

Visitor studies: Interdisciplinary methods for understanding the impact of inclusive museum AD experiences.

Abstract

The nineteenth century authoritative model of museums, in which it was assumed that visual access alone was a great enough ‘gift’ to the general public, no longer satisfies museum professionals, visitors or funders. Museums must now compete with other leisure activities for visitors, whilst seeking to justify their funding by using their collections and knowledge to strengthen community and society. However, museums can only achieve these societal aims if they make themselves accessible and engaging for all sections of society and indeed, they have a legal and moral imperative to do so. For people who are blind or partially sighted (BPS), audio description (AD) is a crucial access provision. Museum AD has traditionally been understood as a visual to verbal translation. However, researchers have argued that museum ‘access’, and therefore AD, should incorporate a wider experience of museum visiting, including the emotional, cognitive and even social aspects. As such, AD could potentially serve as an important inclusive design tool for any visitors who struggle to engage with the museum experience, regardless of their level of vision. This chapter explores why the visitor experience should be at the heart of museum AD evaluation, and how empirical quantitative and qualitative methods can facilitate generalisable and actionable conclusions to enhance provision.

Museums are undergoing a transformation, in terms of how they understand their role and function within society. In the past, museums were places of high culture: academic, authoritative and élite institutions (Selwood, 2018), where visitors could come to stand in awe in the presence of unique objects or artworks. In such a landscape, visitors and their needs were arguably secondary, and individuals with additional access requirements were largely invisible. But the landscape has changed. In recent decades, there has been a strong shift to placing the emphasis on audiences (Crossick, 2018). Museums have found themselves operating in a complex experience economy (Pine & Gilmore, 2011) where they compete with other tourism, leisure and cultural institutions for visitors' time, enthusiasm and budget. Thus, visitors become customers (Bubaris, 2014). At the same time, museums are seeking to reframe their interactions and engagement with visitors, whilst broadening and diversifying their visitor base. In order to become inclusive, museums need not only to become representative, they also need to become accessible. They have a legal imperative to provide access to culture 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). They are compelled to remove barriers to access and to thereby ensure that they cater for a variety of audiences (Dodd & Sandell, 2001), including people who would not normally choose to visit museums (Selwood, 2018).

For people who are blind and partially sighted (BPS), museum Audio Description (AD) seeks to provide access to museums by offering verbal description of museum collections. The field of museum AD practice is less than 20 years old (Taylor, 2019) and has received less attention from AD researchers compared to screen AD. In translation studies, museum AD draws its definition from AD more broadly, and is generally understood as an intersemiotic translation (Jakobson, 2012) which takes a nonverbal visual source text and translates it into a target text of spoken language (Jiménez Hurtado & Soler Gallego, 2015; but see also Neves, in press.). Within that definition, museum AD therefore seeks to 'translate' the visual aspects of museums' collections such as shape, size, or colour into verbal language. However, up to now, what has been neglected in museum AD research has been the visitors themselves, and the nature of their museum experience. Arguably, to understand the museum visitor experience is to understand the full source text of museum AD. Furthermore, enriched with this understanding, museum AD, more than any other branch of AD practice, has the potential to have the broadest impact on inclusive audiences, by facilitating access for both visitors who are BPS and for visitors who are typically sighted.

The need to understand visitors and their experience is also central to museums' social inclusion agendas, as they strive to become more outward looking and audience focused (Sandell, 2003). Museums are being called upon to justify the value of their services in light of the public funding that they receive (Dodd & Sandell, 2001). Museums' social inclusion agendas are wide-ranging and ambitious. They seek to drive social inclusion at individual, community and societal levels (Sandell, 2003). On an individual level, museum engagement can enhance self-esteem, confidence and creativity (Sandell, 2003), as well as well-being (Chatterjee & Noble, 2013; O'Brien, 2010). Paradigm shifts in museum practice and research are therefore flipping the focus – from objects to ideas (McCall & Gray, 2014); from curation to co-curation (Selwood, 2018); from learning as the experience, to learning as just one part of a multifaceted experience (Duke, 2010). An important starting point in this on-going transition is a deeper understanding of visitors, and the nature of their museum experiences, as opposed to the experience that museums have traditionally sought to prescribe. Museums cannot know how to enhance and extend their provision, if they do not understand the nature and impact of the experience that is currently provided. Thus, understanding the user experience is central to museum studies and practice, and the development of AD.

Our starting point for evaluation of museum AD is that it should be explored as inclusive interpretation for use by any museum visitor, rather than exclusively as an access provision for people who are BPS. The potential for AD as inclusive interpretation rests on the notion that having vision does not automatically equate to having access in the museum: sighted visitors may not know how to use their vision to engage with collections either emotionally or cognitively (Koide, Kubo, Nishida, Shibata, & Ikeda, 2015; Smith, Smith & Tinio, 2017). For visitors seeking additional interpretation, most must rely on visual text labels and text panels (Whitehead, 2011), to facilitate a rich and rewarding experience of collections. Traditional audio guides provide interpretation that is available aurally. Whilst they may refer to some prominent visual aspects of the work they are addressing, they do not standardly aim to guide the user's eyes either around the object or feature under discussion, nor around the work more broadly. Furthermore, they are not generally adequate for the needs of visitors who are BPS. AD, in contrast, could help sighted visitors to direct their vision, by drawing attention to visual aspects of an artwork or artefact, and simultaneously describing those aspects in words and/or delivering relevant semantic information to enrich understanding. Presenting information in this way, through both visual and auditory channels, would provide some level of congruence (for example, examining visual features of a sculpture whilst

hearing a description of them and how they were created). Congruent presentation of stimuli in multiple modalities is known to enhance perceptual processing and memorability (Gottfried, Smith, Rugg, & Dolan, 2004; Kim, Seitz, & Shams, 2008; Lehmann & Murray, 2005; Nyberg, Habib, McIntosh, & Tulving, 2000; von Kriegstein & Giraud, 2006). Thus, understanding from cognitive psychology suggests that AD could help to increase the longer-term impact of sighted visitors' engagement with the collections. If AD can offer 'guided looking' and access simultaneously (Eardley et al., 2017), then it may help many visitors to have an engaging and memorable museum experience (see Eardley et al., 2017; Hutchinson & Eardley, 2019). Taking this rationale from cognitive psychology, our research explores museum AD in the context of inclusive design.

Re-framing museum AD as a tool for inclusive design further strengthens our contention that museum AD is a powerful potential avenue for future research, as it stands to benefit many visitors. In this chapter, we explore how the impact of museum AD on the experience of all visitors can be understood through analysis of visitors' memories. We will detail how theories of human cognition inform this understanding, and how, in practical terms, research methods and understanding from museum studies, museum practice and psychology can drive museum AD research and development. In so doing, we call for a re-framing and broadening of two key concepts: what museum AD is, and why it can be beneficial to museums; broadening access both for audiences who are BPS, and for fully sighted audiences.

Reception studies and AD

To date, museum AD research in translation studies has been more focused on AD language and content than on the recipients (Jiménez Hurtado & Soler Gallego, 2015; Perego, 2019). Although little research on user experience of AD has been carried out within the museum and heritage sector, AD research in screen has increasingly been focusing on the recipient experience (Fryer & Freeman, 2012, 2013; Fryer, Pring, & Freeman, 2013; Ramos, 2015; Ramos, 2016; Romero-Fresco & Fryer, 2013; Walczak & Fryer, 2017). Fryer and colleagues have taken a holistic approach to the experience of viewing a film, exploring and testing multiple components of the experience with BPS and sighted participants, including cognitive aspects (Fryer & Freeman, 2012, 2013; Romero-Fresco & Fryer, 2013). In their work on the film *Brief Encounter*, experience questionnaires revealed that 'cinematic' AD, which was designed to indicate camera work and viewpoint, was preferred by users,

particularly those who had previously had vision (Fryer & Freeman, 2013). Measures of presence, namely the extent to which participants experienced the feeling of being in the depicted scene (Fryer & Freeman, 2012), revealed that cinematic AD resulted in stronger measures of engagement and spatial presence for some groups within the BPS users (Fryer & Freeman, 2012). Furthermore, participants were positive about the potential use of audio introductions for film (Romero-Fresco & Fryer, 2013). This multi-pronged approach to the filmic experience significantly advanced understanding of the reception of screen AD (Fryer & Freeman, 2013). Thus, experimental research that is focused on the participant experience can develop practice, in this case by specifically suggesting the need to review guidelines that do not encourage the use of cinematic terms in AD (Bardini, 2020; Fryer & Freeman, 2012).

In other screen research, debates about AD design and content, such as the requirement for objectivity (RNIB, 2010; Snyder, 2014) have been reframed in terms of the recipient experience. For example, a strictly objective approach would preclude AD style that is creative, or seeks to evoke emotion, as might also be required in AD that seeks to facilitate a broader museum experience. Both aspects have been addressed in reception studies looking at film. Walczak and Fryer's (2017) study demonstrated that creative AD, which incorporated not only elements of camera work but also subjective description of characters and actions, resulted in higher levels of presence for recipients, suggesting that creative AD could lead to more immersive filmic experiences. Similarly, Ramos (2015) compared a more emotive AD style to a neutral one, employing physiological measures (heart-rate) as well as user evaluation measures. Participants had stronger emotional reactions to scenes of fear and sadness with the emotive AD. Insight into the recipient experience can therefore challenge the validity of traditional AD conventions and guidelines that emphasise a focus on objectivity.

If researching the participant experience in screen AD leads to challenging and questioning of AD practice, then it is all the more imperative for museum AD research to follow suit. This is particularly important in museum AD as it is under researched compared to screen AD (Hutchinson & Eardley, 2019) and there are fewer guidelines devoted to museum AD compared to screen (Hutchinson & Eardley, 2020). The currently limited extent of AD research with museum visitors means there is great scope for development of powerful and innovative transdisciplinary methods to drive practice. What such studies would have in common with research on visitor experience in museums is the emphasis on the user

experience, and the desire for understanding about experience to be the driver for developments in practice.

Visitor Experience

One way in which cultural experiences such as museum visits and human experience more broadly can be understood is through the application of understanding of human cognition. Cognitive psychology is the scientific study of mental processes, including perception, attention, decision making and memory. Cognitive approaches can also be used to understand emotions, sense of identity and social interactions. As a discipline, cognitive psychology draws on an empirical epistemology. As such, it is based on the principle of commonality in human function (see Eardley & Dobbin, submitted). However, this does not assume that individuals are identical, nor that experience of a particular event (such as a museum visit) will be the same. Rather, cognitive psychology takes an epistemological approach that accepts that the cognitive processes underpinning the way in which people attend, the way in which people remember, and indeed the way in which they learn have quantifiable and measurable commonalities. Consequently, it identifies the patterns of behaviour in a particular sample, and generalises those to a particular population. This is equally applicable to cognitive research which looks at the variations in the broader human experience, here they are still looking to quantify consistent inter-individual variation (e.g. Boogert et al., 2018). Researchers have examined museums in the context of attention (Bitgood, 2013), emotion (Chiappa, Andreu, & Gallarza, 2014; Schorch, 2014), sensory-perceptive experience (Levent & Pascual-Leone, 2014) and memory (Anderson, 2003; Anderson & Shimizu, 2007; Medved, Cupchik, & Oatley, 2004; Medved & Oatley, 2000), thus exploring the nature of experience and its lasting impact. Theory and knowledge from cognitive psychology can therefore inform museum research and practice in terms of developing understanding of the museum experience and its lasting impact. It should also inform explorations of museum AD.

The empirical approach of cognitive psychology is underpinned by the principle of commonality of experience. Research on visitors in the museum literature is generally discussed in the context of individually contingent factors, and underpinned by a constructivist epistemology (see Eardley & Dobbin, submitted). Importance is typically placed on context and individual 'meaning-making', or construction of experience in museums (De Backer et al., 2015; Dierking & Falk, 1992; Falk & Dierking, 2000; Falk & Storksdieck, 2005). Falk & Dierking's influential model (1992) of the interactive experience

of museum visits set out three contexts through which visitors construct their own individual assimilation of the museum. These are the physical context, meaning the museum environment, as well as the collections within it; the social context, such as interactions with friends, family, museum staff and other visitors; and the personal context, which is what each visitor brings to the museum in terms of prior knowledge and experiences, motivations, attitudes and interests. From this perspective, the visitor ‘constructs’ their own reality, or experience in the museum, and what is recalled of the experience later informs upon what has been learnt (Dierking & Falk, 1992). This model helped set the agenda for the importance of the museum experience, in all of its social, cognitive, kinaesthetic and aesthetic richness (Dierking & Falk, 1992). The model was later developed into the Contextual Model of Learning (Falk & Dierking, 2000) a framework by which the interactions between individual, physical and sociocultural contexts and their relationship with learning could be understood (Falk & Dierking, 2000). In this sense, museum learning is arguably regarded as the central part of the museum experience, which in itself is recognised as being highly contingent upon the individual visitor. Whilst such approaches may draw upon empirical methods to qualify and quantify ‘learning’ (e.g. Falk & Storksdieck, 2005), they are deeply rooted in a constructivist tradition with its focus on individual experience.

With such emphasis on visitors’ individual constructions of their experience, the task of drawing out generalisable conclusions about visitors and museum experiences appears to be complex, if it can even be achieved in a meaningful way (Dierking & Falk, 1992). On any given day, a museum will be full of people who have come for a myriad of reasons. These may be people with an individual learning agenda, who are seeking particular knowledge, such as cultural enthusiasts or historians. There are likely to be ‘learners’ with an agenda created for them by others, such as children on a school trip. Other visitors may have a social or entertainment agenda, for example, those who are having a day out with family or friends. Furthermore, visitors themselves are dynamic in terms of their motivations and corresponding needs (Falk, 2006; 2016). A visitor may enter the museum as a facilitating adult for a child one day, and for the purposes of their own learning or leisure on another. Thus, underpinned by a constructivist approach, much visitor research has emphasised the experiential nature of museums (Doering, 1999) and the breadth and variety of the experiences within them; where visitors come 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). Whilst such a research focus is in line with museums' desire to focus on and understand their audiences, the apparently diverse breadth of human experience begs the question of how we can start to draw generalisable conclusions about the nature of museum experiences, from which museums can develop and enhance their provision. Furthermore, if access and inclusion agendas are to be successful, it is crucial that a deep understanding of the museum experience is informing their development, and that this understanding can be expanded beyond the experience of the limited number of individuals in any given study.

In visitor studies, researchers have drawn on empirical approaches when looking at museum memories, seeking to understand the content of visitors' memories in the months and years after a visit, in order to explore the long-term impact. Museum memories have been primarily used as a route to understanding museum learning, although it has been recognised that analysis of memories is critical to understanding the entire museum visitor experience (Falk, 2013). Falk & Dierking's early (1990) exploratory study used a qualitative interview method with 12 museum professionals, looking at social interactions, objects or exhibits viewed, recall of the physical environment of the museum, thoughts and emotions. The same methodology was used to look at the long-term impact of school trips (Falk & Dierking, 1997), and to better understand the impact of events and happenings, recall of displays and the physical environment, sensory experiences, emotions, and social interactions (Anderson, 2003). Anderson & Shimizu (2007) analysed long-term memories of an exhibition centre, considering memory vividness and the impact of rehearsal (re-visiting the event later in discussion with others). These interviews captured a variety of details recalled about the participants' experiences, such as sensory information, emotions, events and thoughts. Other museum memory research has considered the stability or deterioration of memories for events or information (Medved & Oatley, 2000), as well as the integration of memories for artworks over time (Medved et al., 2004).

Whilst drawing on theory from cognitive psychology, these studies have varied in their use of empirical methodology, or which aspects of memory theory they have chosen to employ. Researchers have thus recognised 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). Whilst memory analysis is seen as a crucial way into the visitor experience, there has been concern that the complex and variable nature of museum visitor experiences threatens the possibility of understanding impact (Anderson et al,

2007). There has also been no consensus on how to develop a methodology that draws upon the most important and informative measures of memorability and impact (Anderson et al, 2007). Anderson and colleagues (2007) call for further research to explore this problem, as well as the development of new longitudinal impact methodologies.

Our position is that, by drawing on theoretical and methodological work in psychological sciences, it is possible to carry out empirical and generalisable research to gain insights into the nature of the museum experience. We would contend that not only is this achievable, but that it is crucial to expanding and improving access provisions in museums, not least because it enables researchers to answer questions about the potential impact of inclusive interpretation for users both with and without typical functioning vision. In order to be able to reach conclusions about impact that extend beyond the immediate group of participants involved in any given study, it is necessary to design robust research that allows for the use of inferential statistical analysis, meaning objective conclusions can be drawn from the results, and findings can be generalised to wider populations. Furthermore, such measures need to draw on a broader understanding and application of the scientific understanding of memory, in order to address the museum experience and its impact in its entirety. Such an approach necessarily expands understanding of museum AD, by building on prior researchers' insights from textual analysis, and by foregrounding the visitor and the experience that AD facilitates.

Using memory to understand visitor experience

In our own research, we have drawn upon autobiographical memory theory (e.g. Conway & Pleydell-Pearce, 2000; Levine, Svoboda, Hay, Winocur, & Moscovitch, 2002) as a framework for our exploration of memory and impact in museums more broadly, and AD specifically (Hutchinson, Loveday & Eardley, 2020; Hutchinson, 2020; Hutchinson & Eardley, 2021). Autobiographical memories are memories for events in our lives that are constructed and reconstructed throughout our life span (Conway & Pleydell-Pearce, 2000). They are central to our identity and sense of self (Bluck, 2017; Conway, 2005; Kihlstrom, 2009), our social interactions (Alea & Bluck, 2003; Harris, Rasmussen & Berntsen, 2014) and our ability to plan for the future (Bluck, 2017; Cohen & Conway, 2007; Conway & Loveday, 2015). Autobiographical memories are made up multiple types of memory traces, which are stored hierarchically in our memory systems (Conway & Pleydell-Pearce, 2000), and these memory traces are combined together to form a memory. A typical autobiographical memory will be made up of many different types of information. This

includes ‘experience-near’, sensory-perceptive information that has been stored in the form of images (e.g. visual, tactile, auditory, olfactory) (Conway, 2009). This may be combined with higher-order knowledge about oneself, and periods of one’s life, organised as ‘themes’ (e.g. when I used to visit the museum with my grandmother) (Conway & Pleydell-Pearce, 2000). The memory may also contain semantic information (facts and concepts), as well as recall of specific happenings/events (episodes), social interactions, thoughts and feelings. A memory of a museum visit, therefore, can give us insight into the lasting impact of a museum experience, and understanding of how an AD-facilitated experience has been received.

Hutchinson, Loveday & Eardley (2020) developed a quantitative coding model designed for use by museums and other cultural institutions, drawing from the autobiographical memory literature, and applied it to written descriptions of visitors’ memories of past museum experiences. This coding model allows us to analyse the prevalence of different types of information in memories, and facilitates comparisons between different groups of visitors or different AD experiences. Analysis of 417 museum memories from 80 participants revealed that details of collections, facts or concepts encountered in the museum were the most prevalent type of content in the memories. We referred to this category as event-specific acquired knowledge, as it included details specific to the event (i.e. the visit) that took place; for example, ‘I saw Queen Victoria’s wedding dress’, or ‘I remember the different expressions and postures of the Terracotta Army soldiers.’ From a museum’s perspective, this category demonstrates some kind of learning has taken place in the museum, be it incidental or intentional learning (Wagnon, Wehrmann, Klöppel, & Peter, 2019). The next most prevalent category was ‘reactions’, meaning thoughts and emotions. This demonstrates a level of cognitive and emotional engagement that was able to endure for months, years or even decades. Other categories such as sensory perceptive information, recall of specific happenings, details of place (such as the museum environment) and social interactions all contributed to the memories but were less prevalent in the hierarchy of content established by our findings. Most importantly, our analysis found no differences in this hierarchy between groups of visitors, aside from some minor differences that could be attributed to what is already known about autobiographical memory and ageing, such as more emotion in memories of older visitors, and more details of specific events or happenings in younger visitors. Aside from these minor differences, the components of the museum experience and their lasting presence over time were found to be broadly similar whether participants were older or younger, frequent or infrequent museum visitors. Whilst the content of the memories

naturally differs, the structure and types of content do not. In other words, the nature of cognitive experience was the driving predictor of the memories, and this was shared by all. As the coding enables quantification of free text, statistical analysis and generalisability become possible, even though the starting point is the collection of diverse museum memories that have been constructed by individuals. What, then, does this mean for AD, and inclusive experiences in museums?

Evaluating AD in museums

The visitor experience is broader than learning; encompassing social, cognitive and emotion engagement (e.g. Hutchison et al., 2020). If AD seeks to ‘translate’ an experience, then understanding of this experience should be at the centre of museum AD research.

Furthermore, there is a need for research driven by understanding of human cognition and empirical research methods, which can be used to enhance practice by contributing generalisable understanding about visitor experience in museums. This, alongside the deep and rich understanding about the experience of visitors which is contributed by constructivist approaches, can bolster our evaluation of AD and strengthen our understanding of what we create, and why. Furthermore, by thinking about the commonalities in human experience, we can consider how access provisions such as AD could impact upon and engage others beyond the group for whom they were originally designed.

In order to evaluate museum AD, we developed a set of measures that would address both the nature of the experience facilitated by the AD, and its lasting impact. The analysis of museum memories (Hutchinson et al., 2020) demonstrated the long-term impact of museum visits and, importantly, the commonalities across all groups of visitors. Our starting point for museum AD evaluation was therefore to bring together a set of measures that could aim to encapsulate the wide-ranging cognitive and emotional aspects of the experience as evidenced in the memory study (Hutchinson et al., 2020) and, furthermore, to use memorability measures to explore the lasting impact on the visitor.

In collaboration with the Museum of London and VocalEyes, two mixed-methods studies, employing both quantitative and qualitative approaches, were designed to explore the impact of museum AD on users with and without vision (see Hutchinson, 2020; Hutchinson & Eardley, 2021). Both studies worked with the Museum of London’s Henry Grant photography collection (Museum of London, 2020), with a select number of photos presented to participants. Study 1 (Hutchinson & Eardley, 2021) compared AD to other, common forms

of interpretation (standard audio guides, and looking only, with minimal text accompaniment). It thereby addressed the question of how AD might impact on the experience and memorability of sighted people, in order to explore the potential of museum AD as inclusive design. One hundred and fifty sighted participants were divided into three equal groups and viewed nine Henry Grant photos. The first group viewed them whilst listening to a standard audio guide that presented some factual and contextual information about the images. The second group listened to an audio descriptive guide, which contained the same factual and contextual information, but also described the images according to AD practice, thereby providing ‘guided looking’ (Eardley et al, 2017). The third group did not listen to audio, but viewed the images alongside some minimal text interpretation. Directly afterwards, all participants completed a questionnaire about their experience. One month later, they completed a second questionnaire, which asked them some further questions about the experience and to write down everything they could recall about the photos. Our findings revealed three important points. Firstly, the experience of viewing the photos was similarly positive, whether participants listened to an audio guide, audio description, or no audio at all. This suggested that listening to audio (whether AD or standard audio guide) did not have the negative impact on the participant experience that has been raised in some studies, such as interfering with the user’s response to the collections (Aoki et al., 2003; Grinter, & Woodruff, 2002; Woodruff, Aoki, Hurst, & Szymanski, 2001); furthermore, the use of AD techniques were well received by sighted people. Secondly, participants who listened to audio (either a standard guide or AD) recalled more photos than those who just looked at them. They were also more likely to re-visit the content between initial presentation and follow up, either in their thoughts, conversations, or online research. Thirdly, and crucially, those who listened to AD had the richest memories of the photos, recalling more details about them than participants in either of the other two groups.

A second study (Hutchinson, 2020) used a similar method to explore the impact of enriching AD with congruent sound effects on experience and memorability. This drew on previous work which discussed the potential benefits of sound enrichment in AD (Eardley et al., 2017; Eardley, Mineiro, Neves, & Ride, 2016; Neves, 2016). In this study, 40 sighted and 40 BPS people were presented with eight Henry Grant photos, four with standard AD and four with sound enriched AD. Experience and memorability were evaluated on the day of the study and one month later with questionnaires, as before. Findings showed that sound enrichment was well received in this study, and preferred by the majority of participants, both BPS and

sighted. Most importantly, memorability analysis demonstrated that whilst sighted participants recalled more photos with standard AD than BPS participants did, there was no difference between groups in the number of photos recalled with sound enrichment. In other words, providing perceptual experience for BPS people, through sound, helped them to remember the artworks.

These studies measured the participant experience both directly (questions about the experience and levels of engagement) and indirectly (through memorability), using a combination of fixed and free text responses. These were analysed using a combination of quantitative and qualitative methods. Levels of interest and enjoyment were explored by a) logging participants' time spent with the individual images, providing insight into the extent to which their attention was being held; b) through Likert scales ratings; and c) by asking participants what they were thinking about during the photo presentation, with answers coded using thematic analysis (Braun & Clarke, 2006). The emotional response was assessed by asking participants if they felt emotion, and if so, which types. Engagement was explored by asking participants whether they would be likely to want to explore more Henry Grant photos, and also by asking them at follow up if or how they engaged with the content during the intervening month, for example whether they discussed it with others, or researched online. Thus, these multiple measures of experience enabled us to draw statistical comparisons between groups. This allowed us to make empirical comparisons of interpretation or AD types based on measures drawn from the psychology literature on experience, engagement, interest, attention and emotion.

Our use of memory in these studies was two-fold. Firstly, we were interested in whether or not autobiographical memories were evoked during the experience. For example, whether the presentation of the photos might cue a personal memory for a participant, and if so, how vivid that memory might be. This allowed us to explore how people connected to the artworks, and also to consider contentions in the museum research literature that audio guides can inhibit a personal response to the work (Bauer-Kroesbacher, 2013). Secondly, we were interested in participants' episodic memories of the photos-in other words, their memory of the 'event' of encountering the photo. Participants were asked to write down any details that came into their minds as they thought about the photo one month later, and their responses were coded for discrete pieces of information, based on the coding model developed for autobiographical memories of museum visits (Hutchinson et al., 2020). For example, recall of a photo might include elements of content ('there was a young girl'); spatial elements ('in the foreground');

or events/movement ('she was running'). It could also include details of emotion or atmosphere ('they looked happy'); non-visual imagery ('you could almost hear the music'); participants' own reactions ('I loved it') or recall of information ('the Thames beach was closed due to pollution'). By creating theoretically driven coding categories in advance of the data collection, we are able to quantify the number of instances where particular categories of response appear. As such, the data are quantitative. The method enabled us to capture the breadth and detail of individual responses to the photos and to convert free recall text into quantifiable information, again allowing for statistical comparison between groups. Thus, we were able to draw conclusions about the participant experience, and its lasting impact; conclusions that could be generalised to wider populations of museum visitors.

Summarising the first empirical findings on museum AD as inclusive design, these two studies set a new scene for the role of AD in museums. Findings from Study 1 (Hutchinson & Eardley, 2021) build a strong case for the potential of AD as an inclusive museum interpretation. AD, with its ability to guide visual attention, was more successful than a standard audio guide in helping to create rich memories of the photos for sighted people. Many of these memories contained not only strong recall of the visual content of the photos and their spatial relation to one another, but also evidence of an emotional response and cognitive engagement, as this extract demonstrates:

The entertainer had attracted a crowd who were watching him intently. He appeared to be performing as we watched. On the left-hand side of the frame there were traffic lights with people preparing to cross the road appearing not to notice what was happening a few yards away... What I particularly liked about the photograph was what I could only describe as a sense of place, here he was performing outside a shop in London whilst life carried on around him.

(sighted participant's recall of Henry Grant's *Street Busker*, presented with AD one month before)

If all standard audio guides available in museums world-wide incorporated audio description, this could instantly open up more collections to BPS visitors, and simultaneously enhance the impact of the experience for those with sight. Furthermore, it would facilitate a shared experience between those with and without vision.

Findings from Study 2 also have crucial implications for museum AD practice (see Hutchinson, 2020). The impact of sound enrichment was to make the experience of visual

artworks equally memorable for BPS visitors as it was for sighted visitors. BPS participants were able to recall not only the visual features of the photo as described by the AD, but many memories also demonstrated a sense of connection to the photo and enjoyment of its atmosphere:

He captured, I think, some young lads..., beaming smiles, in the air, all their feet off the ground so he captured them, sort of, as they jumped up. I think the camera was held at waist height so ... had a good perspective, and full of energy, full of joy, full of...movement or energy, a group of young pre-teen boys in a playground. A very emotive image, I thought and one that's clearly stuck in my mind...I loved it. I thought it sounded wonderful, full of movement and joy and youthful energy and representative of the period.

(Blind participant's recall of *Highbury Quadrant Infants' School*, presented with sound enriched AD one month before)

The presence of cognitive and emotional engagement in the memories such as this one therefore emphasises the need for museum AD to consider the museum experience, in all its richness, as its source text.

Conclusions

People visit museums for all kind of reasons, bringing different levels of experience and individual agendas (Falk, 2016). Although learning has traditionally been a key objective in relation to visitor experience for many museums, for many visitors, learning objectives may not be the key reason to visit at all, and learning may only occur incidentally, as part of the experience of the day. As such, whether museums and cultural institutions are seeking to enhance access, or inclusion, or maximise impact on visitors, it is necessary to understand the full richness of that experience. This understanding can then inform what audio describers 'translate' as their source text. For museums to be fully inclusive and to meet the needs of all visitors, they need to reflect that understanding in their marketing, programming and interactions with their visitors. Building on qualitative exploration with empirical research will develop understanding of the museum experience and increase the impact of research and its meaning for practice. Our research has shown that, whilst visitors' motivations and experiences will vary hugely, it is possible to draw generalisable conclusions about the impact on their cognitive processes, through memorability analysis.

Understanding the cognitive experience and impact of visiting a museum provides crucial information and insight for museum practice, and for development of museum AD.

We have argued that the museum experience itself is as much the ‘source text’ in museum AD as the collections are (Hutchinson & Eardley, 2019). Correspondingly, the aim for museum AD research should be to develop ways to measure the full breadth of experience, capturing not only evidence of learning, but social interactions, engagement, interest, emotional and cognitive responses. In so doing, AD research will contribute understanding to museum practice, by showing how inclusive interpretation can impact on visitors’ assimilations of museums’ collections and narratives. Most importantly, it will also serve the needs of visitors, BPS and sighted alike, by developing understanding of how we can support their engagement in the museum.

The two AD studies presented here pave the way for a new understanding of museum AD and inclusive museum interpretation, as well as new approaches to its evaluation.

Understanding from visitor studies and cognitive psychology informs on the nature of the experience and the components of which it consists. Furthermore, the use of empirical research methods, and theoretically driven approaches such as autobiographical memory, enable a new kind of evaluation for museum AD. Whilst this evaluation captures the breadth and variety of individual responses to cultural encounter, it simultaneously allows for application of the findings to wider populations of visitors. Generalisable empirical findings, whilst they can never create solutions that cater for every individual’s needs, nonetheless are a solid foundation from which to drive development of practice and a new understanding of what museum AD can achieve. This final point is ultimately the crucial one when considering the future of museum AD; namely what it is and whom it is for. By taking as the starting point our understanding of the commonalities of cognitive experience – how we engage, how we remember – we are able to explore the benefits of AD for many visitors. Such a re-framing of museum AD, as inclusive museum interpretation that has experience and memorability benefits for people with and without sight, not only stands to enhance access and inclusion for one specific group of visitors, but for many. It is in this direction that we hope future research endeavour will focus, so that we can continue to explore how AD can facilitate rich and rewarding museum experiences for as many people as possible.

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