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Reciprocal relations across time between basic values and value-expressive behaviors:

A longitudinal study among children

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Abstract

Tracing children's values and value-expressive behavior over a sixth-month period, we examined stability and change of values and behavior and the reciprocal relations between them. Three hundred and ten sixth-grade students in Italy completed value and value-expressive behavior questionnaires three times in three-month intervals during the scholastic year. We assessed Schwartz's (1992) higher-order values of conservation, openness to change, self-enhancement, and self-transcendence, as well as their respective expressive behaviors. Reciprocal relations over time between values and behaviors were examined using a cross-lagged longitudinal design. Results showed that values and behaviors had reciprocal longitudinal effects on one another, after the stability of the variables was taken into account (i.e., values predicted change in behaviors, but also behaviors predicted change in values). Our findings also revealed that: (1) values were more stable over time than behaviors, and (2) the longitudinal effect of values on behaviors tended to be stronger than the longitudinal effect of behaviors on values. Findings are discussed in light of the recent developmental literature on value change.

Around the world, children's values are at the heart of society. For example, teachers may aim for their pupils to be open-minded and curious during a science lesson, to strive for good grades, or to win nation-wide competitions (e.g., Jugend forscht, n.d.). Also, parents may want their children to be safe, to be friendly with other people or to follow the family's tradition (e.g., Best family traditions, n.d.). That means, educational agents would like the next generation to internalize key values and to act on them. There is thus the assumption that children's values are not mere lip service, but that they guide children's behavior and the way children interact with their environment. At the same time, education in the school and the family implicitly or explicitly relies on the assumption that value priorities in childhood can be shaped through teaching children value-relevant behavior. For example, the British national curriculum outlines that "pupils learn about themselves as developing individuals and as members of their communities, building on their own experiences and on the early learning goals for personal, social and emotional development" (Department for Education, 2011). But whether children's values predict their behavior and children's behavior predicts their values over time has not yet been empirically investigated at all.

In this article, we take a novel approach and aim to trace, for the first time, the longitudinal relation between values and behavior in childhood. We ask: Do values predict an increase in the behaviors that express them or do behaviors predict an increase in the values they express? Or do both processes occur, demonstrating reciprocal relations between values and behaviors? To address these issues we use Schwartz's (1992) theory of personal values, due to its comprehensiveness and the vast research that supports and uses it (see Schwartz et al., 2012). We begin by explaining and illustrating values in this theory. We then present findings on value-behavior relationships and on some of the mechanisms of change in values and behavior. Finally, we link these findings to the literature on children's developing personality and derive our hypotheses.

Basic Personal Values

Schwartz (1992) defined values as desirable, trans-situational goals varying in importance that serve as guiding principles in people's lives. He emphasizes the motivational component

underlying the structure of value contents. In Schwartz's model (see Figure 1), values are arranged along a circle that has two underlying orthogonal dimensions: self-enhancement versus self-transcendence, and conservation versus openness to change. The single values within each of these four poles share the same broad motivational goal which contrasts with the motivational goal that underlies the opposing pole. *Self-enhancement* comprises values of achievement and power which emphasize personal success and a strong outstanding position of the self in comparison to other persons. The opposing pole of this dimension, *self-transcendence*, comprises values of universalism and benevolence which emphasize tolerance and concern for other persons and the whole world. *Conservation* comprises the values of security, tradition and conformity which emphasize the motivation to keep things as they are and avoid change. The opposing pole of this dimension, *openness to change*, comprises the values of stimulation and self-direction which emphasize openness to new ideas and actions. Hedonism values share elements of both openness to change and self-enhancement but are closer to the former.

The validity of this structure has been confirmed in hundreds of studies with adult samples from all over the world (e.g., Schwartz & Boehnke, 2004; Schwartz et al., 2012; Vecchione, Casconi & Barbaranelli, 2009). Recent studies (Bilsky et al., 2013; Cieciuch, Döring, & Harasimczuk, 2013; Döring, 2010; Döring, Blauensteiner, Aryus, Drögekamp, & Bilsky, 2010; Knafo & Spinath, 2011) have found this structure to be differentiated already in middle childhood (i.e., ages 6 to 11). Particularly towards the end of this developmental stage, children's values are organized according to the same compatibilities and conflicts proposed in Schwartz's (1992) model. This finding reflects the current state of research in developmental psychology, according to which children have richly differentiated personalities by the end of middle childhood (Shiner, 2010).

The Relations between Values and Behavior

In adults, research evidence suggests that values tend to guide behavior, meaning that people pursue important values through behaving in ways that express or promote them (see reviews in Bardi, Calogero, & Mullen, 2008; Maio, 2010; Roccas & Sagiv, 2010). Such research shows value-

behavior links both in correlational and in experimental designs. For example, Bardi and Schwartz (2003) found that a person who values self-transcendence is more likely to buy environmentally-friendly products or to lend things to neighbors than a person who values self-enhancement. In turn, a person who values self-enhancement is more likely to pressure others to go along with his or her preferences and commitments, and to study late into the night before exams to achieve the best possible grade. Overall, value-behavior correlations were found to be the most positive for the behaviors that most strongly express these values and the most negative for the behaviors that express the opposed values. In this respect, values and behavior are related to one another in a coherent way that can be predicted from Schwartz's model (see Bardi & Schwartz, 2003).

Value Change

Looking at values over time, past research mainly followed Rokeach's (1973) assumption that values are largely stable, trait-like entities. Only recently, researchers started to explore when and how values do change. In longitudinal studies, values were found to change in a pattern that follows the value structure. That is, compatible values changed in the same direction and conflicting values changed in opposite directions (Bardi, Lee, Hofmann-Towfigh, & Soutar, 2009). Recent experimental studies in adults also showed that change occurs according to the two dimensions (Maio, Pakizeh, Cheung, & Rees, 2009). For example, as values of openness to change become more important, values of conservation tend to become less important, whereas the orthogonally-placed values of self-transcendence and self-enhancement remain unaffected. The first longitudinal study of children's values by Cieciuch and colleagues (published in this special section) revealed that value change in childhood follows the same pattern of conflicts and compatibilities as outlined in Schwartz's (1992) model.

Bardi and Goodwin (2011) integrated the existing evidence from studies with adults and proposed a model of value change. This model covers various processes of change, involving both effortful cognitive processes and automatic processes, such as priming. For example, it was shown that the English language, which is associated with individualistic values, can automatically activate

individualistic values in persons from a collectivistic culture (in this case, bilinguals in Hong Kong; Bond & Yang, 1982).

A suggestion of Bardi and Goodwin (2011) that has not been tested yet is that behavior change may lead to value change, as people attempt to maintain consistency. This suggestion is based on Bem's (1967) self-perception theory that assumes that people observe their behavior and conclude that they hold the reflected attitude. Self-observation of behavior may prime a behavior-consistent schema in which the expressed value is embedded, which over time replaces the original schema, thereby causing value change. This may be particularly true for recurring behaviors that may create habits, which through self-observation processes are then interpreted by the person as reflecting his or her values (Rachlin, 2002). Also, the person's awareness of inconsistency between values and behaviour may lead to cognitive dissonance (Festinger, 1957) that the person aims to resolve through changing values. The awareness of inconsistency between values and behavior may also make the value salient and cause the person to deeply think about whether it is still as important to the person as previously. Repeatedly behaving in a way that is inconsistent with the person's values may lead to value change, as values are used to justify behavior. This means that there may not only be a process in which change in values leads to a change in behavior, but also a process in which change in behavior leads to a change in values.

This process can help explain changes in values due to adaptation to new situations. Bardi and Goodwin (2011) noted that adaptation has been the most prominent facilitator of value change in the literature. As they argue, a new life situation requires new behavior (for example, the laws or social-norms of a new country, behavior required by a new life role like becoming a parent, or by a new position at work like becoming a manager). It is therefore possible that as part of adapting to new life situations people first change their behavior to comply with the new expectations, norms, or rules. This behavior change may gradually lead to value change.

Continuity and Change in Values and Behavior in Childhood and Adolescence

Values are viewed as core aspects of the self (e.g., Rokeach, 1973) and, as such, can be expected to be largely stable over time (see Harter, 1999; La Greca, 1990). In a representative sample of French adults, stability coefficients of the ten values varied between .50 and .66 over an interval of two years (Schwartz, 2005). For children, two-year stability coefficients were slightly lower, varying between .34 and .43 (Cieciuch et al., in this special section). Coefficients were considerably lower and close to zero for youngest children, who were seven years old at the first point of measurement. These findings are in line with developmental conceptualizations of the ‘agentic self’ (i.e., the person’s motivational striving, McAdams & Olson, 2010) that becomes consolidated toward the end of childhood, which implies the ability to articulate more or less stable goals. A view into the developmental literature (e.g., Klimstra, Hale, Raaijmakers, Branje & Meeus, 2009) further reveals that, as children grow older and move through adolescence, their cognitive capacity to engage in abstract and integrating thinking about personality improves. As Klimstra (2012) wrote, adolescents “begin to search for sameness and continuity of the self” (p. 80). The threshold between childhood and adolescence is therefore a fascinating age to study how children’s values and their behavior shape one another and how consistent change may occur across the two. During this critical transitory stage, children are likely to exhibit a ‘dispositional signature’, meaning that they express their behavior, thoughts, and emotions relatively consistently across situations and over time (Harter, 1999; Shiner, 2010). The present study captures this developmental period and thereby covers a rich variety of individual differences in motivational goals and behavior before children enter the stage of adolescence with its numerous new potential roles and negotiations of identity (see Knafo & Schwartz, 2004).

To date, no published study has examined longitudinal relations between Schwartz’s values and behavior in childhood. We followed Schwartz’s (1992) definition of values as desirable motivational goals, we looked into the recent developmental literature on children’s motivational goals, and we found support for our ideas that (1) children’s values should predict children’s behavior, and (2) children’s behavior should predict children’s values. Thompson, Meyer, and

McGinley (2006), for example, portrayed the child as an intuitive moralist who does not only react to incentives and sanctions, but also learns about values within relationships that are important to him or her and sensitively reacts to guidance provided by primary caregivers. Throughout childhood, children develop conceptions of others' desires, intentions, and rules, and also representations of behavioral expectations. On numerous occasions, children express goals that are important to them in observable behavior. For example, the striving for security at threatening events (e.g., a thunderstorm) could be expressed through behaviors such as comfort-seeking and staying close to the parents. Similarly, the goal to make new friends could be expressed in affective sharing behavior. Interestingly, the literature also implies that the mechanism can work in the other direction (Blakemore, Berenbaum, & Liben, 2009), meaning that children's repeatedly shown behavior along with primary caregivers' reactions can induce value change. For example, Morongiello and Dawber (1999) found that parents tended to encourage boys' and discourage girls' risk-taking behavior at the playground regardless of the child's play competencies, thereby reinforcing boys' striving for stimulation and girls' striving for security. In this way, occasions for value priorities to be crystalized through repeatedly shown behavior are provided throughout childhood. Overall, the few existing studies may point to a possible reciprocal influence between values and behavior in late childhood, but this hypothesis has never been tested directly.

The Current Study

In the present study, we measured children's values and value-expressive behavior at the age of 11 years, over a period of six months, with the aim to examine how they prospectively predict one another during this significant developmental period. In investigating the possible reciprocal influences between values and behavior, we focused on processes of change that occur at the interindividual level, in the rank-ordering of individuals (e.g., Roberts & DelVecchio, 2000). Based on the empirical evidence referred to above, we expected (1) values to predict changes over time in the relative occurrence of value-expressive behavior, and (2) behavior to predict changes over time in the relative importance of values.

We expected these predictions to be coherent and to reflect the circular motivational compatibilities and conflicts expressed in Schwartz's (1992) model. Thus, we expected an increase in the importance of each value to predict an increase in the occurrence of behaviors that express that value. For example, self-enhancement values would positively predict self-enhancement behaviors. Furthermore, the pursuit of values of one pole is likely to conflict with behaviors that express values of the opposed pole. For example, the child who values conservation will tend to avoid taking risks and dangerous situations. Therefore, conservation values should negatively predict openness to change behaviors. Moreover, we expected value-expressive behaviors to predict changes in the corresponding values over time, so that an increase in the occurrence of each behavior would predict an increase in the importance of values that are expressed by that behavior, and a decrease in the importance of opposing values. For example, behaviors that express self-transcendence would positively predict self-transcendence values and negatively predict self-enhancement values.

Method

Participants and Procedures

This study is part of an ongoing longitudinal project aimed at investigating children's motivation and personality development. Participants were 310 sixth-grade students (171 boys, 139 girls) drawn from four Italian public schools. The age of the sample ranged from 10 to 12 years, with a mean of 10.67 ($SD = 0.58$). Participants were assessed at three time points during the scholastic year: December 2012, March 2013, June 2013.

Data were collected in the classrooms by a female researcher. Teachers were present but not involved in test administration. The assessment procedure was adapted to children's life context and cognitive development, as described in values research with the same age group (Bilsky et al., 2013; Bubeck & Bilsky, 2004; Döring, 2010). For example, tasks and scales use were explicitly explained, providing examples and responding to children's requests for clarification.

The schools were informed about the procedures and gave consent for the study to take place in the classroom. A consent letter was sent to parents to inform them about what children would be asked. The letters were distributed via the children who returned the signed forms to the school. The participation rate was high during the longitudinal data collection: 92% from Time 1 to Time 2, 88% from Time 1 to Time 3. Participants who provided complete data ($n = 272$, 44% girls) and participants who dropped out ($n = 38$, 50% girls) were similarly distributed between genders ($\chi^2 = 0.47$, $df = 1$, $p = .30$). Multivariate analysis of variance revealed that the mean scores on self-reported values [$F(4,305)=1.10$, $p=.36$] and behaviors [$F(4,305)=1.09$, $p=.36$] were not significantly different between attrited and non-attrited participants. In addition, the Box's M test showed that the covariance matrices of values, $F(10,18453.45)=1.51$, $p=.13$, and behaviors, $F(10,18453.45)=1.55$, $p=.12$, did not differ significantly.

Measures

Personal values

We measured basic human values with the Portrait Values Questionnaire (PVQ, Schwartz, 2006). The PVQ includes 40 short verbal portraits describing a person's goals, aspirations, or wishes that point implicitly to the importance of a value. For example: 'She believes she should always show respect to her parents and to older people. It is important to her to be obedient' describes a person who holds conformity values important. For each portrait, respondents indicate how similar they are to this person on a 6-point scale ranging from "not like me at all" to very much like me". Respondents' values are inferred from the values of the people they consider similar to themselves. The more similar respondents consider themselves to a portrait, the more important the values expressed in this portrait are to them.

As the PVQ-40 has rarely been employed with children aged 11 years or younger (e.g. Knafo & Spinath, 2011), a pre-test was performed on the same respondents who took part in the study, three months before Time 1. Children's questions and observations during the test administration were recorded and used to identify the words in the items that turned out to be

unclear for the children. These words were paraphrased or replaced by appropriate synonyms. This led to modifying half of the original items.¹

We focused on the four higher-order value types (conservation, openness to change, self-enhancement, self-transcendence), because past analyses on PVQ data obtained from 10-12-year-old children in various countries consistently yielded clearly distinct regions for these values (Bilsky et al., 2013; Döring, 2010). The factor structure of the scales was assessed with confirmatory factor analysis (CFA). Two models were tested, one for each pair of higher-order values that are opposite in the circle (i.e., self-enhancement vs. self-transcendence, and conservation vs. openness to change). This approach has been used in previous studies on the PVQ (e.g., Cieciuch, Schwartz & Vecchione, 2013; Knoppen & Saris, 2009). It permits a more accurate examination of specific parts of the circle than a single model for the whole circle, by avoiding sources of misspecification that may derive from the circumplex structure of values (Davidov, Schmidt, & Schwartz, 2008).

Both models have an acceptable fit at each time point (CFI ranged .91-.97; RMSEA ranged .03-.05; SRMR ranged .05-.08). Internal consistency was derived from CFA model parameters, using Hancock and Mueller's (2001) coefficient *H* as an accurate reliability index within latent variable systems. Coefficients ranged from .64 (openness to change at T2) to .89 (self-enhancement at T2), indicating that the measures were internally consistent.

Value-expressive behaviors

Children completed a 16-item questionnaire that was designed for this study. We adapted the adults' questionnaire that was employed by Bardi and Schwartz (2003) for application with children: Some items (e.g., buying environmentally friendly products as an expression of universalism values) did not reflect children's leeway in decision making and were therefore excluded. Some items needed to be slightly rephrased or more concrete. The final questionnaire includes four items for each higher-order value type. For each item, children were instructed to

¹ The modified version of the PVQ is available upon request from the corresponding author.

think of all the times they had an opportunity to engage in this behavior and to estimate how often, of these times, they actually engaged in the behavior. during the past three weeks, from 1—rarely, to 5—very often. . The list of items is reported in the Appendix.

Similarly to what has been done for values, a CFA model was tested for each pair of higher-order values. Both models had acceptable fit (CFI ranged .93-.96; RMSEA ranged .03-.04; SRMR ranged .04-.05). Reliability coefficients ranged from $H=.53$ (openness to change at T3) to $H=.76$ (self-transcendence at T1). Measurement of broad values with only four items may account for the relatively low internal consistency of some dimensions.

Results

Measurement Invariance Across Time

As a preliminary step, we assessed the longitudinal invariance of the personal values and value-expressive behaviors. We first examined configural invariance by fitting the three waves of data simultaneously, without imposing equality constraints across time. A configural model was tested for each pair of higher-order values and behaviors. We then tested metric invariance, by constraining the factor loadings of each scale to be equal over time.

Table 1 reports the results of measurement invariance tests. As can be observed, goodness-of-fit indices for the configural invariance models were within recommended guidelines, except for the CFI of the model that includes openness to change and conservation values, which fell slightly below .90. Overall, results supported that the scales represent similar constructs across time. Equality constraints on factor loadings ended in a non-significant increase of the chi-square when compared with the configural models. We can therefore conclude that longitudinal metric invariance is tenable for all measures.

Intercorrelations Among Values and Behaviors

Means, standard deviations and Pearson correlations are reported in Table 2 (self-enhancement and self-transcendence) and Table 3 (openness to change and conservation). As participants tend to differ in their use of the response scale of both the PVQ and the behavior

questionnaire, correlations were calculated following the common practice of centering persons' responses on his/her own mean response on each scale (Bardi & Schwartz, 2003; Schwartz, 2006). This corrects for individual differences in scale use.

The pattern of means suggests substantial stability. The standardized mean change, calculated as the difference between means at T3 and T1 divided by the standard deviation of the scores at T1, was found to be small for all variables of interest, ranging from zero to less than one-fifth of a standard deviation.

The observed pattern of correlations for basic personal values was in line with the theory, with negative and significant within-time correlations between higher-order values that are opposite in the circle (i.e., between self-enhancement and self-transcendence, and between conservation and openness to change). A similar pattern was observed for value-expressive behaviors. Concurrent correlations between values and behaviors that share the same motivational goals (e.g., between conservation values and conservation behaviors) were positive and significant. Values and behaviors that stem from conflicting motivational goals (e.g., between conservation values and openness to change behaviors) exhibited negative correlations.

Finally, moderate to high correlations across time attested the longitudinal stability of the examined variables. Correlations between adjacent time points ranged from .33 (T1-T2 conservation) to .78 (T2-T3 self-enhancement) for values ($M = .63$, $SD = .14$), and from .36 (T1-T2 openness to change) to .62 (self-transcendence) for behaviors ($M = .48$; $SD = .08$).

Reciprocal Relationships Between Values and Behavior over Time

Cross-lagged models were used to investigate the possible reciprocal relations between values and behaviors. Four alternative models were tested, using full information maximum likelihood. Model 1 posits no reciprocal influences over time between values and behaviors. This model assumes that values and behaviors have synchronous (i.e., within wave) correlations, but they do not affect each other. Model 1 includes three classes of parameters: (a) the autoregressive paths, which represent the temporal stability of the constructs, namely the degree to which the

relative ordering of individuals is maintained over time (Roberts & Del Vecchio, 2000); (b) the synchronous correlations (at T2 and T3, correlations were specified between residual terms); (c) the cross-lagged paths between conflicting values (e.g. from self-enhancement values at T1 to self-transcendence values at T2) and between behaviors that express conflicting values (e.g. from openness to change behaviors at T2 to conservation behaviors at T3). These parameters are only tangentially related to the aim of the study. They are expected to reflect the structure of values proposed by Schwartz (e.g., an increase in the importance of given values is expected to determine a decrease in conflicting values).

Model 2 posits that values affect behaviors but not vice versa. It includes additional cross-lagged paths (d) from each value at one time point to each behavior at the subsequent time point. The magnitude of these parameters reflects the change in behaviors that is accounted for by values, controlling for the stability of behaviors. Model 3 assumes the reverse path of influence (i.e. behaviors affect values, but not vice versa). It includes cross-lagged paths (e) from behaviors to subsequent scores on values. Model 4 includes cross-lagged paths in both directions (d, e). This is the larger (less parsimonious) model. A simplified representation of this model (with only one value and only one behavior) is presented in Figure 2.

The four competing models were tested for each pair of opposite higher-order values and behaviors. Model A includes item composites of self-enhancement and self-transcendence values and behaviors. Model B includes item composites of openness to change and conservation values and behaviors.² We used uncentered scores in this analysis, as centered scores may cause multicollinearity problems in regression-based analysis.

Table 4 presents the goodness fit indices of each tested model. Results showed that Model 4 fitted significantly better for both pairs of higher-order values (i.e., the chi-square value of this

²An alternative would have been to use factor scores, which are less affected by measurement error. Their use, however, has been criticized for producing biased estimates (e.g., Bollen, 1989). We therefore preferred to rely on item composites. It should be noted, however, that factor scores and item composites are highly intercorrelated in the present sample (average r was .94), and that model parameters are substantially equivalent using either one or the other.

model was significantly lower than those of more restricted models). This suggests that values and behaviors have a reciprocal influence over time, after the stability of the variables was taken into account. In other words, values predicted change in behaviors, while behaviors predicted change in values. Parameter estimates from this best fitting model are reported in Table 5 (autoregressive paths) and Table 6 (cross-lagged effects between values and behaviors).

Autoregressive paths averaged .57 for values, and .40 for behaviors (Table 5). Values and behaviors pertaining to the same domain were significantly correlated within time ($p < .05$). At T1, correlations were .30 for self-enhancement, .51 for self-transcendence, .54 for conservation, and .31 for openness to change. At T2 and T3, correlations between residuals were respectively .19 and .26 for self-enhancement, .42 and .40 for self-transcendence, .34 and .32 for conservation, .12 and .14 for openness to change.

Significant cross-lagged paths were observed between values that are opposite in the circle, as well as between opposite behaviors, but only in the self-enhancement and self-transcendence dimensions. We found that self-enhancement values at T2 negatively predicted self-transcendence values at T3; self-enhancement values at T2 negatively predicted self-transcendence values at T3. Self-transcendence behavior at T2 negatively predicted self-enhancement behavior at T3.

Several cross-lagged effects from basic values to value-expressive behaviors were found to be significant, over and above the stability of behaviors (Table 6). Self-enhancement values at T1 predicted positively self-enhancement behaviors at T2. They also had a negative effect on self-transcendence behaviors at T2. Self-transcendence values at T1 and T2 predicted positively self-transcendence behaviors at T2, and T3, respectively. Conservation values at T1 and T2 predicted positively conservation behaviors at T2, and T3, respectively. Openness to change values at T1 predicted positively openness to change behaviors at T2. Moreover, openness to change values at T1 and T2 predicted negatively conservation behaviors at T2 and T3.

Some cross-lagged paths from value-expressive behaviors to basic values were also significant, over and above the stability of values. These effects, however, seem slightly weaker and

less consistent than the effects from values to later behavior. As shown in Table 6, self-enhancement behaviors at T1 predicted positively self-enhancement values at T2. Self-transcendence behaviors at T1 predicted negatively self-enhancement values at T2. Self-transcendence behaviors at T1 and T2 predicted positively self-transcendence values at T2 and T3, respectively. Conservation behaviors at T1 and T2 predicted positively conservation values at T2 and T3.

Discussion

The present study focuses on the dynamic relations between Schwartz's (1992) values and behavior at the transition from childhood to adolescence. The stability coefficients we observed for the four-higher order values measured three months apart are as high as those found for other self-reported personality dispositions in childhood (see La Greca, 1990, for a review). At the same time, they were lower than those found for adults, which in an earlier study (Vecchione, Schwartz, Dentale & Caprara, 2012) ranged between .71 (self-transcendence) and .79 (openness to change) over a similar time interval (i.e., two months). Furthermore, children reported a moderate stability in value-expressive behavior. This pattern of results reflects the current view that while personality structure is basically set in childhood, major growth occurs throughout childhood and into adulthood. The older people grow, the more crystallized their self-perceptions become and the less likely new experiences are to challenge them (e.g., Caspi & Roberts, 2001).

The patterns of changing value priorities during this developmental stage consistently reflected motivational compatibilities and conflicts as captured in Schwartz's (1992) model: As values of self-transcendence became more important, values of self-enhancement became less important and vice versa. In this respect, our findings are in line with the few existing studies on change in value prioritization as naturally occurs over time (Bardi et al., 2009) or as induced by significant life events (Daniel, Fortuna, Thrun, Cioban & Knafo, 2013) or by experimental manipulation (Maio et al., 2009). Similar evidence was found for value-expressive behavior: As

self-transcendence behaviors increased in frequency, self-enhancement behaviors became less frequent.

Most importantly, we found that values and behavior have reciprocal longitudinal relations, in which values predict later increases in the behavior that expresses them and later decreases in the behavior that impedes their fulfillment. Similarly, but more weakly, we found that behavior predicts later increases in the values that it expresses and later decrease in the opposing values. These reciprocal relations may suggest that the different elements of the self-concept develop in coherence with one another, rather than in isolation. As children gradually develop an image of who they are, the things they find important and the behavior they consider typical of themselves seem to converge. At the threshold from childhood to adolescence, children start to strive towards continuity of their self (Klimstra, 2012), which seems to go along with parallel development of values and behavior: Across time, children do what they value, and they also value what they do (for similar findings regarding values and beliefs in adults, see Goodwin, Polek, & Bardi, 2012).

Values and Behavior: Strength and Structure of Relations

In our study, value-expressive behaviors showed moderate associations with their corresponding higher-order value type as assessed at the same point in time. The average correlation was .37, with coefficients ranging from .43 to .48 for self-enhancement, from .33 to .49 for self-transcendence, from .41 to .52 for openness to change, and from .13 to .20 for conservation. In a similar study on adults, value-behavior correlations for each of the ten values ranged from .28 to .76, with an average of .48 (Bardi & Schwartz, 2003). Thus the correlations we found in our study were apparently smaller than those reported in adulthood. It may be argued that children's agentic power is rather low as compared to later stages of life. For example, their parents may not allow them to watch adventure films or decorate their room, so that children cannot express their values of openness to change in this way. Likewise, children are not completely free to choose who they meet or help, and their overall power to influence others to get what they want is limited. That means, whereas values represent the self, children's behavior is more situationally constrained. As

children grow older, they gain more power to affect their environment and to act according to their personality (Scarr & McCartney, 1983). Our finding that value-behavior correlations gradually increase from T1 to T3 are in line with this argument.

The question of why the relations we found for conservation values were smaller than had been observed for the other higher-order value types is still open. It has been argued (Döring, 2010; Döring et al., 2010) that concrete behavior associated with conservation values does not imply active striving toward a goal, but rather a passive and protective conservation of the status quo. Conservation-seeking behavior is primarily about what is not done rather than about what is actively done, as is apparent from the verbs we employed in our questionnaire: ‘respect’, ‘obey’, ‘avoid’.

Considering value-behavior relations in a snapshot view, we replicated findings from adulthood. Moreover, our findings underscored the potential of Schwartz’s model as a comprehensive framework for understanding patterns of relationships, as values were not only positively associated with the corresponding behavior, but also negatively associated with the opposed behavior. The motivational compatibilities and conflicts underlying Schwartz’s (1992) model appears to be relevant for studying children’s values and behavior not only at one point in time, but also longitudinally, as discussed in the next paragraph.

Reciprocal Relations Between Values and Behavior over Time

Do children adapt their behavior to their values? In our study, value prioritization clearly predicted later children’s engagement in actions that expressed these values. Using Bardi and Schwartz’s (2003) terminology, children’s expression of value-consistent action is probably a way to naturally pursue their values and get what they want. Furthermore, to a lesser degree, over time children also decreased their engagement in those behaviors that conflicted with the values they were striving toward, as self-enhancement values negatively predicted later self-transcendence behavior, and openness to change values negatively predicted later conservation behavior. That means children realized these so called ‘self-focused’ values (see Schwartz, 2006) not only through

acting in a way that strengthened their own position and gave them stimulation and free choice, but also through engaging less in actions that aimed at the community and others' well-being.

Do children adapt their values to their behavior? Interestingly, the answer to this question was also 'Yes'. Self-enhancement, self-transcendence and conservation behavior positively predicted a later increase in prioritization of the respective values, meaning that as children engaged in value-expressive actions, the underlying values became more important. In this respect, we captured a process that had been proposed in the literature (Bardi & Goodwin, 2011) and that underlies numerous educational endeavors, but that had not been systematically examined in empirical studies. At present, we can only speculate about underlying developmental processes: It may be that the value-expressive activities were intrinsically or extrinsically rewarding for the children and that they were closely linked to positive emotions. For example, competing and succeeding may make children proud and increase their self-efficacy, which in turn would increase the later prioritization of achievement values. In the same vein, being close to others and caring for their well-being can be intrinsically rewarding and trigger positive emotions, as explained in attachment theory (Ainsworth & Bowlby, 1991), which in turn would increase the later prioritization of benevolence values. Additionally, cognitive processes as proposed by Bardi and Goodwin (2011) could come into play. For example, in an attempt to reduce cognitive dissonance, children may want to be consistent and adjust their values to match their behavior. Also, performing certain behaviors may genuinely convince children of the values they express (e.g., wearing kneepads for skating and experiencing how well they protect the child when he/she falls down may convince the child of the importance of security values, along their experience of parents' relief and happiness).

Limitations and Future Directions

In our study, we succeeded to capture the unexplored dynamic relations between values and behavior over time. Having captured this phenomenon in a specific sample and age group, it would be important to see how it expands to other age groups and cultures. In view of developmental

processes and educational demands, it will be particularly important to examine value-behavior relations in early childhood, to explore the onset of the development of value concepts and its relations with children's behavior and the opportunities for action as provided by primary caregivers.

Following Bardi and Schwartz's (2003) approach, we adapted an adult behavioral questionnaire for application with children. Assessing both values and behavior through children's self-report it is possible that we have overestimated the strength of value-behavior relations due to common method bias (see McBroom & Reed, 1992), although self-reports are usually rather valid (see Gosling, John, Craik, & Robins 1998). Still, common method bias was not likely to create cross-lagged correlations as they reflect links between variables measured three months apart. Our behavioral questionnaire asked children to report the frequency of each behavior across all situations in the past three weeks where they had the opportunity to perform it (see Bardi & Schwartz, 2003 for further explanation of the rationale). This allowed us to assess behavior across contexts. Nonetheless, observing children's behavior in situations that they typically encounter in their everyday life and exploring how these opportunities for showing value-expressive actions shape children's values are highly important for future research. Moreover, researchers should extend the study to longer time intervals, by examining whether the reciprocal effect of values and value-expressive behavior is persistent or tend to decay over time.

To conclude, children's values and behaviour show a certain degree of stability, but also change meaningfully over a six-month period. They change according to the conflicts and compatibilities that organize Schwartz's model, and have reciprocal influences – value change leads to relevant behaviour change and vice versa.

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Table 1. Tests of longitudinal invariance of the PVQ and the behaviour questionnaire.

	Configural invariance				Metric invariance				<i>Model comparison</i>		
	χ^2	<i>df</i>	CFI	RMSEA	χ^2	<i>df</i>	CFI	RMSEA	$\Delta\chi^2$	Δdf	<i>p</i>
<i>Values</i>											
S-Enhan vs. S-Tran	1590.5	1104	.911	.036 (.032, .040)	1612.4	1134	.912	.035 (.031, .039)	21.9	30	.86
OpChg vs. Cons	1803.7	1278	.880	.035 (.031, .038)	1842.2	1312	.879	.034 (.031, .038)	38.5	34	.27
<i>Behaviors</i>											
S-Enhan vs. S-Tran	260.02	213	.965	.031 (.015, .044)	272.04	229	.968	.029 (.011, .041)	12.02	16	.74
OpChg vs. Cons	244.85	213	.969	.026 (.000, .041)	260.91	229	.974	.020 (.000, .031)	16.06	16	.45

Table 2. Means, standard deviations, and intercorrelations across time between self-enhancement and self-transcendence values and behaviors.

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
1.Self-Enhancement values (T1)	3.06	.97	1.00											
2.Self-Transcendence values (T1)	4.61	.81	-.70**	1.00										
3.Self-Enhancement behaviors (T1)	3.58	.81	.43**	-.33**	1.00									
4.Self-Transcendence behaviors (T1)	3.97	.76	-.38**	.33**	-.48**	1.00								
5.Self-Enhancement values (T2)	3.04	.99	.77**	-.56**	.41**	-.36**	1.00							
6.Self-Transcendence values (T2)	4.64	.81	-.59**	.55**	-.34**	.34**	-.74**	1.00						
7.Self-Enhancement behaviors (T2)	3.34	.83	.42**	-.33**	.48**	-.36**	.48**	-.42**	1.00					
8.Self-Transcendence behaviors (T2)	3.93	.81	-.44**	.37**	-.27**	.51**	-.44**	.42**	-.49**	1.00				
9.Self-Enhancement values (T3)	3.07	1.04	.75**	-.57**	.40**	-.32**	.78**	-.62**	.40**	-.39**	1.00			
10.Self-Transcendence values (T3)	4.75	.84	-.62**	.61**	-.40**	.39**	-.65**	.70**	-.38**	.48**	-.78**	1.00		
11.Self-Enhancement behaviors (T3)	3.44	.83	.41**	-.34**	.47**	-.39**	.46**	-.37**	.59**	-.43**	.48**	-.46**	1.00	
12.Self-Transcendence behaviors (T3)	3.98	.78	-.39**	.34**	-.18**	.42**	-.35**	.39**	-.34**	.62**	-.41**	.49**	-.46**	1.00

Note. * $p < .05$; ** $p < .01$.

Table 3. Means, standard deviations, and intercorrelations across time between openness to change and conservation values and behaviors.

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
1.Openness to change values (T1)	4.36	.80	1.00											
2.Conservation values (T1)	4.62	.79	-.47**	1.00										
3.Openness to change behaviors (T1)	3.65	.77	.41**	-.29**	1.00									
4.Conservation behaviors (T1)	3.68	.76	-.20**	.15**	-.41**	1.00								
5.Openness to change values (T2)	4.39	.74	.65**	-.31**	.36**	-.17**	1.00							
6.Conservation values (T2)	4.61	.79	-.37**	.45**	-.27**	.12*	-.47**	1.00						
7.Openness to change behaviors (T2)	3.55	.86	.39**	-.29**	.36**	-.15**	.43**	-.34**	1.00					
8.Conservation behaviors (T2)	3.50	.73	-.28**	.21**	-.20**	.38**	-.20**	.13*	-.48**	1.00				
9.Openness to change values (T3)	4.50	.81	.54**	-.31**	.30**	-.13*	.68**	-.36**	.40**	-.23**	1.00			
10.Conservation values (T3)	4.75	.77	-.35**	.52**	-.25**	.18**	-.43**	.49**	-.26**	.17**	-.59**	1.00		
11.Openness to change behaviors (T3)	3.51	.89	.36**	-.25**	.38**	-.20**	.45**	-.25**	.50**	-.24**	.52**	-.33**	1.00	
12.Conservation behaviors (T3)	3.58	.72	-.20**	.13*	-.19**	.37**	-.16**	.17**	-.21**	.38**	-.26**	.20**	-.42**	1.00

Notes. * $p < .05$; ** $p < .01$.

Table 4. Goodness of fit of alternative cross-lagged models.

Model A: Self-enhancement and self-transcendence						
	χ^2	df	CFI	SRMR	RMSEA	AIC
Model 1A – only stability	202.81	36	.874	.140	.117 (.101, .133)	7633.79
Model 2A – values affect behaviors	100.54	28	.945	.060	.087 (.069, .106)	7533.08
Model 3A – behaviors affect values	142.31	28	.914	.095	.110 (.092, .128)	7579.45
Model 4A – reciprocal influence	62.05	20	.968	.033	.079 (.057, .101)	7503.93
Model B: Openness to change and conservation						
	χ^2	df	CFI	SRMR	RMSEA	AIC
Model 1B – only stability	171.97	36	.866	.104	.105 (.090, .121)	7369.32
Model 2B – values affect behaviors	87.77	28	.941	.057	.079 (.061, .098)	7294.87
Model 3B – behaviors affect values	122.48	28	.907	.073	.100 (.082, .118)	7335.49
Model 4B – reciprocal influence	57.46	20	.963	.040	.074 (.052, .097)	7279.85

Note. Best-fit models are highlighted in bold.

Table 5. Stability coefficients of the best fitting cross-lagged model.

<i>Model 4A: Self-enhancement and Self-transcendence</i>			<i>Model 4B: Conservation and Openness to change</i>		
Stability coefficients	<i>t1→t2</i>	<i>t2→t3</i>	Stability coefficients	<i>t1→t2</i>	<i>t2→t3</i>
S-Enhan (V)	.66**	.71**	Cons (V)	.61**	.57**
S-Tran (V)	.50**	.56**	OpChg (V)	.52**	.50**
S-Enhan (B)	.40**	.53**	Cons (B)	.44**	.33**
S-Tran (B)	.37**	.47**	OpChg (B)	.39**	.39**

Note. * $p < .05$, ** $p < .01$; S-Tran=Self-Transcendence; S-Enhan=Self-Enhancement; Cons=Conservation; OpChg=Openness to Change. V=values; B=behaviours.

Table 6. Structural parameters of the best-fitting cross-lagged model.

<i>Model 4A: Self-enhancement and Self-transcendence</i>			<i>Model 4A: Conservation and Openness to change</i>		
<i>Values → behaviors</i>	<i>t1→t2</i>	<i>t2→t3</i>	<i>Values → behaviors</i>	<i>t1→t2</i>	<i>t2→t3</i>
S-Enhan (V)→S-Enhan (B)	.19**	.05	Cons (V)→Cons (B)	.36**	.28**
S-Enhan (V)→S-Tran (B)	-.20**	-.09	Cons (V)→OpChg (B)	.02	.02
S-Tran (V)→S-Enhan (B)	.03	.03	OpChg (V)→Cons (B)	-.14**	-.17**
S-Tran (V)→S-Tran (B)	.27**	.18**	OpChg (V)→OpChg (B)	.15**	-.01
<i>Behaviors → values</i>	<i>t1→t2</i>	<i>t2→t3</i>	<i>Behaviors → values</i>	<i>t1→t2</i>	<i>t2→t3</i>
S-Enhan (B)→S-Enhan (V)	.15**	.02	Cons (B)→Cons (V)	.14**	.23*
S-Enhan (B)→S-Tran (V)	.04	.01	Cons (B)→OpChg (V)	-.03	.05
S-Tran (B)→S-Enhan (V)	-.09*	-.07	OpChg (B)→Cons (V)	.02	-.02
S-Tran (B)→S-Tran (V)	.22**	.15*	OpChg (B)→OpChg (V)	.09 [†]	.05

Note. * $p < .05$, ** $p < .01$; [†] $p < .10$. R-squared at T2 ranged from .26 (S-Enhan-B) to .58 (S-Enhan-V); R-squared at T3 ranged from .20 (OpChg-B) to .58 (S-Enhan-V).

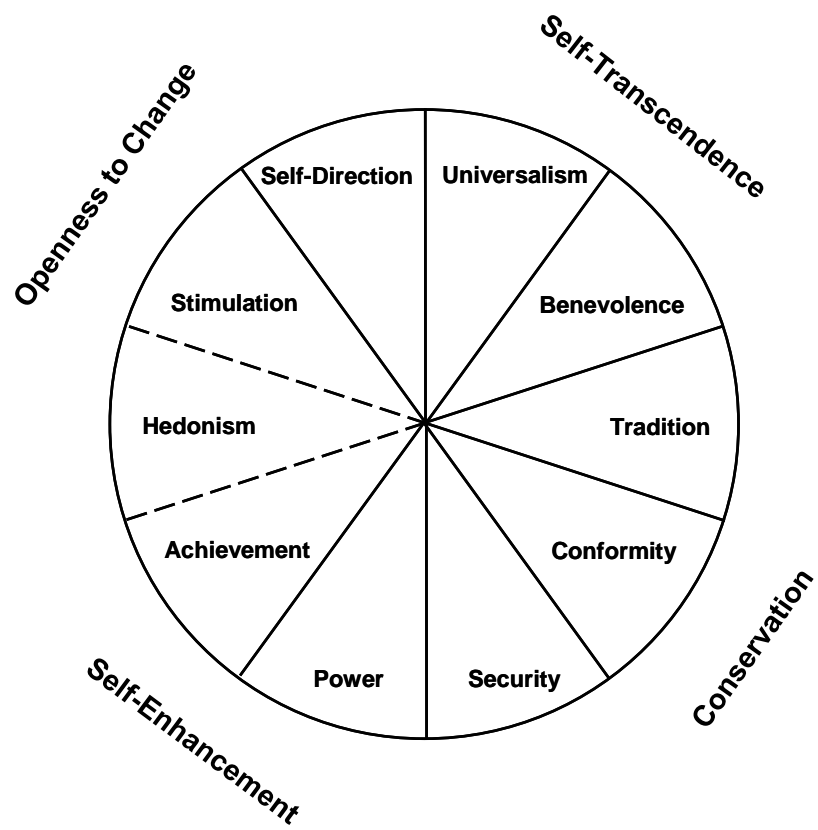


Figure 1. Schwartz's (1992) circular model of values.

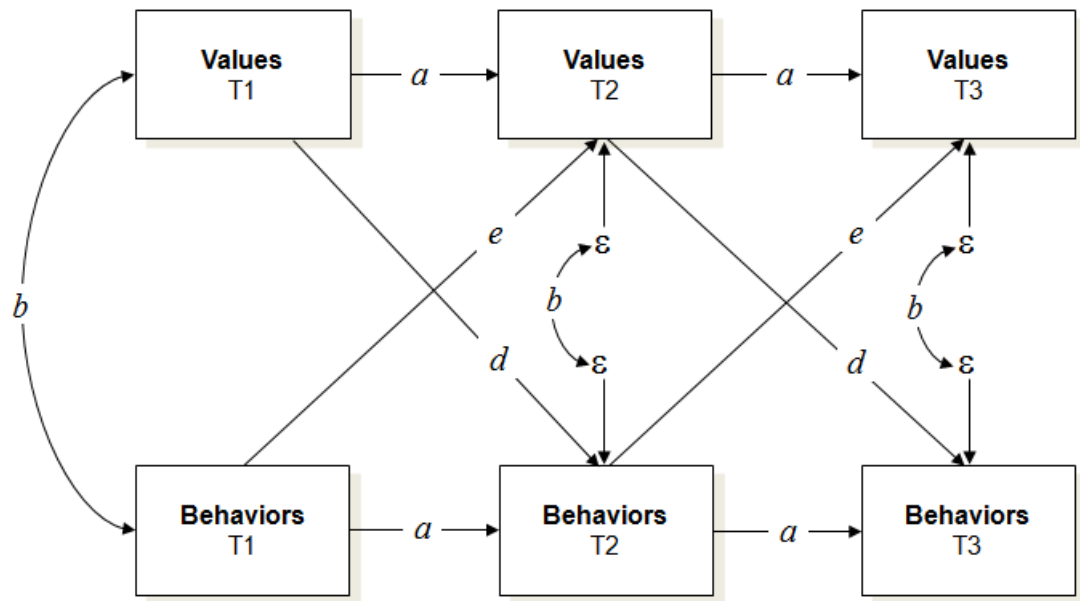


Figure 2. Simplified representation (with only one value and one behavior) of Model 4.

Note. a =autoregressive parameters; b =cross-sectional associations; d =cross-lagged effects from values to behaviors; e =cross-lagged effects from behaviors to values. Parameters c (cross-lagged paths between conflicting values, and between conflicting behaviors) are not represented.

Appendix

1. I keep my opinion even if the other children don't agree. (Openness to Change)
2. I respect the customs and habits of my family. (Conservation)
3. I obey the rules and regulations. (Conservation)
4. I influence others to get what I want. (Self-Enhancement)
5. I avoid dangerous places and neighborhoods. (Conservation)
6. I work hard to get the best grades in class. (Self-Enhancement)
7. I take care not to harm animals, even insects. (Self-Transcendence)
8. When my friends feel bad, I spend time with them to make them smile. (Self-Transcendence)
9. I do what I can to win competitions, for example in sports. (S-Enhancement)
10. I use a helmet or a security belt even if it's not compulsory. (Conservation)
11. I lend my stuff to my friends, (Self-Transcendence)
12. I watch adventure films. (Openness to Change)
13. I invent new decorations for my room. (Openness to Change)
14. I care for my friends and my family whenever they ask for it. (Self-Transcendence)
15. I put much effort into doing handicrafts, so that my work will be the very best. (Self-Enhancement)
16. I check whether rules and regulations make sense to me before I follow them. (Openness to Change)