, Bertens & Polak (2019) found that the use of an audio guide enriched with ambient sound resulted in higher evaluation by participants of emotional engagement, although this suggestion should be regarded as tentative as it relies upon a single self-report measure that was not interrogated with inferential statistical tests. Furthermore, as was the case with the study by Marshall et al (2016), the sound enriched guide contained different semantic content (here, emotions and memories of artists) to the non-enriched guide, meaning that the increased emotional connections cannot be attributed solely to the use of sound.

Nevertheless, the relationship between sound and emotion more generally is broadly accepted in the wider context, with environmental and ambient sounds as well as music and vocal sound being linked to increased emotion (Weninger, Eyben, Schuller, Mortillaro, & Scherer, 2013). Sound design in film is also deemed crucial to arousing emotion in the viewer (Fahlenbrach, 2008). In summary, sound may potentially enhance autobiographical memory if it is indeed able to increase attention, interest, mental imagery generation and emotion.

It is also relevant to consider whether the use of sound effects is likely to have a similar impact on the experience and memorability of people with and without sight. Findings in the research literature related to memory in BPS people more generally, and sound specifically, present a mixed picture. Researchers of autobiographical memory in sighted people have identified the importance of visual imagery in autobiographical memory retrieval (Conway & Pleydell-Pearce, 2000; Williams, Healy, & Ellis, 1999). However, Eardley & Pring (2006) demonstrated that both congenitally blind people and sighted people draw upon cross-modal imagery to generate autobiographical memories. Nevertheless, they did observe a trend towards sighted participants generating more specific events than blind participants- both autobiographical memories and projections about the future, both of which may rely on imagery (Eardley & Pring, 2006).

Tekcan et al (2015) also reported fewer memories generated by blind participants in response to cue words compared to sighted. Their suggested explanation was that although autobiographical memory retrieval employs multisensory imagery, it is vision that is the most effective sense in integrating components of memory both at encoding and later rehearsal (Tekcan et al., 2015). An alternative explanation set out by Eardley & Pring (2014) is that imagery is more likely to be multisensory for sighted people, as their images are almost always accompanied by a visual image. Therefore, autobiographical memories for people with vision are more likely to be multisensory, and multisensory input is likely to make these memories more memorable.

The studies by Tekcan et al. (2015) and Eardley & Pring (2006) were conducted using a cue word methodology whereby participants were asked if they were able to generate autobiographical memories in response to a specific word. The current research uses presentation of a stimulus and analyses later recall of it, thereby exploring participants' memories for the stimuli over time. Participants are not asked for memories of the initial experience of the presentation, nor for memories of the event of taking part in the study.

As such, it addresses episodic information, in the form of a memory for a personal experience (Cohen & Conway, 2007). If such episodic information is integrated with knowledge about the self, then it may be considered an autobiographical memory.

Whether or not such an integration applies here, the findings in the research literature that suggest lower autobiographical memory generation in BPS people nonetheless provide an interesting context. It is possible that sighted people may produce more memories in a longitudinal study, although this possibility is further complicated by the fact that some BPS people will have some or no visual experience, and others will have residual or largely intact visual memory. If autobiographical memory retrieval is lower in blind people compared to sighted people, then this may reduce the number of memories retrieved by BPS people overall.

The study by Tekcan et al (2015) also looked at the effect of the age of memories on the imagery variables and metacognitive variables of recollection and belief, noting that the impact of the age of the memory on those variables was similar for both groups (blind and sighted). This suggested that age of the memory affected the patterns of the memory content in broadly similar ways in both groups, indicating that the processes underlying autobiographical memory are likely to be similar in both groups of participants in the current research. In summary, the structure of autobiographical memories could be similar in both BPS and sighted participants, but there is an open question regarding whether the level of recall may be subject to the variations between the two groups that are tentatively suggested by the research literature (Tekcan et al., (2015), Eardley & Pring, (2006).

The importance of auditory imagery in autobiographical memory is also of potential importance. Tekcan et al (2015) found that blind participants reported higher auditory imagery at retrieval, with totally blind people recalling the highest auditory imagery. This appears to be consistent with observations in the research literature that blind people may make superior use of other senses, such as research that has demonstrated that blind people perform better than sighted on auditory perceptual tasks, even when musical experience is controlled for (Wan, Wood, Reutens, & Wilson, 2010). Sound effects may therefore be expected to be particularly beneficial to BPS participants, as the sound would provide a layer of perceptual experience, as opposed to merely the language of standard AD.

Fryer et al., (2013), wanted to explore the impact of sounds for an AD audience, and used audio drama with/without sound effects in order to evaluate the impact of sound effects on measures of presence (the feeling of being in the mediated environment). Whilst sound effects increased ratings of spatial presence and ecological validity in sighted people, there was no effect for blind participants, which brings in to question the possible benefit of sound for BPS participants. The authors suggested that some of the sound effects used may have had a distancing effect on the blind listener, and that the effort of assimilating distant sounds into their mental model of the scene would have reduced their sense of presence (Fryer et al., 2013). However, the lack of impact on BPS listeners may be specific to the measure of presence, and may not preclude other benefits, including memorability. Presence measures seek to understand the subjective experience of feeling immersed and engaged in a mediated environment (Lombard & Ditton, 1997, cited in Fryer, 2013). It is therefore possible that the picture for memorability may present differently, and indeed the research literature discussed above supports this suggestion (e.g. Marshall, 2016, Rodero, 2012, Bertens & Polak, 2019). Furthermore, Fryer et al. (2013) are dealing with audio drama, which is a different type of stimuli to a museum audio guide. However, Fryer (2013) also reported on a task whereby BPS participants were asked to rate their mental imagery across sense modalities in response to both verbal stimuli and sound stimuli. Findings showed no difference between the two conditions for BPS participants. Therefore, the research literature presents a mixed picture regarding the importance of sound for people who are BPS.

Sounds that are congruent with visual stimuli (e.g. image of dog and dog bark) have been shown to aid perceptual processing and memorability (e.g. Kim et al., 2008; von Kriegstein & Giraud, 2006, see Chapter 1). Relating this to AD for sighted people, enriching description of a visual image (e.g. a photo) with congruent sounds (e.g. market sounds presented as the audio guide discusses markets) could be expected to have a greater impact on memory for information. For sighted people, this may occur through the congruence of sound, image and information; for BPS people it may occur through the congruence of sound and information.

It seems plausible that the use of congruent sound effects with AD could enhance memorability for information. However, it could also be expected that sighted participants would recall more than BPS participants with AD that has not been enriched. For sighted people, or people with partial sight, standard AD will include the

perceptual experience of seeing the stimuli, with the added advantage of the AD guiding attention to the semantic elements as they are verbalized, providing congruence of visual and semantic information. Research has suggested that both blind and sighted people can create mental representations based on language only (Eardley et al., 2016). However, when people with no residual vision listen to AD that presents language only, then there is no perceptual experience, and therefore there is not the same opportunity for benefits to memory. The lack of perceptual experience would mean that blind people are relying on imagery to support the semantic information provided by the AD, which increases the cognitive load of listening and remembering, without perceptual prompts to support this process. Sighted people, however, have the additional support of visual perception, which may mean better memory for non-enriched AD.

Developing on Chapter 4, which demonstrated that ADGs increase memorability for sighted people, compared to SAGs, this study therefore seeks to explore the impact of AD with/without congruent sound effects (ADG, EDG) upon the experience, engagement and memorability of both blind and sighted people. It also investigates the ways in which the AD experience overall is received by both sighted and BPS participants, in the context of inclusive design.

In summary, it is possible that BPS participants will present with lower recall overall at time B than sighted participants, due to potential differences in autobiographical memory retrieval between the two groups. Sighted participants may recall more with standard AD than BPS participants due to the benefits of ‘guided looking’. However, if vision is of primary importance to autobiographical memory, then sighted participants would recall more than BPS participants with both ADG and EDG. However, the research literature on the impact of sound effects suggests that sound can increase attention, interest, mental imagery generation and emotion, all of which could contribute to enhanced memorability, in both blind and sighted participants. It is expected that sighted participants may recall more with ADG than BPS participants, due to the nature of ‘guided looking’. It is also expected that the use of sound in EDGs will impact positively upon the experience and engagement both groups. BPS participants can also be expected to recall more with EDG than ADG, due to the additional layer of perceptual experience. Sighted participants may also recall more with EDG than ADG, if the additional perceptual experience is able to increase imagery or increase attention/interest/emotion enough to enhance memorability.

Methods

Design

The study was a longitudinal mixed design. It had one between subjects IV: vision group (BPS, sighted). There were two repeated IVs: AD type (ADG, EDG) and time (time A - directly after the presentation; time B - one month later). A series of dependent variables were examined; the overall experience (enjoyment, engagement) was measured at times A and B, and memorability was measured at time B. Where data were not normally distributed, and normality could not be achieved using transformations, non-parametric tests were used. All tests were two-tailed.

Participants

Forty BPS people and forty sighted people took part in the study. One participant in the sighted group did not complete the follow up and was therefore excluded from the analysis. Within the BPS group, the mean (SD) age was 50.39 (15.04); 23 males, 17 females. In the sighted group, the mean (SD) age was 50.64 (15.53); 22 males, 17 females. Participants were matched for age within 5 years and an independent *t* test confirmed no difference in ages between BPS and sighted groups: ($t=0.074$, $df=76$, $p=.94$). Within the BPS group, 16 participants described themselves as having no useable vision, 22 as having some useable vision, and 2 as having considerable useable vision. An additional scale was selected which has been used to measure self-reported levels of functional vision (Douglas, Corcoran and Pavey, 2006; see also Fryer, 2013). Based on this scale, all 40 BPS participants would require assistance to access museum exhibits, which are often displayed from some distance. Five participants in the BPS group and three in the sighted group were non-native speakers of English; all eight described themselves as bi-lingual or fluent. The study received ethical approval from the University of Westminster's Psychology Ethics Committee and was run in accordance with the British Psychological Society's ethical requirements. All participants gave informed consent, and were debriefed upon completion.

Materials

Eight photos were selected from the Henry Grant Collection (see appendix 3.1). Seven of these were used in the previous study, and one additional photo was selected for this study, which can be viewed with the accompanying AD text in appendix 4.1. The audio

descriptions used in the previous study were used (see appendix 3.2) and these provided the ADG condition. Enriched soundscapes were then created for the photos. The recorded audio descriptions were edited by the researcher using Audacity software (version 2.2.2) to apply sound effect files sourced via the National Theatre or via online resources such as the BBC Sound Effect archives (BBC, 2018). Where possible, sound was given a spatial element, such as footsteps walking from left to right. These enriched descriptions formed the EDG condition. The sound files were sent to experts for review (VocalEyes, Joselia Neves) and the final versions were produced to incorporate their feedback. The inclusion of sound effects added a mean time of 18.5 seconds to the total duration of the presentation of the photos compared to the previous study where only plain AD was presented.

Measures

Two questionnaires (time A, time B) were designed for the experiment; one administered in person after the participants had viewed the photos and the second completed online via a Qualtrics link, or by phone, one month later. The questionnaire at both time A and B (see appendices 4.2 and 4.3) addressed the participant's experience and engagement levels, with the questionnaire at time B also addressing memorability for the photos.

The questionnaires were an adapted version of those used in Study 3 (Chapter 4), with additional questions relating to the different stimuli (ADG, EDG) and questions specific to the BPS group. They collected the following information through a combination of quantitative and qualitative measures:

Demographic data: the demographic data was the same as that collected in Study 3: age, gender, whether English was the first language. If English was not the first language, participants were asked to rate their level of English on a 5-point scale where 1 was 'beginner' and 5 was 'bilingual'. Participants were asked to rate their museum visiting habits over the last 5 years on a 5-point Likert Scale (1= never, 5= once a week or more).

Vision Information: Participants were asked to confirm whether or not they had a visual impairment and if so, to state whether they considered themselves to have 'no useable vision', 'some useable vision' or 'considerable useable vision.' A second scale (Douglas, Corcoran and Pavey, 2006; see also Fryer, 2013) asked them to select the

most appropriate statement from a series, ranging from ‘I have no light perception’ to ‘I can recognise a friend by sight alone if I’m on the other side of the street.’

Experience and Engagement: The following measures remained the same as Study 3: desire to re-engage with the content, re-engagement at time B, thoughts and memories during the exhibition at time A, emotional response (yes/no), identification of emotions if relevant, generation of mental images and clarity of mental images if reported. Participants’ attention was measured by logging the time spent on each photo in seconds, and the time spent in seconds reviewing any photos, if they chose to do so. Participants were asked to rate their enjoyment of the experience on a 7-point Likert scale ranging from ‘hated it’ (1) to ‘loved it’ (7).

Audio Evaluation: Participants firstly rated their experience of the audio at a general level using the same audio evaluation measure as Study 3. Participants were additionally asked whether they noticed the enrichment using sound effects in some of the photo presentations, and if they answered yes, they were asked to describe any impact it had on their experience in a free text response. They were then asked to state whether they preferred the ADG, the EDG, or whether it made no difference. If they stated a preference, they then rated their agreement with 10 statements about the audio on a 7-point Likert scale where 1 = ‘not at all true’, 4 = ‘somewhat true’ and 7 = ‘very true’. Participants with a preference for one type of audio were asked to rate this one specifically; participants who did not express a preference for an audio type were asked to rate the audio in general using the same scale. The ten statements addressed various aspects of the listening experience; ‘the audio was clear and easy to follow’, ‘it helped me to create an image in my mind of the photo’, ‘it brought the photo to life’, ‘it helped me to understand the layout of the photo’, ‘it gave me facts and context about the photos’, ‘it gave me what I need to discuss the exhibition with other visitors’, ‘it made me wonder or feel curious about the photos’, ‘it made me want to discuss what the photos were about’, ‘I enjoyed listening to it’, and ‘it held my attention throughout.’

Memorability measures: At time B, participants were asked to recall the photos and provide as much detail about them as they could in free text responses. This photo recall text was then coded across several categories. Five of these were the same as categories used in Study 3: spatial, event/activity/movement, emotion and atmosphere (including non-visual imagery), participants’ reactions (emotions, thoughts, and memories mentioned during photo recall), and semantic recall (socio-historical

information/context and information about the photographer). Auditory imagery and references to sound was a separate category. The ‘visual’ category from Study 3 became ‘content’, and included content elements that could be from seeing the photo or listening to the audio (e.g. one count attributed to ‘there was a boy’). The categories were combined as before to give each participant a score for the total details they recalled for both the ADG and EDG photos.

Procedure

All participants took part in the study in a quiet room with no external distraction. The eight photos, four of each photo type, ADG and EDG, were presented on a laptop computer in a PowerPoint presentation with a minimum screen of 13.5 inches. The order of both the photos and the photo type was randomised. Each photo was therefore presented with both EDG and ADG with the lowest percentage of EDG presentation for any individual photo being 41% and the highest 56%; the average percentage of EDG presentation for the photos was 50%. Participants listened to the audio through headphones after being invited to check the volume was comfortable. Participants were told that they could listen to the full duration of the audio file if they wanted to, or move on sooner if they chose, and that they would have a chance to re-visit any photos at the end if they wanted to. After the presentation of the photos participants completed the Time A questionnaire. This was done either online (Qualtrics) with the aid of a screen-reader if necessary, via large-print questionnaire or via recorded dictation to the researcher, with the recordings later undergoing professional transcription. A month later, the time B questionnaire was either completed by phone, in which case calls were recorded and professionally transcribed, or online via Qualtrics. Upon completion, participants were debriefed, and sent a £15 shopping voucher as a thank you for their time.

Results

Participant demographics and time taken to follow up

Participants were asked to what extent they enjoyed visiting museums and galleries. In the BPS group the median value was 4 (‘like it a lot’) with a range of 4. In the sighted group the median value was also 4 (range 2). A Mann-Whitney U test confirmed no difference between the groups: (U=664.50, N₁=40, N₂= 35 p=.68).

Participants were asked how often they had visited museums in the last 5 years. In the BPS group, the median (range) response was 3 (4) and it was 3 (2) in the sighted group, with 3 indicating ‘about once every 6 months.’ A Mann-Whitney U test confirmed that sighted participants had visited more frequently in the last 5 years: ($U=521.00$ $N_1=40, N_2= 39, p=.008$).

In the BPS group, the mean (SD) time taken in days to follow up was 35.78 (7.15). In the sighted group, it was 35.10 (5.21). A Mann-Whitney U test confirmed no significant difference between the two groups: ($U=733, N_1=40, N_2= 39, p=.64$).

Thirty-six of 40 BPS participants (90%) had used AD before, of which 28 had used AD in museums and galleries. Seventy-four per cent of the sighted group confirmed that they had heard of AD before. The median (range) frequency with which the sighted participants had used standard audio guides was 2.5 (4) (2=rarely, 3=sometimes).

This study sought to explore a) the impact of EDG compared to ADG, for BPS and sighted participants, and b) the overall AD experience for BPS and sighted participants. The results are therefore divided into two sections.

Comparison of the impact of ADG and EDG, for BPS and sighted participants

Emotion and imagery

To assess emotional responses and mental imagery generation, participants were first asked to select the photo that they found ‘most interesting’ and the photo that they found ‘least interesting.’ Some photos were selected more often than others, however each photo appeared in both the ‘most interesting’ and ‘least interesting’ categories. The split between original ADG and EDG presentation was broadly equal (see Procedure).

Further analysis identified whether the choice of most and least interesting photos were originally presented with ADG or EDG:

	BPS group	Sighted group
‘most interesting’ photo – with EDG	73%	64%
‘most interesting’ photo – with ADG	27%	36%
‘least interesting’ photo – with EDG	37%	46%
‘least interesting’ photo – with ADG	63%	54%

Table 5.1: selection of most and least interesting photos: proportions with ADG and EDG, by participant group

Table 5.1 suggests that both sighted, and to a greater degree, BPS participants were more likely to select an EDG photo as the one they found most interesting. BPS participants choice of ‘least interesting’ photo was more likely to have come from the ADG condition; for sighted participants the split looks more even. Binomial tests confirmed that more BPS participants chose an EDG than an ADG photo for the ‘most interesting photo’: EDG choice= 29, ADG choice=11, $p=.006$. For sighted participants, there was no difference: EDG choice=25, ADG choice =14, $p=.108$. For the choice of least interesting photo, there were no differences between the numbers of photos chosen with EDG or ADG for either BPS ($p=.15$) or sighted ($p=.75$).

The emotional response was then analysed by stimulus type.

		BPS group		Sighted group	
		N	N reporting emotion	N	N reporting emotion
'most interesting'	ADG	11	7 (64%)	14	11 (79%)
	EDG	29	25 (86%)	25	17 (68%)
'least interesting'	ADG	25	16 (64%)	21	8 (38%)
	EDG	15	7 (47%)	18	5 (28%)

Table 5.2: number of participants who selected EDG or ADG for the most/least interesting photo, and percentage thereof who reported experiencing emotion

Table 5.2 suggests that more BPS participants reported experiencing emotion in response to their 'most interesting' photo when this photo was presented with EDG compared to ADG. For sighted participants, the reverse appears to be the case. The proportions of participants reporting emotion for the most interesting photo appear similar for both BPS and sighted. For the least interesting photo, BPS participants appear to report emotion more than sighted participants. The distribution of counts in these categories were too low for inferential analysis.

Participants were also asked whether they could form a mental image when thinking about these two photos, and if so, to rate its clarity from 1-10:

		BPS group	Sighted group
‘most interesting’ Photo	ADG	8 (6) (n=11)	8 (5) (n=14)
	EDG	8 (6) (n=28)	8 (4) (n=25)
‘least interesting’ Photo	ADG	6 (8) (n=23)	8 (7) (n=21)
	EDG	8 (8) (n=13)	8 (8) (n=18)

Table 5.3: median (range) imagery clarity rating for the participants who reported experiencing mental images: BPS N=39 (most interesting photo), N=36 (least interesting photo); sighted N=39 (most and least interesting photo).

Results suggest that mental imagery generation was similar in clarity for both groups of participants (see Table 5.3).

Audio evaluation

Participants also stated at times A and B which audio they preferred, or whether it made no difference:

	Time A			Time B		
	Audio with SFX	Plain Audio	Made no difference	Audio with SFX	Plain Audio	Made no difference
Blind and partially sighted participants	73%	20%	7%	73%	25%	2%
Sighted participants	74%	18%	8%	69%	18%	13%

Table 5.4: Audio preferences (percentages) by participant group (BPS, sighted) at times A and B

The majority of participants preferred listening to the EDG audio at time A; and that audio preferences remained broadly consistent across both groups at time B (see Table 5.4). A binomial test analysis was conducted for each sight group in order to explore whether there was a significant difference between the numbers of participants who preferred ADG or EDG. The participants who selected ‘it made no difference’ were omitted from this analysis, 3 BPS and 3 sighted participants at time A, and 1 BPS participant and 5 sighted at time B. The binomial analysis was significant at time A for both groups: BPS $p=.001$, sighted: $p<.001$ and at time B: BPS $p=.003$, sighted, $p=.001$. This indicates that significantly more participants in both the sighted and BPS groups preferred EDG.

At time A, participants were also asked whether they noticed the sound effects, and if so, what the impact it had (if any) on their experience. All participants confirmed that they noticed it. The qualitative data provided on the impact of enrichment using sound effects was also analysed. Observations made by participants about the enrichment across all free text questions were coded thematically in order to explore the nature of the impact. In the BPS group, there were 94 positive observations, from 34 participants (85% of sample). There were 22 negative observations, from 10 participants (25%) and 6 (15%) participants made a mixture of positive and negative observations. In the sighted group, there were 59 positive observations from 32 participants (82% of sample), and 8 negative observations from 8 participants (21%). 4 participants (10%)

made both positive and negative observations. A Pearson's Chi-square test confirmed that there was no relationship between sight status and the numbers of positives comments (chi-square=11.54, p=.17). There was a relationship between sight status and the numbers of negative comments (chi-square= 11.61, p=.009), with more negative comments about the enrichment from BPS participants. Nevertheless, it is worth noting that there were similar numbers of people who made negative comments in both groups, and the difference seems to result from the fact that those who didn't like the enrichment in the BPS group made more negative comments than did those in the sighted group.

These observations were broken down further thematically to explore the content of what was said. Within the positive observations, the most important theme was that of the enrichment 'making it more real.' This included comments about the photos being brought to life by the enrichment, about the participant feeling present in the scene, or about the enrichment helping them to imagine it. Forty-three such comments were made by 23 BPS participants (58% of sample), and 30 comments were made by 25 sighted participants (64% of sample). Examples included: 'it just transported me actually into the scene itself. It felt more realistic' (BPS participant); 'the background sounds made you feel as if you were right there with them' (BPS participant); 'The sound effects made the pictures come to life; made them seem more real. I felt that I could almost imagine myself being there' (sighted participant); 'It positioned me in the photograph, giving each experience a sense of immediacy and urgency' (sighted participant).

The next most prevalent type of positive observation was that is enhanced the experience. Such observations were expressions of enjoyment and interest, including observations that the enrichment added atmosphere and helped tell the story. There were 37 comments in this category from 24 BPS participants (60%), such as 'it made it more interesting' and 'it made me smile' and 21 comments from 17 sighted participants (44%); 'it made it more lively', and 'each photo had a story to tell emphasized by the sounds'.

Eight participants (4 in the BPS group (10%) and 4 (10%) in the sighted group) made the observation that the enrichment helped them to concentrate and helped to focus their attention, with two sighted participants stating that the sound effects highlighted aspects of the photos that they would otherwise have missed. Five BPS participants and 1

sighted participant commented that the enrichment either evoked memories or would help them to recall the photos later, and 7 participants (5 BPS, 2 sighted) likened the experience of listening to the EDG to cinema or film.

The negative observations (from 10 BPS participants (25%) and 8 sighted participants (21%) were similar for both groups; namely that the enrichment was distracting, unnecessary or irritating if it did not match with the participants' imagined versions of how the sounds should be. Seven BPS participants and 2 sighted participants suggested ways in which they would change the enrichment, such as shortening the duration of the sounds, ensuring they were used only during a pause in the words, or making them quieter. This analysis demonstrated a very similar, positive response to the use of enrichment with both BPS and sighted people, although the BPS participants recorded more thoughts overall than sighted.

Autobiographical Memories

One hundred and six autobiographical memories were recorded by participants in response to the free text question 'During the exhibition, did any memories come to mind?', of which 71 (67%) were from the BPS group and 35 (33%) from the sighted group. In the BPS group, the mean (SD) number of memories was 1.78 (1.25) and in the sighted group it was 0.90 (1.02). A Mann Whitney U test confirmed that there were significantly more memories in the BPS group: ($U=441.50$, $N_1=40$, $N_2=39$, $p=.001$). If participants reported memories, they were asked to rate the vividness of the most vivid memory. For BPS participants, the median (range) memory vividness rating was 9.5 (8); for sighted participants it was 8 (8). A Mann Whitney U test confirmed there the BPS group's memory vividness was significantly greater than the sighted participants: ($U=370$, $N_1=36$, $N_2=29$, $p=.04$)

In the BPS group, 38 memories related to EDG photos and 33 to plain photos. In the sighted group, 15 memories related to EDG photos and 20 to plain photos. Wilcoxon tests confirmed no difference in the numbers of memories generated in response to EDG and ADG photos for either group: for BPS ($Z=-0.51$, $p=.61$), for sighted ($Z=-9.7$, $p=.33$). In other words, BPS participants recorded more memories than sighted participants, but similar numbers of memories were evoked in response to both ADG and EDG photos in both groups.

Memorability measures

At time B, BPS participants recalled a mean (SD) number of 2.08 (1.38) ADG photos, and 2.48 (1.22) EDG photos. Sighted participants recalled a mean (SD) number of 2.79 (1.20) ADG photos, and 2.72 (1.19) EDG photos. Wilcoxon tests confirmed that more EDG photos were recalled than ADG photos in the BPS group: ($Z = -2.15, p = .031$) and that there was no difference between the amount of EDG and ADG photos recalled in the sighted group ($Z = -0.323, p = .75$). Mann-Whitney U tests confirmed that more ADG photos were recalled by sighted than BPS participants ($U = 548.50, N_1 = 40, N_2 = 39, p = .02$) but that there was no difference in the number of EDG photos recalled in either group: ($U = 682.00, N_1 = 40, N_2 = 39, p = .32$)

The memories were coded for details, resulting in a total details score for ADG photos and a total details score for EDG photos, for each of the sighted and BPS groups. Some participants recalled a memory in only one condition, but not the other (see Table 5.5).

	Recalled details for ADG photos only	Recalled details for EDG photos only	recalled no photos
Blind and partially sighted participants	2	7	0
Sighted participants	1	0	2

Table 5.5: recall of details for ADG or EDG only, and no recall of photos, by participant group

The two participants in the sighted groups who did not recall any content about the photos were excluded from this analysis. Data of those who only remembered content from one condition were included in the analysis, but the result was that the data was not normally distributed, so nonparametric inference tests were used, with a Bonferroni-Holm correction for multiple tests. In the BPS group, the mean (SD) total details scores were 24.65 (22.00) for ADG photos and 30.30 (26.50) for EDG photos. In the sighted group, the mean (SD) total details scores were 37.12 (30.38) for ADG photos and 37.92 (31.64) for EDG photos. Wilcoxon tests confirmed no differences in the amount of details recalled for ADG or EDG photos either in the BPS group: ($Z = 1.68, p = .19$); or in the sighted group: ($Z = 0.369, p = .71$). Therefore, participants in both groups recalled similar numbers of details for photos regardless of the AD type. Mann-Whitney U tests

were also conducted to explore potential differences in recall of the details between groups. The difference between the sighted and BPS groups for the amount of details recalled for ADG photos did not quite reach the threshold for statistical significance ($U=541$, $N_1=40$, $N_2=37$, $p=.084$). There was no difference between the sighted and BPS groups in terms of the amount of details recalled for EDG photos ($U=617$, $N_1=40$, $N_2=37$, $p=.21$). Therefore, blind and sighted participants recalled similar numbers of details about ADG and EDG photos, but there was a potential trend towards sighted people recalling more details about ADG photos than BPS participants.

Finally, participants' recall of the photos were scored for detail types.

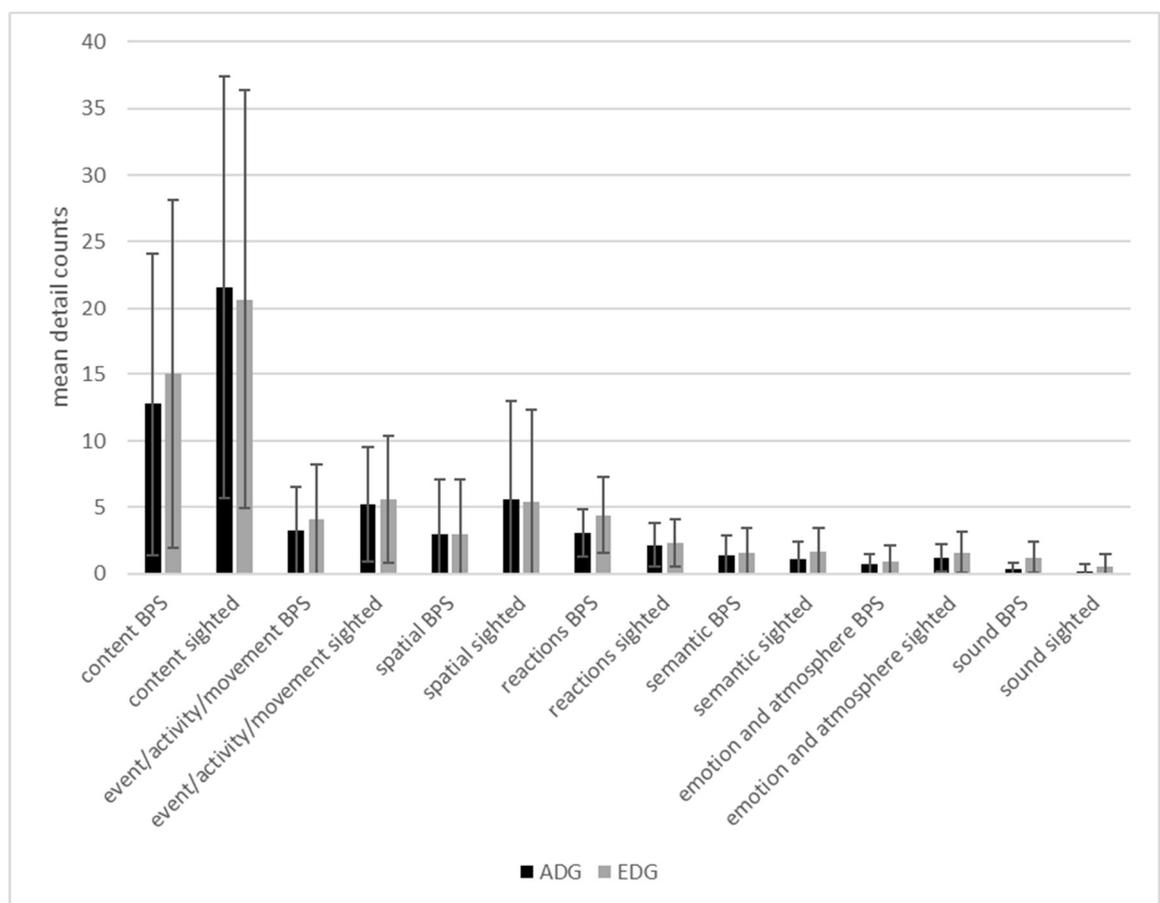


Figure 5.1: mean detail counts for categories: content, event/activity/movement, spatial, reactions (participants' thoughts, emotions and memories), semantic information (socio-historical details and details about the photographer), emotion and atmosphere (including non visual imagery) and sound (references to sound and sound images) by participant group and stimuli type (ADG, EDG), at time B

Figure 5.1 shows that content elements were the most salient category recalled for both BPS and sighted participants. BPS participants appear to have higher mean counts of personal reactions compared to sighted participants. The amount and distribution of data points within the categories did not permit inferential analysis.

The overall AD experience: levels of engagement of BPS and sighted participants

Attention

The total presentation time for the 8 photos varied for each participant depending on the randomly allocated combination of ADG and EDG files that they received, although this was only minimally different (see Materials, p.126). In the BPS group, the mean (SD) total photo presentation time was 30 minutes and 51 seconds (3.81 seconds). In the sighted group, it was 30 minutes and 52 seconds (5.20 seconds). A Mann-Whitney U test confirmed there was no difference in the total presentation time for BPS or sighted: (U=665, N₁=40, N₂= 39, p=.26). Each participant’s time with the photos was calculated as a percentage of the total audio time available to them. The mean (SD) percentage of available time spent listening was 99.34 (11.97) for the BPS group, and 94.81 (15.47) for the sighted group. Some participants spent more than 100% of the total audio time, due to them choosing to reflect on the photo before moving on. Analysis was therefore conducted on the number of participants who chose to listen for less than the total available audio time. 19% of BPS participants listened for less than the total available time, and 34% of sighted participants. A Pearson chi square analysis confirmed no differences between the two groups: (chi-square=2.19, p=.14).

Enjoyment

	Enjoyment Rating Time A	Enjoyment Rating Time B
Blind and partially sighted participants	7 (2)	6 (3)
Sighted participants	6 (3)	6 (4)

Table 5.6: enjoyment ratings (median, range) at times A and B, where the maximum score is 7

Table 5.6 indicates that enjoyment in both groups was high at time A, with BPS participants appearing to rate their enjoyment slightly more positively than the sighted participants, where there was also more variability. A Mann-Whitney U test confirmed this difference was significant: (U=544, N₁=40, N₂= 39, p=.009). Over time, enjoyment

ratings for sighted people appeared to remain stable at time B. Enjoyment ratings appeared to reduce for BPS participants, one month later. Wilcoxon tests confirmed that there was no difference between times A and B for sighted participants: ($Z=1.70$, $p=.09$) but there was a significant difference between times A and B for BPS participants: ($Z=-2.50$, $p=.012$). However, the rating of how enjoyable the exhibition had been was still high at Time B, with the median rating of 6 indicating ‘liked it a lot’. A Mann-Whitney U test confirmed no difference between BPS and sighted groups in enjoyment scores at time B with the test not reaching the convention for statistical significance: ($U=583.50$, $N_1=40$, $N_2=39$, $p=.063$.)

Re-engagement

	likely re-engagement Rating Time A	likely re-engagement Time B
Blind and partially sighted participants	5 (2)	5 (2)
Sighted participants	5 (3)	4 (2)

Table 5.7: Likely re-engagement scores at times A and B (median, range) for BPS and sighted participant groups, where maximum score=5 (definitely).

Table 5.7 shows that likely re-engagement scores were at the maximum level for both participant groups at time A. There was no difference between the likely reengagement scores between BPS and sighted people at Time A: ($U=718.50$, $N_1=40$, $N_2=40$, $p=.37$). At time B, the desire to explore more photos remained at the maximum level for BPS participants (definitely). It reduced to ‘probably’ amongst sighted people, with a Wilcoxon test showing that the difference between times A and B for sighted people was close to significance: ($Z=-1.94$, $p=.052$). However, a Mann-Whitney U test confirmed no differences between BPS and sighted groups in likely reengagement scores at time B: ($U=604.00$, $N_1=40$, $N_2=39$, $p=.086$).

At follow up, participants were asked whether they had thought about the photos or talked to anyone about them since, if they had tried to find out any further information, or engaged further with the museum. In the BPS group, 88% gave a positive response to this question, compared to 67% in the sighted group. A Pearson’s chi-sq test confirmed

that there was a relationship between participant group and follow-up engagement: (chi sq (1, N=79) = 4.87, p=.027). For the 61 participants who reported follow up engagement, the breakdown was as follows:

	BPS	Sighted
	N= 35	N= 26
<hr/>		
Thoughts:		
thought about the photos or audio guides	86%	92%
<hr/>		
Conversations:		
talked about the photos, audio guides, or the experience	100%	92%
<hr/>		
Content engagement:		
researched the photos or photographer online	23%	35%
<hr/>		
Museum engagement:		
visited the museum physically or online	11%	15%

Table 5.8: Details of further engagement for the BPS and sighted participants who engaged with the content between times A and B

Two blind participants also left an additional comment that they had discussed with others how the exhibition had been able to create images in their minds.

Table 5.8 suggests that conversations followed by thoughts were the most prevalent form of follow-up engagement in both groups, followed by content engagement and engagement with the museum. The distribution of counts in these categories did not allow for further analysis.

Thoughts

Participants were asked what they were thinking about during the exhibition and their thoughts were coded thematically. BPS participants recorded a mean (SD) number of 3.53 (3.43) thoughts; sighted participants recorded a mean (SD) number of 2.15 (1.16) thoughts. A Mann-Whitney U test confirmed there were significantly more thoughts in the BPS group: ($U=535.00$, $N_1=40$, $N_2=39$, $p=.014$).

Many of the participants' thoughts were related to the content or subject matter. Seventeen comments were made by 14 BPS participants (35% of sample) and 9 comments from 8 sighted participants (21% of sample) about the photos themselves, either content within them, or the fact that they were concentrating on them. Other comments related to the photos were about imagining oneself in the picture, or about the atmosphere of the photo; for example, 'I was mainly trying to just think about the pictures that I was seeing and also trying to imagine myself in those situations.' (sighted participant) and 'it was being brought to life in my mind, the scene, not just the photo but the whole scene and the area' (BPS participant). Such comments were more prevalent in the BPS group (16 comments from 13 participants, 33% of sample) than in the sighted group (5 comments from 5 participants, 13%), partly due to the fact that BPS participants also referred to actively building mental images whilst listening. Such mental impressions were also created in multiple modalities, for example: 'the eels, yeah, you get the impression of the smell, the taste, the whole environment' (BPS participant). There were similar numbers of thoughts in each participant group about the photographer, about London, and about life in the past.

Participants also thought about the interpretation, and these thoughts were more prevalent in the BPS group. Twenty-two comments were made by 17 BPS participants (43%) about the description. Most of these comments referred to participants' enjoyment of the description or feeling of being immersed in it; one person found the factual information too long, and two participants commented on the story-telling nature of the AD. In the sighted group, 17 comments were made by 13 people (33%). Three participants found the description too long or too detailed, and the rest of the comments

were positive observations, with several people highlighting the fact that it drew their attention to things they would otherwise have missed or otherwise enhanced the experience; ‘Interesting that the description took my attention around the photographs to things that I wouldn't necessarily have noticed without it’; ‘Taking the time to listen to a guided description of each image triggered imagination in an unexpectedly powerful way.’ Three sighted participants (8%) thought about the use of sound effects, compared to 13 participants (33%) in the BPS group.

Finally, participants reported thoughts that were a personal response to the exhibition, such as memories (12 participants (30%) from each group) and reactions, including expressions of interest or emotion (13 BPS participants (33%) and 5 sighted participants (13%). Overall, the thoughts recorded were broadly similar in content although the BPS group reported larger numbers of thoughts and observations.

Audio Evaluation

At time A, participants gave ratings for four aspects of the overall audio experience (measured using a 10-point Likert scale). These were totalled to create an audio evaluation measure, which had a Cronbach's alpha of .82, indicating high internal consistency. In the BPS group, mean (SD) audio evaluation score was 36.35 (4.09) and in the sighted group it was 32.87 (4.74); the maximum score was 40. A Mann-Whitney U test was performed on the total audio evaluation score, which confirmed that the BPS rated the audio overall more highly than the sighted group: ($U=421.00$, $N_1=40$, $N_2=39$, $p<.001$).

Discussion

This study extended the findings of Chapter 4, and the broader AD literature, by exploring the impact of enriched AD with both BPS and sighted people. The study's findings enable firstly a comparison of the impact of EDG and ADG on the experience, engagement and memorability of BPS and sighted people, and secondly, a comparison of the overall AD experience for the two groups.

The impact of EDG and ADG on BPS and sighted listeners: experience and engagement

Firstly, the EDG was well received by both groups of participants, with significantly more listeners preferring the enriched AD, regardless of their level of vision. This preference in both BPS and sighted people is consistent with observations in the research literature that sounds in audio guides can increase enjoyment (Ardito, Costabile, De Angeli, & Lanzilotti, 2012; Bertens & Polak, 2019). The preference for EDG also emerged through the selection of the ‘most interesting photo’; which, within the BPS group, was significantly more likely to have been presented with EDG. It seems reasonable to suggest that the layer of perception provided through sound contributed to the level of interest for BPS people. It may also have contributed to the level of emotion in this group, as BPS participants appeared more likely to report an emotional response to their choice of ‘most interesting’ photo, if it was one originally presented with EDG. This finding provides tentative support to the observations in the museum literature about sound increasing emotion (Bertens & Polak, 2019; De Jong, 2018; Fahlenbrach, 2008; Marshall et al., 2016), although in the current study the tendency for EDG to enhance emotion is indicated in the blind but not in the sighted group. It is possible that the use of sound had more emotional impact for the BPS participants as it provided them with a direct perceptual experience of the photos, not available through ADG alone, and as such, may have had more salience. However, this finding remains tentative as it could not be supported by inferential analysis.

The breakdown of comments about the sound enrichment was also broadly similar between groups, with the most common theme being that the enrichment helped to bring the photo to life or increased the sense of being present in the scene. This differs from the findings in audio drama (Fryer et al., 2013) and whilst the observations are qualitative in nature, they would merit further exploration. The prevalence and content of comments about negative aspects of the sounds were also similar between groups, namely that the sounds were distracting or unnecessary, although the prevalence of negative comments was relatively low. This serves to re-emphasise the importance of choice of mode of delivery in museum interpretation, and in audio in particular (Woodruff et al., 2001), so that visitors can select interpretation that fits their own preferences.

Whilst the qualitative comments suggested that the sounds were able to enhance imaginative engagement, the sound enrichment did not appear to contribute any particular advantage to the generation of mental images as evaluated through the mental image clarity ratings. Both ADG and EDG were successful in stimulating the creation of mental images for both groups of participants, and the clarity ratings were similarly high in both groups. It may have been expected that the sounds would increase mental imagery generation and clarity, especially for the BPS participants, where the sounds were a source of perceptual experience relating to the photos. However, it is possible that the language of the AD alone was sufficient to allow the formation of images. This is an important finding for AD practice, as it suggests that the AD was able to engage the BPS participants' imagination in a way that gave them a sense of the photo, and with similar self-reported levels of clarity to people with sight.

Whilst it must be recognised that not all BPS people will want to create mental images (Chapter 2), and indeed that imagery capabilities are subject to individual differences (Isaac & Marks, 1994), it remains an important aspect of evaluation for AD. Firstly, because many BPS people will wish to form a mental image of the object or artwork, as reported by the majority of practitioners in AD traditions and across AD types (Giansante, 2013; RNIB, 2010; Synder, 2014). This may be because the majority of blind people have some visual experience to draw upon, as sight loss often affects people in later life (RNIB, 2018). Secondly, because the formation of mental imagery is likely to enhance recall (for example, Conway & Pleydell-Pearce, 2000). Generation of mental imagery is therefore a possible predictor that a lasting memory may be formed of the exhibits, which may in turn indicate increased impact. Furthermore, research has demonstrated that BPS people are able to create a spatial mental representation through language alone (Eardley, Edwards, Malouin, & Kennedy, 2016). The similarly high imagery ratings in both groups reported here may provide further tentative support for this, as they suggest that BPS participants' ability to create a mental representation was not compromised by reduced or absent vision. It is also possible that the inability of sound to increase the clarity of mental images even further may have been a reflection of the fact that the median clarity ratings were already high (8/10).

The majority of participants in both groups also experienced autobiographical memories being evoked in response to the photos. However, EDG was no more likely than ADG to generate autobiographical memories in BPS or sighted participants. This again suggests that the sounds contained in EDG did not offer any specific advantages in

terms of cueing memories, perhaps because the impact of the photo content and the audio commentary was already high in terms of memory cueing, with 82% of the sample recording memories.

In summary, the EDG did not appear to offer any clear-cut advantages in evocation of autobiographical memories and mental image generation/clarity. However, this should be contextualised by the fact that EDG was preferred by both groups of participants and that the qualitative data demonstrated its potential to enhance imaginative engagement. Selection of the ‘most interesting’ photo suggests that the preference for EDG was even higher amongst BPS than sighted participants. EDG appears therefore to offer advantages in terms of the experience for all participants.

The impact of EDG and ADG on BPS and sighted listeners: memorability

The memorability measures in this study revealed that the impact of photos presented with EDG and ADG did indeed differ. The key finding of the study was that the EDG stimuli were able to increase memorability for BPS people, compared to ADG photos. Furthermore, this effect on memorability for BPS participants meant that there was no difference between the BPS and sighted groups in the number of photos recalled with EDG, or the richness of EDG memories. In other words, if there is a tendency for BPS participants to recall fewer memories than sighted people (see also Eardley & Pring, 2006; Tekcan et al., 2015), then the use of EDG was able to negate this tendency. However, it should be recognised that this study did not ask participants for memories of the experience of the photo presentation, but rather they were asked for memories of the photos themselves, which may have been episodic components of the overall memory of the event of participating in the study. Comparisons with the autobiographical memory literature are therefore necessarily tentative.

Regardless of the type of memory representation that was created by the participant, the use of recall in this study was consistent with understandings of everyday memory whereby learning is incidental and aspects of everyday memory (such as memory for places, faces, objects and actions) are components with a broader framework of personal history (Cohen & Conway, 2007). Nonetheless, recall was increased for BPS people with EDG and it seems likely that there are multiple explanations for this, which are not mutually exclusive.

Firstly, it is possible that the additional layer of perceptual experience provided by the sounds supported mental image generation, as suggested by the qualitative analysis of BPS participants' thoughts on the experience generally and the sound in particular, where comments strongly suggested that it helped with imaginative engagement. Secondly, it is possible that the sound increased interest and emotion, all of which are associated with enhanced recall (Holland & Kensinger, 2010; Renninger & Hidi, 2015). Increased interest for EDG was apparent for both BPS and sighted participants through the preference for EDG over ADG. It was also apparent in the BPS group through the choice of 'most interesting' photo, which was more likely to be chosen with EDG. The BPS data also suggest that emotional responses to the 'most interesting' photo were more likely if it was presented with EDG. Although the effects of ADG and EDG cannot be entirely dissociated in this research because of the repeated measures design, the data suggest that EDG was enjoyed more than ADG amongst the BPS group. This is also consistent with qualitative observations and discussion in the museum literature about the benefits of sound (for sighted visitors) (Bertens & Polak, 2019; Bubaris, 2014; Marshall et al., 2016).

It was anticipated that these advantages of sound could aid memorability in both groups, however there were no differences between the numbers of photos recalled with EDG and ADG in the sighted group. It is possible that the visual experience, and the guided looking through AD, was enough for the sighted participants to form sufficient connections at encoding, and that the effect of any additional perceptual experience above and beyond that would be of lesser importance. However further research would be needed to explore this tentative suggestion.

Finally, sighted participants recalled more ADG photos than BPS participants did, and with a potential trend towards a higher amount of details. It is likely that the congruent nature of the 'guided looking' was able to create a perceptual experience that brought together visual elements of the photos with semantic content. Furthermore, there was the potential for this experience to be enriched further with multisensory imagery through the language of the AD. For BPS participants, there was no direct link between perceptual experience and semantic content when the sounds were absent. Furthermore, mental imagery generated through language may be 'weaker' than imagery generated through perceptual experience (Bolls & Lang, 2003; Rodero, 2012; but see Fryer, 2013). Therefore, these findings were consistent with the prediction that sighted participants would recall more than BPS with ADG.

The overall AD experience for BPS and sighted participants:

Some of the experience and engagement measures used in this study do not dissociate between the effects of ADG and EDG but rather provide insight into the similarities and differences between BPS and sighted participants in terms of the overall experience of presenting photos with AD. As such, these measures are crucial to the investigation of AD as a tool for inclusive design within museums and interpretation in a museum context.

There were a number of similarities in the experience and engagement of BPS and sighted participants. The experience was well received by both groups of participants and engagement levels were similar. This was demonstrated by high enjoyment levels in both groups, with median ratings of at least 6 ('I liked it a lot'). Levels of interest were also high, as demonstrated by participants' indication that they would be keen to explore more of the museum's photography collections (median ratings indicating 'probably' to 'definitely'). This is also consistent with the findings presented in the chapter 4, and provides further evidence that AD, enriched or otherwise, is well tolerated and enjoyed by people with vision as well as by people who rely on it for access.

Qualitative analysis of participants' thoughts showed that they were all concentrating on the task, and that the photo presentation was able to generate thoughts that suggested participants were making personal connections to the stimuli. These included expressions of interest, emotion, and personal memories. There were also thoughts that were an extension of the semantic information presented, such as reflections on the city of London today and in the past, and thoughts about the photographer and his work. Thus, the analysis of thoughts indicated positive levels of interest and engagement.

The importance of personal context and identity in meaning-making in museums has been widely discussed in the research literature (Dierking & Falk, 1992; Falk, 2006, 2013; Paris & Mercer, 2011). Paris & Mercer (2011) contend that museum visitors search for features of their personal lives during their exploration of museums, and that this feeds back into their understanding of their own identity. As demonstrated in Chapter 4, the current findings suggest that the audio interpretation provided participants with the support they needed to engage with the photos, consider their possible meaning, and relate this to their own lived experience.

Furthermore, the memorability analysis for both groups shows that the content of the photo memories was broadly similar between groups. As in Chapter 4, the content elements (e.g. ‘there was a boy’) were the most salient, and the other categories were similar in prevalence. The presence of participants’ emotional and cognitive reactions, semantic recall, and details indicating imaginative engagement such as ‘emotion and atmosphere’ were all present in this study as they were in Chapter 4, suggesting once again that the AD experience was able to facilitate a rich and engaging experience.

Some differences between the BPS and sighted groups suggest that whilst engagement was high overall, it was higher still amongst BPS participants. Although the audio evaluation measures showed positive responses in both the BPS and sighted groups, they were significantly higher in the former, with BPS participants providing a more positive overall evaluation of the audio. Other qualitative measures suggested that BPS participants were more engaged with the experience than the sighted participants. As discussed above, one way of exploring levels of interest and the formation of personal connections was through evaluation of participants’ thoughts and memories. These showed a high level of engagement for both groups, but the BPS group generated more memories and thoughts compared to the sighted group, suggesting higher engagement. They also rated the vividness of their memories more highly than the sighted group.

The nature of the thoughts was also slightly different. BPS participants appeared more likely to report placing themselves imaginatively in the scene of the photo (33% of BPS sample and 13% of sighted sample). For many, this related to the conscious process of building a mental image, which the sighted participants did not have the same need to do. They were also more likely to reflect on the interpretation, and the use of sound, perhaps because both were entirely central to their experience of the photos, as opposed to one part of the perceptual experience, as was the case for sighted people.

It seems reasonable to suggest that BPS people were more stimulated by the AD experience, because the AD *was* their experience to a greater or lesser extent, depending on an individual’s level of sight. However, it is also possible that methodological issues influenced the higher number of thoughts and memories in BPS people. Whereas the sighted participants typed their answers into an online questionnaire, 93% of BPS participants chose to dictate their responses to the researcher. Whilst every care was taken to ensure this still operated as the recording of an answer, rather than as a conversation, it is still possible that BPS participants provided more information simply

because it is faster and easier to speak than to type. Further research, ideally using dictation for all participants, would be needed to explore this potential difference in the thoughts and memories stimulated by AD for BPS people, compared to sighted.

It would be useful to develop further AD reception studies to try to determine whether attention and engagement is sustained for longer amongst BPS people compared to sighted. Further work could also use measures of presence to further investigate whether BPS people are more 'immersed' whilst listening to AD.

There were also differences between subsequent re-engagement between times A and B. Levels of re-engagement were high overall in this study, with 67% of sighted participants choosing to re-engage with the experience either in their thoughts, conversations or subsequent explorations of the subject matter and museum. This is comparable to 60% of the sighted ADG group who chose to re-engage in Chapter 4. In the current study, this figure rose to 88% amongst BPS participants, with conversations being the most common form of re-engagement (all participants), closely followed by thoughts about the photos and guides. Sufficient interest was triggered for BPS participants to research the subject matter further online, or to engage further with the museum (23 and 11% respectively). However, it was striking that all 35 BPS participants who confirmed subsequent re-engagement stated that they discussed the experience with someone else between times A and B. This figure may be elevated to some degree by the fact that some BPS participants had a travel companion with them, and so it would be very natural to discuss the experience on the return journey. However, many did not, but were sufficiently interested to want to subsequently discuss the photos or audio guides in their social circles. This finding is again consistent with Study 4 and is suggestive of the importance of social function and conversations in cultural experience as discussed in Chapter 3. It is also consistent with the museum literature which emphasises the importance of social aspects of museum visiting (Dierking & Falk, 1992), and observations in focus groups held with BPS museum visitors about the importance of post visit reminiscing and conversations (Reich et al., 2011).

Finally, it should be recognised that the BPS participants did not form a homogeneous group, but that the spectrum of sight loss was wide, ranging from 3 congenitally blind participants, to people who had access to a life-time of visual memory following recent sight loss in their sixties. However, the common factor, and justification for grouping

them together, was that all BPS participants had sufficient visual impairment that they would not be able to access collections in a museum without AD. The heterogeneity of the BPS group means that they are representative of BPS audiences for museums, but it is possible that the heterogeneity makes it harder to find an effect of EDG. This may therefore suggest that if the study had focused on people with very little vision or visual experience, then the effects may have been even stronger. The differences found in this study could be of even greater importance when considering the museum access needs of people with very little vision or visual experience.

Summary

This study was the first empirical exploration of the use of congruent sound effects in AD in both blind and sighted people. The findings demonstrate that EDG was preferred by both groups of participants. The qualitative data and choice of ‘most interesting’ photo suggest particularly high levels of engagement amongst BPS people for the EDG. Furthermore, the memorability benefits of EDG meant that the photos presented with EDG were as memorable for the BPS group as they were for the sighted participants. It has been suggested that the purpose of AD is to offer parity of experience for BPS people, compared to sighted visitors (Chapter 2). The current findings, which suggest equal, if not greater, levels of enjoyment, interest, attention, mental image generation and engagement in BPS participants, suggest that this can certainly be achieved. EDGs are therefore a valid choice for museums to explore when they are considering how to make their narratives accessible and engaging through inclusive design and EDGs have promising potential as inclusive museum interpretation. These results indicate that offering AD that is enriched with congruent sounds would be a valid and valuable choice for museums to make. In so doing, they would increase their access provision and enhance their interpretation for many users beyond the access audience. Furthermore, they would facilitate more shared experiences.

Chapter 6: Revisiting inclusive experiences facilitated through Audio Description

Introduction

This research started with the premise that many museum visitors need support in order to access an engaging and memorable experience, regardless of their level of vision. It therefore sought to explore the central question: *how might AD support access to an engaging museum experience for visitors with and without sight?* The approach to this question was framed by a broad understanding of access. The concept of access was not limited to physical access to the museum's collections, whereby their physical appearance and visual features are addressed. Rather, access was understood as access to an engaging museum experience, that may have a long-term impact on the individual, as demonstrated by aspects of emotional and/or cognitive engagement. Museum interpretation provides support for visitors which may help them to engage. The objective of the thesis was to explore ways in which AD, as a potentially inclusive form of museum interpretation, might help museums to enhance access for both blind and sighted users, also facilitating shared experiences.

In asking the question '*how might AD support access to an engaging museum experience for visitors with and without sight?*', the research addressed several elements, which were split out and explored in the experimental chapters 2-5. Any question about museum AD needs to begin with an exploration about what form(s) museum AD takes and what its purpose is thought to be. This is crucial, as museum AD is an under researched segment of AD practice and research.

In thinking about the purpose of museum AD, it is essential to understand the experience it is seeking to translate. The impact of the museum experience, and how to evaluate it, was explored through analysis of museum memories using an autobiographical coding model. This developed a method of evaluation for museums that informs on the nature of their impact, and simultaneously contributes to understanding in psychology about memories for cultural events.

The nature of engagement in an experience of exploring museum artworks was considered through evaluating participants' levels of engagement immediately after experiencing a photo presentation and the impact one month later. Measures of

attention, enjoyment, emotional response, interest, and memorability were used. The research addressed the use of AD by sighted people by comparing it to a standard audio guide or minimal text interpretation. This was the first study to explore the impact of museum AD on sighted users. The final study built on these findings by a) exploring the impact of enhancing the AD experience through perceptual enrichment, and b) adding to the findings about AD's potential as inclusive design by evaluating the experience with both blind and sighted participants. This study was also the first evaluation of the impact of sound enriched AD with both blind and sighted users.

The findings of experimental chapters 2-5 now allow us to revisit the central question. In so doing, this chapter will draw conclusions based on how the research findings have developed understanding of AD and its purpose in museums; the nature of the museum experience and the ways in which it can be evaluated, and how AD can help to facilitate an engaging and inclusive experience. The chapter then discusses implications for practice and avenues for future research. Finally, it revisits the concept of museum AD in the light of the research findings, and discusses the future of the discipline. The chapter concludes with a summary of the contribution of this research to the fields of AVT, psychology and museum studies.

Discussion of the research findings

The purpose of museum AD

In its 'home discipline' of Translation Studies, AD is defined as a form of intersemiotic translation, which takes a nonverbal visual source text and translates it into a target text of spoken language (Jiménez Hurtado & Soler Gallego, 2015, see Chapter 1). When understood as such, in the museum context, it primarily addresses physical access to collections (to the visual information). Chapter 2 developed understanding of museum AD by examining the current museum AD guidelines, and exploring practitioners' views about the optimal content, style, and purpose of AD in museums (Study 1).

Responses from two important AD traditions, US and Europe, were compared, revealing many points of agreement but some important differences. Describers from both regions tended to agree on important aspects of AD content, such as the use of multisensory imagery, referring to colour, and seeking to generate mental images. However, European describers gave more importance to factors such as addressing

meaning or creating emotion in museum AD, thereby indicating that a certain level of subjective interpretation can be acceptable or even desirable. They also placed more emphasis on using cognitive prompts, with the aim of leaving the listener with something to think about or remember. US practitioners were more likely to view cognitive prompts as outside the remit of museum AD, and overall US practitioners favoured an approach that reduced subjectivity as far as possible. The spectrum of opinion demonstrated in this research is also reflected in the (so far) limited museum AD guidelines (see Chapter 2).

These results therefore opened debates about the kind of experience that museum AD is seeking to provide: whether it should address the ‘translation’ of visual information only, or whether it should expand its remit to address meaning and emotion. The findings emphasised that AD could aim to do many things in a museum: provide visual information, help listeners to build mental images, tell stories, provide background information, explore meaning and arouse emotion in the listener. The differing views on which of these aspects it could and should address raised the question of what the purpose of museum AD should be, and to what extent the describer should be explicit about their own role in the process of creating and delivering AD.

These debates were then discussed in the context of theory from Translation Studies, whereby the principle of objectivity in translation more broadly is critically examined and recognition of the visibility of the translator is called for (Chesterman, 1997; Van Wyke, 2010, Venuti, 1995). It is likely that the differences in opinion between US and European describers are underpinned by the pervading emphasis given to the objectivity principle in the wider discipline of AD, particularly in the US, where principles of objectivity are advocated through the WYSIWYS maxim (Mazur & Chmiel, 2012) (Chapter 2). This thesis calls for a critical evaluation of the objectivity principle in the context of museum AD. It argues that a broader understanding of museum ‘access’, meaning access that goes beyond physical and sensory access to include access to an engaging experience, necessitates a different understanding of museum AD and its function. The empirical findings from Study 1 – the differences in opinions between regions (US, Europe) – are what suggest a need for a broader discussion about AD and its function.

These findings add weight to observations in the research literature. In his exploration of the experiences of blind visitors in art museums, Simon Hayhoe contends that

learning about the visual arts is based on more than perception alone, emphasising the importance of language, emotional attachment and personal identity. He argues for the re-evaluation of artworks as ‘objects with merely perceptual value’, and museums as ‘institutions that hold little value beyond their contents’ (Hayhoe, 2017, p.23). The findings of this thesis logically suggest a re-evaluation of the ‘source text’ in museum AD (chapter 2). If the ‘source text’ is deemed to extend beyond the visual appearance of exhibits, and to encompass the broader museum visiting experience, then understanding the nature of that experience and relating it to AD becomes crucial. Exploring the nature of the museum experience and optimal ways to evaluate its impact was addressed in Study 2 (Chapter 3).

The long-term impact of the museum experience and approaches to evaluation

Museums have developed their thinking about their role in society in recent decades. Whereas they were once viewed as formal, academic and highbrow institutions where visitors came to learn, or have a reverent cultural experience, in both practice and research the emphasis is now on the experiential nature of museums (Prior, 2003). Museums operate in an experience economy (Pine & Gilmore, 2011, Radder & Han, 2015) and there has been much focus in the museum research literature on understanding audiences, including the reasons why people visit museums (Pekarik et al., 1999; Prentice, 2001; Radder & Han, 2015; Roppola, 2012; Slater, 2007). However, relatively little is understood about the cognitive experiences that visitors have once at the museum, and how this relates to the long-term impact of that experience.

Research has explored the application of memorability as a way of evaluating the experience (Anderson, 2003; Anderson & Shimizu, 2007; Falk & Dierking, 1990, 1997; Medved et al., 2004; Medved & Oatley, 2000). However, researchers recognize that early museum memories studies were atheoretical, and that the methodologies of museum memory studies have since varied according to individual research questions (Anderson et al, 2007). There is therefore no broad agreement regarding the key measures that could guide museum memory research, and new research strategies need to be developed in order to understand the long-term impact of visits (Anderson et al, 2007). Thus, up to now there has not been a method of evaluation that has applied inferential analysis to a fuller breadth of measures that can be drawn from the autobiographical memory theory and literature. This has limited the possibility of

reaching generalisable conclusions about the impact that museums have on their visitors. This is the gap that this research sought to address, on the basis that such a technique a) provides a ‘common ground’ in understanding the apparently diverse experiences that people may have in museums and b) allows for the generalisation from samples to wider populations.

The research findings presented a hierarchy of content that was remarkably similar across the sample, regardless of participants’ age or the frequency with which they visit museums, thus demonstrating that our cognitive experiences of museums are broadly similar, no matter who we are as individuals or what our reason for visiting may be. The minor differences that were identified between older and younger participants could be explained by differences in autobiographical memory that occur through aging. The consistency within this hierarchy of content therefore enables us to develop our understanding of the impressions museums leave on visitors.

This approach starts to respond to the issue raised by researchers regarding the challenge of expanding the unit of analysis beyond individuals (Anderson et al., 2007). The complexity of human experiences has been regarded as a challenge to museum memory research (Anderson et al., 2007), and it has been suggested that it is difficult to evaluate the highly individual and complex nature of visits in ways that are robust (Anderson et al., 2007). However, this research contends and demonstrates that whilst there is of course variability in individual experiences, the commonalities in people’s cognitive experiences within the museum mean that autobiographical memory theory-driven research can facilitate exploration of patterns of commonalities and differences in populations. In that sense, the current paradigm does enable generalisation about impact: something previously considered problematic in the literature (Anderson et al., 2007). This provides an important contribution to the museum memory literature which is calling for new and generalisable methods (Anderson et al., 2007).

The breakdown of the hierarchy of content in this research gives us crucial understanding about the lasting memories, or impact, that result from museum visits. Impact was defined in this thesis as ‘the lasting memories of an experience, with evidence of cognitive or emotional engagement’ (Chapter 1, p.30). The findings of this research, as demonstrated through the analysis of participants’ memories in Chapter 3, showed evidence of both cognitive and emotional engagement, even in memories of visits that took place several decades before.

The hierarchy demonstrated that the presence of ESAK (event specific acquired knowledge) was particularly salient. This category referred to information recalled about the specific event of the museum visit, and indicated that participants showed evidence of recall of details about the museum, such as objects and artworks seen, the physical features of the exhibition, or facts and concepts presented within it. This confirms that traces of learning can endure in visitors' memories of museum visits over the life span. The museum literature contends that 'learning' in museums can range from 'simple awareness of things' to 'highly complex conceptual understanding' (Anderson et al., 2007, p.198); these findings provide empirical evidence that such incidental or intentional learning is an important part of a museum experience.

Personal reactions to the visit in the form of thoughts and emotions were also particularly salient, suggesting that emotions and cognitions experienced during a museum visit can have a long-term impact, again contributing further empirical evidence in support of recognition in the literature that emotions associated with the experience of visiting have an impact on memorability (Anderson et al., 2007).

Furthermore, the hierarchy of content suggests the importance of personal connections and context. This was evident through the ways in which visitors integrated their memory of the visit with their knowledge about themselves, their own personal narratives and their sense of personal chronology. This was consistent with the contextualisation of episodic events with the autobiographical knowledge base during the formation of autobiographical memories, as described by Conway and Pleydell-Pearce (2000). The importance of visitors' identity and personal biographies have also been widely observed and discussed in the museum literature (Falk, 2016; Anderson et al., 2007), with museum researchers suggesting that museums may increase their impact or even encourage repeat visits if they can provide visitors with personalised experiences that fit with their sense of self (Anderson et al., 2007).

Memory traces of other information, such as sensory-perceptive information, events (in the sense of 'happenings'), details of place and interactions with others, were all present, albeit to a lesser extent than ESAK, participants' personal reactions, and personal context for the visit.

The hierarchy of content therefore showed how similar visitor memories are, in terms of the basic elements of which they consist. This research therefore provides an empirical approach based on autobiographical memory theory that relates to discussions in the

museum literature about the nature of museum memories. For example, Falk (2016) observes, based on his qualitative analysis of museum memories, that memories share structural commonalities and are constructed from a small number of basic elements: ‘we see that the colours and trim on each (memory) are unique, but if we look closely, we can discern that structurally each is built from just a handful of basic designs’ (p.136).

The autobiographical memory model used to analyse memory content could be transferred and applied to any situation where a museum wishes to understand the long-term impression it has left on its visitors through particular exhibitions, performances, community or access interventions, or indeed any form of programming. The hierarchy of content will help museums to understand the relative salience of the memory traces that endure, thus revealing the relative impact of the various aspects of a museum visit; such as the design, content and interpretation within an exhibition, the thoughts and feelings stimulated in the visitor, their sense of the space they are in, and their interactions with others. With the focus in museum practice and research on the experiential nature of museums, an empirically driven approach to evaluation based on autobiographical memory could provide the crucial link that enables museums to understand their impact.

One aspect of visitor memories where visitor differences did appear to have some importance was in analysis of the distribution of memories over the life span (chapter 3). This research indicated that frequent visitors were more likely to recall museum visits from their early years of life (0-9 years), despite the age of their first visit being approximately the same as that of the infrequent visitors. It cannot be determined from this research whether frequent visitors made more childhood visits, or whether the visits were more memorable and if so why; this would be an interesting and worthwhile direction for future research. It would also be valuable to explore the role of schools and facilitating adults in these memories, especially as museums are increasingly called upon to demonstrate the impact of early school visits (Anderson et al., 2007). Nonetheless, this research provides empirical findings to support the importance in museum practice of programming with young people.

The life span distribution also suggested a strong effect of recency for the overall sample of participants aged 40 and over. This means that participants recalled more memories from 40+ than would have been expected had each participants’ memories

been evenly distributed across the life span. The recency effect also presented as larger and earlier in these findings compared to the theoretical lifespan curve (Conway & Pleydell Pearce, 2000). This indicates that recent memories were more accessible for the participants compared to those from the reminiscence bump period of 10-30 years, from which a high proportion of memories are usually drawn.

This suggests that memories of museum visits are not, in general, tightly bound with experiences that had an important bearing on identity, such as first-time experiences (although these can, of course occur). Rather, the availability of recent memories is suggestive of the role of museums in the participants' more recent sense of cultural identity, perhaps as expressed through conversational sharing. Such rehearsal of a memory ('do you remember the exhibition we saw recently?') may contribute to the relative ease with which more recent experiences were recalled. These findings were tentative due to the descriptive nature of the data analysis, but are in line with observations and suggestions in the museum literature that sharing experiences through conversations (rehearsal) is likely to enhance memorability for museum visits (Anderson et al., 2007). Further use of the autobiographical memory coding model could be applied to see if these findings are replicated with larger samples, and if so, what implications this may have for museum's understanding of their role in visitors' social and cultural lives.

In summary, findings from this research demonstrate the extent and nature of the impact that museums have on visitors. This exploration of the long-term impact of museum experiences brings context to the discipline of museum AD by setting out the salient features of the experience that AD is seeking to facilitate. The research also contributes a new methodology which can equip museums with the evaluation tools they require to understand the experiences of their audiences. This form of evaluation was further applied in this research to the analysis of experiences facilitated through AD, in order to explore the potential of AD as inclusive design.

AD as a tool for inclusive design

This research set out to explore the potential for AD as inclusive design, based on the rationale that whilst AD provides access for BPS people, it could simultaneously enhance access for people with sight, as a kind of 'guided looking' (Eardley et al., 2017). 'Guided looking' suggests that visitors with sight may benefit from the potential of AD to influence patterns of attention, through spending longer with an object or

artwork and taking in details that may otherwise have been missed (Eardley et al., 2017). The use of multisensory imagery in the language of the AD, along with the potential for ‘guided looking’ to bring together visual elements of the photos with semantic content, suggested the possibility for enhanced memorability with AD for sighted users. However, it was also crucial to explore the experience of using AD for sighted people, as there would be little practical benefit of enhanced memorability if engagement levels were low.

The findings of Chapters 3 and 4 confirm a positive picture for the future use of AD in inclusive design. In Study 3, the experience of AD for sighted people was compared to a standard audio guide (as well as no audio at all). Findings showed that AD did not have a negative impact on the experience of viewing photographs (Chapter 4), despite the anticipated drawbacks of audio guides in general (Chapter 1), and the longer duration of the ADG compared to the SAG. Rather, the quantitative data showed that participants who listened to an ADG (compared to a SAG or no audio at all) were just as likely to have an enjoyable experience and to want to re-engage with the content. Furthermore, they experienced similar levels of autobiographical memories being evoked, that were similarly vivid, and their emotional response was comparable to the other two groups. In other words, the AD did not have any negative effect on their levels of engagement and ability to form personal connections with the artworks, indicating that the description of visual elements was not intrusive or distracting to the point where it impacted on the experience.

Furthermore, in the audio evaluation qualitative data, many ADG participants commented on their appreciation of the audio, with such comments being more frequent in the ADG than in the SAG group. Some of these observations were about the benefits of the ‘guided looking’, for example: ‘(the audio) highlighted things that I missed at first glance’, and: ‘the audio guide made me look at the photographs more closely and gave more depth to their subjects. I thought the guide was very informative and drew your eye to certain aspects which may have been missed.’ Others commented on the use of narrative: ‘The best part was a story about the photograph’. Another participant mentioned the focus of the ADG on the ‘people in the photo - their activity, their sensations and feelings’, saying that this made it more ‘interesting and engaging’, which also indicates a response to the use of narrative and cognitive prompts in the ADG texts. There were also many observations on the general level of enjoyment and the ability of the AD to bring the photos to life: ‘It (the audio) provides a rich context for each photo

which entices the spectator towards each point of the photograph. It overall gives a greater sense of enjoyment as opposed to just the photograph alone'. Other participants commented on the ability of the AD to bring the photo to life through sensory engagement: 'very good description of each photo - with the one-man band you could virtually hear the music.' For some, this brought the photos closer to their own experience: 'the sun on their face, grass tickling an arm, boy in the lido who had an unexpected shiver - they are experiences which we can relate to and therefore make the photo more enjoyable.' Whereas it was anticipated that the use of multisensory imagery may help with memorability, the use of such imagery in the AD texts seems also, for some participants, to have contributed to enjoyment and engagement.

Where criticisms of the audio guide experience did occur, these were no more prevalent in the ADG group than in the SAG group, suggesting that the extra time taken to describe the visual elements did not have a negative impact on the experience. However, whilst there were a relatively low number of negative comments regarding duration, some participants (both SAG and, to a slightly greater extent, ADG) did report finding the audio too detailed. Whilst a certain level of detail will be required for an audio text to function as AD, and facilitate the creation of mental images, the level of detail should be critically reviewed in terms of the trade-off between mental image generation and the cognitive load engendered by lots of information. This is particularly relevant in the context of the findings of Study 1 (Chapter 2), which suggested that not all BPS museum visitors actively engage in building mental images, (see also Fryer, 2013).

Furthermore, it may often be possible, depending on the object/artwork that the AD is addressing, to come up with creative ways to deliver the spatial information (the layout of visual elements) in a way that is engaging and simultaneously offers enriching information or narrative. For example, in the descriptions of photographs used in this research, a number of ADG participants (27%) interpreted the spatial information as information about composition, and indeed the description of the spatial relationship of the visual elements did by definition inform participants about the layout of the photo. Although the spatial information was provided to allow the text to function as AD, it was also valued as contributing to understanding: 'the audio guide gave lots of information about the composition of the photos...I would have spent a few seconds looking at each photo without the audio' (ADG participant). Another ADG participant commented: 'the audio guide gave an interesting perspective on each photo, not only

describing what was being depicted, but also the photographic techniques used... the imagery, the use of angles, and shapes e.g. diagonals.’ Building enriching information such as narrative or multisensory imagery into the provision of spatial elements is something that could be emphasised in AD training. This example demonstrates how it can be achieved:

We stand with Grant (*Henry Grant: the photographer*), facing the children, who are thundering across the playground towards us. The school buildings are approximately 30-40 metres away and the crowd of school children spreads out between us and the buildings - the nearest boy will reach us in just a second or two.

In this way, the spatial information about the scene is provided but it simultaneously seeks to keep the text engaging for the listener by building anticipation and narrative.

Crucially, the results of Study 3 also demonstrated that AD led to richer memories of the photos a month later. The richer nature of the memories, and the content that was identified within them, is important when considering how museums can help to increase their impact, when understood as evidence of long-term cognitive or emotional engagement. The memories of the photos analysed in Study 3 all indicated a level of impact, with cognitive and emotional engagement suggested through the recall of the photos’ content, socio-historical information and information about the photographer, as well as thoughts and feelings in response to the photos. ‘Impact’, therefore, was a consequence of the photo presentation, regardless of the original mode of presentation (SAG, ADG or no audio).

However, the key finding was that whilst ADG participants’ pattern of recall was broadly similar to the other groups, higher numbers of details were recalled, suggesting a greater level of impact. As discussed in Chapter 4, the mechanism(s) by which this occurred are difficult to dissociate: the nature of ‘guided looking’, multisensory imagery or narrative may all have contributed to various extents. It seems unlikely that the increased recall was primarily due to the novelty of presentation, as participants’ comments did not indicate any surprise about the format, and indeed the spatial information, when commented upon, was interpreted as information about composition. Only one person’s comments revealed that they had made the connection between the ADG and how a work might be presented to a blind person. From a museum’s perspective, knowing that the AD enhanced memorability is arguably more important

than knowing the precise mechanisms by which this may have occurred. However, the current findings and analysis of the qualitative data suggest that multisensory imagery, guided looking and narrative all played a role. In summary, Study 3 suggests that the use of AD techniques in museum audio provision would have a positive impact on visitors' experience and memorability, regardless of their level of vision.

Study 4 further sought to explore the impact of perceptual enrichment of AD, and its impact on all potential users (BPS and sighted). This research was the first empirical exploration of the impact of sound enrichment in AD on experience, engagement and memorability in blind and sighted people. The use of sound is advocated in AD (de Coster & Muehleis, 2007; Giansante, 2013; Neves, 2012, 2016) and has been explored by practitioners (Eardley et al., 2017). The potential of sound enrichment for inclusive design in these findings was extremely positive, in two respects. Firstly, the use of sound was preferred by BPS and sighted participants, with the frequent observation that it brought the photos to life and increased the sense of being in the scene. Secondly, sound enrichment was able to increase recall of the photos, and details about them for the BPS participants, to the extent that the level of recall in the BPS cohort for EDG was the same as that of the sighted cohort. Therefore, sound enrichment provided better 'access' for BPS participants in the sense that the photos were able to have the same impact (including cognitive and emotional engagement) on them as they did on the sighted participants.

Although overall participants preferred EDG, the BPS as well as the sighted participants expressed a range of opinions about the sounds, with both positive and negative reactions to the use of sound overall and individual sounds specifically. This emphasises the need for sound enrichment to be offered as a choice, and for various curatorial approaches to including sounds to be further explored through future research. For example, the impact of congruency, authenticity, frequency or duration of sounds could all be the subject of future studies. The use of sound enrichment may also lend itself better to some objects and artworks than others. However, the potential for the sound enrichment to have an impact on the experience of someone with low or no vision was clear from the qualitative comments. One participant with partial sight made the following comment: 'Oh, it just brought it all to life. It felt as though I was listening to a Radio Four story. It was as if I was actually transported to the actual place itself. I wouldn't get that from a photo.' The ability of sound to bring the photos to life was equally important to this congenitally blind participant:

if it had just been purely description, I don't think I would have quite got as much of a feel for it, but because the sounds effects were there... it brought it more to life, like the scenery. You could imagine being there....So, the fact that the sound was there enabled me to visualise it in my own way... without the sound effects... I would have still got a lot from the descriptions and I would have enjoyed it but, I think, it would have been a bit less impactful. I just think, for blind people we appreciate things that we can identify with, so we appreciate things we can hear.

In summary, the enjoyment of sound by both BPS and sighted participants contributes empirical findings to the audio guide literature that discusses the benefits of sound enrichment in standard guides (Bertens & Polak, 2019; Marshall et al., 2016), and the current research addresses this from an inclusive design perspective. Most importantly, the findings of this research validate and support the use of sound as an additional choice in AD delivery, for all visitors, regardless of their level of vision.

Finally, Studies 3 and 4 provide further tentative support for the understanding of the hierarchy of content in memories, as shown in the descriptive breakdown of the photo recall memories. (Chapter 4, p.105, Chapter 5, p.134). In studies 3 and 4, the photo recall task was focused on recall of content, rather than an overall museum experience. As such, the photo recall memories may have been more episodic in nature, with the photo recall information being one component of an overall autobiographical memory of taking part in the study. However, the pattern of content within the photo memories adds to our understanding of the content that may be present within episodic memories, or autobiographical memories if the episodic information is later integrated with knowledge about the self.

Firstly, elements of content were the most salient category, for example, 'there were eels in the photo', in other words, information which could have been encoded from vision or from listening to the guide. This is consistent with the salience of EASK ('event specific acquired knowledge') in Study 2, and is consistent with the occurrence of learning (intentional or incidental) in everyday memory (Cohen & Conway, 2007). Furthermore, there was evidence of further cognitive engagement through recall of factual or contextual information, as well as thoughts and reflections. The presence of emotional engagement was clear through the emotional reactions to the experience. The development of personal connections was also indicated in Studies 3 and 4 by the high

proportion of participants in both studies who reported their own personal memories being evoked during the presentation of the photos. Therefore, the analysis of memory content, whether it be for museum visits in the past (chapter 2) or for the recall of photo stimuli a month before (Chapters 4 and 5), suggested similarities in the hierarchy of content and demonstrated evidence of impact. Again, the content of these different types of memories provide crucial information for museums regarding the long-term impact that artworks and experiences have on visitors.

Inclusive AD: implications for practice and avenues for future research

The aspiration of inclusive design is to enable enjoyable, shared, inclusive experiences which benefit all users. In 2011, a team of collaborators from between Art beyond Sight and Museum of Science, Boston, published their qualitative findings about the needs and preferences of blind visitors to art museums. Their report followed a series of focus groups with BPS participants held at 7 major art museums throughout the United States, with the intention to provide professional development for museum professionals and to inform on the development of museum programming for BPS visitors (Reich et al., 2011). Whilst the report focused on the needs of the specific access audience, rather than on inclusive design, the need for inclusive experiences was evident throughout the findings presented. Participants stated that what they would like museums to develop would be the creation of a welcoming atmosphere with the provision of social experiences that they could enjoy alongside their sighted companions (Reich et al., 2011). This was part of their desired outcome of being socially involved: a motivation which is crucial in light of the fact that spending time with friends and family is a major reason for museum visiting (Packer & Ballantyne, 2005). Participants also emphasised the need for intellectual and emotional stimulation. Furthermore, they wished to be able to explore museums independently and to be able to visit on their own. The final desired outcome was that accommodations made for them (i.e., ‘access’) would have universal appeal. These findings emphasise the desire of BPS visitors to visit museums and enjoy them with others, blind and sighted, with emphasis on both social experiences and opportunities for independence (Reich et al., 2011).

The current research suggests that the incorporation of AD techniques in recorded audio would significantly further the aims captured in the Reich et al. (2011) study and help museums to enhance the engagement of their visitors regardless of their level of vision.

This would also help museums to fulfil their social inclusion and access agendas. More widespread provision of inclusive audio descriptive guides that could be used by all would immediately open up more collections to BPS people and allow for more shared experiences, as the current provision of ADGs in museums is low (Cock et al, 2018). Listening to ADGs that not only describe the visual appearance of exhibits, but also seek to tell a story and provide context and meaning, would stand to provide additional ‘support’ to help all visitors engage more deeply with collections, irrespective of their visual status. This would help to provide the emotional and intellectual stimulation sought by BPS visitors as reported by Reich et al. (2011), and would be likely to enhance the long-term impact for all listeners (Study 3). The report from Reich et al. (2011) also emphasises that BPS museum visitors are not a homogenous group (which also applies to sighted visitors). Rather, they have diverse interests and needs which will require various approaches to the design and delivery of interpretation. This is consistent with the findings of this research and suggests several possible directions for future research, in terms of the flexibility and choice in delivery of inclusive AD.

This research kept technology deliberately out of scope, for the purpose of explicitly isolating AD from its delivery, in order to understand its impact. Presenting the AD through a device in these studies, whilst attractive from an ecological validity perspective, would have introduced additional variability. This would have reduced the validity of the conclusions reached about AD itself. In other words, it would have been very difficult to deduce whether the AD, or the device, was impacting on memorability and experience. However, the next phase of research should most certainly explore the integration of AD and technology, with the myriad of creative opportunities for engagement that this will offer.

Future research could examine the impact of layering information, so that listeners can access description distinctly from factual or contextual information, for example. Whilst separation of these types of information allows for an initial sensory response to the artwork, as advocated by some practitioners, others advocate interweaving the description and information which would allow for the closer linking of semantic content to mental imagery (chapter 2). It would be useful to explore the benefits of both approaches, in different museum settings.

Other aspects relating to choice and flexibility in AD delivery would also be well worth exploring. Allowing for sound enrichment to be present as an option would no doubt be

valuable, to allow listeners to switch from standard AD to sound enriched AD, from one exhibit to the next, according to their preference. Providing true parity of experience (Chapter 2) through inclusive AD also means facilitating a variety of AD experiences, to allow BPS visitors to have access to the range of experiences that sighted people do. For example, offering short ‘clips’ of AD might provide an experience similar to the quick glance of a sighted person, which helps them decide whether to linger at an artwork or move on. This may also be appreciated by sighted visitors, as a 30 second ‘burst’ of guided looking through audio may provide more support than the equivalent number of seconds of unsupported looking as described in the research literature (Smith & Smith, 2001, Smith, Smith & Tinio, 2017).

Whereas much museum AD is delivered by the professional voice of a describer, sometimes in conjunction with a curator, the use of different voices in AD could be more widely explored and exploited. The use of different voices, perhaps even other museum visitors (through collaborative description), may help to maintain attention and interest, or even incite curiosity, and such potential techniques have been discussed and explored at AD events (Thompson, 2018).

Different modes of delivery in recorded AD would be worth investigating. If access to an engaging museum experience means creating opportunities for social interaction, then exploring alternatives such as listening stations or linked devices (Aoki et al., 2003) would be important and useful, as would the use of headphones that deliver content into one ear only, allowing for simultaneous social interaction with companions. Delivery of inclusive AD through these alternative formats may help to reduce the isolation effect of audio guides in general (Aoki et al., 2003) and enhance the inclusive nature of shared experiences.

The focus of the current research is recorded audio, as researching recorded AD was deemed to be the optimal starting point for this empirical study of museum AD. It is more practical to control variables within the participant experience with recorded AD compared to live tours, enabling stronger conclusions to be drawn about the AD variables under investigation. This was important considering the lack of empirical findings on museum AD. However, live AD tours are an important part of museums’ AD offering (Chapter 2) and offer more opportunity for interaction and social engagement, thus, access to a different museum experience that is also in need of research attention. From an inclusive design perspective, there is potential for standard

museum tours to incorporate AD techniques, thereby becoming more accessible, although they would also need to incorporate navigation in order for BPS visitors to make full, independent use of them. However, it would be valuable to explore what impact the use of AD techniques has on sighted visitors during a guided tour. If there is the same benefit for memorability and impact as suggested here for recorded AD, then this would have further exciting potential for inclusive experiences. Inclusive tours could offer new ways of engaging with art and objects for all visitors, as well as for museum staff, who may enjoy new ways of ‘seeing’ (Eardley et al., 2017)

Finally, the promising results for sound enrichment reported here could be developed in multiple directions. Whilst the EDGs used in this study contained some limited spatial elements (footsteps moving from left to right, for example), fully immersive binaural soundscaping was outside the scope of this research. Further work could explore the impact of such delivery on both BPS and sighted participants. AD research in film has been exploring in recent years whether words in AD can be replaced by sounds (Lopez & Pauletto, 2009), for example, a chair leg scraping on the floor, versus ‘he leaves the table.’ This may help to reduce the amount of detail that AD needs to provide, which may help all listeners with processing the information, although sound localisation may be more challenging for sighted people and the replacement of verbal AD with directional/spatial sound would potentially reduce the guided looking benefits of AD. It would be interesting to explore the impact of this technique in museum AD. One BPS participant in Study 4 noted the spatial direction of sounds in an EDG text, and commented to this effect:

the example I gave earlier about the boat, it enabled you to orientate in terms of the sound and it matched the description. So in the description of the picture I know that the man is standing on the left, I know that his feet are really close to the edge of the water and that the water threatens to make his feet wet. And the sound came from the left, and ... I know that from the description the boat is travelling from my left to my right and so the sound went in the same way. So it frees up brain cells to go and think about something else.... And it just added to the depth of the experience, it felt more participative.

Research has suggested the importance of perceptual sound to sighted listeners in audio drama (Fryer et al., 2013; Rodero, 2012), but not for BPS listeners (Fryer et al, 2013), although the findings of Study 4 support the notion that auditory imagery is of particular

importance to BPS people in recall (Tekcan et al., 2015). This is therefore an area that merits further research attention in terms of the trade-off between words and sounds in AD, suggesting this as a valuable future avenue for inclusive AD research.

Rethinking museum AD

This thesis developed understanding to address the central research question of how AD might support access to an engaging museum experience for visitors with and without sight. The findings show that AD could become an important tool in inclusive museum interpretation due to its ability to provide access for BPS people and simultaneously enhance access for sighted people, and its ability to facilitate a rich experience. AD therefore has potential to increase independence of visiting for BPS people and to create new shared and inclusive experiences. AD can help to address a broader experience of museum exhibits than access purely to visual information, as evidenced by the presence of learning, thoughts and feelings in the memories analysed in this research. In this sense, it is an important tool for museums who seek to reduce the reliance on visual access in their settings and who are prepared to look creatively at other, non-visual, ways of engagement. In order to take this new understanding of the function and potential of AD forward, it is important to revisit the original assumptions about what it seeks to achieve.

These research findings have brought into question whether or not museum AD should be considered as a visual to verbal translation, or whether it should rather seek to address the museum experience (Study 1). The empirical exploration of experiences of artworks and experiences in museums presented here demonstrates that the lasting impact of such experiences shows evidence of cognitive and emotional engagement. Museum AD therefore must address the broader experience of museum visiting, in order to ensure it is optimising the opportunities for such cognitive and emotional engagement to occur.

Simultaneously, as a tool for inclusive design, it can help to provide the interpretation support that is needed for many visitors to engage, not exclusively an access audience. Expanding the remit of museum AD as a form of inclusive interpretation that facilitates an engaging museum experience therefore means going beyond the provision of visual information. However, this research strongly suggests that in so doing, it will enhance access for all its users. Taken together, the findings of this thesis therefore support the

argument for an approach to museum description that seeks to arouse emotion, draw the listener into a story, or incite their curiosity, with the explicit aim of creating access to an engaging experience. This does not suggest that the translation issues of objectivity and describer visibility are no longer important, or no longer apply (see Chapter 2). Rather, such an approach allows for levels of personal interpretation and subjectivity, but with a transparent and self-aware approach to description from practitioners.

Such self-reflexivity is already discussed and encouraged by translation scholars (Chesterman, 1997; Van Wyke, 2010, see Chapter 2 for discussion) but could be discussed, validated, even promoted further in museum AD. Such approaches are likely to already happen in practice, particularly in live AD tours, where it may be more natural for a describer to incorporate narrative, or even offer an opinion or reaction to an artwork which is self-evidently (or explicitly) subjective. Such an approach may enliven AD delivery and increase engagement. Training resources for museum describers, which have been in development during the course of this research in the form of the ADLab Pro project (ADLabPro, 2019) provide important endorsement of this approach. The materials specific to museums and static art AD state that a ‘freer approach’ is permissible, and draw upon comparisons with film to clarify their position:

While for AD in general the use of appraisal (that is personal interpretations, subjective description) is either frowned upon or acceptable in small doses, in describing works of art, especially those considered worthy of description, it is difficult to avoid using expressions of approval, pleasure and personal interpretation. Within reason, this can help to *bring the exhibit to life* for the PSL (person with sight loss, my emphasis in the text). The phrase ‘a beautiful girl’ in film translation is a subjective opinion and should be avoided. But describing artworks as ‘magnificent’ or ‘remarkable’ and colours as ‘voluptuous’ would seem to be more acceptable, take for example ‘these magnificent 17th century tapestries’.

These training materials therefore take the previously limited recognition of interpretative techniques in the guidelines further (ADI, cited in RNIB, 2010; ADC, 2009), with the emphasis on the potential to bring the text to life. This firmly shifts the focus away from objectivity and onto the recipient experience, with all the aspects of engagement that this implies. Such advice is likely to be welcomed by many, as it validates the opinion of many practitioners that interpretative techniques can be

acceptable in museum AD (Chapter 2). The academic and art expert Georgina Kleege, who is herself blind, puts forward a similar case in *More Than Meets The Eye* (Kleege, 2018):

If I can derive any specific recommendations from the comments of these three artists, and from my own experience as a museum-goer, it would be to abandon the pretext of objectivity. It is impossible and besides the point. The blind listener knows that there's some interpretation involved in even the most basic description, and often the systematic cataloguing of depicted objects is more information than anyone wants. Once the pretense of objectivity is abandoned, it could be replaced with descriptions of the artist's techniques, as well as the effect the work has on the viewer, recognizing that this will differ from individual to individual. (p.121)

Again, the emphasis here is to be shifted from objective 'cataloguing' of visual elements on to the effect that art has on people, namely the experience. The current findings take important steps towards exploring how expanding our understanding of that experience can underpin development and evaluation of museum AD.

Museum AD has been an under researched segment of AD, and advice for museum describers has been hereto limited (chapter 2). As this is addressed (ADlab Pro, 2019), and empirical research continues to explore the impact of museum AD on people's experiences, it seems likely that museum AD will continue to carve out its own unique and differentiated place in the field of AD. With countless opportunities for future research and development of the discipline, there are doubtless many new and creative avenues to be explored in order to bring museums' collections to life for all visitors.

Summary of contribution to knowledge:

This thesis has made a number of important and novel contributions to the fields of AVT, psychology and museums. Firstly, it has expanded the AD research by providing the first empirical reception studies of museum AD. It has taken AD research in new directions by substantially increasing the empirical data available about the potential for AD as inclusive design. Furthermore, it provides the first insight into international views and practices of museum describers. Taken together, these studies advance the current understanding of museum AD significantly. In psychology, this work develops understanding of memories for cultural events and provides theoretically driven

evaluation measures (autobiographical memory coding model) that can be applied to other questions and settings to further develop our understanding of the impact of cultural experience. For museum practice, this work provides the first empirical investigation of inclusive audio interpretation, clearly demonstrating that AD could be taken out of its access ‘niche’ and considered as an inclusive interpretation tool to enhance engagement and access for all visitors. The work further adds to the empirical data on the experience and memorability of audio guide use more generally. Finally, this research contributes an evaluation tool for museums, the autobiographical memory coding model. This model provides museums with a theoretically driven method to explore and understand the lasting impact that they have on their visitors, in terms of cognitive, emotional and social engagement – in other words, to what extent optimal access is being achieved for all.

Appendices

Appendix 1: Chapter 2

Appendix 1.1: Museum AD questionnaire

Title of Study: Audio Description for Museums: Exploring Practitioner Views

Very little research has been carried out into Museum audio description. This project represents a collaboration between museum studies, psychology and audio-visual translation researchers at the University of Westminster, in collaboration with VocalEyes, UK, to explore audio description specifically within Museums. In order to understand and develop the field we would like to gather information and expertise from the people who are currently delivering AD for and within Museums. It is crucial to get a full understanding of your priorities and processes as Audio Describers.

You will be asked to complete a short questionnaire to share your views and experiences, which should take approximately 10-20 minutes to complete. The questionnaire is divided into two sections. The first section seeks your view on methodologies, considering aspects such as coverage and selection, and content and style. In the second part, we ask for some details to help us understand your activity as an Audio Describer. All sections have additional space for you to include comments on anything you consider of importance which we have not addressed.

There is space for you to leave your email address if you would like an update on the results of the study. The project has been approved by the University of Westminster Psychology Department ethics committee.

This research forms part of a wider research project on Museum AD. The project will examine the impact of Museum AD on visitor experience and memorability, considering both sighted visitors and those with visual impairment, thereby exploring AD as an opportunity for Inclusive Design.

Some points about your participation:

Participation in this study is entirely voluntary. ·

You have the right to withdraw at any time through the study without providing a reason.

- All information collected from you during the course of the research will be kept strictly confidential.
- All references to participants in the report and any subsequent publications/presentations will be anonymous.
- The information will be kept in a secure location, accessible only to the researchers.
- You have the right to ask for your data to be withdrawn at any time as far as it is practical to do so, and for all personal information to be destroyed.

· You do not have to answer particular questions or take part in any part of the study if you feel uncomfortable or do not wish to do so.

Questions about the research:

If you wish to contact the researcher, Rachel Hutchinson, after participation, please send her an email: w1580109@my.westminster.ac.uk I confirm that by providing my consent I am willing to be a participant in this research study. By clicking below you are giving your consent to proceed under the conditions outlined above.

Yes

No

Have you worked on Audio Description in Museums, in any form?

Yes

No

Please select the types of Museum AD you have provided:

Museum AD – live tours

Recorded Museum AD – audio guide

Recorded Museum AD -hosted online

Museum AD training

Other _____

Section A: Your Museum AD Methodology – Version of the Questionnaire for participants who stated they offer recorded AD

We are particularly interested in recorded AD in/for museums. We are keen to understand the methodologies you use as you write your descriptions. Whether you consider yourself to be expert or a novice in this particular branch of AD, we would be grateful for any information you can give us. All information will help us develop a better understanding of how recorded AD is developed for a museum context. We are also interested in any differences between recorded AD and live audio described tours within museums. In each section, please answer the questions initially solely about recorded AD. After each question, we will then ask you to specify any differences between recorded AD in museums and live AD.

1.Coverage and Selection:

How do you plan a description for a particular museum artwork or artefact?

(For example: Which factors determine what you decide to describe, and what you decide to omit? Do you describe the gallery/museum space? Do you gather information from curators or other sources? How do you incorporate it?)

1b. Are there any differences in how you plan a description for a particular museum artwork/artefact for a live tour?

2 Content and Style:

Do you have a 'framework' or structure that you typically use when writing descriptions for artworks or artefacts? If so, please describe what that structure is.

2b. Are there any differences in the 'framework' or structure that you typically use for a live tour, compared to a recorded AD, within the museum context?

Thinking about recorded AD within museums, please could you give us your view on various aspects of content and style by rating the importance of the elements below:

	Extremely Important	Very Important	Slightly Important	Not really Important	Not at all Important
References to colour	<input type="radio"/>				
Use of factual and contextual information	<input type="radio"/>				
Use of imagery description that appeals to senses other than vision (e.g. touch, taste, smell)	<input type="radio"/>				
Inclusion of technical information (e.g. materials used, techniques, composition, method of construction)	<input type="radio"/>				
Use of literary devices such as simile or metaphor	<input type="radio"/>				
The building of a narrative (i.e. ensuring the description tells a story):	<input type="radio"/>				
Relating the measurements	<input type="radio"/>				

of an artefact to the body (e.g. 'it sits in the palm of your hand')					
Describing measurements (e.g. using feet/inches and/or centimetres)	<input type="radio"/>				
Describing how an object (or representation of an object) might be used	<input type="radio"/>				
Embedding the description with 'thinking' or 'conceptual' prompts or questions for the listener	<input type="radio"/>				

Is there anything you would like to add on content and style relative to recorded AD in museums? Are there any differences in the factors on content and style for live AD in museums?

3. The role of AD in Museums and Heritage Sites:

Please indicate your level of agreement with the following statements:

	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
AD should provide a verbal substitute for	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

visual information					
AD should explore the meaning of the artwork or artefact	<input type="radio"/>				
AD should create an engaging narrative	<input type="radio"/>				
AD should give background information about the artwork or artefact and its creation	<input type="radio"/>				
AD should create an emotional experience of the artwork or artefact	<input type="radio"/>				
AD should provide the listener with a way of 'seeing' the artwork or artefact	<input type="radio"/>				
AD should provide the listener with a way of 'understanding' the artwork/artefact	<input type="radio"/>				

What is the optimum duration of a museum audio description (in minutes and seconds)?

Recorded AD Guide: individual stop (for one artefact or artwork)

Recorded AD Guide: exhibition/whole tour

Live AD Tour: individual stop (for one artefact or artwork)

Live AD Tour: exhibition/whole tour

How might your approach to description vary, depending on whether you are delivering recorded or live AD? Does it make a difference?

Is there anything you would like to add?

Section B: Your Museum AD Practice:

We would like to understand your activity as an Audio Describer: How long have you been working as an Audio Describer (AD in general, not restricted to museum/heritage work)?

- Less than one year
- 1-5 years
- 6-10 years
- 11-15 years
- 16-20 years
- over 20 years

Is your activity as an Audio Describer:

- Professional work
- Volunteer work

How much of your overall AD practice, in a year, is typically Museum based?

- 76-100%
- 51-75%
- 26-50%
- 25% or less

How would you describe the institutions that you've worked with? (please complete all that apply) - Recorded AD (Audio guide/online hosting) :

- Large Museums/Galleries, e.g. National Museums
- Medium Museums/Galleries, e.g. city museums (non-capital cities)
- Small Museums/Galleries, e.g. town/rural museums
- University Museums/Galleries
- Heritage Sites
- Other _____

- Live AD tours:

- Large Museums/Galleries, e.g. National Museums
- Medium Museums/Galleries, e.g. city museums (non-capital cities)
- Small Museums/Galleries, e.g. town/rural museums
- University Museums/Galleries
- Heritage Sites
- Other _____

- AD training:

- Large Museums/Galleries, e.g. National Museums
- Medium Museums/Galleries, e.g. city museums (non-capital cities)
- Small Museums/Galleries, e.g. town/rural museums
- University Museums/Galleries
- Heritage Sites
- Other _____

What kind of artworks and artefacts do you describe? Please tick all that apply.

- 2D visual art such as paintings, photographs or drawings

- 3D visual art such as sculpture or installations that you CAN'T touch
- 3D visual art such as sculpture or installations that you CAN touch
- Artefacts that CAN'T be handled
- Artefacts that CAN be handled
- I describe museum spaces and provide orientation aid
- Other _____

Which of these do you describe most frequently?

How frequently does guided touch form part of your description in recorded AD?

- Never
- Rarely
- Sometimes
- Often
- Always

How frequently does guided touch form part of your description in live AD tours in museums?

- Never
- Rarely
- Sometimes
- Often
- Always

Are there any comments you would like to make about guided touch?

Your expertise: We are interested to understand how you develop your practice and methodologies. Please could you rate the following in terms of their significance in contributing to your knowledge, and tell us in the space provided about anything we missed:

	Extremely Important	Very important	Slightly important	Not really important	Not at all important
Feedback and discussion with blind and partially sighted people	<input type="radio"/>				
Discussion with other describers	<input type="radio"/>				
Shared experiences at conferences	<input type="radio"/>				
Access to professional literature	<input type="radio"/>				
Access to academic literature	<input type="radio"/>				
Discussion with museum staff	<input type="radio"/>				
Other	<input type="radio"/>				

Please complete the following

The country you live in

Your first language

The language(s) in which you write your Audio Descriptions

We would like to share the findings of this study with you. If you would like to receive these, please enter your email address here:

Would you be happy to participate in further research?

Yes

No

Section A; Your Museum AD Methodology: Version of the Questionnaire for participants who stated they offer only live AD:

We are keen to understand the methodologies you use as you write your descriptions. Each section has extra space for you to comment further on anything we missed.

1.Coverage and Selection: How do you plan a description for a particular museum artwork or artefact? (For example: Which factors determine what you decide to describe, and what you decide to omit? Do you describe the gallery/museum space? Do you gather information from curators or other sources? How do you incorporate it?)

2 Content and Style: Do you have a ‘framework’ or structure that you typically use when writing descriptions for artworks or artefacts? If so, please describe what that structure is.

Please could you give us your view on various aspects of content and style by rating the importance of the elements below:

	Extremely Important	Very Important	Slightly Important	Not really Important	Not at all Important
References to colour	<input type="radio"/>				
Use of factual and contextual information	<input type="radio"/>				
Use of imagery description that appeals to senses other than vision (e.g. touch, taste, smell)	<input type="radio"/>				

Inclusion of technical information (e.g. materials used, techniques, composition, method of construction)	<input type="radio"/>				
Use of literary devices such as simile or metaphor	<input type="radio"/>				
The building of a narrative (i.e. ensuring the description tells a story):	<input type="radio"/>				
Relating the measurements of an artefact to the body (e.g. 'it sits in the palm of your hand')	<input type="radio"/>				
Describing measurements (e.g. using feet/inches and/or centimetres)	<input type="radio"/>				
Describing how an object (or representation of an object) might be used	<input type="radio"/>				
Embedding the description with	<input type="radio"/>				

'thinking' or 'conceptual' prompts or questions for the listener					
--	--	--	--	--	--

Is there anything you would like to add on content and style?

3. The role of AD in Museums and Heritage Sites: Please indicate your level of agreement with the following statements:

	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
AD should provide a verbal substitute for visual information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AD should explore the meaning of the artwork or artefact	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AD should create an engaging narrative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AD should give background information about the artwork or artefact and its creation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AD should create an emotional experience of	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

the artwork or artefact					
AD should provide the listener with a way of 'seeing' the artwork or artefact	<input type="radio"/>				
AD should provide the listener with a way of 'understanding' the artwork/artefact	<input type="radio"/>				

What is the optimum duration of a museum audio description (in minutes and seconds)?

Recorded AD Guide: individual stop (for one artefact or artwork)

Recorded AD Guide: exhibition/whole tour

Live AD Tour: individual stop (for one artefact or artwork)

Live AD Tour: exhibition/whole tour

Is there anything you would like to add?

Appendix 2: Chapter 3

Appendix 2.1: Museum memories questionnaire

Memories of Museum Visits:

Project Background:

This research is being conducted by Rachel Hutchinson, in collaboration with Dr Alison Eardley and Dr Catherine Loveday, as part of on-going research at the University of Westminster regarding people's memories of cultural experiences. We are particularly interested in people's most memorable museum visits.

What you will be asked to do:

Participation will involve an online questionnaire, which should take you approximately 20 minutes to complete. You will be required to:

- Provide some basic demographic details such as age, occupation, gender, education and museum going experience (past and present).
- Provide information about up to six museum visits that you can remember, briefly stating the age at which this visit occurred, and sharing your recollections of the visit.

Confidentiality:

Some points about your participation:

- Participation in this study is entirely voluntary.
- You have the right to withdraw at any time through the study without providing a reason.
- All information collected from you during the course of the research will be kept strictly confidential. All references to participants in the report and any subsequent publications/presentations will be anonymous. The information will be kept in a secure location, accessible only to the researchers.
- You have the right to ask for your data to be withdrawn at any time as far as it is practical to do so, and for all personal information to be destroyed.
- You do not have to answer particular questions or take part in any part of the study if you feel uncomfortable or do not wish to do so.
- Please notify us if you wish to receive information on the results of the research, or if you have any questions or concerns.

Questions about the Research:

If you wish to contact the researcher, Rachel Hutchinson, after participation, please send an email to w1580109@my.westminster.ac.uk

I confirm that by providing my consent I am willing to be a participant in this research study.

By clicking below you are giving your consent to proceed under the conditions outlined above.

Yes

No

Please tell us about up to 6 different museum or gallery visits that you remember. You may feel that there are more than 6 choices, or that these choices might change if you were to think about it another day, but that is fine. Please just select the 6 that come to your mind now. If you are unable to remember 6 visits, please fill in as many as you are able to recall. Please try to describe at least three specific things that you remember about the experience. These might be fragments, or very clear events. This might be something about the museum or gallery itself, or the artworks or exhibitions within it. It could be a feeling you experienced, a conversation you had, or any specific moment you remember during the visit. Please try to remember the approximate age you were at the time of the visit and note that down too.

Museum Visit 1:

Approximate age at time of visit:

Museum Visit 2:

Please try to describe at least three specific things that you remember about the experience. These might be fragments, or very clear events. This might be something about the museum or gallery itself, or the artworks or exhibitions within it. It could be a feeling you experienced, a conversation you had, or any specific moment you remember during the visit. Please try to remember the approximate age you were at the time of the visit and note that down too.

Museum Visit 2:

Approximate age at time of visit:

Museum Visit 3:

Please try to describe at least three specific things that you remember about the experience. These might be fragments, or very clear events. This might be something about the museum or gallery itself, or the artworks or exhibitions within it. It could be a feeling you experienced, a conversation you had, or any specific moment you remember during the visit. Please try to remember the approximate age you were at the time of the visit and note that down too.

Museum Visit 3:

Approximate age at time of visit:

Museum Visit 4

Please try to describe at least three specific things that you remember about the experience. These might be fragments, or very clear events. This might be something about the museum or gallery itself, or the artworks or exhibitions within it. It could be a feeling you experienced, a conversation you had, or any specific moment you remember during the visit. Please try to remember the approximate age you were at the time of the visit and note that down too.

Museum Visit 4:

Approximate age at time of visit:

Museum Visit 5:

Please try to describe at least three specific things that you remember about the experience. These might be fragments, or very clear events. This might be something about the museum or gallery itself, or the artworks or exhibitions within it. It could be a feeling you experienced, a conversation you had, or any specific moment you remember during the visit. Please try to remember the approximate age you were at the time of the visit and note that down too.

Museum Visit 5:

Approximate age at time of visit:

Museum Visit 6:

Please try to describe at least three specific things that you remember about the experience. These might be fragments, or very clear events. This might be something about the museum or gallery itself, or the artworks or exhibitions within it. It could be a feeling you experienced, a conversation you had, or any specific moment you remember during the visit. Please try to remember the approximate age you were at the time of the visit and note that down too.

Museum visit 6:

Approximate age at time of visit:

What is the first museum that you remember visiting? What can you recall about the experience? (if it is different to your memories described above).

What age were you at the time of this first visit?

Please tell us about your favourite museum, and why it is your favourite?

We are also interested in how frequently you visit museums, and your reasons for going, both currently and in the past.

During which period of your life have you visited museums most often?

- 0-9
- 10-19
- 20-29
- 30-39
- 40-49
- 50-59
- 60-69
- 70+

Q38 During that period of your life, how frequent, on average, were your visits?

- Once a week or more
- Once a month
- Once every six months
- Once a year

- Once every few years

During that time period, during which you visited most often, what were your reasons for visiting? Please select all that apply:

- spend time with family and friends
- tourist activity in home country
- tourist activity abroad
- to have a cultural experience
- to learn about a specific subject
- to experience an iconic building or cultural site
- to facilitate a visit for somebody else, who would not be able to visit on their own
- because the visit had been organised for me by somebody else
- to take children to the museum
- other _____

During the last five years, how often do you visit museums, on average?

- Once a week or more
- Once a month
- Once every six months
- Once a year or less
- Never

During the last five years, how would you describe the typical purpose of these museum visits? Please select all that apply:

- spend time with family and friends
- tourist activity in home country
- tourist activity abroad
- to have a cultural experience

- to learn about a specific subject
- to experience an iconic building or cultural site
- to facilitate a visit for somebody else, who would not be able to visit on their own
- because the visit has been organised for me by somebody else
- to take children to the museum
- other _____

How would you describe the museums or galleries that you typically visit? Please select all that apply:

- Large Museums/Galleries, e.g. National Museums
- Medium Museums/Galleries, e.g. city museums (non-capital cities)
- Small Museums/Galleries, e.g. town/rural museums
- University Museums/Galleries
- Heritage Sites
- other _____

Finally, could you please give us some background information:

Age

Q22 Gender

- Male
- Female

The country in which you live:

The country in which you grew up (if more than one, please list)

What is your nationality?

What is your occupation?

How many years of education have you completed?

Do you have a disability?

- yes _____
- no

I would like to receive information relating to the results from this study. (If yes please enter email address)

If you would be willing to be contacted to follow-up any points you have included in the questionnaire or if you would be interested in being contacted regarding further research in the future, please provide contact information below. This is entirely optional and not necessary in order for this study to go ahead.

In this study, we are interested in exploring memories of museum visits that have been important to us throughout life. Autobiographical memory is described as our own personal scrapbook, containing information about ourselves and our past experiences. Autobiographical memory resides in a memory system which consists of episodes recollected from an individual's life, based on a combination of both episodic (personal experiences and specific objects, people, and events experienced at a specific time/place), and semantic memory (general knowledge and facts about the world). We are interested in memory for museum visits in particular because we are exploring the role of cultural experiences in our lives and the development of our sense of self. In recent years, research has examined the distribution of autobiographical memories over the life span, and it has been proposed that older adults report a higher frequency of autobiographical memories for experiences that occurred between the ages of 15-30, compared with other life periods. Furthermore, this phenomenon has been found across cultures, and through the use of various methods, including responses to word cues, olfactory cues, and musical cues. This study will contribute to this field of research by developing understanding about the ways in which autobiographical memory in relation to cultural experience may be more salient for certain life periods. Please be assured that all the information collected today will remain anonymous and will be treated with and stored with strict confidentiality, and as such it will not be possible for your responses to be identified within the data archive. Your participation in the present study is highly appreciated, and we hope that it will give us a greater understanding of group patterns in memory for museums that have been important to us. I would be very grateful if you could refrain from discussing the nature of this research project with other potential participants to ensure that it does not have an effect on their responses. If you have any further questions regarding the nature of the study or if you would like a copy of the outcomes of the research once complete, please contact Rachel Hutchinson on the following email address: w1580109@my.westminster.ac.uk . Thank you for your participation.

Appendix 2.2: Instructions and examples for second coder

Step 1: Classifying memory type:

Categorise the memory as either a non-memory, a general memory, or a specific memory.

Select *Non-Memory* if the text given by the respondent does not constitute any kind of memory, for example a generic comment such as ‘I like the Science Museum’.

Select *General Memory* if there was no clear information in the memory that enabled it to be situated in a specific day or moment. General memories might be an amalgamation of many different visits, perhaps typifying a life period, for example: ‘Natural History Museum: Many visits with our children beginning when they were 5 and 3 respectively.’

Also include descriptive memories without a spatial-temporal context in this category, for example: ‘Cragside Northumberland. Large National Trust estate. Historic house, the first to be lit by electricity, flame shaped shades on staircase lamps. Bedroom with owls carved on bedposts. attic room filled with curiosities from around the world. A warren of a house developed over a number of years using proceeds from the armament industry.’

The use of a single grammatical tense throughout is an indicator to class the fragment as a general memory. For example, the present tense only is used here: ‘Fitzwilliam museum Cambridge. I always visit when in the area. They have an amazing permanent collection. ... Think it is a beautiful building and it has a nice café.’ The sole use of the past tense can be less clear, as in this example: ‘The V&A - I really liked that for most of the things displayed there they had an audio information if you are interested to hear more about what are you looking at. I liked that the way of display followed a historical line - from early centuries to recent times.’ Here, the use of the past tense throughout could indicate two scenarios. Firstly, that the memory does indeed refer to a specific moment in the past. I ‘liked’ it (on the day that I visited). Alternatively, I ‘liked’ it, on the many occasions when I visited. As it cannot not be clearly determined which scenario applies, classify as general.

Memory fragments with no verbs are by definition classed as general, as there was no verb construction to link detail to any specific moment: ‘Saatchi Gallery. Wonderful

exhibition by young new artists. A beautiful pencil drawing of a massive sequoia. a hyper realistic statue of a swimmer.’

Select *Specific Memory* if there is some detail which indicates a particular day or moment. This could be a reference to the time when the visit happened, e.g. ‘The first time I went to the science museum’, or it could be the recall of something specific that happened there: ‘I can never forget the scream I heard from my little brother when we first walked in and the rush of adrenaline in me when I saw that skeleton.’

A change in tense may be an indicator that a memory is moving from a general memory to a specific moment, for example with a shift from present to past tense. In the following memory, the fragment contains a shift from the present tense, to the present perfect (*‘has created’*) to the introduction of a specific detail in the past simple tense (bold type): ‘Preston Park Museum, Stockton. Good place to take children as it is in a parkland setting. with other attractions such as butterfly house and playground. Museum has recreated street of shops, printer and stationer, chemist, cobbler etc, some of which sold items, some just had exhibits. **Also had a valuable painting**, The Card players I think, can't remember artist, housed in a darkened room by itself, very reverential, made you feel you could only whisper’. This shift in tense through to a specific moment in the past is considered adequate to classify the overall memory as a ‘specific memory.’

Step 2: identify special memories:

Special Memories: this category includes memories that have an emotional element that indicates an enduring relevance and salience for the participant. For example, a memory of doing something for the first time (the first time I ever visited London), a memory that was in some way self-defining (seeing the work of Monet that I had dreamed of seeing since childhood), culture-defining (a moment of external relevance and importance for a generation, eg 9/11) or that marked a moment of transition (during this visit, I finally understood why art could be exciting). Memories that were coded as ‘first time’, ‘self-defining’, ‘culture-defining’ or ‘transitional’ are grouped into the category ‘*special memories*’. Memory fragments were not counted in more than one of the subcategories, meaning they did not artificially inflate the overall score for ‘special memories.’ However, self-defining, culture defining or transitional memories could also be first-time memories: eg the visit was the first date I went on with my future husband) All other memories are categorised as ‘*Other Recollection*.’

Step 3: code for memory content:

For each unique description you are asked to code the segments of text using a series of codes, described below. A segment of text is based on units of meaning, and can therefore range from a single word to an entire sentence. However, discrete segments are only coded once – no double coding across categories.

Sensory-Perceptual Categories:

Visual: a visual image recalled by the participant: including colours, conditions of light/darkness: for example: ‘The big red blue and white targets on the sides of the planes’, ‘light flooded in from the outside’. Where size or scale is associated with visual detail, then this is also counted as visual: ‘little coloured engraved details’ (However see also ‘spatial’ section). Reports of the experience of visual images were also coded in this category: ‘I can visualise the scene now.’

Spatial: the scale of the environment ‘the museum was big’ or the scale of objects within the environment: ‘huge canvases’. The spatial layout of objects or elements of the environment, such as ‘suspended from the ceiling.’ Spatial information situating the participant within their environment: ‘I remember standing *under* the glass pyramid’. Details of how space is perceived: ‘acres of open space’, ‘the curve of the space was so unusual’, ‘low ceilings’.

Auditory: sounds heard, or the absence of sound, such as ‘there was this amazing singing or chanting’, ‘there was just a huge silence.’

Taste: a memory of a particular food eaten or the taste of something, such as ‘also remember the so so good, and warm cinnamon bun’. Mentions of the act of eating are not included in this category as they don’t represent a true taste image or sensory experience, but rather an event detail. Details such as ‘we had lunch’ are therefore included in ‘event’, in the sense of a ‘happening.’

Tactile: detail of touching something or texture: ‘I remember the smoothness of some of the statues.’

Olfactory: specific smells reported or the memory of a smell ‘I remember a strong smell of beeswax’, ‘It all smelt wonderful.’

Kinaesthetic: Movement is included in this category e.g. ‘detail regarding the body such as ‘we sat down’, or use of part of the body to grab, dip one’s hand in, etc. Something like ‘I ran through the gallery’, would receive a coding of Kinaesthetic for ‘I ran through’ and Place for ‘the gallery’.

Pain: any mention of pain, discomfort or fatigue is included in this category. E.g. ‘I had tummy ache’ or ‘my feet hurt’ or ‘I was tired’.

Emotion: Any mention of emotions experienced is coded in this category, whether reported directly as a feeling: ‘I was very emotional’, or whether reported indirectly: ‘the atmosphere was incredible.’ Reports of the emotions of others were included in the category ‘event.’ See ‘social interaction’ for classification of emotions in the first-person plural.

The verbs ‘to like’ and ‘to love’ denote enthusiasm and therefore indicate a count for emotion. For example: ‘I liked the displays’, or ‘I loved the paintings.’

Cognition: details classed as thoughts or implications are coded in this category. This included thoughts relating directly to the exhibit or its subject matter: ‘stunning, exceptionally high quality photos’, thoughts relating to the overall experience: ‘I remember thinking about how grand it all looked’, thoughts generated in response to the event (visit): ‘For the first time in my life, I had mixed feeling towards my faith’ and thoughts relating to the rememberer themselves and their autobiographical memories: ‘reminded me of flying my kite with my dad.’ Expressions of interest or fascination are included as cognition, not emotion. Aesthetic judgements are also cognition: ‘it was beautiful’. Note that when a cognition is coded, elements of the thought are not coded further (to avoid double coding). Eg, the following would score 1 for cognition, but ‘rooms’ would not require a ‘place’ score: ‘The rooms felt as though Monet and his family had just popped out for a moment and might arrive any minute back in the room’

NOTE: The cognitions are related to what people thought at the moment. Or thoughts they had about it after the experience. Where people say ‘I remember going into a long room’ the ‘I remember’ is not coded as cognition.

Context -time: includes abstract, thematic knowledge that contextualises other information in terms of the rememberer’s personal history (Conway et al., 1992). Examples of this are the ‘back story’ provided by the participants to contextualise their

memory, eg ‘I was on a school trip’, ‘the first time I went to a museum on my own’, ‘the first museum I visited in London’ (this example would receive one count for ‘context’ and one for ‘place.’).

Secondly, this category also includes information from participants that provides context in the memory but is too broad in scope to count as a specific detail, for example: ‘there was a lot of stuff to do with the world war’.. Thus, comments that qualify the visit in some way are also included in this category: ‘there was plenty to see and do’, ‘I don’t usually use an audio guide’. Information was counted as context if it was given in the passive voice ‘there were a lot of paintings.’ If an active verb is attributed, eg ‘we saw a lot of paintings’, then it would count as ‘event’ (in this example, event + ESAK). ‘There was a lot of art’ - passive voice - context. ‘We saw a lot of art’ – active voice – event. *Time*: includes details that place the museum visit in the participant’s sense of autobiographical chronology: ‘last summer’, ‘about a year ago’, ‘last year when I went to Scotland for the first time.’ It also includes details on perceived duration ‘the tour lasted an hour’, ‘it was a short trip’.

Place: details of the physical environment of the museum, such as references to the different floors of the museum, the shop or café, or physical features such as ‘a massive grand hall’. Mention of the location (city, region). Note that where the participants gave a title to their memory, e.g. ‘the Natural history Museum’, this is not coded for place, as treating these as part of the memory text would overly inflate the place counts.

However, if specific information was given within the title ‘eg Australian Impressionists at the National Gallery’, then this would receive one count for ESAK’. Multiple *identical* references to the same part of the museum, e.g. ‘the rooms’ are coded for ‘place’ the first time, but not with every repeated use (see example at end of document)

Event: In line with other autobiographical memory coding systems (Levine et al., 2002), this category includes happenings ‘we lost my son’, ‘there was a book reading by an author’, ‘we had a guided tour’, as well as weather conditions ‘It was raining’. It also includes references to people present who were not known to the rememberer ‘there were hosts in pink shirts’, or mentions of crowding in the museum e.g. ‘it was too crowded to see much’. Emotional reactions or physical actions of others were coded as ‘event’: ‘She was fit to burst with pride’, ‘I watched a man draw.’

Social Interaction: This includes details of any reported interactions with others, known and unknown. A reported joint emotion counts as social interaction as interaction is implicit: ‘we laughed’, ‘we were disappointed.’ Joint expressions of interest also: ‘we were fascinated.’ However a joint action such as ‘we saw lots of paintings’ is not coded as a social interaction as this activity could be done alongside someone without necessarily interacting with them.

Person/People: detail to do with a person or people known to the rememberer at subsequent recall (e.g. friend or family member, teacher, or tour guide). If a fragment has been coded as social interaction, but also includes a ‘person’ detail, this does not require an additional ‘person’ count as the presence of another person is implied.

Event-Specific Acquired Knowledge: this category includes details internal to the event (visit), for example objects or artworks seen, such as ‘Queen Victoria’s wedding dress’, ‘the Mona Lisa’, and details of them, such as the ‘different expressions and postures’ of the Terracotta Army soldiers. This category also includes physical features of the exhibition ‘you can take a walk on an old Pan AM plane’, its displays ‘there was a display of the tomb where they were found and how they were found’, or facts/concepts recalled ‘(Scotland)... merged with England but was originally separate’, ‘they (artists) used logos of famous brands to create their pieces criticising the actions, or the lack of effective actions from big nations such as US and also UN.’ Knowledge about something seen within the museum can be coded as ESAK, if even general ‘statues/paintings’. Information given which qualifies the name of the museum can also be counted as ESAK ‘Australian Impressionists, XXX.’

Text Segmentation and Scoring: A segment of text was based on units of meaning, and could range from a single word to an entire sentence. However, discrete segments were only counted once within the multiple categories of Level 3. In the following example, a participant recalled a visit to Monet’s house:

The rooms felt as though Monet and his family had just popped out for a moment and might arrive any minute back in the room (*cognition=1*). I felt almost a sense of intrusion (*emotion=1*) shuffling through (*kinaesthetic=1*) the crowded (*event*) rooms (*place**) examining the saucepans etc (*event-specific acquired knowledge*). I remember the colours within the rooms being so vivid (*visual=1*) as the light flooded in from the outside (*visual=1*). Blue and yellow are predominant in my mind (*visual=1*). The gardens (*place=1*) were beautiful (*cognition=1*) and felt so lush (*cognition=1*). I

remember crouching down (*kinaesthetic=1*) and telling my son (*social interaction=1*) that I was looking at a bridge which I had wanted to see since I was a little girl (*cognition*). It felt so much more special (*emotion=1*) because I was able to share it with him (*social interaction=1*).

The fragment in its entirety clearly refers to a specific moment, and so is coded as a specific memory; also coded as 'self-defining', as this moment represents something that the participant had thought about over her life-time up to this point, when she finally saw the object of her recurring thoughts.

* see note in place category.

Appendix 3: Chapter 4

Appendix 3.1: Henry Grant photographs

Photographs used in Studies 3 and 4, taken from the Museum of London's Photography Collections and reproduced here with permission from the Museum of London.

Children playing in the Lido in Parliament Hill Fields, Hampstead Heath, 1957:



An eel stall, Chapel Street Market, 1955:



The Irwin Clement Steel band, 1964:



Pupils at Highbury Quadrant Infants School, 1964:



Sailing Model Boats Kensington Palace Gardens, 1959:



Feeding Pigeons in Trafalgar Square, 1954:



A one-man band performs to the crowds outside Woolworth's, Camden, 1952:



Londoners relax on Tower Beach, 1952:



A group of Wolf Cubs on an outing to Kensington Gardens, 1954:



Appendix 3.2: Audio guide and audio description texts

Parliament Hill Lido: Audio Guide

Henry Grant took this photo in the heatwave of June 1957. It shows children playing in the Parliament Hill Lido in North London.

In this photo, Henry Grant displays his enthusiasm for photographing children enjoying their environment. Some children are playing with the spray from a standpipe at the edge of the pool, and others are in the shallow water of the lido.

The Lido was opened on 20 August, 1938, in the decade when lidos were the height of fashion and enjoying their heyday. The construction of lidos was part of a government initiative to improve the nation's health, especially that of the working classes. Between 1930 and 1939 at least 180 lidos were built in Britain. This lido was designed by Harry Rowbotham and TL Smithson, who were architects working for London County Council. They designed all of the city's lidos between 1906 and 1939. It cost £34,000 to construct, making it the most expensive of the lidos built in London in the 1920s and 30s.

By 1957, when this photo was taken, the Lido had been open for nearly 20 years and had survived a direct hit in the Blitz. On 13 September 1940, incendiary bombs caused seventeen local fires, and the last one fell on the lido. The fire brigade managed to extinguish the blaze and keep the lido open.

Since Henry Grant took this photo, the lido has continued to survive despite the gradual decline of lidos across the UK. In 1976, a young boy lost his life there, which resulted in increased numbers of staff and the removal of most of the diving boards. The final board was taken away in 2003.

The lido underwent a major refurbishment in 2005 and remains open today, with the addition of a stainless-steel liner which is said to give the water an extra shimmer. It is acclaimed as an Art Deco classic and was Grade II-listed in 2009. Measuring 61 by 27 meters, it is a large pool which is packed with families on warm days, and is popular with triathletes in training.

Parliament Hill Lido: AD:

Henry Grant took this photo in the heatwave of June 1957. It shows children playing in the Parliament Hill Lido in North London.

A small section of the shallow end of the lido is captured in the photo. We stand, with Grant, at the water's edge, surveying the scene. Water is to our left, and tarmac to our right, with the edge of the lido leading up from the base of the picture. This forms a line dividing the action of the photo.

To the right, are two boys and a girl, all about 10 years old. They appear half way up the photo, standing on the poolside tarmac which looks rough under their bare feet. They crowd around a standpipe which sends a jet of water spraying into the lido. The two boys are in front of the girl, closest to the pipe, and their wet hair is plastered against

their foreheads. They are wearing plain dark swimming trunks. One boy has his hand in the jet of water, forcing it up and over his playmates in the pool. A girl in a plain dark swimming costume stands behind him. Her right hand is on the boy's back as she reaches past him, jostling for position at the source of the stream of water.

To the left, are around 12 children of similar age, girls and boys, ankle deep in the lido. They run towards the roaring spray of water. It forms an arch and patters like heavy rainfall as it cascades into the pool. They raise their arms and stretch out their hands to feel the force of the cool water as it batters against their faces.

In the foreground is a young boy about 3 or 4 paces away from us. He stands still, ankle deep, drawing his shoulders up towards his ears, holding his arms away from his sides. His body is tense, his rib cage showing, as if the coldness of the water has caused a sharp intake of breath. Exhilarated, a broad grin spreads across his face as he glances past the camera.

The photo has been taken with the camera angled towards the ground. The sky line is high and the clear, cloudless sky takes up only the top fifth of the photo. The horizon line is made up of a row of terraced houses and, in front of them, three elm trees in leaf.

By the time this photo was taken, the Lido had been open for 19 years. Lidos were at their height in the 1930s, as a result of a government drive to improve the health of the working classes. It was built by Harry Rowbotham and TL Smithson, who were architects for London County Council. The Lido cost £34,000 to construct, making it the most expensive of the city's lidos built in the 1920s and 1930s. The Lido is still open to swimmers today. It survives despite the decline of lidos across the UK, and its own turbulent history. It took a direct hit in the Blitz of 1940 and a young boy lost his life there in 1976. It has since undergone major changes. These include the removal of diving boards and the addition of a stainless-steel liner, which is said to give the water an extra shimmer. The lido is acclaimed as an Art Deco classic and was Grade II-listed in 2009. Measuring 61 by 27 meters, it is a large pool which is packed with families on warm days, and is popular with triathletes in training.

Eels at Chapel Street Market: AG

Henry Grant took this photo in 1955, at Chapel Street Market, which sold textiles, food, hardware and jewellery. It shows the eel stall.

In this photo, there is a market trader with his large tubs of live eels in water. People walk past in the background. The trader has positioned himself outside a shop selling cooked eels.

Grant was drawn to market scenes for the buzz of activity and the characters that he found there. Markets also provided the opportunity to photograph great British traditions. This was attractive to Grant, as it provided good potential for 'stock' imagery which showcased iconic London scenes. Stock imagery would be reprinted more frequently due to editorial demand, and so could increase his earnings.

Chapel Street market was open seven days a week. People bought the eels to cook at home, once the stall trader had dispatched them with a knife, as he is doing here. As

well as being sold for cooking at home, eels were also sold ready to eat. There were two businesses on Chapel Street selling hot stewed eels, both in the name of Manze. (*pron: Mans*) Eels were served alongside meat pie and mashed potato. The consumption of eels in London can be traced back far earlier than the 1950s, when this photo was taken. References to eels as food can be found from Shakespearian to Victorian times. Eels were said to have helped feed London during the Great Fire in 1666, when they were brought from the Netherlands in huge quantities to help meet demand. The popularity of eels was due to the fact that they were cheap and plentiful. Whereas other meat and fish had to be preserved in salt, eels could be kept alive in puddles of water until required.

Today, the consumption of this traditional working class food has declined dramatically. This has been attributed to changing tastes and the scarcity of the eel. However, Manze's still exists today on Tower Bridge Road. Dating from 1908, it is now the oldest surviving eel shop. For Grant in 1955, however, a teeming mass of eels would have been a striking, even if commonplace sight in London's bustling market scenes.

Eels at Chapel Street Market: AD

Henry Grant took this photo in 1955, at Chapel Street Market, which sold textiles, food, hardware and jewellery. It shows an eel stall.

We stand with Grant at the stall, facing the market trader, who doesn't seem to have seen us yet. Between him and us, two large rectangular tubs of eels span the base of the photo. The tubs are filled nearly to the top with a mass of seething, black eels squirming over one another with their smooth, muscular bodies. The trader stands in the centre, a set of weighing scales to the right of him and a cash register to the left. In his 30s, he has short dark wavy hair, parted to the side and slicked back away from his face. He wears a jacket with the sleeves rolled up to his elbows, a stained apron of thick material tied around his waist. In front of him is a heavy wooden block. His right hand holds a sharp knife, about as long as his forearm. His finger points down the handle to direct the blade, which rests in contact with the block. He has just used it to cut up an eel. His left hand holds the stump of the eel's body, with sticky blood oozing out of its centre. He looks down at the knife, fully absorbed in his task. His right shoulder is angled backwards, away from the knife and the eel. Perhaps he is trying to avoid being splattered with blood.

Behind him, the motion of the passing street scene fills the rest of the frame with no sky visible. A shopfront frames the market trader, with the capitalised text 'HOT STEWED EELS' clearly captured by Grant. Two passers-by, out of focus, walk from left to right. One man, on the left side, is smartly dressed in a suit. He walks by, looking straight ahead. In front of him, a blond woman in her 30s walks past, wearing a checked jacket. She turns her face towards us, in a blur of motion. Perhaps the photographer has caught her attention as she hurries by.

Markets were a favourite location for Grant with their bustling activity, characters and traditions. They also provided ample opportunity for 'stock imagery' of iconic London scenes, which had greater earning potential for the photographer.

On Chapel Street, eels were sold by Manze, a business which still exists today on Tower Bridge Road. Open since 1908, it is now one of the oldest surviving shops to sell the

traditional working class food of eels, pie and mash. Eels had a long tradition as a cheap and plentiful food that dated back to Shakespearian times, and even helped feed London during the Great Fire of 1666. In recent times, the British taste for eels has declined dramatically. But for Grant in 1955, a teeming mass of eels would have been a striking, even if commonplace sight in London's bustling market scenes.

Irwin Clement Steel Band: AG:

Henry Grant took this photo in May 1964. It shows the Irwin Clement Steel Band playing at Stalbridge Street, in Lisson Grove, in London.

A man dancing the limbo has removed his shoes to allow him to pass beneath a low bar. Steel band music and the limbo are popular in the Caribbean, especially in Trinidad, and have developed out of African music and dance. The first steel band played in London in 1951, when the Trinidad All-Steel Percussion Orchestra presented the newly-invented steelpan to an international audience.

Steel pans are made from industrial waste, such as car parts, paint pots, dustbins, oil drums and biscuit tins. A series of dents hammered into the shiny metal surface create a range of different notes, according to their position and size. The pans can be stationary, or slung around the players' necks so they can be played as the musicians walk, as a marching band.

The players in this photo are not identified, but we know that Irwin Clement began his career as a pannist with Dem Boys of Belmont in 1952. He migrated to the UK in the early 1960s where, in addition to being a pannist, he became a percussionist. He played for many years with the Russ Henderson Steel ensemble and travelled extensively as an accompanist to many prominent artists. Whilst he continued to be based in London, his profession took him to many countries in Europe, Asia, southern Africa and Australia. In recent times Clement has been a frequent visitor to Tobago where he has a home. At 80 years of age, "Clem" continues to be an active pannist and percussionist.

This photo was taken a few months before the first Notting Hill Carnival, which began in 1964. Russ Henderson is recognised as one of its founders. Henry Grant did not photograph the Notting Hill Carnival, but he did photograph street musicians all over London. He also documented the transformation of London following African-Caribbean migration, marked by the arrival of the passenger ship the Empire Windrush in June 1948. He captured this social change through photographs of employment, political demonstrations, music and culture.

Irwin Clement Steel Band: AD:

Henry Grant took this photo in May 1964. It shows the Irwin Clement Steel Band playing at Stalbridge Street, in Lisson Grove, in London.

They are playing music on steel pans and bongos, and a man is dancing the limbo. Steel band music and the limbo are popular in the Caribbean, especially in Trinidad. Steel pans are made from industrial waste materials, and give out a range of notes from dents hammered into their surface.

The limbo dancer is the focal point of the photo. He has removed his smooth black slip-on shoes, which are paired neatly on the road next to him. His legs are splayed out in front of him as he draws his body under the limbo bar, feet first. His back is parallel to the road and his knees just inches above its surface. The posture of his body looks as though it would be impossible to sustain a moment longer. We imagine the burning sensation in his legs as the tension builds and the roughness of the road felt through his socks. His hands are flung up for balance, fingers spread, as he inches his weight under the bar. Behind him, three band members stand with their large round steel pans, which weigh heavily on the back of their necks, where the straps rest. The outermost men appear to be of Caribbean origin and are smartly dressed with shirts, black trousers and smooth black slip-on shoes. The central pannist is the only white member of the group. The fourth band member is playing the bongo which is clamped between his knees. He is squatting on the kerb, at eye level with the limbo bar. The rhythmic thuds of the bongo intermingle with the tones of the pans, perhaps building to a crescendo to encourage the dancer. All four men are smiling at the limbo dancer and the leftmost man is tapping his foot. At the far left hand side of the image, a young white boy stands watching with his arms folded. His stance gives nothing away and we wonder what he thinks of what he sees.

Grant held the camera at waist height to take this photograph, which puts us on eye level with the limbo bar. The band are playing on the pavement, just a few paces away from Grant, with the limbo dancer in the road in front of them. The limbo bar consists of two vertical posts, with a horizontal pole balanced across them. The posts have pegs at intervals that allow the pole to be lowered. The bar juts out into the road, at a 45-degree angle to the pavement. In the background, there's a line of wrought iron railings behind the band, and brick buildings fill the rest of the frame with no sky visible. We can make out the street sign for 'Stalbridge Street' to the right, fixed to the railings, although it is partially obscured by one of the four band members.

The players in this photograph are not identified, but we know that Irwin Clement migrated to the UK in the early 1960s when his career as a pannist and percussionist took him around the world. He also played alongside other well-known artists, such as Russ Henderson. Henderson was one of the founders of the Notting Hill Carnival, which began in the months after this photograph was taken. Grant did not photograph the Notting Hill Carnival, but he did photograph street musicians all over London. He documented the transformation of London following African-Caribbean migration, marked by the arrival of the passenger ship the Empire Windrush in June 1948. He captured this social change through photographs of employment, political demonstrations, music and culture.

Highbury Quadrant Infants School: AG

Henry Grant took this photo in December 1964. It's called 'Pupils at Highbury Quadrant Infants School.' It shows a crowd of schoolchildren, around 60 or so, running across the playground towards the photographer.

The low-rise pre-fab buildings of Highbury Quadrant Infants School contrast with the imposing and ornate semi-detached villas behind. The school itself was opened in 1956 by Countess Atlee. 9 years later, this photograph was taken close to Christmas when the

children were rehearsing their Nativity play, which Grant photographed separately. Here, Grant has directed the children to run towards him. He has positioned the camera at waist level, or perhaps even lower to the ground, so the children are at eye level as they approach. A few black children can be seen amongst the crowd of mainly white faces. This reflects the increasing numbers of Caribbean families coming to London in the post-war years. A teacher or dinner lady is also seen amongst the crowd. This photo was taken in midwinter, and the children are wearing jumpers and winter coats, but many of the boys are still in schoolboy shorts.

Grant was a committed socialist, and his pictures often contain a layer of social comment. He was a passionate believer in education as a vehicle for social change. He worked in partnership with his wife Rose, a journalist. Together, they covered a wide-ranging spectrum of events and subjects within London. These included welfare, the NHS, Housing, construction developments, famous events and landmarks, youth culture and schools. In the 1950s, with a child of their own, they became increasingly focused on schools and the education system. This took Grant into the classroom, from special needs schools and nurseries through to secondary schools and universities. Grant produced thousands of photographs of schools and school children. He and Rose were particularly interested in new approaches in education, such as the first comprehensives. A great deal of Grant's work, including this photo, appeared in the Times Educational Supplement, and chronicled developments in education.

In Grant's work in schools, many of the shots were taken in playgrounds, where the children can be seen skipping, hula hooping, running and jumping. These photographs, and this one among them, demonstrate Grant's ability to work with school children and to capture their natural exuberance.

Highbury Quadrant Infants School: AD

Henry Grant took this photo in December 1964. It's called 'Pupils at Highbury Quadrant Infants School.' It shows a crowd of schoolchildren, around 60 or so, charging across the playground towards the photographer.

We stand with Grant, facing the children, who are thundering across the playground towards us. The school buildings are approximately 30-40 metres away and the crowd of school children spreads out between us and the buildings - the nearest boy will reach us in just a second or two. The children closest to us are about 7 or 8 years old and there's a mix of girls and boys, with a few black children reflecting the increasing number of Caribbean families moving to London in the post-war years. There is a female teacher or dinner lady in the crowd, and the younger children are staying close to her. She seems very fixed and dour compared to the excited children. The three nearest boys capture our attention. The nearest child is on the left side of the photograph, and takes up just over half its height as he is just a pace or two away from Grant. He is winning the race to the photographer by a clear margin. Like many of the boys in the photograph, he wears a winter jumper and his coat is flapping open, and he has bare legs in schoolboy shorts. The wind whistles past his ears and the cold air must feel biting on his face and legs as he charges towards Grant. The other two boys head the rest of the crowd and are approximately in the centre of the photograph. All three of these boys are looking directly at Grant with broad smiles on their faces. They also have

both feet, blurred with motion, completely clear of the ground as they sprint towards us. We can imagine the thuds of their feet and their whoops of delight as they surge forwards.

Grant held the camera low to the ground to capture this image. Only a thin sliver of sky is present, as the majority of the photograph is taken up by the tarmac of the playground. Apart from the children, the playground itself is completely empty, except for a solitary leafless tree on the far-right hand side. Behind the children are the low rise pre-fab school buildings, with their large windows, which frame the playground. On a nearby street overlooking the school, rise two sets of imposing and ornate semi-detached villas, across the left half of the photograph. They form a contrast with the more modern school buildings below.

Grant was a committed socialist, and his pictures often contain a layer of social comment. He was a passionate believer in education as a vehicle for social change. Grant worked in partnership with his wife Rose, a journalist, covering a wide-ranging spectrum of events and subjects within London. In the 1950s, with a child of their own, they became increasingly focused on schools and the education system. This took Grant into the classroom, from special needs schools and nurseries through to new comprehensives and universities. Grant produced thousands of photographs of schools and school children. He and Rose were particularly interested in new approaches in education. A great deal of Grant's work, including this photo, appeared in the Times Educational Supplement.

In Grant's work in schools, many of the shots were taken in playgrounds, where the children can be seen skipping, hula hooping, running and jumping. These photographs, and this one among them, demonstrate Grant's ability to work with school children and to capture their natural exuberance.

Sailing Model Boats: AG

Henry Grant took this photo sometime in the 1950s. It shows a middle-aged man launching a model boat, the R.A.F. Rescue Launch 141, on the waters of the Round Pond in Kensington Palace Gardens.

The Round Pond was created in 1730 by George II. It is around seven acres in area, measuring approximately 200 by 150 metres. It is up to 5 metres deep in places. Despite its name, it is not circular, but rectangular with stepped and rounded corners. It is home to a variety of wildlife, including fish, ducks, geese, swans and other birds, all of whom are regularly fed by visitors. Kensington Gardens and the Round Pond were first opened to the public in 1830, to visitors who were deemed to be 'respectfully dressed.' The Round Pond very quickly became popular for the sailing of model yachts. In 1876, the Model Yacht Sailing Association was founded. It is still active today, making it the oldest model sailing club in the UK. It has met many challenges in its sailing history, including a period in the 1880s when the pond was drained, and some further disruption in the same decade due to pondweed. The club suffered greatly after the First World War, when membership went down, but it gradually recovered its popularity and status. In 1937, a section of the pond was railed off to create a paddling pool for children. However, this met with fierce resistance and the rails were removed a year later.

In the 1950s, when Grant took this photograph, people crowded around the Round Pond to watch model boats race around the water, such as this R.A.F. Rescue Launch 141. The R.A.F. models were based on the marine boats used in the Second World War to rescue airmen who had fallen into the sea. Today, the club continues to face challenges from pressures on parkland space and boathouse accommodation, and the sailing is still periodically halted due to pondweed. However, club members still gather on most Sundays throughout the year to race their collection of vintage and classic model boats and yachts.

Sailing Model Boats: AD

Henry Grant took this photo sometime in the 1950s. It shows a middle-aged man launching a model boat on the waters of the Round Pond in Kensington Palace Gardens.

The focal point of this photo is the miniature R.A.F. Rescue Launch 141. Its streamlined, graceful form cuts through the water of the Round Pond, its colour dark in contrast. Water splashes up against its bow. It has been launched from the left side of the photo, and a bubbling trail in its wake crosses over two thirds of its width. On the far left-hand side, the man who launched it follows its progress with a look of concentration. He crouches at the water's edge, just a couple of metres away from Grant. About 40 years old, he wears dark trousers and a thick coat. The collar is pulled up to protect his neck from the wind, which lifts his hair. His left arm is outstretched, having just pushed the boat into the water, dipping his hand into the cold water in the process. The boat itself is about the length of the man's forearm.

Grant might have crouched down to take the photo, as his subject is doing, as the camera has been held close to ground level. The man's smart black lace-up shoes are roughly half way up the photo, and he balances his weight on the concrete at the water's edge. Small waves lapping at the shore threaten to soak his feet. Behind him, two children on the edge of the frame capture our attention as they peer over his shoulder to watch the boat's progress. One of them, a boy around 10 years old, wears a school boy cap and round glasses. Behind them, the water's edge divides the photo in half. It is lined with many small figures of other spectators, who appear in the far distance. Behind them rise the trees of the Gardens. Their bare branches suggest that the model sailing enthusiasts are braving cold and wintry weather to enjoy their hobby.

Created in 1730 by George II, the Round Pond measures approximately seven acres in area, and 200 by 150 metres. It is up to 5 metres deep in places, and it is actually rectangular with rounded corners. It is home to fish and a variety of waterbirds. First opened to 'respectfully dressed' visitors in 1830, the Pond quickly became popular with model yacht enthusiasts and the Model Yacht Sailing Association was founded in 1876. The club is still active today, despite a history of challenges. Draining of the pond, pondweed and space given over to children have all temporarily halted sailing. The club's membership numbers also suffered after the First World War, but it gradually recovered its popularity and status.

In the 1950s, people raced RAF models based on the marine boats used in the Second World War to rescue stricken airmen. Today, club members face on-going pressures on

boathouse accommodation and battles with pondweed, but they still gather most Sundays to race vintage and classic models.

Feeding the Pigeons: AG

Henry Grant took this photo in November 1954. It shows a young boy feeding pigeons in Trafalgar Square.

Feeding the pigeons was a London tourist attraction for many decades. The construction of Trafalgar Square started in the 1830s, and it was already known for its large number of pigeons by the time building finished in 1844. Feed sellers soon established themselves there, selling bags of seed to visitors throughout the Victorian era. Feeding the pigeons soon became a quintessential London pastime among all social classes.

The National Portrait Gallery exhibited a series of photos taken around Trafalgar Square, including one of Elizabeth Taylor being mobbed by pigeons. The last licensed bird feed vendor on Trafalgar Square was Bernard Rayner, whose family sold feed in the square for half a century. He was forced to leave in 2001 when the then Mayor of London, Ken Livingstone, decided to ban licensed feed sellers in the area. The local authorities were concerned that the birds' acidic droppings were damaging Nelson's Column and they started to install anti-pigeon wires and spikes. Westminster City Council extended the ban on feeding the pigeons to a wider area in 2007, and imposed a £500 fine on anyone who disregarded the new bylaws. Harris hawks were also brought in to patrol the Square and scare the pigeons away.

Feeding the pigeons was also popular on the steps of St Paul's Cathedral. This was immortalised in the now iconic *Feed the Birds* song in the Disney film *Mary Poppins*. The song shows the Bird Woman sitting on the Cathedral steps selling crumbs for tuppence a bag. Today, visitors are encouraged not to feed the pigeons on the steps, but many come to have their photo taken in the same spot as the Bird Woman, and the Cathedral shop continues to sell a number of *Feed the Birds* inspired gifts.

Henry Grant took many photos of this popular pastime. In this one, some of the major landmarks of Trafalgar Square can be seen, including the National Gallery and one of the Sir Edwin Landseer lions. The young boy feeding the pigeons is wearing his school blazer. He typifies Grant's delight in capturing London and its scenes through the eyes of young people.

Feeding the Pigeons: AD

Henry Grant took this photo in November 1954. It shows a boy feeding pigeons in Trafalgar Square.

A young boy, about twelve, stands stock still, tense, and looks past Grant, his mouth half open in an awkward smile. Just a metre or so in front of us, slightly to the right of centre, he holds out his hands. The thick material of his dark school blazer pulls tight at his elbows. With a whoosh of beating wings, blurry with motion, two pigeons swoop and settle on his bare hands. Their feet and claws are sharp on his skin and their wings waft air towards his face. A bird perches on his right sleeve, and another sits on his left upper arm. Unsure, the boy draws his shoulders up and pulls his chin down into his

chest, his tie tight around his neck. Another bird sits in profile, on his head, surveying the scene. Its dark grey colour contrasts with the boy's close-cut fair hair and the bright sun casts the bird's shadow on the side of his face, above his ear. Its feet are sharp through his hair. If it moves, its tail feathers will brush against the side of his face.

From the pocket of his blazer, just in frame, to the pigeon on his head, our unsure subject forms a central column of interest, taking up most of the photo's height. Behind him, men mill about in Trafalgar Square, in dark overcoats, some wearing caps. Pigeons move busily between them, casting shadows on this bright day. One of the Sir Edwin Landseer lion statues, larger-than-life, juts into the shot from the left. Raised on its plinth, it peers over the people, its paws level with their heads. It looks regally, in profile, towards the National Gallery. The Gallery's ornate lantern and pillars are just a blurred suggestion above the head of our boy and the men behind him. Grant has focused his camera entirely on the young boy in the foreground. We think he is enjoying himself despite his uncertainty.

Feeding the pigeons was a popular London pastime and tourist attraction for many decades, from the 1830s when Trafalgar Square was first built. It has been immortalised in popular culture. Elizabeth Taylor was photographed being mobbed by pigeons in Trafalgar Square, and the photo was exhibited at the National Portrait Gallery.

In the Disney film *Mary Poppins*, the iconic *Feed the Birds* song showed the Bird Woman feeding the pigeons on the steps of St Paul's Cathedral, and selling bags of crumbs for tuppence.

The last licensed bird feed vendor on Trafalgar Square was Bernard Rayner, whose family sold feed in the square for half a century. He was forced to leave in 2001 when the then Mayor of London, Ken Livingstone, decided to ban licensed feed sellers in the area. The local authorities were concerned that the birds' acidic droppings were damaging Nelson's Column and they started to install anti-pigeon wires and spikes. Westminster City Council extended the ban on feeding the pigeons to a wider area in 2007, and imposed a £500 fine on anyone who disregarded the new bylaws. Harris hawks were also brought in to patrol the Square and scare the pigeons away.

However, in the 1950s, feeding the birds was still a popular pastime. The young boy photographed here typifies Grant's delight in capturing London and its scenes through the eyes of young people.

Street Busker: AG

Henry Grant took this photo in 1952. It shows a one-man band performing to the crowds outside Woolworth's in Camden Town.

The photo was taken at the corner of Camden High Street and Delancey Street, where a crowd has gathered to listen to the busker. He is wearing a large bass drum on his back, with cymbals attached, but at the moment the photo was taken, he appears to be playing a wind instrument, perhaps a soprano sax.

The history of the one-man band in London goes back over 100 years before Henry Grant took this photo, at least as far as Victorian London. A watercolour painting by

George Scharf from the 1820s shows a one-man band on the Strand. The man plays panpipes fastened around his neck and beats a bass drum and tambourine which are slung over his shoulders. The one-man band was later immortalized in popular culture, 8 years after Grant's photo, in the Disney film *Mary Poppins*. Dick van Dyke plays Bert, a one-man band who entertains the crowds in Edwardian London.

Behind the listening crowd in Grant's photo, we can make out a pub, possibly the Brighton, and Woolworth's. In its heyday, a Woolworth's shop was a feature of every British high street. Woolworth's was the retail phenomenon of the twentieth century. The mass-market shop sold factory-made goods at rock bottom prices. It has its roots in the US, as the original five-and-dime store, where all goods were priced at either 5 or 10 cents. It quickly went global, building to more than 3,000 near-identical stores across the world.

Part of its magic was an ability to fit into different local communities without sacrificing its identity. Shoppers in the UK considered 'Woolies' as British as fish and chips, while Americans continued to call the chain 'the five-and-ten' more than sixty years after other, more expensive lines of merchandise were added.

In the 1950s, Woolworth's boasted a shop in virtually every parade across the British Isles and the Republic of Ireland. The shops were known for their bright and shiny appearance and loyal customer following. The shops changed very little over the years, except for stocking many more expensive items. However, the chain could not survive the financial crisis of 2008 and it went from normal trading in 800 stores to complete shutdown in just 41 days.

For Grant in 1952, 'Woolies' would have been the quintessential British shop, making for a typical high street scene. The one-man band was also iconic. When Grant archived this photograph, he stored it alongside images of chair makers and market traders, labelled collectively as 'London Types'.

Street Busker: AD

Henry Grant took this photo in 1952. It shows a one-man band performing to the crowds outside Woolworth's in Camden.

In profile, a busker lifts a wind instrument, perhaps a soprano sax, to his lips, ready to entertain the waiting crowd. He leans towards his audience, to counterbalance the weight of a large bass drum, positioned uncomfortably on his back. Thick straps pass over his shoulders and under his arms to hold the drum in place. This drum has a smaller drum and cymbals lashed to its side. More ropes pull taught between the instruments on his back and his feet, where they loop around his scruffy black leather boots. The slightest movement he makes will result in a crash or jangle of instruments. The bass drum is large enough to have a loud, deep tone, enough to be heard despite the chatter of the crowd.

Only a small part of the man's face is visible, but he may be in his 40s, and he has a dishevelled appearance. He wears dark clothing, maybe overalls, which finish mid shin where they meet his thick woollen socks and boots. His only smart article of clothing is

his black top hat. It is pushed firmly down on his head and gives him a dapper appearance, despite the scruffy clothes.

The busker's audience stands in a semicircle on the pavement, just a step up from his position in the road. The kerb stretches from the bottom right of the photo, in a strong diagonal line, finishing just under half way up on the left side. 30-40 people have gathered to hear him play. They are warmly dressed in winter coats, and the men wear ties. On the left side of the photo, some shoppers wait to cross the road, paying little attention to Grant or the busker. On the right side, closer to us, spectators smile directly at the busker. Two of them are young boys of about 8, whose bare legs show between their woollen socks and winter coats. Their hands are pushed down into their coat pockets for warmth. The busker has their full attention.

Behind the crowd, buildings at the corner of Camden High Street and Delancey Street rise to fill the rest of the frame, with very little sky visible. The building on the left side of the photo is a pub, possibly 'the Brighton' although some of its letters are obscured by traffic lights. A smart shopfront, with two large protruding glass windows, takes up about one third of the photo's width on the right side. Above the door, the name 'F.W.Woolworth's' in capital letters.

Woolworth's was a high-street presence across the UK in the 1950s. The brand came from the US, where it was known as a 'five and dime' store, selling cheap items. The chain grew internationally but was known for its ability to fit into local communities. Shoppers in the UK considered 'Woolies' as British as fish and chips. The store disappeared from British High Streets after the financial crisis of 2008. For Grant in the 1950s, it would have been part of a typically British high street scene.

The one-man band was also a typical London sight for Grant. These single buskers, carrying and playing an array of musical instruments, had been entertaining London since at least Victorian times. An 1820s painting by George Scharf shows a one-man band on the Strand. The one-man band would go on to be immortalised in popular culture through the character of Bert in the Disney film *Mary Poppins*. This was released 8 years after Grant's photo. For Grant in 1952, the one-man band was iconic enough for him to file this photo, alongside other images of chair makers and market traders, under the category of 'London types.'

Tower Beach: AG

Henry Grant took this photo in 1952. It shows Londoners relaxing on the artificially created Tower Beach, which was next to the Tower of London.

Tower Beach was a popular day-trip destination, especially for children and adults from the East End. 1500 tonnes of sand were added to the shingly foreshore at Tower Hill to create a beach holiday atmosphere. The beach officially opened on 23rd July, 1934. King George V promised that the children of London would have 'free access for ever'. In the 1930s over 500,000 people dipped their toes in the water of London's very own seaside.

In many ways, the experience came very close to the real thing. The tides came and went just as they did on the coast, and children could build sandcastles whilst their

parents relaxed in deck-chairs. Toffee-apple sellers and entertainers sold their wares just as they did at Brighton or Southend. Visitors could paddle, swim or even hire a rowing boat. It cost 3 shillings to take a trip under Tower Bridge and back again. A boatman was posted on duty to look out for adventurous children getting into difficulties. When people had tired of the beach, they could visit the Tower of London, which was free for children.

The beach was closed during the Second World War but reopened again in 1946 and thrived throughout the 1950s and 1960s. It finally closed in 1971 due to public concern about the water quality of the Thames.

London's iconic Tower Bridge appears in the background in this image, with its distinctive towers in Victorian Gothic style, and the walkways between them.

The photo is typical of Grant's work in many ways. He sought out iconic London scenes, and he frequently photographed social leisure scenes. Children at play in their city form a regular theme throughout his work. He also had an ability to document scenes that seem in some way historic, scenes that may not last, just as this one did not. The composition of the photo is split in half diagonally with the scattering of figures on the beach on one half and the dominant, famous Tower Bridge on the other. Today, now that the riverfront looks so different, this almost feels like two separate scenes conjoined: Tower Bridge and the seaside.

Tower Beach: AD

Henry Grant took this photo in 1952. It shows Londoners relaxing on the artificially created Tower Beach, which was next to the Tower of London.

A little girl picks her way across the sand at Tower Beach, on this bright summer's day. With her back to us, feet just out of frame, she is in the centre of the photo, just a pace or two away from Grant. Maybe 5 or 6 years old, she wears a knitted swimming costume, straps cross at the back. Her blond hair is neatly parted and pulled tightly into plaits which are pinned to the side of her head. No hair escapes from this neat style and the nape of her neck and her back are completely exposed to the sun, which warms her skin.

She and Grant survey the scene. Crowds of people sit, stand or stroll. Children in swimming costumes or shorts are barefoot on the coarse sand. It is rough under their bare feet, especially close the river, where it turns to shingle. They call to one another as they play and explore the beach. People's shadows fall in long dark stripes across the sand, suggesting a warm summer's afternoon. One man moves away from Grant, pushing a bike over the sand. Another man, closer, sits facing the river reading a newspaper. His dark suit jacket and trousers are formal and restrictive and must be uncomfortably warm on this sunny July day.

The diagonal line of the shore cuts through the photo, punctuated by people walking along it or paddling in the water. One young boy stands thigh deep in the water, several metres away from the shoreline. He is far enough into the river to be wading in deeper, colder water. Beyond him, the iconic form of Tower Bridge rises against the bright sky. The bridge deck forms a strong horizontal line just above the river, spanning the entire

photo. Tower Bridge itself takes up the rightmost half of the photo where it juts into the sky, the details of its ornate Victorian Gothic style on display. Its towers, their roofs (*rooves tbc*) a cluster of turrets, are at right and centre. 4 stories of windows on the towers face over the river. At the level of the highest window, walkways join the towers. Parallel to the walkways, the old wharves of Bermondsey, very small in the distance, extend across the width of the photo. The silhouettes of cranes rise in the far distance.

Tower Beach was created in 1934 by adding 1500 tonnes of sand to the shingly foreshore of the River Thames at Tower Hill. King George V promised that the children of London would have 'free access for ever', and the beach was very popular with families from the East End. The beach came close to the real sea-side experience, with toffee-apple sellers, deck-chair men and entertainers. Visitors could paddle, build sand-castles or even hire a rowing boat for a trip under Tower Bridge and back, for the price of three shillings. The nearby Tower of London was free for children too.

The beach was closed during the Second World War, but reopened again in 1946 and thrived throughout the 1950s and 1960s. It finally closed in 1971 due to public concern about the water quality of the Thames.

This photo reveals Grant's enjoyment in capturing iconic London scenes through the eyes of young people. It also shows his ability to document historic scenes that were transient, just as this one was. The composition of the photo is split in half diagonally, with the scattering of figures on the beach on one half and the dominant, famous Tower Bridge on the other. Today, now that the riverfront looks so different, this photo almost feels like two separate scenes conjoined: Tower Bridge and the seaside.

Wolf Cubs: AG

Henry Grant took this photo in March 1954. It shows 20 boys in Wolf Cub uniform having a picnic on the grass. A single girl is among them. The Albert Memorial is in the background. Queen Victoria opened the memorial in 1872 to commemorate her husband. The statue of Prince Albert within it was added three years later.

In the 1950s, when Grant took this photo, Wolf Cub membership was at its peak. But Wolf Cubs were not part of Baden-Powell's original concept for scouting. The scheme was never meant for boys below the age of 12. However, younger boys were keen to participate and would join older brothers and friends at Scout meetings. By 1913 the younger element was seen as a problem and it was clear that something would have to be done. Wolf cubs was created for boys aged 7-11.

Baden-Powell and Sir Percy Everett, of the Headquarters Committee, corresponded at length to work out details of the age of admittance, uniform, and tests for the first Stars. The Stars were awarded on completion of activities from four activity areas, and were worn on the side of the cap. The wolf cubs were given the official go ahead in January 1914. By the end of the first year, there were 30,000 wolf cub scouts.

The world's first international Scout Jamboree was held at Olympia in August 1920, just around the corner from Kensington Gardens. It included wolf cubs.

Today, wolf cubs have been renamed cub scouts, and their numbers run into many millions worldwide. They are also no longer the youngest group. The Beavers have now taken their place.

We don't know anything about the Wolf Cubs in this photo. Perhaps they were Londoners, or boys visiting from elsewhere. Kensington Gardens would have been a convenient place to stop for lunch if they were visiting the Science or Natural History Museums nearby.

This photo was a good opportunity for a stock image, especially considering the popularity of Wolf Cubs at this time. These images would be re-printed more frequently and could earn the photographer more money.

Wolf Cubs: AD

Henry Grant took this photo in March 1954. A group of twenty boys of about 7 or 8 years old, sit, squat, kneel or stand on the grassy lawns of Kensington Gardens. If they were in an arrangement for the photo, then it is now collapsing. Some of the boys are looking in Grant's direction, but most are engrossed in eating. Perhaps Grant saw this lunch stop as an opportunity for a photograph.

The boys are all dressed in the peaked caps of the Wolf Cub uniform, blazers, shorts and knee high woollen socks. On the far right of the group, a boy with dark rimmed glasses sits legs akimbo, his lunch on a bag between them. He smiles slightly as he opens a paper packet, perhaps discovering his favourite sandwiches. Moving left, a boy with a mop of thick, dark, curly hair crams his lunch into his mouth, his eyes on Grant. In front of him, four more boys form an untidy front row. The rightmost boy lounges across the front of the group, eating, with his legs stretched out casually to the side. The grass must tickle his bare knees. To the left of him, also eating, two boys sit more sensibly with crossed legs. The leftmost boy in the front row of our group is falling backwards on a boy behind. His left hand clutches his packet of sandwiches and he breaks his fall with his right elbow. He sticks his tongue out and his eyebrows are pinched together, making him look slightly aggrieved. A thickset boy behind has a hand on his shoulder - is he pulling him up, or did he push him down? On the far left hand side of the group, a little girl sits slightly apart, looking more composed in a dark coat and hat. To the right of her, a smooth dark leather handbag marks a space between her and the boys. Perhaps an adult has momentarily stepped away to help Grant attract the group's attention. At the back of the group, one boy stands tall and is looking in the photographer's direction. His peaked cap is pulled down to the side, just above his right eye, and his cub scarf stands out against his dark shirt. Behind him, a row of formally planted trees recedes to the skyline, which divides the photo in half. Bare branches stretch to the top of the frame and form an ever-fading silhouette against a dull sky. The fading trees in the distance and their bare branches suggest a cold day, fog even. In the far distance, right of the trees and just right of centre, rises the Albert Memorial, Albert's statue in sombre profile. Its ornate and imposing form contrasts with the heap of hungry boys in the foreground. No broad grins for the camera this time. Perhaps the children are chilled sitting on the ground on this March day, or just too interested in their lunch to pay much attention to Grant.

By the time Grant took this photo in the 1950s, Wolf Cub Scout membership was at its peak. Younger members had not been part of Baden-Powell's original plan for scouting, but pressure from younger siblings and Scout leaders resulted in the formation of Wolf Cubs, for boys aged 7-11. Wolf Cubs began in 1914 after a long correspondence between Baden-Powell and Sir Percy Everett of the Headquarters committee. They worked out details of age of admittance, uniform, and tests for the first Stars. These were badges that were worn on the side of the cap, and were given upon successful completion of activities.

Today, Wolf Cubs have been renamed Cub Scouts, and the Beavers have taken their place as the youngest members.

Appendix 3.3: Time A questionnaire

Sample time A questionnaire for the ADG or SAG group:

Participant Number: _____

1. Please could you provide some brief information about yourself?

Age: _____

Gender: M F

Your email address: (so we can send you a link to the follow-up questionnaire, this won't be used for any other purpose)

Your occupation: _____

Number of years of education: _____

Your nationality: _____

Is English your first language?

Yes

No

If you answered 'No', how would you describe your level of English?

Fluent

Competent

Intermediate

Beginner - Basic

2. Now, we would like to ask you some questions about your experience of the Henry Grant exhibition that you have just seen on the computer.

For each of the following statements, please indicate how true it is for you, using the following scale:

1 2 3 4 5 6 7

Not at Somewhat Very
all true true true

I enjoyed doing this activity very much _____

This activity was fun to do _____

I thought this was a boring activity _____

This activity did not hold my attention at all _____

I would describe this activity as very interesting _____

I thought this activity was quite enjoyable _____

While I was doing this activity, I was thinking about how much I enjoyed it _____

3. How likely is it that you would want to look at more of the Museum of London's photography collections? Please circle as appropriate:

Definitely Probably Probably Not Definitely Not Don't know

4. Please could you tell us your opinion about each of the Henry Grant photos.

Please tick one box for each item (please respond on your first impressions, no need to think too long about it)

	Loved	Liked A lot	Liked	Okay	Didn't Like	Really didn't like	Hated
							

	Loved	Liked A lot	Liked	Okay	Didn't Like	Really didn't like	Hated
							
							
							
							
							

	Loved	Liked A lot	Liked	Okay	Didn't Like	Really didn't like	Hated
							
							
							

5. Thinking about the Audio Guide that you heard, if you were to describe it to a friend, what would you say?

(For example, what did you hear? How did it describe the photos? Did it make you think about anything in particular? What impact did it have on your experience?)



6. For the audio guide generally, please could you answer the following:

What did you think of the information given in the Audio Guide? (indicate using the scale below):

Really hated it 1 2 3 4 5 6 7 8 9 10 Really loved it

What did you think of the delivery of the Audio Guide? (the voice, the tone):

Really hated it 1 2 3 4 5 6 7 8 9 10 Really loved it

What did you think of the speed of the Audio Guide?

Really hated it 1 2 3 4 5 6 7 8 9 10 Really loved it

How much did you enjoy the Audio Guide?

Really hated it 1 2 3 4 5 6 7 8 9 10 Really loved it

7. What were you thinking about during the Henry Grant exhibition?

(Any thoughts at all - for example, it could be about the photos, or about the experience generally, or about someone with you, or something completely unrelated to what you are doing)

8. During the exhibition, did any memories come to mind? They could be related to something you saw or felt, or something that you thought about – they can be memories from any period - yesterday, last week, your childhood etc.)

YES

NO

Please briefly describe any memories that came to mind during this exhibition:

How vivid was the most vivid memory? (indicate using the scale below):

How vivid was the most vivid memory? (indicate using the scale below):

Not at all vivid

1 2 3 4 5 6 7 8 9 10

Incredibly vivid

9. We'd like you to think about your favourite photo. Which photo did you find the most interesting? Please select one by circling it:

Lido Eels at a Market Stall Wolf Cubs Street Busker
Feeding Pigeons Tower Beach Highbury School
Sailing Model Boats Irwin Clement Steel Band

When you think about this photo now, can you create an image of it in your mind?

YES NO

Please can you indicate how clear your mental image of the photo is, using the scale below:

No image, only know I am thinking about it **1 2 3 4 5 6 7 8 9 10** As clear as if I was actually looking at the photo

Whilst you were looking at this photo, did you feel any particular emotion?

YES NO

If yes, please complete the following section:

a) Please use the scale below to rate the type of emotion:

Negative 1 2 3 4 5 6 7 8 9 10 **Positive**

b) Please can you indicate how strong the emotion was, using the scale below:

Barely noticeable 1 2 3 4 5 6 7 8 9 10 **As strong as I have ever felt**

Please circle the word(s) that best describes the emotion(s) you felt whilst viewing this photo (or name it below):

HAPPY SAD FRUSTRATED BORED
INSPIRED

ENTHUSIASTIC AMUSED ANGRY
INTERESTED

CURIOUS NOSTALGIC EXCITED IRRITATED

CALM UNCOMFORTABLE PUZZLED
OVERWHELMED

Others: (please name any relevant)

10. We'd now like you to think about your LEAST favourite photo. Which photo did you find LEAST interesting? Please select one by circling it:

Lido Eels at a Market Stall Wolf Cubs Street Busker

Feeding Pigeons Tower Beach Highbury School

Sailing Model Boats Irwin Clement Steel Band

When you think about this photo now, can you create an image of it in your mind?

YES NO

Please can you indicate how clear your mental image is of the photo, using the scale below:

No image, only know I am thinking about it **1 2 3 4 5 6 7 8 9 10** As clear as if I was actually looking at the photo

Whilst you were looking at this photo, did you feel any particular emotion?

YES NO

If yes, please complete the following section:

a) Please use the scale below to rate the type of emotion:

Negative 1 2 3 4 5 6 7 8 9 10 **Positive**

b) Please can you indicate how strong the emotion was, using the scale below:

Barely noticeable 1 2 3 4 5 6 7 8 9 10 **As strong as I
have ever felt**

Please circle the word(s) that best describes the emotion(s) you felt whilst viewing this photo (or name it below):

HAPPY SAD FRUSTRATED BORED
INSPIRED

ENTHUSIASTIC AMUSED ANGRY
INTERESTED

CURIOUS NOSTALGIC EXCITED IRRITATED

CALM UNCOMFORTABLE PUZZLED
OVERWHELMED

Others: (please name any relevant)

11. **Thinking about the exhibition generally**, did your strongest emotion(s) relate to the photos, the experience more generally, or a memory that came to mind? (please circle)

PHOTOS GENERAL EXPERIENCE A MEMORY

12. Is there anything you would like to add?

13. Finally, we would like to ask you how frequently you visit museums, and your reasons for going, both currently and in the past.

During which period of your life have you visited museums most often? (please tick

13. Finally, we would like to ask you how frequently you visit museums, and your reasons for going, both currently and in the past.

During which period of your life have you visited museums most often? (please tick one option)

0-9

10-19

20-29

30-39

40-49

- 50-59
- 60-69
- 70+

During that period of your life, how frequent, on average, were your visits? (Please tick one option)

- Once a week or more
- Once a month
- Once every six months
- Once a year
- Once every few years

During that time period, during which you visited most often, what were your reasons for visiting? Please tick all that apply:

- Spend time with family and friends
- Tourist activity in home country
- Tourist activity abroad
- To have a cultural experience
- To learn about a specific subject
- To experience an iconic building or cultural site
- To facilitate a visit for somebody else, who would not be able to visit on their own
- Because the visit had been organised for me by somebody else
- To take children to the museum
- Other (please write here) _____

During the last five years, how often do you visit museums, on average? Please tick one option.

- Once a week or more
- Once a month
- Once every six months
- Once a year
- Once every few years
- Never

During the last five years, how would you describe the typical purpose of these museum visits? Please tick all that apply:

- Spend time with family and friends
- Tourist activity in home country
- Tourist activity abroad

- To have a cultural experience
- To learn about a specific subject
- To experience an iconic building or cultural site
- To facilitate a visit for somebody else, who would not be able to visit on their own
- Because the visit had been organised for me by somebody else
- To take children to the museum
- Other (please write here) _____

How would you describe the museums or galleries that you typically visit? Please tick all that apply:

- Large Museums/Galleries, e.g. National Museums
- Medium Museums/Galleries, e.g. city museums (non-capital cities)
- Small Museums/Galleries, e.g. town/rural museums
- University Museums/Galleries
- Heritage Sites
- Other (please write here) _____

Thank you! In a month's time, we will send you an email with a link to a short follow-up questionnaire, which we ask you to complete within a week of receiving the link, if possible.

Thank you for your time and participation.

Appendix 3.4: Time B questionnaire

Sample time B questionnaire for the ADG or SAG group:

Henry Grant Photo Exhibition: Follow Up Questionnaire

Researcher: Rachel Hutchinson, in collaboration with Dr Alison Eardley, University of Westminster, and the Museum of London

Thank you again for participating in this research study on the Henry Grant Photo Exhibition.

Now that it is approximately one month since you viewed the photos, we'd like to ask you a few questions about them. This should take about 20 minutes to complete.

The questionnaire asks you to recall some details about the photos, and to share your opinions about them, and the audio guide you listened to. Some of the questions will be the same as before, and some will be different. Please do not worry about what you wrote last time, we want your thoughts today. Some of your ratings/thoughts may be the same as before, some may be different. That is completely fine.

There is space for you to leave your email address if you would like an update on results of the study. The project has been approved by the University of Westminster Psychology Department ethics committee.

Questions about the Research

If you wish to contact the researcher, Rachel Hutchinson, after participation, please send an email to r.hutchinson@my.westminster.ac.uk

Please enter your name here (everything you write here today will be subsequently anonymised and your personal data treated confidentially, this is just for us to match your responses to the questionnaire you completed previously)

In this section, we would like you to tell us what you remember about the Henry Grant photos. It does not need to be the order in which you viewed them. Any order is fine.

For each photo that you remember, please tell us the title, or give a few words of your own to identify it. Then we would please like you to tell us any details that come into your mind as you think about it. This could be a person, building or other detail that you remember seeing in the photo, or it could be a particular piece of information, word or phrase that comes to mind as you remember the image.

It might be clear to you, slightly hazy, or just a fragment of information, but that doesn't matter. Please list all the details that you can remember below. We would really appreciate it if you could give as much information as you can.

Don't worry if you can't remember all the photos. Please just fill in as much information as you can for those you do remember. We have provided space for you to give us details about all 9 photos, but you can click through the rest of these pages if you have filled in all you can.

Photo 1: (please give the title or your own heading to identify it)

What do you remember about Photo 1?

When you think about the photo today - how would you rate your opinion of it?

	love it	like it a lot	like it	it's okay	don't like it	really don't like it	hate it
Photo 1	<input type="radio"/>						

Thinking about the photo now, how vivid is the image in your mind? (please move the slider to indicate using the scale below):

1=no image, only know I am thinking about it. 10= as clear as if I were actually looking at the photo.

1 2 3 4 5 6 7 8 9 10

mental image vividness for Photo 1	
------------------------------------	--

Photo 2: (please give the title or your own heading to identify it)

What do you remember about Photo 2?

When you think about the photo today - how would you rate your opinion of it?

	love it	like it a lot	like it	it's okay	don't like it	really don't like it	hate it
Photo 2	<input type="radio"/>						

Thinking about the photo now, how vivid is the image in your mind? (please move the slider to indicate using the scale below):

1=no image, only know I am thinking about it. 10= as clear as if I were actually looking at the photo.

1 2 3 4 5 6 7 8 9 10

mental image vividness for Photo 2



Photo 3: (please give the title or your own heading to identify it)

What do you remember about Photo 3?

When you think about the photo today - how would you rate your opinion of it?

	love it	like it a lot	like it	it's okay	don't like it	really don't like it	hate it
Photo 3	<input type="radio"/>						

Thinking about the photo now, how vivid is the image in your mind? (please move the slider to indicate using the scale below):

1=no image, only know I am thinking about it. 10= as clear as if I were actually looking at the photo.

1 2 3 4 5 6 7 8 9 10

mental image vividness for Photo 3	
------------------------------------	--

Photo 4: (please give the title or your own heading to identify it)

What do you remember about Photo 4?

When you think about the photo today - how would you rate your opinion of it?

	love it	like it a lot	like it	it's okay	don't like it	really don't like it	hate it
Photo 4	<input type="radio"/>						

Thinking about the photo now, how vivid is the image in your mind? (please move the slider to indicate using the scale below):

1=no image, only know I am thinking about it. 10= as clear as if I were actually looking at the photo.

1 2 3 4 5 6 7 8 9 10

mental image vividness for Photo 4	
------------------------------------	--

Photo 5: (please give the title or your own heading to identify it)

What do you remember about Photo 5?

When you think about the photo today - how would you rate your opinion of it?

	love it	like it a lot	like it	it's okay	don't like it	really don't like it	hate it
Photo 5	<input type="radio"/>						

Thinking about the photo now, how vivid is the image in your mind? (please move the slider to indicate using the scale below):

1=no image, only know I am thinking about it. 10= as clear as if I were actually looking at the photo.

1 2 3 4 5 6 7 8 9 10

mental image vividness for Photo 5	
------------------------------------	--

Photo 6: (please give the title or your own heading to identify it)

What do you remember about Photo 6?

When you think about the photo today - how would you rate your opinion of it?

	love it	like it a lot	like it	it's okay	don't like it	really don't like it	hate it
Photo 6	<input type="radio"/>						

Thinking about the photo now, how vivid is the image in your mind? (please move the slider to indicate using the scale below):

1=no image, only know I am thinking about it. 10= as clear as if I were actually looking at the photo.

1 2 3 4 5 6 7 8 9 10

mental image vividness for Photo 6	
------------------------------------	--

Photo 7: (please give the title or your own heading to identify it)

What do you remember about Photo 7?

When you think about the photo today - how would you rate your opinion of it?

	love it	like it a lot	like it	it's okay	don't like it	really don't like it	hate it
Photo 7	<input type="radio"/>						

Thinking about the photo now, how vivid is the image in your mind? (please move the slider to indicate using the scale below):

1=no image, only know I am thinking about it. 10= as clear as if I were actually looking at the photo.

mental image vividness for Photo 7



Photo 8: (please give the title or your own heading to identify it)

What do you remember about Photo 8?

When you think about the photo today - how would you rate your opinion of it?

	love it	like it a lot	like it	it's okay	don't like it	really don't like it	hate it
Photo 8	<input type="radio"/>						

Thinking about the photo now, how vivid is the image in your mind? (please move the slider to indicate using the scale below):

1=no image, only know I am thinking about it. 10= as clear as if I were actually looking at the photo.

1 2 3 4 5 6 7 8 9 10

mental image vividness for Photo 8	
------------------------------------	--

Photo 9: (please give the title or your own heading to identify it)

What do you remember about Photo 9?

When you think about the photo today - how would you rate your opinion of it?

	love it	like it a lot	like it	it's okay	don't like it	really don't like it	hate it
Photo 9	<input type="radio"/>						

Thinking about the photo now, how vivid is the image in your mind? (please move the slider to indicate using the scale below):

1=no image, only know I am thinking about it. 10= as clear as if I were actually looking at the photo.

1 2 3 4 5 6 7 8 9 10

mental image vividness for Photo 9	
------------------------------------	--

Of all the photos you have described above, which one is your **favourite today**? (Don't worry if you can't remember the title, just give us a few words to identify it)

Today, if you were to describe your favourite photo from the Henry Grant exhibition to a friend, what would you say?

And of all the photos you have described above, which one is your **LEAST favourite today**?

And today, if you were to describe your **LEAST favourite photo** from the Henry Grant exhibition to a friend, what would you say?

When you viewed the Henry Grant Exhibition on the computer with us, we asked you if any memories came to mind. They could be related to something you saw or felt, or something that you thought about – they can be memories from any period - yesterday, last week, your childhood etc. They could be clear or just fragments. If memories did come to mind, could you please describe them to us again in the space below:

How vivid is the most vivid memory? (please move the slider to indicate using the scale below):

1=not at all vivid, 10=incredibly vivid

1 2 3 4 5 6 7 8 9 10

memory vividness	
------------------	--

For the Audio Guides overall, please could you answer the following? Please move the slider to indicate how you feel about each statement.

1= really hated it, 10= really loved it

1 2 3 4 5 6 7 8 9 10

What did you think of the information given in the Audio Guide?	
What did you think of the delivery of the audio guide? (the voice, the tone)	
What did you think of the speed of the Audio Guide?	
How much did you enjoy the audio guide?	

what did you think about the duration of the Audio Guides that you heard?

1= much too short, 4=just right, 7=much too long

1 2 3 4 5 6 7

Audio Guide duration	
----------------------	--

When you visit museums or galleries, how often do you choose to use an audio guide?

- always
- very often
- sometimes

- rarely
- never

Since you first looked at the Henry Grant photos with us, have you thought about the experience or talked to anyone about it? Or did you try to find out any further information about the photos?

- yes
- no

If yes, please select all that apply:

- I thought about the photos
- I thought about the audio guide
- I talked about the photos with someone else
- I talked about the audio guides with someone else
- I talked to someone else about the overall experience (including the questionnaires or the experience of being in a research study)
- I looked on the Internet to find out more about the photos
- I looked on the Internet to find out more about Henry Grant
- I looked on the Internet to find out more about the Museum of London
- I subsequently visited the Museum of London
- other _____

If yes, please tell us what you talked about/thought/researched in relation to the Henry Grant exhibition:

Is there anything you would like to add?

And finally, we would really appreciate it if you could draw your mental image of your FAVOURITE photo, as best you can. If you don't want to do this, then that's fine - your response will be very valuable to us anyway - so please continue to finish the survey and submit your response.

If you are happy to do this, then this will provide us with very useful information for this research study. Don't worry about your drawing ability! A rough sketch is fine. You can send your sketch to r.hutchinson@my.westminster.ac.uk.

If you would be willing to be contacted to follow-up any points you have included in the questionnaire, or if you would like to receive a summary of the research findings when the study is complete, please provide an email address here:

Thank you very much for your participation in this research experiment.

This study is exploring different ways of presenting information to museum visitors. In particular, we are keen to understand whether presenting audio information alongside artworks enhances visitors' experiences.

In this study, we are comparing the presentation of photographs simply as they are, with minimal accompanying text, with the presentation of photographs with an audio guide. We are also testing two different kinds of audio guides. One is a standard guide, providing some factual and contextual information about the photo. The other is an audio descriptive guide, which also provides some facts and contextual information, but also describes the visual elements that can be seen in the photo. The audio descriptive guide draws upon techniques used for interpreting artworks for blind and partially sighted museum visitors.

We are keen to understand which kind of presentation is most enjoyed by museum visitors, and whether this affects how people might connect to the artwork and what they might remember.

If you would like any further information about the different kinds of presentations used here, please contact the researcher Rachel Hutchinson on r.hutchinson@my.westminster.ac.uk. You can also contact this address to receive a summary of the research findings when the study is complete.

If you know other people who are taking part in this study, please do not mention the information given here as it may influence their responses.

Once again, thank you for your time and your participation!

Appendix 3.5: Instructions and examples for second coder

Photo recall coding

Participants viewed 9 photos at time A and were asked to describe what they could recall about them a month later (time B). Time B data were collected via an online questionnaire.

Each memory of a photo is therefore an individual text which is broken down into discrete segments. Segments are not defined by grammatical rules or other restrictions. A segment could therefore be a single word: 'bike', or phrase: 'there was a bike.' It may also be a complete sentence, in the case of a thought (see category 'participants' thoughts' below). A thought is the only instance where the multiple elements within a phrase or sentence are not coded separately: eg: 'they were just people outside their homes making music' would receive one count (for a thought).

Discrete segments, once allocated to a code, are not coded again in any other category (i.e. no double coding). However, where elements are repeated, they are coded again each time. Eg if the participant mentioned a beach twice, this receives two counts. However, grammatical referents (they, he etc) are not coded as further occurrences. Justification - 'the man' is closer to an image or representation of the photo content than 'he'

'boy scouts' – content element (boy) and semantic (scouts).

It counts as 'content element' if it is referenced in the image/description – 'eg Woolworths' (has the sign visible above the door.) it counts as semantic if it is not visible from the image (eg Camden)

The categories are as follows:

1. **Photo content elements:** these are details of content within the photos – details which could have been retained either through visual observation or through listening to an audio guide. Examples: 'there were trees', 'beach', 'bridge', a steel drum band', 'there was a man.' However, these are NOT facts or conceptual information (see 'Semantic recall' category for that).
2. **Photo structure/spatial elements:** details that indicate the spatial relationship between photo content elements, or details that refer to composition/framing of the photo. For example: 'in the foreground', 'in the background', 'on their right', 'behind them', 'gathered around him', 'the scene was happening in front of'.
3. **Event/Activity/Movement:** details of events or activities in the photos (in the sense of a 'happening') eg 'posing for the picture', 'reading', 'sunbathing', 'performing music', 'they were playing'. Also, movement: 'they were running', 'children wading', 'bending down', passing by', 'walking by'.

4. **Photo emotion and atmosphere:** perceived emotions of photo subjects (NOT participants' emotions) for example: 'they looked happy', 'their excited expressions', 'acting spontaneously', 'he looked quite uncomfortable'. Atmosphere of the photo includes weather conditions: 'it looked like a warm summer's day', 'misty scene'.
5. **Non visual imagery – auditory** 'singing', 'cheering him on', 'you could almost hear the music'. Also tactile or taste imagery.
6. **Participants' reactions:** this category includes participants' emotional reactions, either positive, such as enthusiasm: 'I liked it, I loved it' or negative such as 'I remember really not liking this photo.' This category includes cognitive reactions, which are more thought based, such as 'it was interesting or intriguing' or an aesthetic judgement 'it was beautiful'.
7. **Participants' thoughts:** thoughts here in the sense of an intellectual evaluation – or a reflection. Examples: 'Unfortunately most of the pictures were singularly unmemorable because they were not very good', 'this picture represents a way of life no longer possible', 'They have Paris plage every year and I always think it is a shame London doesn't have an equivalent although I think they might have had in recent years', 'the photos were memorable because of sense of pleasure and incongruity.' Thoughts are not double coded – once the entire phrase/sentence is classified as a thought, it is not coded further (eg in the last example, pleasure would NOT receive a count for 'participant reactions'.
8. **Semantic recall** – This can include mentions of the photographer, facts or any socio-historical information given (this can be vague, even, for example, the decade in which the photo was taken. Examples: 'long standing eel and pie shop', '1950s', 'some Victorian / Georgian buildings' (semantic count for Victorian/Georgian', content element count for 'buildings'). No second coding within 'semantic' fragments, eg 'The beach was closed during the war but was reopened, finally it was shut for good when concerns were raised about the quality of the Thames river water' - 'beach' here not coded for content element as it forms part of a broader recall of information rather than an image of content.
9. **AB memories** – please code any memories that are evoked as the participant recalls the photos, and code as either general or specific: eg 'Visiting Trafalgar Square with my own family when I was younger' (general), 'I do remember years ago going there specially when it had been drained for maintenance. A complete fleet of boats was resting in the mud.' (specific)

Examples:

1. Beach (CONTENT ELEMENT) at the fore, (STRUCTURAL/SPATIAL) thronging with (EMOTION/ATMOSPHERE) people (CONTENT ELEMENT), filling the lower left hand corner of the photo (STRUCTURAL/SPATIAL)

Tower Bridge (CONTENT ELEMENT) cutting horizontally across the photo (STRUCTURAL/SPATIAL) about two thirds up it (STRUCTURAL/SPATIAL)

We had the perspective of (STRUCTURAL/SPATIAL) a young girl (CONTENT ELEMENT) looking (EVENT) in the direction of (STRUCTURAL/SPATIAL) the mid-point (STRUCTURAL/SPATIAL) of the bridge (CONTENT ELEMENT)

Some children (CONTENT ELEMENT) paddling (EVENT) in the river (CONTENT ELEMENT)

A nearby (STRUCTURAL/SPATIAL) gent (CONTENT ELEMENT) sat (sat) down (STRUCTURAL/SPATIAL) on the beach (CONTENT ELEMENT) with his suit (CONTENT ELEMENT) on on what seemed to be a very hot day (EMOTION/ATMOSPHERE)

The beach was created before the 2nd World War, (SEMANTIC) and was closed during the war (SEMANTIC). It re-opened again (SEMANTIC), but was permanently closed in the 70s (SEMANTIC) after water quality problems were confirmed (SEMANTIC)

2. Tower Bridge (CONTENT ELEMENT) Beach (CONTENT ELEMENT)

People (CONTENT ELEMENT) enjoying themselves (EMOTION/ATMOSPHERE) by the river (CONTENT ELEMENT). Tranquillity in the middle of the city. (THOUGHT)

3. Eel pie stall (CONTENT ELEMENT)

Discovering (PARTICIPANT REACTION) there was such a thing as eel pies (SEMANTIC) and the bustle (MOVEMENT) of the street market (CONTENT ELEMENT)

4. Boys (CONTENT ELEMENT) sitting in (STRUCTURAL/SPATIAL) a field (CONTENT ELEMENT) having lunch (EVENT)

I can visualise the image of boys (CONTENT ELEMENT), I think boy scouts (SEMANTIC), having a packed lunch (EVENT) in a field/park (CONTENT ELEMENT). There was one girl (CONTENT ELEMENT) to the left of the photo (STRUCTURAL/SPATIAL). There was a monument (CONTENT ELEMENT) in the background (STRUCTURAL/SPATIAL). I remember not really liking the photo (PARTICIPANT REACTION) but it has come back to me quite vividly (THOUGHT).

Appendix 4: Chapter 5

Appendix 4.1: Additional Henry Grant photo and AD text:



Henry Grant took this photo in 1978. It's called 'Buying a wig, Camden Market.'

We stand with Grant at an L-shaped market stall, mingling with the shoppers. The stall is in the foreground - it's a bric-a-brac stall, laden with a collection of unwanted household items, such as cushions and a lampshade.

The clear focal point of the photo is a woman in her forties, slightly to the right of centre. She examines a collection of wigs. She has a long fringe that reaches her eyes – it's flattened down by a headscarf tied tightly under her chin. She wears a thick, bulky coat, down to her knees where the frame finishes. By her left elbow is the handle of her shopping trolley, with her umbrella dangling from it. The strap of a black bag strains across her chest and pulls at the thick material of her coat under her right arm and at her left shoulder. The bag looks full and heavy and is pushed uncomfortably behind her back to allow her hands to explore items on the stall. With her eyes down, her attention is entirely focused on the light-coloured wig that she holds in her right hand. In her left she holds two - a wig of silky dark hair and a second lighter one. Her right arm, with the lighter wig, is extended and she holds it higher than her left, as if giving this one at least momentary preference. Despite the thick coat, she wears no gloves. Perhaps she has removed them to better feel and assess the thick, wiry texture of the locks of hair which fill her hands.

The stall where we stand is on a street corner with the road immediately beyond it. To the right of the woman, about one quarter of the photo, the scene opens out with a view

down an adjacent street, with terraced houses and parked cars. This is the only section of the photo where the sky is visible, and it is a bright day.

To the left of the woman, a building on the street corner fills the frame for the remaining three quarters of the photograph. The building itself is mostly obscured. A billboard advertising Bingo covers much of it, promising 'Free Membership' and 'Eyes down' at 2.55. Below the billboard, a refuse lorry is at the street corner on the far side of the road from the stall. The smell of its contents will reach the shoppers due to its open side.

It is clearly the woman in the centre of the photo who has caught Grant's attention, but she is not alone at the stall. Two women, to the left of her, are also examining its contents. One stands at the far left hand side of the shot and is only partially captured. Similarly, another visitor to the stall just edges into the frame on the extreme right.

Tourism, gentrification and youth culture have all converged to change the face of Camden's market scene. Today, a walk between Camden Tube and Camden Lock takes the visitor through an eclectic series of markets offering international street food and original fashion and design. This photo may have been taken at the more traditional market at nearby Inverness Street, near Camden Tube. Grant did much of his street photography in between assignments, taking pictures constantly, searching the city for stories and images that few others would consider worthwhile. He photographed everyday market scenes across London, often holding the camera at waist height to pass unnoticed. He may have been drawn to this scene due to the unusual element of the wigs. The image allows us an unobtrusive view into everyday market life in the 1970s.

Appendix 4.2: Time A questionnaire

Sample Time A Questionnaire hosted on Qualtrics for sighted participants and BPS screen-reader users (with branching to different versions). The questionnaire was also provided in a screen-reader friendly and large-print MS Word version for BPS participants.

Please type your participant number below (please check with the researcher if you are not what it is.)

Firstly, please could you provide some background information about yourself?

What is your age? Please type in numbers in the box below

What is your gender? Please type in the box below

What is your occupation? Please type in the box below

Is English your first language? Please select one of the following two options

- Yes
- No

How would you describe your level of English? Please select one of the following options

- Bilingual
- Fluent
- Competent
- Intermediate
- Beginner- Basic

To what extent did you enjoy the Henry Grant exhibition? Please select one of the options below

- loved it
- liked it a lot
- liked it
- it was ok
- didn't like it
- really didn't like it
- hated it

How likely is it that you would want to experience more of the Museum of London's photography collections? Please select one of the 5 options below

- definitely
- probably
- maybe/don't know
- probably not
- definitely not

Please could you tell us your opinion about each of the Henry Grant photos. The titles may not be in the order that was presented to you.

please respond on your first impressions, no need to think too long about it.

Please select one of the following options for the photo 'Eels at Chapel Street Market'

- Loved
- Liked a lot
- Liked
- okay
- Didn't like
- Really didn't like
- hated
- don't remember

Please select one of the following options for the photo 'Feeding Pigeons'

- Loved
- Liked a lot
- Liked
- okay
- Didn't like
- Really didn't like
- hated
- don't remember

Please select one of the following options for the photo 'Highbury Infant School'

- Loved
- Liked a lot
- Liked
- okay
- Didn't like
- Really didn't like
- hated
- don't remember

Please select one of the following options for the photo 'Buying a Wig'

- Loved
- Liked a lot
- Liked
- okay
- Didn't like
- Really didn't like
- hated
- don't remember

Please select one of the following options for the photo 'Parliament Hill Lido'

- Loved
- Liked a lot
- Liked
- okay
- Didn't like
- Really didn't like
- hated
- don't remember

Please select one of the following options for the photo 'Tower Beach'

- Loved
- Liked a lot
- Liked
- okay
- Didn't like
- Really didn't like
- hated
- don't remember

Please select one of the following options for the photo 'Street Busker'

- Loved
- Liked a lot
- Liked
- okay
- Didn't like
- Really didn't like
- hated
- don't remember

Please select one of the following options for the photo 'Sailing Model Boats'

- Loved
- Liked a lot
- Liked
- okay
- Didn't like
- Really didn't like
- hated
- don't remember

What were you thinking about during the Henry Grant exhibition?

(Any thoughts at all - for example, it could be about the photos, or about the experience generally, or about someone with you, or something completely unrelated to what you are doing)

During the exhibition, did any memories come to mind?

They could be related to something you saw or felt, or something that you thought about – they can be memories from any period - yesterday, last week, your childhood etc.)

- Yes
- No

Please briefly describe any memories that came to mind during this exhibition, and which photo or photos they related to:

How vivid was the most vivid memory? Please type a number where 1 equals not at all vivid and 10 equals incredibly vivid

Which photo did you find the MOST interesting?

- Lido
- Eels at Chapel Street Market
- Street Busker
- Feeding Pigeons
- Tower Beach
- Highbury Infants School
- Sailing Model Boats
- Buying a Wig

whilst you were listening to the description of this photo, did you feel any particular emotion?

- Yes
- No

please rate the emotion by typing a number from 1-10 in the box below, where 1 equals negative and 10 equals positive

please can you tell us how strong the emotion was, by typing a number from 1-10 where 1 equals barely noticeable and 10 equals as strong as I have ever felt

please select the word or words that best describe the emotion or emotions you felt whilst this photo was being described. Please could you select from the following list or name any other emotions that you felt?

- happy
- sad
- frustrated
- bored
- inspired
- enthusiastic
- amused
- angry
- interested
- curious
- nostalgic
- excited
- irritated
- calm
- uncomfortable
- puzzled
- overwhelmed
- other _____

When you think about this photo now, can you create an image of it in your mind?

- Yes
- No

Please can you tell us how clear your mental image of the photo is by typing a number, where 1 equals no image, only know I am thinking about it, and 10 equals extremely clear

Which photo did you find the LEAST interesting?

- Lido
- Eels at Chapel Street Market
- Street Busker
- Feeding Pigeons
- Tower Beach
- Highbury Infants School
- Sailing Model Boats
- Buying a Wig

whilst you were listening to the description of this photo, did you feel any particular emotion?

- Yes
- No

please type a number from 1-10 where 1 equals negative and 10 equals positive

please can you tell us how strong the emotion was, by typing a number from 1-10 where 1 equals barely noticeable and 10 equals as strong as I have ever felt

please select the word or words that best describe the emotion or emotions you felt whilst this photo was being described. Please could you select from the following list or name any other emotions that you felt?

- happy
- sad
- frustrated
- bored
- inspired
- enthusiastic
- amused
- angry
- interested
- curious
- nostalgic
- excited
- irritated
- calm
- uncomfortable
- puzzled
- overwhelmed
- other _____

When you think about this photo now, can you create an image of it in your mind?

- Yes
- No

Please can you tell us how clear your mental image of the photo is by typing a number, where 1 equals no image, I only know I am thinking about it, and 10 equals extremely clear

We are interested in your views on the Audio Guide you heard today.

Firstly, a few short questions about your experience of the audio guide overall.

For each statement, please type a number from 1-10, where 1 equals really hated it, and 10 equals really loved it

What did you think of the information given in the Audio Guide?

What did you think of the delivery of the Audio Guide? (the voice, the tone):

What did you think of the speed of the speech of the Audio Guide?

How much did you enjoy the Audio Guide?

Some of the audio files you heard had extra sound effects, and some didn't. Did you notice this?

yes

no

Did this have an impact on your experience?

yes

no

Please select an option below to tell us how positive or negative this impact was:

extremely positive

positive

no impact

negative

extremely negative

Please could you tell us about how this impacted on your experience? Please type your answer in the box below:

Which audio did you prefer?

- the plain audio
- the audio with sounds
- it made no difference to me

can you please tell us why you preferred this type of audio?

Still thinking about the audio that you liked best, please could you tell us how true the following statements are for you.

Please type your answer in the box next to each statement, using a scale from 1 to 7, where 1 = not at all true, 4 = somewhat true and 7 = very true:

The audio was clear and easy to follow

The audio helped me to create an image in my mind of the photo

The audio brought the photo to life

The audio helped me to understand what was where in the photo/ gave me an impression of the layout of the photo

The audio gave me facts and context about the photos

The audio gave me what I need to discuss the exhibition with other visitors, if I want to do so _____

The audio made me wonder or feel curious about the photos

The audio made me want to discuss what the photos were about

I enjoyed listening to the audio

The audio held my attention throughout

Thinking about the audio generally, please could you tell us how true the following statements are for you.

Please type your answer in the box next to each statement, using a scale from 1 to 7, where 1 = not at all true, 4 = somewhat true and 7 = very true:

- The audio was clear and easy to follow

- The audio helped me to create an image in my mind of the photo

- The audio brought the photo to life

- The audio helped me to understand what was where in the photo/ gave me an impression of the layout of the photo

- The audio gave me facts and context about the photos

- The audio gave me what I need to discuss the exhibition with other visitors, if I want to do so _____
- The audio made me wonder or feel curious about the photos

- The audio made me want to discuss what the photos were about

- I enjoyed listening to the audio

- The audio held my attention throughout

It would be very helpful for us to know your level of vision. Please could you select one of the following options:

- I have a visual impairment that is NOT correctable with lenses or glasses
- I do not have a visual impairment

Please select the statement which best applies to you:

- I have no useable vision
- I have some useable vision
- I have considerable useable vision

which of these best describes your sight with glasses or contact lenses if you normally use them?

- I have no light perception or no useable vision
- I can tell by the light where the windows are
- I can see the shapes of furniture in the room
- I can recognise a friend by sight alone if I'm close to their face
- I can recognise a friend by sight alone if I'm at arms' length away
- I can recognise a friend by sight alone if I'm on the other side of the room
- I can recognise a friend by sight alone if I'm on the other side of the street

have you ever had full vision?

- yes
- No

Did your vision get worse over time? Please type your answer in the box below

up to what age did you have full vision? Please type in the box below:

We are interested to hear about your previous experiences with Audio Description. Have you used it in museums or galleries before, or elsewhere? If so, please use the box below to type your answer:

When you visit museums and galleries, how often do you choose to use an Audio Guide?

- always
- very often
- sometimes
- rarely
- Never

Audio Description (AD) describes visual information in words to make it accessible for blind and partially sighted people. Have you heard of AD before?

- yes
- no
- not sure

Thinking about the exhibition generally, did your strongest emotion(s) relate to the photos or photo descriptions, the experience more generally, or a memory that came to mind?

- photos or photo descriptions
- the experience
- a memory

Finally, we would like to ask you about your museum visiting habits.

During which period of your life have you visited museums most often?

- 0-9
- 10-19
- 20-29
- 30-39
- 40-49
- 50-59
- 60-69
- 70+

During the last five years, how often do you visit museums, on average?

- Once a week or more
- Once a month
- Once every six months
- Once a year or less
- Never

How would you describe the museums or galleries that you typically visit? Please select all that apply:

- Large Museums/Galleries, e.g. National Museums
- Medium Museums/Galleries, e.g. city museums (non-capital cities)
- Small Museums/Galleries, e.g. town/rural museums
- University Museums/Galleries
- Heritage Sites
- other _____

How much do you enjoy visiting museums and galleries?

- love it
- like it a lot
- it's ok
- don't like it much
- really don't like it

And finally, is there anything you would like to add? Please type it in the box below if so

if you would be happy to be contacted about future research, please enter your email address here:

Thank you! In a month's time, we will send you an email with a link to a short follow-up questionnaire, which we ask you to complete within a week of receiving the link, if possible. Thank you for your time and participation. PLEASE NOW CLICK ON TO THE NEXT PAGE TO SUBMIT YOUR RESPONSE. Thank you!

Appendix 4.3: Time B questionnaire

Sample Time B Questionnaire hosted on Qualtrics for sighted participants and BPS screen-reader users (with branching to different versions). As before, the questionnaire was also provided in a screen-reader friendly and large-print MS Word version for BPS participants.

Museum Audio Description: Follow Up Questionnaire

Thank you again for participating in this research study. Now that it is approximately one month since you listened to the Henry Grant Audio Guide, we'd like to ask you a few questions about the exhibition that we presented to you. This should take about 20 minutes to complete.

The questionnaire asks you to recall some details about the photos, and to share your opinions about them, and the audio guide you listened to. Some of the questions will be the same as before, and some will be different. Please do not worry about how you responded last time, we want your thoughts today. Some of your ratings/thoughts may be the same as before, some may be different. That is completely fine. Please do not worry if you can't remember the photos in detail. Even fragments of information, no matter how hazy they may seem to you, will be very valuable for the study.

Please enter your name here (everything you write here today will be subsequently anonymised and your personal data treated confidentially, this is just for us to match your responses to the questionnaire you completed previously)

Firstly, we are interested to know how much you enjoyed the experience. To what extent did you enjoy the Henry Grant exhibition? Please select from one of the following options below:

- loved it
- liked it a lot
- liked it
- it was ok
- didn't like it
- really didn't like it
- hated it

and how likely is it that you would want to experience more of the Museum of London's photography collections?

- definitely
- probably
- maybe or don't know
- probably not
- definitely not

In this section, we would like you to tell us what you remember about the Henry Grant photos. It does not need to be the order in which you viewed them. Any order is fine.

For each photo that you remember, please tell us the title, or give a few words of your own to identify it. Then we would please like you to tell us any details that come into your mind as you think about it. This could be a person, building or other detail that you remember from the photo, or it could be a particular piece of information, word or phrase that comes to mind as you remember the photo.

It might be clear to you, slightly hazy, or just a fragment of information, but that doesn't matter. Please list all the details that you can remember below. We would really appreciate it if you could give as much information as you can.

Don't worry if you can't remember all the photos. Please just fill in as much information as you can for those you do remember. We have provided space for you to give us details about all 8 photos, but you can skip through the rest of these pages if you have filled in all you can.

Photo 1: (please give the title or your own heading to identify it)

What do you remember about Photo 1?

When you think about the photo today - how would you rate your opinion of it?

- loved it
- liked it a lot
- liked it
- it was ok
- didn't like it
- really didn't like it
- hated it
- don't remember

Thinking about the photo now, how vivid is the image in your mind? please enter a number below from 1 to 10, where 1 equals 'no image, I only know I am thinking about it' and 10 equals 'extremely clear'

Photo 2: (please give the title or your own heading to identify it)

What do you remember about Photo 2?

When you think about the photo today - how would you rate your opinion of it?

- loved it
- liked it a lot
- liked it
- it was ok
- didn't like it
- really didn't like it
- hated it
- don't remember

Thinking about the photo now, how vivid is the image in your mind? please enter a number below from 1 to 10, where 1 equals 'no image, I only know I am thinking about it' and 10 equals 'extremely clear'

Photo 3: (please give the title or your own heading to identify it)

What do you remember about Photo 3?

When you think about the photo today - how would you rate your opinion of it?

- loved it
- liked it a lot
- liked it
- it was ok
- didn't like it
- really didn't like it
- hated it
- don't remember

Thinking about the photo now, how vivid is the image in your mind? please enter a number below from 1 to 10, where 1 equals 'no image, I only know I am thinking about it' and 10 equals 'extremely clear'

Photo 4: (please give the title or your own heading to identify it)

What do you remember about Photo 4?

When you think about the photo today - how would you rate your opinion of it?

- loved it
- liked it a lot
- liked it
- it was ok
- didn't like it
- really didn't like it
- hated it
- don't remember

Thinking about the photo now, how vivid is the image in your mind? please enter a number below from 1 to 10, where 1 equals 'no image, I only know I am thinking about it' and 10 equals 'extremely clear'

Photo 5: (please give the title or your own heading to identify it)

What do you remember about Photo 5?

When you think about the photo today - how would you rate your opinion of it?

- loved it
- liked it a lot
- liked it
- it was ok
- didn't like it
- really didn't like it
- hated it
- don't remember

Thinking about the photo now, how vivid is the image in your mind? please enter a number below from 1 to 10, where 1 equals 'no image, I only know I am thinking about it' and 10 equals 'extremely clear'

Photo 6: (please give the title or your own heading to identify it)

What do you remember about Photo 6?

When you think about the photo today - how would you rate your opinion of it?

- loved it
- liked it a lot
- liked it
- it was ok
- didn't like it
- really didn't like it
- hated it
- don't remember

Thinking about the photo now, how vivid is the image in your mind? please enter a number below from 1 to 10, where 1 equals 'no image, I only know I am thinking about it' and 10 equals 'extremely clear'

Photo 7: (please give the title or your own heading to identify it)

What do you remember about Photo 7?

When you think about the photo today - how would you rate your opinion of it?

- loved it
- liked it a lot
- liked it
- it was ok
- didn't like it
- really didn't like it
- hated it
- don't remember

Thinking about the photo now, how vivid is the image in your mind? please enter a number below from 1 to 10, where 1 equals 'no image, I only know I am thinking about it' and 10 equals 'extremely clear'

Photo 8: (please give the title or your own heading to identify it)

What do you remember about Photo 8?

When you think about the photo today - how would you rate your opinion of it?

- loved it
- liked it a lot
- liked it
- it was ok
- didn't like it
- really didn't like it
- hated it
- don't remember

Thinking about the photo now, how vivid is the image in your mind? please enter a number below from 1 to 10, where 1 equals 'no image, I only know I am thinking about it' and 10 equals 'extremely clear'

When we first presented the exhibition to you, we asked you if any memories came to mind. They could be related to something you saw or felt, or something that you thought about – they can be memories from any period - yesterday, last week, your childhood etc. They could be clear or just fragments. If memories did come to mind, could you please describe them to us again in the space below:

How vivid is the most vivid memory? please give us a number from 1 to 10, where 1 equals not at all vivid, and 10 equals incredibly vivid.

The photos were presented with different types of audio. One was plain audio- just with words, the other had words with additional sound effects. When you think TODAY about the audio that you listened to, which type did you prefer?

- the plain audio - just words
- the audio with words AND sound effects
- it makes no difference to me

thinking today about the plain audio - the one with words only - please could you tell us how true the following statements are for you. Please type your answer in the space next

to each statement, using a scale from 1 to 7, where 1 = not at all true, 4 = somewhat true and 7 = very true:

The audio was clear and easy to follow

The audio helped me to create an image in my mind of the photo

The audio brought the photo to life

The audio helped me to understand what was where in the photo/ gave me an impression of the layout of the photo

The audio gave me facts and context about the photos

The audio gave me what I need to discuss the exhibition with other visitors, if I want to do so _____

The audio made me wonder or feel curious about the photos

The audio made me want to discuss what the photos were about

I enjoyed listening to the audio

The audio held my attention throughout

thinking today about the audio with sound effects - the one with words AND additional sound effects- please could you tell us how true the following statements are for you. Please type your answer in the space next to each statement, using a scale from 1 to 7, where 1 = not at all true, 4 = somewhat true and 7 = very true:

The audio was clear and easy to follow

The audio helped me to create an image in my mind of the photo

The audio brought the photo to life

The audio helped me to understand what was where in the photo/ gave me an impression of the layout of the photo

The audio gave me facts and context about the photos

The audio gave me what I need to discuss the exhibition with other visitors, if I want to do so _____

The audio made me wonder or feel curious about the photos

The audio made me want to discuss what the photos were about

I enjoyed listening to the audio

The audio held my attention throughout

thinking today about the audio in general, please could you tell us how true the following statements are for you. Please type your answer in the space next to each statement, using a scale from 1 to 7, where 1 = not at all true, 4 = somewhat true and 7 = very true:

The audio was clear and easy to follow

The audio helped me to create an image in my mind of the photo

The audio brought the photo to life

The audio helped me to understand what was where in the photo/ gave me an impression of the layout of the photo

The audio gave me facts and context about the photos

The audio gave me what I need to discuss the exhibition with other visitors, if I want to do so _____

The audio made me wonder or feel curious about the photos

The audio made me want to discuss what the photos were about

I enjoyed listening to the audio

The audio held my attention throughout

Since we presented the Henry Grant photos to you, have you thought about the experience or talked to anyone about it? Or did you try to find out any further information about the photos?

yes

no

If yes, please select all that apply:

- I thought about the photos
- I thought about the audio guide
- I talked about the photos with someone else
- I talked about the audio guides with someone else
- I talked to someone else about the overall experience (including the questionnaires or the experience of being in a research study)
- I used the Internet to find out more about the photos
- I used the Internet to find out more about Henry Grant
- I used the Internet to find out more about the Museum of London
- I subsequently visited the Museum of London
- other _____

If yes, please tell us what you talked about/thought/researched in relation to the Henry Grant exhibition:

Is there anything you would like to add?

If you would be willing to be contacted to follow-up any points you have included in the questionnaire, or if you would like to receive a summary of the research findings when the study is complete, please provide an email address here:

Thank you for participating in this study. This section provides some further information and explanation about the study. Once you reach the end of the information below, please ensure that you click on the final next arrow at the bottom of this page, in order to record your response.

This study is exploring different ways of presenting information to museum visitors. In particular, we are keen to understand how audio description can be enhanced with sound and how this might impact on the experience for the visitor.

This study presented photos using Audio Description, which is used to present artworks to blind and partially sighted museum visitors. We presented each participant with 8 descriptions, half of which were plain and half of which had additional sounds.

We are keen to understand which kind of presentation is most enjoyed by museum visitors, and whether this affects how people might connect to the artwork and what they might remember.

If you would like any further information about the different kinds of presentations used here, please contact the researcher Rachel Hutchinson on r.hutchinson@my.westminster.ac.uk. You can also contact this address to receive a summary of the research findings when the study is complete.

If you know other people who are taking part in this study, please do not mention the information given here as it may influence their responses.

Once again, thank you for your time and your participation! PLEASE NOW CLICK ON THE FINAL NEXT ARROW TO SUBMIT YOUR RESPONSE. THANK YOU.

Glossary of Abbreviations

AD: Audio Description

ADG: Audio Descriptive Guide

ANOVA: Analysis of variance

AVT: Audio-Visual Translation

BPS: Blind or partially sighted person

DV: Dependant Variable

EDG: Enriched Descriptive Guide

IV: Independent Variable

SAG: Standard Audio Guide

WYSIWYS: 'what you see is what you say' (Synder, 2014)

References

- Audio Description Coalition. (2009). *Standards for audio description and code of professional conduct for describers, third edition*. Retrieved from <http://audiodescriptionsolutions.com/the-standards/download-the-standards/>
- Adlab Pro. (2019). Retrieved from <https://adlabpro.wordpress.com/>
- Alea, N., & Bluck, S., (2003) Why are you telling me that? A conceptual model of the social function of autobiographical memory, *Memory*, *11*(2), 165-178. DOI: [10.1080/741938207](https://doi.org/10.1080/741938207)
- Alea, N., Bluck, S., & Semegon, A. B. (2004). Young and older adults' expression of emotional experience: Do autobiographical narratives tell a different story? *Journal of Adult Development*, *11*(4), 235–250. <https://doi.org/10.1023/B:JADE.0000044527.52470.5d>
- Anderson, D. (2003). Visitors' Long-term Memories of World Expositions. *Curator: The Museum Journal*, *46*(4), 401–420. <https://doi.org/10.1111/j.2151-6952.2003.tb00106.x>
- Anderson, D., & Shimizu, H. (2007). Recollections of Expo 70: Visitors' Experiences and the Retention of Vivid Long-Term Memories. *Curator: The Museum Journal*, *50*(4), 435–454. <https://doi.org/10.1111/j.2151-6952.2007.tb00284.x>
- Anderson, D., Storksdieck, M., & Spock, M. (2007). Understanding the Long-term Impacts of Museum Experiences. In J. Falk, L. Dierking, & S. Foutz (Eds.), *In Principle, In Practice: Museums as Learning Institutions* (pp. 198–215). Lanham, MD: AltaMira Press.
- Aoki, P. M., Grinter, R. E., Hurst, A., Szymanski, M. H., Thornton, J. D., & Woodruff, A. (2002). Sotto voce: exploring the interplay of conversation and mobile audio spaces. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 431-438). <https://doi.org/10.1145/503453.503454>

- Ardito, C., Costabile, M. F., De Angeli, A., & Lanzilotti, R. (2012). Enriching archaeological parks with contextual sounds and mobile technology. *ACM Transactions on Computer-Human Interaction*, 19 (4). <https://doi.org/10.1145/2395131.2395136>
- Arnold-de Simine, S. (2013). *Mediating memory in the museum: trauma, empathy, nostalgia*. Baskingstoke: Palgrave Macmillan.
<https://doi.org/10.1080/14782804.2014.942985>
- Art Beyond Sight. (2014). *Disability and inclusion: resources for museum studies programs*. Retrieved from <http://www.artbeyondsight.org/dic/module-4-museum-access-accessible-physical-space/universal-design-principles-and-guidelines/>
- Bahk, Y. C., & Choi, K. H. (2018). The relationship between autobiographical memory, cognition, and emotion in older adults: a review. *Aging, Neuropsychology, and Cognition*, 25(6), 874-892. <https://doi.org/10.1080/13825585.2017.1377681>
- Bartsch, L. M., Singmann, H., & Oberauer, K. (2018). The effects of refreshing and elaboration on working memory performance, and their contributions to long-term memory formation. *Memory and Cognition*, 46(5), 796–808.
<https://doi.org/10.3758/s13421-018-0805-9>
- Bauer-Krösbacher, C. (2013). Mobile interpretation at cultural attractions: insights into users and non-users of audio-guides. In R. Raj, K. Griffin, N. Morpeth (Eds.), *Cultural tourism* (pp. 64–73). CABI. <https://doi.org/10.1079/9781845939236.0064>
- Beaumont, E., & Sterry, P. (2005). A study of grandparents and grandchildren as visitors to museums and art galleries in the UK. *Museum and Society*, 3(3), 167–180.
- Bedford, L. (2001). Storytelling: The Real Work of Museums. *Curator: The Museum Journal*, 44(1), 27–34. <https://doi.org/10.1111/j.2151-6952.2001.tb00027.x>
- Bellezza, F. S., Richards, D. L., & Geiselman, R. E. (1976). Semantic processing and organization in free recall. *Memory & Cognition*, 4(4), 415–421.
<https://doi.org/10.3758/BF03213198>
- Berger, J. (1972). *Ways of Seeing*. London: Penguin.

- Bertens, L., & Polak, S. (2019). Using Museum Audio Guides in the Construction of Prosthetic Memory. *Journal of Conservation and Museum Studies*, 17(1), 6-17. <https://doi.org/10.5334/jcms.182>
- Bitgood, S. C., & Patterson, D. D. (1993). The Effects of Gallery Changes on Visitor Reading and Object Viewing Time. *Environment and Behavior*, 25(6), 761–781. <https://doi.org/10.1177/0013916593256006>
- Bitgood, Stephen. (2009). Museum Fatigue: A critical review. *Visitor Studies*, 12(2), 93–111. [https://doi.org/DOI: 10.1080/10645570903203406](https://doi.org/DOI:10.1080/10645570903203406)
- Bitgood, Stephen. (2013). *Attention and Value: Keys to Understanding Museum Visitors*. Walnut Creek, CA: Left Coast Press. <https://doi.org/10.4324/9781315433455>
- Black, G. (2005). *The Engaging Museum. Developing Museums for Visitor Involvement*. New York: Routledge. <https://doi.org/10.5617/nm.3292>
- Bluck, S. (2017). Remember and Review or Forget and Let Go? Views from a Functional Approach to Autobiographical Memory. *The International Journal of Reminiscence and Life Review*, 4(1), 3–7. Retrieved from <http://www.ijrlr.org/ojs/index.php/IJRLR>
- Bluck, S., & Liao, H. (2013). I Was Therefore I Am: Creating Self-Continuity Through Remembering Our Personal Past. *The International Journal of Reminiscence and Life Review*, 1(1), 7–12. Retrieved from <http://www.ijrlr.org/ojs/index.php/IJRLR7>
- Bolls, P. D., & Lang, A. (2003). I saw it on the radio: The allocation of attention to high-imagery radio advertisements. In *Media Psychology*, 5, 33–55. https://doi.org/10.1207/S1532785XMEP0501_2
- Braun, S. (2007). Audio Description from a discourse perspective: a socially relevant framework for research and training. *Linguistica Antverpiensia, New Series–Themes in Translation Studies*, 6, 357–369.
- Braun, S. (2011). Creating Coherence in Audio Description. *META*, 56(3), 645–662.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77–101. <https://doi.org/10.1191/1478088706qp063oa>

- Brewer, W. F. (1986). What is autobiographical memory? In D. Rubin (Ed.), *Autobiographical Memory* (p. 25-49). Cambridge: Cambridge University Press.
- Brown, K., & Mairesse, F. (2018). The definition of the museum through its social role. *Curator: The Museum Journal*, 61 (4), 525-529
- Brown, M. (2018). Tate recommends ‘slow looking’ at major Pierre Bonnard exhibition. Guardian. <https://www.theguardian.com/artanddesign/2018/jul/23/tate-modern-slow-looking-pierre-bonnard-exhibition-2019>
- Bubaris, N. (2014). Sound in museums – museums in sound. *Museum Management and Curatorship*, 29(4), 391–402. <https://doi.org/10.1080/09647775.2014.934049>
- Calvert, S. L., & Gersh, T. L. (1987). The selective use of sound effects and visual inserts for children’s television story comprehension. *Journal of Applied Developmental Psychology*, 8(4), 363–375. [https://doi.org/10.1016/0193-3973\(87\)90027-X](https://doi.org/10.1016/0193-3973(87)90027-X)
- Cambridge, U. of. (2019). *Inclusive Design Toolkit: What is inclusive design?* Retrieved from <http://www.inclusivedesigntoolkit.com/whatis/whatis.html#p40>
- Cattaneo, Z., Vecchi, T., Cornoldi, C., Mammarella, I., Bonino, D., Ricciardi, E., & Pietrini, P. (2008). Imagery and spatial processes in blindness and visual impairment. *Neuroscience and Biobehavioral Reviews*, 32(8), 1346–1360. <https://doi.org/10.1016/j.neubiorev.2008.05.002>
- Celo, O., Braakmann, D., & Benetka, G. (2008). Quantitative and qualitative research: Beyond the debate. *Integrative Psychological and Behavioral Science*, 42(3), 266–290. <https://doi.org/10.1007/s12124-008-9078-3>
- Chafe, W. L. (1980). *The pear stories: Cognitive, cultural, and linguistic aspects of narrative production*. Norwood, NJ: Ablex. doi:10.1017/S0047404500008897
- Chan, J. K. L. (2009). The consumption of museum service experiences: Benefits and value of museum experiences. *Journal of Hospitality and Leisure Marketing*, 18(2–3), 173–196. <https://doi.org/10.1080/19368620802590209>
- Chatterjee, H., & Noble, G. (2013). *Museums, Health and Wellbeing*. London: Ashgate Publishing. <https://doi.org/10.1111/cura.12089>

- Chesterman, A. (1997). Ethics in Translation. In M. Snell-Hornby, Z. Jettmarová, & K. Kaindl (Eds.), *Translation as intercultural communication: selected papers from the EST Congress, Prague 1995* (pp. 148–156). Amsterdam: J. Benjamins.
doi.org/10.1075/btl.20
- Chiappa, G. Del, Andreu, L., & Gallarza, M. G. (2014). Emotions and visitors' satisfaction at a museum. *International Journal of Culture, Tourism and Hospitality Research*, 8(4), 420–431. <https://doi.org/10.1108/IJCTHR-03-2014-0024>
- Chu, S., & Downes, J. J. (2000). Odour-evoked Autobiographical Memories: Psychological Investigations of Proustian Phenomena. *Chemical Senses*, 25(1), 111–116. <https://doi.org/10.1093/chemse/25.1.111>
- CIOL. (2017). *Code of Professional Conduct*. Retrieved from <http://www.ciol.org.uk/sites/default/files/Code.pdf>
- Classen, C. (2017). *The Museum of the Senses: Experiencing Art and Collections*. London: Bloomsbury
- Cock, M., Bretton, M., Fineman, A., France, R., Madge, C., & Sharpe, M. (2018). *State of Museum Access 2018*. London, VocalEyes.
- Cohen, G., & Conway, M. A. (2007). *Memory in the Real World*. (3rd edition). Hove, Psychology Press. <https://doi.org/10.4324/9780203934852>
- Conway, M. (2001). Sensory-perceptual episodic memory and its context: autobiographical memory. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, 356(1413), 1375–1384.
<https://doi.org/10.1098/rstb.2001.0940>
- Conway, M. (2005). Memory and the self. *Journal of Memory and Language*, 53(4), 594–628. <https://doi.org/10.1016/j.jml.2005.08.005>
- Conway, M. (2009). Episodic memories. *Neuropsychologia*, 47(11), 2305–2313.
<http://doi.org/10.1016/j.neuropsychologia.2009.02.003>
- Conway, M., & Loveday, C. (2015). Remembering, imagining, false memories & personal meanings. *Consciousness and Cognition*, 33, 574–581.
<https://doi.org/10.1016/j.concog.2014.12.002>

- Conway, M., & Pleydell-Pearce, C. (2000). The Construction of Autobiographical Memories in the Self-Memory System. *Psychological Review*, *107*(2), 261–288. <https://doi.org/10.1037//0033-295X>
- Conway, M., Singer, J., & Tagini, A. (2004). The Self and Autobiographical Memory: Correspondence and Coherence. *Social Cognition*, *22*(5), 491–529. <https://doi.org/10.1521/soco.22.5.491.50768>
- Conway, M., Wang, Q., Hanyu, K., & Haque, S. (2005). A Cross-Cultural Investigation of Autobiographical Memory: On the Universality and Cultural Variation of the Reminiscence Bump. *Journal of Cross-Cultural Psychology*, *36*(6), 739–749. <https://doi.org/10.1177/0022022105280512>
- Craik, F. I. M. (2002). Levels of processing: Past, present ... and future? *Memory*, *10*(5-6), 305-318. <https://doi.org/10.1080/09658210244000135>
- Craik, F. I. M., & Lockhart, R. S. (1972). Levels of processing: A framework for memory research. *Journal of Verbal Learning and Verbal Behavior*, *11*(6), 671–684. [https://doi.org/10.1016/S0022-5371\(72\)80001-X](https://doi.org/10.1016/S0022-5371(72)80001-X)
- Creswell, J., & Plano Clark, V. (2011). *Designing and Conducting Mixed Methods Research* (2nd ed.). Thousand Oaks, California: SAGE Publications Inc.
- Csikszentmihalyi, M., & Robinson, R. E. (1990). *The art of seeing: an interpretation of the aesthetic encounter*. California: The Getty Center for Education in the Arts
- De Coster, K., & Muehleis, V. (2007). Intersensorial translation: Visual art made up by words. In J. Díaz Cintas, P. Orero, & A. Remael (Eds.), *Media for all: Subtitling for the deaf, audio description and sign language* (pp. 189–200). Amsterdam: Rodopi.
- De Jong, S. (2018). Sentimental Education. Sound and Silence at History Museums. *Museum and Society*, *16*(1). <https://doi.org/10.29311/mas.v16i1.2537>
- Dede, C., Salzman, M. C., Loftin, R. B., & Sprague, D. (1999). Modeling and Simulation in Science and Mathematics Education. Modeling Dynamic Systems. In N. Feurzeig, W., Roberts (Eds.), *Modeling and Simulation in Science and Mathematics Education* (pp. 282–319). New York: Springer. https://doi.org/10.1007/978-1-4612-1414-4_12

Department for Education, U. (2010). *Phonics teaching materials: core criteria and the self- assessment process*. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/298420/phonics_core_criteria_and_the_self-assessment_process.pdf

Diaz Cintas, J., & Neves, J. (2015). *Audiovisual translation: taking stock*. Newcastle: Cambridge Scholars Publishing.

Dierking, L. D., & Falk, J. (1992). Redefining the museum experience: the interactive experience model. *Visitor Studies*, 4(1), 173–176.

Dodd, Jocelyne, & Sandell, R. (2001). *Including museums: perspectives on museums, galleries and social inclusion*. Leicester: Research Centre for Museums and Galleries.

Doering, Z. D. (1999). Strangers, Guests, or Clients? Visitor Experiences in Museums. *Curator: The Museum Journal*, 42(2), 74–87. <https://doi.org/10.1111/j.2151-6952.1999.tb01132.x>

Dudley, S. H. (2012). Encountering a Chinese horse: Engaging with the thingness of things. In S. Dudley (Ed.), *Museum objects: Experiencing the properties of things* (pp. 1–15). Abingdon: Routledge

Duke, L. (2010). The Museum Visit: It's an Experience, Not a Lesson. *Curator: The Museum Journal*, 53(3), 271–279. <https://doi.org/10.1111/j.2151-6952.2010.00028.x>

Dunlosky, J., & Kane, M. J. (2007). The contributions of strategy use to working memory span: A comparison of strategy assessment methods. *Quarterly Journal of Experimental Psychology*, 60(9), 1227–1245. <https://doi.org/10.1080/17470210600926075>

Eardley, A.F., Edwards, G., Malouin, F., & Kennedy, J. (2016). Allocentric Spatial Performance Higher in Early-Blind and Sighted Adults Than in Retinopathy-of-Prematurity Adults. *Perception*, 45(3), 281–299. <http://doi.org/10.1177/0301006615607157>

Eardley, A., Fryer, L., Hutchinson, R., Cock, M., Ride, P., & Neves, J. (2017). Enriched Audio Description: Working towards an inclusive museum experience. In S. Halder, & L. C. Assaf (Eds.), *Inclusion, Disability and Culture: An Ethnographic Perspective*

Traversing Abilities and Challenges (pp. 195–207). Springer International Publishing. doi:10.1007/978-3-319-55224-8

Eardley, A., Mineiro, C., Neves, J., & Ride, P. (2016). Redefining Access: Embracing multimodality, memorability and shared experience in museums. *Curator: The Museum Journal*, 59(3), 263–286. <https://doi.org/10.1111/cura.12163>

Eardley, A., & Pring, L. (2006). Remembering the past and imagining the future: A role for nonvisual imagery in the everyday cognition of blind and sighted people. *Memory*, 14(8), 925–936. <https://doi.org/10.1080/09658210600859582>

Eardley, A., & Pring, L. (2007). Spatial processing, mental imagery, and creativity in individuals with and without sight. *European Journal of Cognitive Psychology*, 19(1), 37–58. <https://doi.org/10.1080/09541440600591965>

Eardley, A. F., & Pring, L. (2014). Sensory imagery in individuals who are blind and sighted: Examining unimodal and multimodal forms. *Journal of Visual Impairment and Blindness*, 108(4), 323–334. <https://doi.org/10.1177/0145482x1410800407>

Edmonds, E., Muller, L., & Connell, M. (2006). On creative engagement. *Visual Communication*, 5(3), 307–322. <https://doi.org/10.1177/1470357206068461>

Ekuni, R., Vaz, L. J., & Bueno, O. F. A. (2011). Levels of processing: The evolution of a framework. *Psychology and Neuroscience*, 4(3), 333–339. <https://doi.org/10.3922/j.psns.2011.3.006>

Ellenbogen, K., Luke, J., & Dierking, L. D. (2007). Family learning research in museums: Perspectives on a decade of research. In J. H. Falk, L. D. Dierking, & S. Foutz (Eds.), *In Principle, In Practice: Museums as Learning Institutions* (pp. 17–30). Lanham, MD: AltaMira Press.

Fahlenbrach, K. (2008). Emotions in Sound: Audiovisual Metaphors in the Sound Design of Narrative Films. *Projections*, 2(2), 85–103. <https://doi.org/10.3167/proj.2008.020206>

Falk, J. (2006). An identity-centered approach to understanding museum learning. *Curator: The Museum Journal*, 49 (2), 151–166.

- Falk, J. (2013a). Museum visitors' motivations and learning. In I. B. Lundgaard (Ed.), *Museums as social learning spaces* (pp. 188–208). Copenhagen: Kulture Styrelsen.
- Falk, J. (2013b). Three basic questions about museum visitors. *Ensino Em Re-Vista*, 20(1), 69–82.
- Falk, J. (2016). *Identity and the Museum Visitor Experience*. London and New York: Routledge.
- Falk, J., & Dierking, L. D. (1990). The effect of visitation frequency on long-term recollections. In S. Bitgood (Ed.), *Proceedings of the Third Annual Visitor Studies Conference* (pp. 94–104). Jacksonville: Center for Social Design.
- Falk, J., & Dierking, L. D. (1997). School field trips: assessing their long-term impact. *Curator*, 40(3), 211–218. <https://doi.org/10.1111/j.2151-6952.1997.tb01304.x>
- Falk, J. H., & Dierking, L. D. (2000). *Learning from museums: Visitor experiences and the making of meaning*. Walnut Creek, CA: AltaMira..
- Falk, J., & Storksdieck, M. (2005). Using the Contextual Model of Learning to understand visitor learning from a science center exhibition. *Science Education*, 89(5), 744-778. <http://doi.org/10.1002/sce.20078>
- Finbow, S. (2010). The state of audio description in the United Kingdom – from description to narration. *Perspectives*, 18(3), 215–229. <https://doi.org/10.1080/0907676X.2010.485685>
- Fish, S. (2006). Interpreting the variorum. In D. Finkelstein, & A. McCleery (Eds.), *The book history reader* (pp. 450–458). Abingdon: Routledge.
- Fivush, R., Haden, C. A., & Reese, E. (2006). Elaborating on elaborations: Role of maternal reminiscing style in cognitive and socioemotional development. *Child Development*, 77(6), 1568–1588. <https://doi.org/10.1111/j.1467-8624.2006.00960.x>
- Fletcher, H. (2006). *The principles of inclusive design*. London; Commission for Architecture and the Built Environment.
- Foley, M., & McPherson, G. (2010). Museums as leisure. *International Journal of Heritage Studies*, 6(2), 161–174. <https://doi.org/10.1080/135272500404205>

- Fryer, L. (2013). *Putting it into words: the impact of visual impairment on perception, experience and presence*. University of London.
- Fryer, L. (2016). *Introduction to audio description*. Abingdon: Routledge.
- Fryer, L., & Freeman, J. (2013). Cinematic language and the description of film: keeping AD users in the frame. *Perspectives*, 21(3), 412–426.
<https://doi.org/10.1080/0907676X.2012.693108>
- Fryer, L., Pring, L., & Freeman, J. (2013). Audio Drama and the Imagination. *Journal of Media Psychology*, 25(2), 65–71. <https://doi.org/10.1027/1864-1105/a000084>
- Ghazanfar, A. A., Schroeder, C. E., (2006). Is neocortex essentially multisensory? *Trends in Cognitive Sciences*, 10(6), 278–285. <https://doi.org/10.1016/j.tics.2006.04.008>
- Giansante, L. (2013). *Writing verbal description audio tours*. Retrieved from <http://www.artbeyondsight.org/mei/verbal-description-training/writing-verbal-description-for-audio-guides/>
- Goldstein, B. (2011). *Cognitive Psychology* (3rd ed.). Belmont: Wadsworth.
- Gottfried, J. A., Smith, A. P. R., Rugg, M. D., & Dolan, R. J. (2004). Remembrance of odors past: human olfactory cortex in cross-modal recognition memory. *Neuron*, 42(4), 687–695.
- Greenberg, D. L., & Knowlton, B. J. (2014). The role of visual imagery in autobiographical memory. *Memory & Cognition*, 42(6), 922–934.
<https://doi.org/10.3758/s13421-014-0402-5>
- Greenblatt, S. (2018). Resonance and wonder. In Watson, S., Barnes, A. J., Bunning, K., (Eds.), *A Museum Studies Approach to Heritage*. Abingdon: Routledge.
- Grinter, R. E., Woodruff, A., & SIGLINK: Hypertext and Web, H. (2002). Ears and Hair: What Headsets will People Wear? *Conference on Human Factors in Computing Systems CHI'02*, 680–681.
- Gross, M. P., & Zimmerman, R. (2010). Park and Museum Interpretation: Helping Visitors Find Meaning. *Curator: The Museum Journal*, 45(4), 265–276.
<https://doi.org/10.1111/j.2151-6952.2002.tb00064.x>

- Hashtroudi, S., Johnson, M. K., & Chrosniak, L. D. (1990). Aging and qualitative characteristics of memories for perceived and imagined complex events. *Psychology and Aging*, 5(1), 119–126. <https://doi.org/10.1037/0882-7974.5.1.119>
- Hayhoe, S. (2017). *Blind Visitor Experiences at Art Museums*. Rowman & Littlefield: London
- Herz, R. (2017). What is engagement, and when is it meaningful? Retrieved from <https://museumquestions.com/2014/08/20/what-is-engagement-and-when-is-it-meaningful/>
- Hinz, P. (2019). *Audio guides – an essential part of the visitor experience*. Retrieved from <https://advisor.museumsandheritage.com/features/tonwelt-audio-guides-essential-part-visitor-experience>
- Holland, A. C., & Kensinger, E. A. (2010). Emotion and autobiographical memory. *Physics of Life Reviews*, 7(1), 88–131. <https://doi.org/10.1016/j.plrev.2010.01.006>
- Holmes, K., (2019). *The No. 1 thing you're getting wrong about inclusive design*. Retrieved from <https://www.fastcompany.com/90243282/the-no-1-thing-youre-getting-wrong-about-inclusive-design>
- Hooper-Greenhill, E. (2000). *Museums and the Interpretation of Visual Culture*. London: Routledge.
- Hutchinson, R., & Eardley, A. (2018). Museum audio description: the problem of textual fidelity. *Perspectives: Studies in Translation Theory and Practice*, 27(1), 42–57.
- Hyman, I. E., & Faries, J. M. (1992). The Functions of Autobiographical Memory. In M. Conway, H. Spinnler, W. Wagenaar (Eds.) *Theoretical Perspectives on Autobiographical Memory* (pp. 207–221).
- ICOM. (2020). *Creating a new museum definition – the backbone of ICOM*. Retrieved from <https://icom.museum/en/resources/standards-guidelines/museum-definition/#:~:text=%E2%80%9CA%20museum%20is%20a%20non,education%2C%20study%20and%20enjoyment.%E2%80%9D>

- Janssen, S. M. J., Chessa, A. G., & Murre, J. M. J. (2010). The reminiscence bump in autobiographical memory: Effects of age, gender, education, and culture. *Memory*, *13*(6), 658-668. <https://doi.org/10.1080/09658210444000322>
- Jimenez Hurtado, C., & Soler Gallego, S. (2013). Multimodality, translation and accessibility: a corpus-based study of audio description. *Perspectives*, *21*(4), 577–594. <https://doi.org/10.1080/0907676X.2013.831921>
- Jiménez Hurtado, C., & Soler Gallego, S. (2015). Museum accessibility through translation: A corpus study of pictorial audio description. In J. Diaz Cintas & J. Neves (Eds.), *Audiovisual Translation: Taking Stock*. Newcastle: Cambridge Scholars Publishing.
- Jones, F. R. (2011). Poetry translation. In Y. Gambier & L. Van Doorslaer, (Eds.), *Handbook of translation studies* (pp. 117–122). Amsterdam: John Benjamins. doi:10.1075/hts.2.poe1
- Kang, M. J., Hsu, M., Krajbich, I. M., Loewenstein, G., McClure, S. M., Wang, J. T., & Camerer, C. F. (2009). The Wick in the Candle of Learning: Epistemic Curiosity Activates Reward Circuitry and Enhances Memory. *Psychological Science*, *20*(8), 963–973. <https://doi.org/10.1111/j.1467-9280.2009.02402.x>
- Kátaí, Z., Juhász, K., & Adorjáni, A. K. (2008). On the role of senses in education. *Computers and Education*, *51*(4), 1707–1717. <https://doi.org/10.1016/j.compedu.2008.05.002>
- Kelly, L. (2002) What is learning...and why do museums need to do something about it? Paper presented at *Why Learning?* Seminar, Australian Museum/University of Technology, Sydney.
- Kensinger, E. A., & Corkin, S. (2003). Memory enhancement for emotional words: Are emotional words more vividly remembered than neutral words? *Memory & Cognition*, *31*(8), 1169–1180. <https://doi.org/10.3758/BF03195800>
- Kihlstrom, J. F. (2009). “So that we might have roses in December”: The functions of autobiographical memory. *Applied Cognitive Psychology*, *23*(8), 1179-1192. <https://doi.org/10.1002/acp.1618>

- Kim, R., Seitz A., & Shams L. (2008). Benefits of stimulus congruence for multisensory facilitation of visual learning. *PLoS ONE* 3(1): e1532.
doi:10.1371/journal.pone.0001532
- Kleege, G. (2018). *More than meets the eye: what blindness brings to art*. New York: Oxford University Press.
- Koide, N., Kubo, T., Nishida, S., Shibata, T., & Ikeda, K. (2015). Art expertise reduces influence of visual salience on fixation in viewing abstract-paintings. *PloS One*, 10(2), e0117696. <https://doi.org/10.1371/journal.pone.0117696>
- Koran, J. J., Koran, M. L., & Ellis, J. (1989). Evaluating the Effectiveness of Field Experiences: 1939-1989. *Visitor Behaviour*, 4(2), 7–10.
- Kosslyn, S. M., Behrmann, M., & Jeannerod, M. (1995). The cognitive neuroscience of mental imagery. *Neuropsychologia*, 33(11), 1335–1344.
- Krejtz, I., Szarkowska, A., Krejtz, K., Walczak, A., & Duchowski, A. (2012). Audio description as an aural guide of children’s visual attention. In *Proceedings of the Symposium on Eye Tracking Research and Applications - ETRA '12* (pp. 99-106). New York: ACM Press. <https://doi.org/10.1145/2168556.2168572>
- Lang, C., Reeve, J., & Woollard, V. (2006). *The Responsive Museum: Working with Audiences in the 21st Century*. Aldershot: Ashgate Publishing.
- Laurienti, P. J., Burdette, J. H., Maldjian, J. A., & Wallace, M. T. (2006). Enhanced multisensory integration in older adults. *Neurobiology of Aging*, 27(8), 1155–1163.
<https://doi.org/10.1016/j.neurobiolaging.2005.05.024>
- Leahy, H. R. (2016). *Museum Bodies: The Politics and Practices of Visiting and Viewing*. Abingdon: Routledge.
- Lee, S. J. (2017). A review of audio guides in the era of smart tourism. *Information Systems Frontiers*, 19(4), 705–715. <https://doi.org/10.1007/s10796-016-9666-6>
- Lehmann, S., & Murray, M. (2005). The role of multisensory memories in unisensory object discrimination. *Cognitive Brain Research*, 24(2), 326-334.
<https://doi.org/10.1016/j.cogbrainres.2005.02.005>

Leonard, M. (2010). Exhibiting popular music: Museum audiences, inclusion and social history. *Journal of New Music Research*, 39(2), 171–181.
<https://doi.org/10.1080/09298215.2010.494199>

Levent, N., & Pascual-Leone, A. (2014). *The Multisensory Museum: Cross-Disciplinary Perspectives on Touch, Sound, Smell, Memory, and Space*. Lanham, Maryland : Rowman & Littlefield.

Levine, B., Svoboda, E., Hay, J. F., Winocur, G., & Moscovitch, M. (2002). Aging and autobiographical memory: dissociating episodic from semantic retrieval. *Psychology and Aging*, 17(4), 677–689.

Lopez, M. J., & Pauletto, S. (2009). The Design of an Audio Film: Portraying Story, Action and Interaction through Sound. *The Journal of Music and Meaning* (8).
Accessed online: <http://www.musicandmeaning.net/issues/showArticle.php?artID=8.2>

Loveday, C. (2016). Music and Cognition. In M. Groome, D., Eysenck (Eds.), *An Introduction to Applied Cognitive Psychology* (2nd edition). (pp. 307–328). London and New York: Routledge.

Loveday, C., & Conway, M. A. (2011). Using SenseCam with an amnesic patient: Accessing inaccessible everyday memories. *Memory*, 19(7), 697–704.
<https://doi.org/10.1080/09658211.2011.610803>

Luchetti, M., & Sutin, A. R. (2018). Age differences in autobiographical memory across the adult lifespan: older adults report stronger phenomenology. *Memory*, 26(1), 117–130. <https://doi.org/10.1080/09658211.2017.1335326>

Macdonald, S. (1998). *The Politics of Display: Museums, Science, Culture*. London: Routledge.

Mannion, S., Sabiescu, A., Robinson, W. (2015). *An audio state of mind: Understanding behaviour around audio guides and visitor media*. Museums and the Web 2015. Retrieved from <http://mw2015.museumsandtheweb.com/paper/an-audio-state-of-mind-understanding-behaviour-around-audio-guides-and-visitor-media/>

Marshall, M. T., Petrelli, D., Dulake, N., Not, E., Marchesoni, M., Trenti, E., & Pisetti, A. (2016). Audio-based narratives for the trenches of World War I: Intertwining stories,

places and interaction for an evocative experience. *International Journal of Human Computer Studies*, 85, 27–39. <https://doi.org/10.1016/j.ijhcs.2015.08.001>

Matamala, A., & Remael, A. (2014). Audio-description reloaded: An analysis of visual scenes in 2012 and Hero. *Translation Studies*, 8(1), 63–81. <https://doi.org/10.1080/14781700.2014.943678>

Mazur, I., & Chmiel, A. (2012a). Audio Description Made to Measure: Reflections on Interpretation in AD Based on the Pear Tree Project Data. In A. Remael, P. Orero, M. Carroll, (Eds.) *Audiovisual Translation and Media Accessibility at the Crossroads: Media for All 3* (pp.173-188.) Amsterdam: Rodopi

Mazur, I., & Chmiel, A. (2012b). Towards common European audio description guidelines: results of the Pear Tree Project. *Perspectives*, 20(1), 5–23. <https://doi.org/10.1080/0907676X.2011.632687>

Mazur, I., & Kruger, J.-L. (2012). Pear Stories and Audio Description: Language, Perception and Cognition across Cultures. *Perspectives*, 20(1), 1–3. <https://doi.org/10.1080/0907676X.2012.633769>

McCarthy, K., Ondaatje, E., Zakaras, L., & Brooks, A. (2004). *Gifts of the Muse: Reframing the Debate About the Benefits of the Arts*. Santa Monica, CA: RAND Corporation. <https://doi.org/10.7249/mg218>

McClellan, A. (2008). *The Art Museum from Boullée to Bilbao*. Berkeley: University of California Press. <https://doi.org/10.1093/jhc/fhp041>

McGaugh, J.L. (2003). *Maps of the mind. Memory and emotion: The making of lasting memories*. New York: Columbia University Press.

McGaugh, J. L. (2000). Memory - A century of consolidation. *Science* 287(5451), 248-251. <https://doi.org/10.1126/science.287.5451.248>

McGillivray, S., Murayama, K., & Castel, A. D. (2015). Thirst for knowledge: The effects of curiosity and interest on memory in younger and older adults. *Psychology and Aging*, 30(4), 835–841. <https://doi.org/10.1037/a0039801>

- McNorgan, C. (2012). A meta-analytic review of multisensory imagery identifies the neural correlates of modality-specific and modality-general imagery. *Frontiers in Human Neuroscience*, 6, 285. <https://doi.org/10.3389/fnhum.2012.00285>
- Medved, M. I., Cupchik, G. C., & Oatley, K. (2004). Interpretative memories of artworks. *Memory* 12(1), 119–128. <https://doi.org/10.1080/09658210244000441>
- Medved, M. I., & Oatley, K. (2000). Memories and scientific literacy: remembering exhibits from a science centre. *International Journal of Science Education*, 22(10), 1117–1132. <https://doi.org/10.1080/095006900429475>
- Munawar, K., Kuhn, S. K., & Haque, S. (2018). Understanding the reminiscence bump: A systematic review. *PLoS ONE*. <https://doi.org/10.1371/journal.pone.0208595>
- MW2016. (2016). *Inclusive design: from approach to execution*. Retrieved from <https://mw2016.museumsandtheweb.com/paper/inclusive-design-from-approach-to-execution/>
- Neves, Josélia. (2012). Multi-sensory approaches to (audio) describing the visual arts. *MonTI*, 4, 277–293. doi:10.6035/MonTI.2012.4.12
- Neves, Joselia. (2016). Enriched Descriptive Guides: a case for collaborative meaning-making in museums. *Cultus: The Journal of Intercultural Mediation and Communication*, 2(9), 137–155.
- Nielsen, J. K. (2017). Museum communication and storytelling: articulating understandings within the museum structure. *Museum Management and Curatorship*, 32(5), 440–455. <https://doi.org/10.1080/09647775.2017.1284019>
- Nord, C. (2010). Functionalist approaches. In Y. Gambier, & L. van Doorslaer (Eds.), *Handbook of translation studies* (pp. 120–129). Amsterdam: J. Benjamins. doi:10.1075/hts.1.fun1.
- Nyberg, L., Habib, R., McIntosh, A. R., & Tulving, E. (2000). Reactivation of encoding-related brain activity during memory retrieval. *Proceedings of the National Academy of Sciences of the United States of America*, 97(20), 11120–11124. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/11005878>

- Nyberg, L., & Tulving, E. (1996). Classifying Human Long-term Memory: Evidence from Converging Dissociations. *European Journal of Cognitive Psychology*, 8(2), 163–184. <https://doi.org/10.1080/095414496383130>
- O'Brien, D. (2010). *Measuring the value of culture: a report to the Department for Culture Media and Sport*. Department for Culture, Media and Sport. <https://doi.org/10.4467/20843968ZP.12.018.0485>
- OCAD University. (2019). *What do we mean by Inclusive Design?* Retrieved from <https://idrc.ocadu.ca/index.php/resources/idrc-online/library-of-papers/443-whatisinclusivedesign>
- Packer, J., & Ballantyne, R. (2005). Solitary vs. Shared: Exploring the Social Dimension of Museum Learning. *Curator: The Museum Journal*, 48(2), 177–192. <https://doi.org/10.1111/j.2151-6952.2005.tb00165.x>
- Packer, J. (2008). Beyond Learning: Exploring Visitors' Perceptions of the Value and Benefits of Museum Experiences. *Curator: The Museum Journal*, 51(1), 33–54. <https://doi.org/10.1111/j.2151-6952.2008.tb00293.x>
- Paris, S., & Mercer, M. (2011). Finding self in objects: identity exploration in museums. In G. Leinhardt, K. Crowley, & K. Knutson (Eds.), *Learning conversations in museums* (pp. 401–425). Mahwah, New Jersey: Lawrence Erlbaum Associates Inc.
- Pasupathi, M. (2001). The social construction of the personal past and its implications for adult development. *Psychological Bulletin*, 127(5), 651–672. <https://doi.org/10.1037/0033-2909.127.5.651>
- Pekarik, A. J. (2004). To explain or not to explain. *Curator: The Museum Journal*, 47(1), 12–18. <https://doi.org/10.1111/j.2151-6952.2004.tb00363.x>
- Pekarik, A. J., Doering, Z. D., & Karns, D. A. (1999). Exploring Satisfying Experiences in Museums. *Curator: The Museum Journal*, 42(2), 152–173. <https://doi.org/10.1111/j.2151-6952.1999.tb01137.x>
- Perego, E. (2019). Into the language of museum audio descriptions: a corpus-based study. *Perspectives: Studies in Translation Theory and Practice*. <https://doi.org/10.1080/0907676X.2018.1544648>

- Persson, H., Åhman, H., Yngling, A. A., & Gulliksen, J. (2015). Universal design, inclusive design, accessible design, design for all: different concepts—one goal? On the concept of accessibility—historical, methodological and philosophical aspects. *Universal Access in the Information Society*, *14*(4), 505–526.
<https://doi.org/10.1007/s10209-014-0358-z>
- Petrelli, D., Not, E., Zancanaro, M. (1999). Getting engaged and getting tired: What is in a museum experience. In *Proceedings of the Workshop on Attitude, Personality and Emotions in User-Adapted Interaction*.
- Pine, B. J., & Gilmore, J. H. (2011). *The experience economy: Updated edition*. Boston, MA: Harvard Business Review Press.
- Piolino, P., Desgranges, B., Benali, K., & Eustache, F. (2002). Episodic and semantic remote autobiographical memory in ageing. *Memory*, *10*(4), 239–257.
<https://doi.org/10.1080/09658210143000353>
- Piolino, P., Desgranges, B., & Eustache, F. (2009). Episodic autobiographical memories over the course of time: Cognitive, neuropsychological and neuroimaging findings. *Neuropsychologia*, *47*(11), 2314–2329.
<https://doi.org/10.1016/j.neuropsychologia.2009.01.020>
- Prior, N. (2003). Having One's Tate and Eating it: Transformations of the museum in a Hypermodern Era. In A. McClellan (Ed.) *Art and its Publics: Museum Studies at the Millennium* (pp. 50–74). Oxford: Blackwell Publishing Ltd.
- Proctor, N., & Tellis, C. (2003). *The State Of The Art In Museum Handhelds In 2003*. Museums and the Web 2003, 1–12. Retrieved from
<http://www.archimuse.com/mw2003/papers/proctor/proctor.html>.www.archimuse.com
- Radder, L., & Han, X. (2015). An examination of the museum experience based on Pine and Gilmore's experience economy realms. *Journal of Applied Business Research*, *31*(2), 455–470.
- Ramos, M. (2016). Testing audio narration: the emotional impact of language in audio description. *Perspectives: Studies in Translatology*, *24*(4), 606–634.
<https://doi.org/10.1080/0907676X.2015.1120760>

- Reich, C., Lindgren-Streicher, A., Beyer, M., Levent, N., Pursley, J., & Mesiti, L. A. (2011). *Speaking out on art and museums: A study on the needs and preferences of adults who are blind or have low vision*. Art Beyond Sight. Retrieved from <http://www.artbeyondsight.org/new/speaking-out-on-art-and-museums.shtml>
- Reiss, K., & Vermeer, H. J. (2014). *Towards a general theory of translational action. Skopos theory explained*. London: Routledge.
- Remael, A., Reviers, N., & Vercauteren, G. (2014). *Pictures painted in words: ADLAB Audio Description guidelines*. Trieste. Retrieved from http://www.adlabproject.eu/Docs/adlab_book/index.html
- Renninger, K. A., & Bachrach, J. E. (2015). Studying Triggers for Interest and Engagement Using Observational Methods. *Educational Psychologist*, 50(1), 58–69. <https://doi.org/10.1080/00461520.2014.999920>
- Renninger, K. A., & Hidi, S. (2015). *The Power of Interest for Motivation and Engagement*. New York: Routledge. <https://doi.org/doi:10.4324/9781315771045>
- Reynolds, C, Vannest, K, Fletcher-Janzen, E. (2013). Multisensory Instruction. In *Encyclopedia of Special Education* (4th ed.). Wiley.
- Richardson, A. (1969). *Mental Imagery*. Berlin: Springer-Verlag
- Rike, S. (2013). Bilingual corporate websites: From translation to transcreation? *The Journal of Specialised Translation*, (20), 68–85.
- Rissman, J., & Wagner, A. D. (2012). Distributed Representations in Memory: Insights from Functional Brain Imaging. *Annual Review of Psychology*, 63(1), 101–128. <https://doi.org/10.1146/annurev-psych-120710-100344>
- RNIB. (2010). *A Comparative Study of Audio Description Guidelines Prevalent in Different Countries*. London, RNIB.
- RNIB. (2017). How many people in the UK have sight loss? Retrieved from <https://help.rnib.org.uk/help/newly-diagnosed-registration/registering-sight-loss/statistics>

- Roberson, D. N. (2011). Free time in an art museum: Pausing, gazing and interacting. *Leisure Sciences*, 33(1), 70–80. <https://doi.org/10.1080/01490400.2011.533112>
- Röder, B., Rösler, F., & Neville, H. J. (2000). Event-related potentials during auditory language processing in congenitally blind and sighted people. *Neuropsychologia*, 38(11), 1482–1502. [https://doi.org/10.1016/S0028-3932\(00\)00057-9](https://doi.org/10.1016/S0028-3932(00)00057-9)
- Rodero, E. (2012). See It on a Radio Story: Sound Effects and Shots to Evoked Imagery and Attention on Audio Fiction. *Communication Research*, 39(4), 458–479. <https://doi.org/10.1177/0093650210386947>
- Roppola, T.(2012). *Designing for the museum visitor experience*. New York: Routledge. doi:10.1111/ cura.12139
- Rosenbloom, S. (2014). *The art of slowing down in a museum*. Retrieved from <https://www.nytimes.com/2014/10/12/travel/the-art-of-slowng-down-in-a-museum.html>
- Rubin, D. C. (2005). A basic-systems approach to autobiographical memory. *Current Directions in Psychological Science*, 14(2), 79–83. <https://doi.org/10.1111/j.0963-7214.2005.00339.x>
- Ryan, R. M. (1982). Control and information in the intrapersonal sphere: An extension of cognitive evaluation theory. *Journal of Personality and Social Psychology*, 43(3), 450–461. <https://doi.org/10.1037/0022-3514.43.3.450>
- Sadoski, M., & Quast, Z. (1990). Reader recall and long term recall for journalistic text: The roles of imagery, affect, and importance. *Reading Research Quarterly*, (25), 256-272.
- Sandell, R. (2003). Social Inclusion, the Museum and the Dynamics of Sectoral Change. *Museum and Society*, 1(1), 45–62.
- Santos, M. (2015). Towards a New Ethics of Audio Description: Re-creation as a Procedure. *Bakhtiniana: Revista de Estudos Do Discurso*, 10(3), 222–234. <https://doi.org/10.1590/2176-457322363>
- Schorch, P. (2013). The experience of a museum space. *Museum Management and Curatorship*, 28(2), 193–208. <https://doi.org/10.1080/09647775.2013.776797>

- Schorch, P. (2014). Cultural feelings and the making of meaning. *International Journal of Heritage Studies*, 20(1), 22–35. <https://doi.org/10.1080/13527258.2012.709194>
- Schorch, P., Walton, J., Priest, N., & Paradies, Y. (2015). Encountering the ‘Other’: Interpreting Student Experiences of a Multi-Sensory Museum Exhibition. *Journal of Intercultural Studies*, 36(2), 221–240. <https://doi.org/10.1080/07256868.2015.1008432>
- Serota, N. (1996). *Experience or Interpretation. The Dilemma of Museums of Modern Art. Walter Neurath Memorial Lectures*. New York: Thames and Hudson.
- Serrell, B. (1997). Paying Attention: The Duration and Allocation of Visitors’ Time in Museum Exhibitions. *Curator: The Museum Journal*, 40(2), 108–125. <https://doi.org/10.1111/j.2151-6952.1997.tb01292.x>
- Shams, L., & Seitz, A. R. (2008). Benefits of multisensory learning. *Trends in Cognitive Sciences*, 12(11), 411–417. <https://doi.org/10.1016/j.tics.2008.07.006>
- Shimojo, S., & Shams, L. (2001). Sensory modalities are not separate modalities: plasticity and interactions. *Current Opinion in Neurobiology*, 11(4), 505–509. [https://doi.org/10.1016/S0959-4388\(00\)00241-5](https://doi.org/10.1016/S0959-4388(00)00241-5)
- Shorten, A., & Smith, J. (2017). Mixed methods research: Expanding the evidence base. *Evidence-Based Nursing*, 20(3), 74–75. <https://doi.org/10.1136/eb-2017-102699>
- Slater, A. (2007). ‘Escaping to the gallery’: understanding the motivations of visitors to galleries. *International Journal of Nonprofit and Voluntary Sector Marketing*, 12(2), 149–162. <https://doi.org/10.1002/nvsm.282>
- Smith, J., & Smith, L. (2001). Spending Time on Art. *Empirical Studies of the Arts*, 19(2), 229–236. <https://doi.org/10.2190/5MQM-59JH-X21R-JN5J>
- Smith, L., Smith, J., & Tinio, P. (2017). Time spent viewing art and reading labels. *Psychology of Aesthetics, Creativity, and the Arts*, 11(1), 77–85. <https://doi.org/10.1037/aca0000049>
- Soler Gallego, S. (2015). Audio Description in art museums: genre and intermediality. In P. Requeijo Rey & C. Gaona Pisonero (Eds.). *Contenidos innovadores en la universidad actual* (pp. 675–685). Madrid: McGraw Hill.

- Soler Gallego, S. (2018). Intermodal coherence in audio descriptive guided tours for art museums. *Parallèles*, 30(2), 111–128. <https://doi.org/10.17462/para.2018.02.06>
- Soren, B. J. (2009). Museum experiences that change visitors. *Museum Management and Curatorship*, 24(3), 233–251. <https://doi.org/10.1080/09647770903073060>
- Squire, L. R., Knowlton, B., & Musen, G. (1993). The structure and organization of memory. *Annual Review of Psychology*, 44, 453–495. <https://doi.org/10.1146/annurev.ps.44.020193.002321>
- St Jacques, P. L., & Levine, B. (2007). Ageing and autobiographical memory for emotional and neutral events. *Memory*, 15(2), 129–144. <https://doi.org/10.1080/09658210601119762>
- Sung, Y. T., Chang, K. E., Lee, Y.H., Yu, W.C. (2008). Effects of a Mobile Electronic Guidebook on Visitors' Attention and Visiting Behaviors. *Educational Technology & Society*, 11(2), 67–80.
- Svoboda, E., McKinnon, M. C., & Levine, B. (2006). The functional neuroanatomy of autobiographical memory: A meta-analysis. *Neuropsychologia*, 44(12), 2189–2208. <https://doi.org/10.1016/j.neuropsychologia.2006.05.023>
- Synder, J. (2014). *The Visual Made Verbal: A Comprehensive Training Manual and Guide to the History and Applications of Audio Description*. American Council of the Blind.
- Taheri, B., Jafari, A., & O’Gorman, K. (2014). Keeping your audience: Presenting a visitor engagement scale. *Tourism Management*, 42, 321–329. <https://doi.org/10.1016/j.tourman.2013.12.011>
- Tekcan, A. İ., Yılmaz, E., Kızıllöz, B. K., Karadöller, D. Z., Mutafoğlu, M., & Erciyes, A. A. (2015). Retrieval and phenomenology of autobiographical memories in blind individuals. *Memory*, 23(3), 329–339. <https://doi.org/10.1080/09658211.2014.886702>
- The Audience Agency (2018). *Museums Audience Report*. London: The Audience Agency
- Thompson, Hannah. (2018). *Images and Words*. Workshop, Tate, London

- Tishman, S. (2017). *Slow Looking: the art and practice of learning through observation* (1st edn). New York: Routledge. <https://doi.org/https://doi.org/10.4324/9781315283814>
- Tulving, E. (1972). Episodic and Semantic Memory. In E. Tulving & W. Donaldson (Eds.), *Organisation of Memory* (pp. 381–403). New York: Elsevier Science.
- Van Wyke, B. (2010). Ethics and Translation. In L. Gambier, & Y. van Doorslaer (Eds.), *Handbook of Translation Studies* (pp. 111–115). Amsterdam: J. Benjamins.
- Vandaele, J. (2012). What meets the eye. Cognitive narratology for audio description. *Perspectives*, 20(1), 87–102. <https://doi.org/10.1080/0907676X.2011.632683>
- Venuti, L. (1995). *The Translator's Invisibility: a history of translation*. London: Routledge
- Venuti, L. (2003). Translating Derrida on Translation: Relevance and Disciplinary Resistance. *The Yale Journal of Criticism*, 16(2), 237–262.
- Vogt, S., & Magnussen, S. (2007). Expertise in pictorial perception: eye-movement patterns and visual memory in artists and laymen. *Perception*, 36(1), 91–100.
- von Kriegstein, K., & Giraud, A.-L. (2006). Implicit multisensory associations influence voice recognition. *PLoS Biology*, 4(10). <https://doi.org/10.1371/journal.pbio.0040326>
- Wagnon, C. C., Wehrmann, K., Klöppel, S., & Peter, J. (2019). Incidental Learning: A Systematic Review of Its Effect on Episodic Memory Performance in Older Age. *Frontiers in Aging Neuroscience*, 11. 173-188. <https://doi.org/10.3389/fnagi.2019.00173>
- Walczak, A., & Fryer, L. (2017). Creative description: The impact of audio description style on presence in visually impaired audiences. *British Journal of Visual Impairment*, 35(1), 6–17. <https://doi.org/10.1177/0264619616661603>
- Wan, C. Y., Wood, A. G., Reutens, D. C., & Wilson, S. J. (2010). Early but not late-blindness leads to enhanced auditory perception. *Neuropsychologia*, 48(1), 344–348. <https://doi.org/10.1016/j.neuropsychologia.2009.08.016>
- Ward, J. (2014). Multisensory Memories: How Richer Experiences Facilitate Remembering. In N. Levent, & A. Pascual-Leone (Eds.), *The Multisensory Museum:*

Cross-Disciplinary Perspectives on Touch, Sound, Smell, Memory, and Space (pp. 273–284). Lanham, Maryland: Rowman & Littlefield.

Weninger, F., Eyben, F., Schuller, B. W., Mortillaro, M., & Scherer, K. R. (2013). On the acoustics of emotion in audio: What speech, music, and sound have in common. *Frontiers in Psychology, 4*, 292–304. <https://doi.org/10.3389/fpsyg.2013.00292>

Whitehead, C. (2011). *Interpreting Art in Museums and Galleries*. London: Routledge. <https://doi.org/10.4324/9780203145616>

Williams, J. M. G., Healy, H. G., & Ellis, N. C. (1999). The Effect of Imageability and Predictability of Cues in Autobiographical Memory. *The Quarterly Journal of Experimental Psychology Section A, 52*(3), 555–579. <https://doi.org/10.1080/713755828>

Woike, B., Gershkovich, I., Piorkowski, R., & Polo, M. (1999). The role of motives in the content and structure of autobiographical memory. *Journal of Personality and Social Psychology, 76*(4), 600–612.

Woodruff, A., Aoki, P. M., Hurst, A., & Szymanski, M. H. (2001). The guidebook, the friend, and the room. In *CHI '01 extended abstracts on Human factors in computing systems - CHI '01*. <https://doi.org/10.1145/634067.634229>

Zimmermann, A., & Lorenz, A. (2008). LISTEN: A user-adaptive audio-augmented museum guide. *User Modeling and User-Adapted Interaction, 18*(5), 389–416. <https://doi.org/10.1007/s11257-008-9049-x>