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Value Development during Adolescence: Dimensions of Change and Stability

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Abstract

Objective: Value change stability was examined in a longitudinal sample of Jewish and Arab Israeli adolescents.

Method: Adolescents ($N = 520$; 55.4% girls, $M_{\text{age}} = 13.76$, $SD = .52$, at initial assessment) reported value importance at four annual evaluations.

Results: Adolescents increased in values' internal coherence and rank-order stability. Their value hierarchy was consistent and differentiated from the hierarchy of adults. Latent growth curve analyses indicated a similar pattern of mean-level value change for both ethnic groups: an increase in power and a decrease in tradition values; an increase in self-direction values among Jewish adolescents but not among Arab participants. Overall, the perceived importance of power, achievement, and self-direction values was more likely to increase than decrease, and the importance of conformity, tradition, security, and benevolence values was more likely to decrease than increase. Intra-individual changes in value importance followed the postulated pattern, as compatible values changed together, while conflicting values changed in opposite directions.

Conclusions: This paper suggests that values become better indicators of individual characteristics during adolescence. Adolescents increase their endorsement of self-focused values and decrease their valuation of other-focused values. They maintain the integrity of their value system despite value changes, confirming and validating value theory.

Keywords: Values, value change, adolescence, longitudinal study

Value Development during Adolescence: Dimensions of Change and Stability

Adolescence is generally recognized as a time of psychological change, but also a time when personality trends are stabilized: while many adolescents rethink their convictions and question their identity, many others report stability in their identity commitments (Meeus, 2011). Value commitment is an important aspect of this identity formation process (Erikson, 1968), but little is known about the extent and path of change or stability in their values.

Values are ideas that describe the desirable; as such, they are used to choose and evaluate attitudes, behaviors, and norms (Schwartz, 1992). As contributors to well-being and behavior, values relate to various domains, such as self-esteem (e.g., Lönnqvist et al., 2009), satisfaction with life (e.g., Sortheix & Lönnqvist, 2014), and aggressive behavior (e.g., Benish-Weisman, 2015). The importance of these factors suggests the need to probe values and value change among adolescents more closely.

Value development between early and middle adolescence has been examined cross-sectionally (Gouveia, Vione, Milfont, & Fischer, 2015; Schwartz, 2012b). While longitudinal studies have focused on younger (Cieciuch et al., 2016) or older age groups (Vecchione, Schwartz et al., 2016), they have rarely included early and middle adolescents (e.g., Hofmann-Towfigh, 2007), despite the centrality of values in identity development during this life period (Meeus, 2011). The current study set out to close this gap by studying the value development of 520 adolescents annually, over a period of three years, at four time points, beginning at age 13 and ending at age 16. It examined multiple aspects of change and stability in values, including internal coherence, rank-order stability, value hierarchy stability, intra-individual changes in value importance, and their respective pattern.

Values

Values are abstractly defined individual goals that serve as guiding principles in people's lives (Schwartz, 1992). In other words, values convey what people find important in their lives (e.g., justice, achievement). They are mental schemas that guide perception, attitude, and behavior (Bardi & Goodwin, 2011). Values are ordered in a personal hierarchy of importance and vary in their importance among individuals and across cultures. Schwartz (1992) suggested that values represent ten motivationally distinct goals (e.g., Schwartz, 1992; Schwartz & Rubel- Lifschitz, 2009; Table 1). The relations between values can be represented as a circular structure (Figure 1), in which adjacent values represent similar motivational goals, while opposite values are conflictual. The circle of values can be summarized by two sets of bipolar dimensions. First, self-enhancement values (power, achievement) stand in contrast to self-transcendence values (benevolence, universalism). Second, conservation values (conformity, tradition, security) can be set against openness to change values (self-direction, stimulation, hedonism; Schwartz, 1992). Importantly, values can be organized by whose interest their attainment serves. Values of openness to change and self-enhancement are self-focused, regulating the expression of personal interests and characteristics. In contrast, values of conservation and self-transcendence are other-focused, regulating social interests and the association of the self with others (e.g., Schwartz, 2012a; Figure 1). The hierarchy of values appears similar across individuals and cultures. For example, benevolence and self-direction values are typically rated as most important, with stimulation, tradition, and power values being typically rated as least important (Schwartz & Bardi, 2001).

Similar patterns of differentiation among value types have been established among adults and adolescents (for a review, see Döring, Daniel, & Knafo, 2016). However, children may distinguish between specific values less clearly than do adults.

Children differentiate clearly between the four higher-order value dimensions (Döring et al., 2015), and as they continue into early adolescence, they are likely to form better internal coherence of each of the ten values.

Value Stability and Change during Adolescence: A Content Perspective

Values are generally hypothesized to be individual characteristics that remain stable over time (e.g., Bardi & Goodwin, 2011). *Rank-order stability* describes the level of constancy in individual differences in value importance within a study sample, and is expressed in test-retest reliability. Rank-order stability suggests that those valuing a value more than others at a given time point are likely to value it more than others at later time points (e.g., Schwartz, 2005; Milfont, Milojev, & Sibley, 2016, Vecchione, Schwartz et al., 2016). There is little information about rank-order stability over short periods of time before adulthood. However, a recent study found that pre-adolescents' values remained moderately stable over a period of six months; namely, these pre-adolescents maintained their relative places in the sample during that time (Vecchione, Döring, Alessandri, Marsicano, & Bardi, 2016). Conversely, another study found that rank-order stability increased between ages seven and 13 (Cieciuch, Davidov, & Algesheimer, 2016).

Value stability is also established via value hierarchy. There are some indications that children's higher-order values maintain a hierarchy similar to that of adults (Döring et al, 2015). However, studies have also found changes in the value hierarchy between childhood and early adolescence (Cieciuch et al, 2016). It remains unclear whether the hierarchy is stable at the personal value level during adolescence.

Researchers have suggested that age-related maturation may be associated with mean-level intra-individual change in value importance throughout the life span (Vecchione, Schwartz et al., 2016). These changes are aimed at maximizing

individuals' opportunities and well-being, helping them fit into a changing environment (Gouveia et al., 2015). As individuals mature, they encounter new situations and new stimuli. They adapt to new demands by targeting different goals or re-evaluating the importance they attach to existing ones (Döring et al., 2016).

Adolescence is a time of transition from childhood to adulthood. As such, it is an outset period for intra-individual changes in value importance. Among the transformations during adolescence are autonomy seeking and self-assertion. Adolescents seek separation from their parents to form their individual and autonomous selves (e.g., Koepke & Denissen, 2012). They increase their demands to make their own decisions over private matters (e.g., Smetana, 2011) and explore new behavioral options, sometimes taking risks (Braams, van Duijvenvoorde, Peper, & Crone, 2015). This process may lead to a unique, idiosyncratic personal identity (e.g., Meeus, 2011). At the same time, to support the process of becoming competent, autonomous individuals, adolescents want to be acknowledged by society (e.g., Van der Giessen, Branje, & Meeus, 2014) and look for acceptance by their peers (Gruenenfelder-Steiger, Harris, & Fend, 2016). In some cases, however, the need for recognition and popularity can lead to acts of control or aggression (Cillessen & Rose, 2005). As a result of these developmental tasks, adolescents' self-focused values (openness to change and self-enhancement) may increase in importance, while other-focused values (conservation and self-transcendence) may lessen in importance.

In line with this theoretical premise, in large cross-sectional studies across cultures, 15 to 21-year-old youth have attributed higher importance to self-focused values and lower importance to other-focused values, relative to adults (Schwartz, 2012b). A one-year, two-measurement, longitudinal study of adolescents of highly varying ages ($M_{\text{age}} = 15$, $SD = 2$) found a small increase in the importance of the self-

focused values of self-direction, power, and achievement; no change in the importance of the other-focused values of conservation; and a small decrease in the importance of the other-focused values of self-transcendence (Hofmann-Towfigh, 2007). These results were replicated in a longitudinal study of children and early adolescents (Cieciuch et al., 2016), finding an increase in self-focused values and a decrease in other-focused values between 10 and 12 years of age, with stability observed between ages 12 and 13. A large cross-sectional study in Brazil found positive associations between age and the importance of self-focused values among 12 to 18-year-olds and negative associations in the importance of other-focused conformity values. Surprisingly, it found positive associations between age and other-focused self-transcendence values (Gouveia et al., 2015). However, as the adolescents were not followed over time, the results may be attributed to cohort effects. These studies focused on values mean-level changes with little attention to individual changes. We suggest that, with adolescence being a period of self-questioning and identity exploration (e.g., Crocetti, 2017), we will find variation in value change among individuals.

To conclude, the findings of previous studies are largely in line with the theoretical premise of changes in self-differentiation, autonomy seeking, and the need for competence among youth, leading to an increase in the importance of self-focused values and a decrease in the importance of other-focused ones. However, these studies have either focused on younger ages or were restricted by cross-sectional or time-limited longitudinal designs. This study represents the first attempt to follow intra-individual development in values over an extended understudied period, between early and middle adolescence.

Values Stability and Change during Adolescence: Structural Perspective

The Schwartz value theory suggests that intra-individual value importance change should occur in an organized, coherent manner (Schwartz, 1992; Vecchione, Schwartz et al., 2016). This organized pattern of change dictates that if one value increases in importance and the opposite one remains stable, adolescents may feel uneasy due to the inherent inconsistencies between the two. Therefore, as one value begins to increase, values driven by compatible motivations are likely to increase as well, while values driven by conflicting motivations are likely to decrease (Bardi, Lee, Hofmann-Towfigh, & Soutar, 2009). For example, adolescents who wish to stand on their own (openness to change) may feel conflicted, even distressed, due to their desire to conform to their peer group (conservation). Such distress may lead to additional changes in values (Bardi et al., 2009) to restore the balance of the value system. Similarly, adolescents who increasingly strive for dominance in their group (self-enhancement) may feel less inclined to tolerate variety among fellow group members (self-transcendence).

This pattern of value-structure stability, in which values change in accordance with Schwartz's circular structure, has been confirmed in longitudinal studies (Bardi et al., 2009; Vecchione, Schwartz et al., 2016) and in experimental studies (Maio et al., 2009). The stability in value structure is independent of any intra-individual changes in value importance (Bardi et al., 2009). This allows values to continue functioning as guiding motivations in adolescents' lives and to minimize internal conflicts (Schwartz, 2012b), even as they change in mean-level importance.

The Current Study

The study had five aims. First, we investigated the internal coherence of values among adolescents. We hypothesized that as values differentiate into ten types during middle childhood (Döring et al., 2015), we may find increases in internal coherence

during adolescence. Second, regarding the rank-order stability of values, we hypothesized that values are intra-individually stable, and this stability increases during adolescence (Cieciuch et al., 2016; Vecchione, Döring et al., 2016). As values demonstrate remarkable hierarchical stability across ages and cultures (Schwartz & Bardi, 2001), we expected adolescents' value hierarchy to remain stable over time. However, given that some age trends were found during childhood (Cieciuch et al., 2016), and that adolescence is a time of setting unique goals (Smetana, 2011), we explored the similarity between adolescents' and adults' value hierarchy.

Third, we investigated the intra-individual change in value importance in early to middle adolescence. Given the well-known limitations of cross-sectional studies (Lindell & Whitney, 2001), the developmental route of value change should be examined longitudinally. Following the noted cross-sectional results, we hypothesized that during adolescence, self-focused values of openness to change (hedonism, stimulation, and self-direction) and self-enhancement (power and achievement) increase, while other-focused values of conservation (conformity, tradition, and security) and self-transcendence (benevolence and universalism) decrease in importance (Schwartz, 2005). We expected to find varying trajectories of change among individuals, due to the exploratory nature of adolescent identity development (Crocetti, 2017).

Fourth, we postulated that patterns of intra-individual change are systematic, in line with the circular structure of conflicts and compatibilities of value importance, leading to stability of the values' circular structure (Bardi & Goodwin, 2011; Bardi et al., 2009). Most previous studies of value change patterns have included two measurement points (Bardi et al., 2009; Lönnqvist et al., 2011) and examined value change in terms of difference scores. The use of difference score measures is

controversial, however, as it may have low reliability (Gollwitzer, Christ, & Lemmer, 2014). One study among adults used latent growth curves to estimate value change across four measurements (Vecchione, Schwartz et al., 2016); we used this improved method in our examination of adolescents.

Earlier studies have established that the importance of specific values differs by gender (Schwartz & Rubel-Lifschitz, 2009). Women tend to accord more importance to benevolence and universalism (other-focused) values than do men, with the opposite being the case for self-focused values. Thus, we controlled for gender in all analyses.

The study was conducted among two ethnic groups: Jewish Israelis and Arab citizens of Israel. In Israel, the Jewish population is the largest ethnic/cultural group, comprising 74.8% of the population (Israel Central Bureau of Statistics, 2016). Arab citizens of Israel are Palestinians whose families lived in what is now the State of Israel before its foundation. They comprise 20.8% of the Israeli population; a majority practice Islam, and minorities practice Christianity and Druze religions (Israel Central Bureau of Statistics, 2016). The Jewish population is defined by relatively Western and individualistic values and norms, which emphasize mastery and independence (Mayseless & Scharf, 2003; Schwartz, 2008), whereas the Arab population holds to more conservative and collectivistic values, which emphasize family and society needs (e.g., Lapidot-Lefler & Hosri, 2016). Previous studies have established that cultures differ in value importance (e.g., Schwartz, 2008). However, studies of individual development during adolescence have generally found similar developmental patterns across cultures, indicating that adolescence is associated with similar tasks across cultures (e.g., Costa et al., 2000). We therefore hypothesized that adolescents in both groups develop similarly regardless of cultural value differences.

Method

Participants

The study included 520 adolescents (55.4% girls) from four public schools whose students were Jewish (45.2%) and Arab citizens of Israel (each school had one of the two main cultural groups). The students were approached annually over four years (T1-T4, from 8th to 11th grade) through their schools. Participants reported their mothers' and fathers' highest level of education: elementary, 3.2%, 6.1%; high school, 44.4%, 50%; university, 38.3%, 29.5%, for mothers and fathers respectively. Values were missing for 13.5% for mothers and 14.4% for fathers.

We included adolescents who participated in at least a single time measure: 8th grade, $N = 438$, $M_{\text{age}} = 13.76$, $SD = .52$; 9th grade, $N = 448$ ($M_{\text{age}} = 14.59$, $SD = .52$); 10th grade, $N = 445$ ($M_{\text{age}} = 15.65$, $SD = .55$); 11th grade, $N = 389$ ($M_{\text{age}} = 16.40$, $SD = .49$). Most of the participants (84 %) took part in at least three of the study's time points (four time points: 52%; three time points: 32%; two time points: 12%; one time point: 4%). We analyzed attrition by comparing those responding and those not responding at T4. While we found no differences in their demographic variables (i.e., gender, ethnicity, parents' education level), the T4 non-responders reported lower hedonism values at T1, $t(442) = 2.33$, $p = .02$, and higher power values at T2, $t(386) = -2.21$, $p = .03$.

Procedure

Of seven schools selected from a list of high schools in the north of Israel that were approached by telephone, four agreed to participate. The schools were part of the public Jewish or Arab school systems, both under the auspices of the Israel Ministry of Education. The systems differ in ethnic group of students, language, and to some extent, curriculum. Consent forms were sent at each time point to parents of all

adolescents in the target grade level; only those whose parents gave consent for them to participate (over 95%) completed the questionnaires. The data were collected annually between February and May over four years, 2011-2014. Questionnaires were distributed by trained research assistants during a class session at the participants' schools, with the forms completed in about 45 minutes. The experimenters explained instructions and answered any questions. For their participation, students received small, attractive incentives (novelty pens or pencils) at each time measure. The study was conducted in accordance with the requirements of the University's and the Ministry of Education's ethical review boards.

Measures

Value: Students' values were assessed using the Portrait Values Questionnaire (PVQ; Schwartz, 2003). The PVQ has been shown to be suitable for use with adolescents (Benish-Weisman, 2015; Döring et al., 2016). It includes short verbal descriptions of 40 people's goals and aspirations, implicitly indicating the importance of one of the ten cited values. For each portrait, adolescents are asked to rate, on a 6-point Likert scale (1 = "not like me at all" to 6 = "very much like me"), how similar they are to the person described in the portrait. For example, "He likes to take risks; he is always looking for adventures" is an item measuring stimulation values. Respondents' own values are inferred from their self-reported similarity to people described in terms of particular values. As a standard procedure when using the PVQ, we controlled for response tendency by centering each participant's responses around their average response to all questions on the scale (Schwartz, 2003).

We estimated the associations between the values within each time point, using confirmatory ordinal multi-dimensional scaling (MDS; Borg & Groenen, 2005; see details in the Results section). We established time equivalence of the values, using

Multigroup Confirmatory Factor Analysis, the gold standard for value measurement invariance (Cieciuch, Davidov, Vecchione, Beierlein, & Schwartz, 2014). We established configural, metric, and scalar invariance (metric vs configural RMSEA $\Delta = .004$, CFI $\Delta = .002$; scalar vs. configural RMSEA $\Delta = .005$, CFI $\Delta < .001$). The analysis indicates values load similarly and intercepts are equal across time points. Therefore, value covariance, regression coefficients, and means can be compared across times.

Control variables: Ethnicity and gender were based on the participants' reports.

Results

Descriptive Analyses, Internal Coherence, and Value Rank-Order Stability

Table 2 presents the means and standard deviations, one-way ANOVA, and linear contrasts of values across times. As the table indicates, we found significant increases in the importance of values of power and self-direction. However, this analysis did not take the longitudinal nature of the data into account. Table 1 presents the Cronbach's α reliability for each of the ten values. When we compared the internal coherence of values across times (Diedenhofen & Musch, 2016), we found that eight of the ten values showed significantly higher reliability with age.

The correlations between the same values across time points (test-retest) for Jewish and Arab adolescents are presented in Table 3. The moderate correlations indicate some rank-order stability in values over one, two, and even three years. Overall, the level of rank-order stability increased with age, as indicated by correlations that were lower for T1–T2 ($M = .46$, $SD = .10$; $M = .29$, $SD = .08$) than for T3–T4 ($M = .59$, $SD = .08$; $M = .34$, $SD = .11$) for Jewish and Arab adolescents, respectively. Some differences were found in stability between the two ethnic groups,

as Jewish adolescents reported more stable value importance, especially in conformity and universalism values, and between adjacent time points. A full correlation table is included in the Supplemental Materials. Finally, we examined the stability of the participants' values hierarchy, testing whether this hierarchy is age specific, by comparing it to a representative Israeli adult sample. The Pearson correlations between the rank order of the values across times were all very high and significant (ranging between $r = .95$ to $r = .99$ for Jewish Adolescents and $r = .99$ for Arab adolescents). In contrast, the correlations between the values hierarchy in our adolescent sample and that of a representative sample of the Israeli general population (aged 15 and above; European Social Survey Round 7, 2014) were lower and non-significant for Jewish adolescents and the Jewish population ($r = .41$ to $r = .54$) and for the study's Arab adolescents and the general Arab population ($r = .34$ to $r = .43$).

For the Jewish population, the most striking difference between the adolescent and general population groups was the particularly high importance of hedonism values among adolescents, consistent across times. In addition, stimulation was more important among adolescents than among the general population, while security and tradition were rated less important by the adolescents. For the Arab population, adolescent–general population differences were even more marked, with adolescents ascribing higher importance to achievement, hedonism, stimulation, self direction, and lower importance to universalism, tradition, and conformity than did the Arab general population group. See the Supplemental Materials for a full table of means, standard deviations, and correlations.

Intra-Individual Value Change

We estimated intra-individual patterns of value change between T1 and T4 along the four time points for each of the ten values, using latent growth curve models

in Mplus 7.11 (Muthén & Muthén, 2010) and full information maximum likelihood (FIML) to account for missing data (ranging from 13.8% to 24.7%). In our preliminary analyses, we estimated the models separately for Jewish and Arab participants. We then compared the models using a Chi-square difference test. In most values, we found no significant difference in the slope of value change between the ethnic groups (p 's > .05); one exception was for self-direction values, $\chi^2(1) = 6.60, p = .01$. We also estimated models separately for girls and boys; we found no significant difference in the slope of value change between genders (p 's > .05). From this point, all models were estimated controlling for the effect of gender and ethnicity on the intercept and slope of value change, and self-direction values were estimated separately in the two cultures. Lastly, models testing the quadratic change of values across time indicated that none of the values showed curvilinear patterns of change.

Consistent with the modeling literature, models resulting in comparative fit index (Hu & Bentler, 1999) $CFI > .95$, root mean square error of approximation (Kline, 2011) $RMSEA < .06$, and standardized root mean square residuals (Hu & Bentler, 1999) $SRMR < .06$ were deemed an excellent fit, while models resulting in $CFI > .90$, $RMSEA < .08$, and $SRMR < .09$ were deemed an adequate fit (Schermelehen-Engel, Moosbrugger, & Müller, 2003).

The growth curve models of linear change in values (Table 4, Figure 2) all fit the data excellently. On average, tradition values decreased significantly in importance over time (slope = $-.08, p = .01$), while power values increased (slope = $.09, p = .01$). In the Jewish group, the association between gender and the latent slope variable interfered with convergence and was restricted to 0. On average, self-direction values increased significantly among the Jewish adolescents (slope = $.07, p < .01$), but not among the Arab ones (slope = $.004, p = .86$). The values of conformity, security,

achievement, hedonism, stimulation, universalism, and benevolence did not change significantly at the mean level.

To further understand the direction of change among individuals in the sample, we examined the distribution of change in adolescents' value importance (Table 4). For example, 80% of the adolescents fitted a regression line with a positive slope for power values. That is, 80% of the sample reported some increase in value importance during the study period, and 20% reported some decrease. In addition, most of the adolescents overall reported increases in importance of achievement (85%), and self-direction values (96% for Jewish participants, 72% for Arab participants), while the remainder of the two groups reported decreases in these values. Less than half of the overall sample reported an increase in values of conformity (40%), tradition (38%), security (28%), and benevolence (34%), while most reported decreases in these values. Approximately half of the overall sample reported an increase in the importance of values of hedonism (47%), stimulation (47%), and universalism (48%), while half reported a decrease.

Development in the Value Structure

We asked if change over time in one value was associated with change over time in others. Specifically, we examined whether our participants changed similarly in adjacent values and in opposite directions in conflicting values. The most appropriate method for testing this hypothesis is multi-dimensional scaling (MDS; Borg, Groenen, & Mair, 2012), as it allows modeling simultaneous inter-relations that may take a circumplex form. Using a method first implemented by Vecchione, Schwartz et al., (2016), we employed the MDS analysis on each individual's linear slope of change over time in each value. This slope of change was the product of the linear growth curve models estimated above. As one value (self-direction) differed in

mean change between the ethnic groups, we conducted separate analyses for the Jewish and the Arab groups. We examined the inter-relations between the value slopes, using confirmatory ordinal MDS (Borg et al., 2012). This method of data analysis represents the strength of relations between data variables on a map. In an MDS structure, highly correlated variables will be closer in space, with less correlated or negatively correlated variables being further apart (Young, 1987). If the value change scores were organized in a circumplex structure, closely following the Schwartz personal values theory (Schwartz, 1992), this would confirm that similar values change in similar directions, and conflicting values change in opposing directions.

We used a confirmatory MDS approach to organize the slopes of value change based on their respective Pearson correlations (PROXSCAL routine in SPSS). We selected starting values showing a pattern of associations between value scores based on the Schwartz theory (Bilsky et al., 2013). By testing and providing a fit statistic, this confirmatory approach facilitated a theoretically grounded interpretation of the results (Borg et al., 2012). Given the innovation of the method, we estimated the relations using principal component analysis as well. The results, reported in the Supplemental Materials, were very similar to the results reported below.

The configuration of slopes in the confirmatory ordinal multi-dimensional scaling is presented in Figure 3A (Jewish Israelis) and 3B (Arab Israelis). As suggested by Borg et al. (2005), we used Kruskal's stress measure (*Stress I* in SPSS) as a measure of fit. Stress measures the loss of information that occurs when data are represented in a two-dimensional space. A perfect MDS solution has *Stress I* = 0, indicating the distances in the MDS configuration represent the data precisely. We compared the observed stress with the expected stress values for a random ranking of

MDS using 12 items ($Stress = .225$; Spence & Ogilvie, 1973), defining a stress value clearly lower than the stress of random rankings as a good fit (Borg et al., 2012). The configuration produced a $Stress I$ values of .07 and .11 for the Jewish and Arab adolescents, respectively. These $Stress I$ values were substantially lower than the stress for a random configuration, indicating that the theoretical MDS configuration represented the data very well. The order of the values around the circle preserved the two-dimensional structure, with self-transcendence values positioned opposite self-enhancement values, and openness to change values positioned opposite conservation values. In the Arab group, achievement values deviated from this structure and were located among openness to change values. Within higher-order value types, we found minor deviations from the theoretical model (switching benevolence and universalism, hedonism and stimulation in both groups, as well as power and achievement in the Jewish group).

Discussion

Our study investigated processes of change and stability in value importance between early and middle adolescence at four time points over the course of three years. We examined five aspects of change and stability to paint a broad picture of developmental processes: internal coherence, rank-order stability, hierarchy stability, intra-individual change, and the structural pattern of intra-individual value change.

Values as Individual Characteristics: The Development of Internal Coherence, Rank-Order Stability, and Hierarchy

During adolescence, values have been described as an individual characteristic that defines identity (Erikson, 1968). Already during middle childhood, children can differentiate major values and maintain a balance between conflicting values (Döring et al., 2015). We found that their ability to form coherent, internally consistent

concepts of values, as reflected in values' internal reliabilities, is augmented in adolescence.

We found values to be moderately stable over time and increase in stability during adolescence. Studies of adults have found higher levels of rank-order stability than we found in our adolescent sample (e.g., Schwartz, 2005; Vecchione, Schwartz et al., 2016), with no change in stability between age groups among adults (Milfont et al., 2016). In contrast, a study of children found lower stability, increasing with age (Cieciuch et al., 2016). Our results imply that adolescence, likely childhood, is a time of value consolidation, when commitments to specific values emerge and solidify. These identity commitments are likely to be shaped by exploration processes (Meeus, 2011). Henceforth, values may become even stronger indicators of individual characteristics.

Some cross-cultural differences were revealed in value stability, as Arab adolescents' values demonstrated less stability than did those of Jewish adolescents. It may be that Arab adolescents, belonging to minority group in Israel, face more challenges in the process of identity formation. Minorities need to navigate varied social contexts, some contexts stressing different or even contradictory values to other contexts (Daniel et al., 2012; Knafo, 2003). Therefore, the task of achieving identity commitment, a reflection of value consistency, may be more complex for minority adolescents, such as the Arabs in our sample.

Value hierarchy was very stable during adolescence for our overall sample. At the same time, the adolescents' value hierarchy only partly resembled the value hierarchy of the general population. The hierarchy differences were in line with age characteristics, as adolescents ascribed high importance to self-focused values (Koepke & Denissen, 2012; Smetana, 2011) and lower importance to other-focused

values. Our findings suggest that minority adolescents may be more likely to show generation gaps than majority adolescents (Knafo & Schwartz, 2001).

The Content of Value Importance: Intra-Individual Development

We hypothesized that self-focused values would increase in importance as result of self-differentiation, autonomy, and competence-seeking during adolescence (Koepke & Denissen, 2012; Smetana, 2011). The data largely support this hypothesis: Overall, the individual adolescents in our study ascribed increased importance to power values over time. Adolescence may be perceived as a process of gaining control over one's personal life (Smetana, 2011) and acquiring a position of influence over the environment. Similarly, the personality trait of social dominance increases during adolescence (Roberts, Walton, & Viechtbauer, 2006).

In our study, the self-focused value of self-direction increased in importance for Jewish adolescents but not for those in the Arab group. As noted, adolescents tend to seek autonomy from their parents (e.g., Koepke & Denissen, 2012). One study found that middle adolescents are less willing to allow society or the government to make decisions for the individual, even for the public good (Flanagan, Stout, & Gallay, 2008). The difference between Jewish and Arab adolescents may reflect value differences between the two ethnic groups. Arab citizens of Israel live in a more traditional society than do their Jewish counterparts (Lapidot-Lefler & Hosri, 2016; Schwartz, 2008). As a result, Arab adolescents may face more pressure to conform to societal rules, while Jewish adolescents may have more liberty to develop their autonomy. Our study suggests that the value difference between the ethnic groups crystallizes during adolescence; indeed, the groups differences in the importance of self-direction values appeared in the 10th and 12th grades, but not before.

An examination of the distribution of change in self-focused values verified the pattern of intra-individual value increase. Self-direction and power, but also achievement values, were more likely to grow in importance with time than to decline. Developing an independent identity during adolescence may take the form of self-promotion, as adolescents seek to augment their social status (Gruenenfelder-Steiger et al., 2016). This tendency may be strengthened by the educational contexts in which they spend much of their time (e.g., the school setting). In these contexts, adolescents are oriented toward the achievement of personal outcomes (Hoy, 2012). This development is not coherent across individuals, however, and is not found at the mean level.

Given that the motivations for other-focused values necessarily run counter to those for self-focused values (Schwartz, 1992), we hypothesized that the former would decrease in importance during adolescence. This hypothesis was partially supported by our findings: The overall mean level of the intra-individual importance of tradition values decreased over time. Tradition values convey an aspiration to follow in the footsteps of ancestors and parents (Schwartz, 1992). As adolescents build an independent identity (Meeus, 2011), they may place less weight on past traditions (Fuligni, 1998), adhere to social rules, traditions, and conventions less, and see larger portions of their social interactions as subject to personal discretion (Smetana, 2011).

An examination of the distribution of change in other-focused values indicated a pattern of intra-individual value change. Conformity, security, and benevolence values were more likely to decrease in importance with time than to increase. All conservation values revealed some pattern of decrease in importance. This decrease may mirror the increase in openness to change values previously noted.

Cross-sectional and longitudinal studies conducted across middle adolescence have yielded mixed results for change during adolescence in other-focused self-transcendence values (Daniel et al., 2016; Schwartz, 2012b). Social justice values were found mostly stable between middle adolescence and early adulthood; however, adolescents were more likely to decrease than to increase their belief in the importance of these values (Daniel et al., 2016). We found some change in ascribing importance to benevolence values, albeit not for the overall sample, in average. No differences were found for universalism values.

Most of the intra-individual changes found in self-focused and other-focused values were in the expected direction; however, they were not consistent across the sample, varying among individuals. Our study taps into a distinct period in individual lives when values consolidate, yet adolescents develop at their own individual pace (Meeus, 2011).

This study contributes the long-missing piece to the puzzle of value development between childhood and adulthood. In middle childhood through early adolescence, openness-to-change values increase and conservation values decrease. Self-enhancement values begin to increase in late childhood (Cieciuch et al., 2016). Middle to late adolescence may be a time of extending this process, albeit slowing its pace. The adolescents did not generally show overarching trends, evident in the average trajectory in the sample. Yet, most of the adolescents did change in the expected direction. This developmental pattern precedes an alteration in the direction of development during adulthood, as other-focused values are enhanced, and self-focused values somewhat diminish (Vecchione, Döring et al., 2016).

Interestingly, the two ethnic groups differed only in the development of self-direction values. This result accords with studies suggesting that adolescents develop

similarly across cultures (e.g., Costa et al., 2000). The results join a wider literature indicating cross-cultural similarity in the structure and meaning of values among adults (e.g., Schwartz, 2012b) and children (Döring et al., 2015).

Pattern of Value Development: Structure Stability

Finally, we examined whether value development was systematic and coordinated. We found that the structure of value change scores closely replicated the theoretical structure of values. Deviations in the value order were mostly minor and echoed those in previous studies of value change (e.g., Bardi et al., 2009). Our results suggest that an increase in one value may be accompanied by (or stem from) a decrease in the opposite and conflicting value. For example, adolescents may show a greater appreciation for openness to change values if their conservation values decrease. This coordinated pattern of change prevents internal conflicts that might accrue if opposite values are enhanced concurrently (Bardi & Goodwin, 2011).

We suggest that with a clear and coherent value system, adolescents' values may influence their everyday decisions. Individuals with clearly articulated self-concepts have previously been hypothesized to show stronger relations between values, attitudes, and behaviors (Rokeach, 1973). By the same token, personality ambivalence—the endorsement of opposing traits (e.g., dominant and submissive)—has been associated with behavior that varies substantially across situations (Erickson et al., 2015). Finally, conflicts in self-content have been related to negative emotions during adolescence (Cohen, Spiegler, Young, Hankin, & Abela, 2014). Thus, if values change in the suggested manner, adolescents' well-being may be protected.

Strengths, Limitations, and Implications

This study has several notable strengths. First, it employed a validated measure of values, based on a generally accepted theory (Schwartz, 1992). Second, it

considered value change across four measurement points; the longitudinal study enabled the consideration of intra-individual value change. Third, it used a varied and multifaceted conceptualization of value change. Last, it modeled change as a slope of growth in a linear growth curve, not as a difference score, as in most previous studies (e.g., Bardi et al., 2009). This modeling technique avoids the long-standing criticism of difference scores as suffering from low reliability (Gollwitzer et al., 2014).

Nonetheless, some limitations should be acknowledged. First, we relied on self-report data, and these can be subject to social desirability bias. However, to date, values are almost exclusively measured using self-reports, their most accurate measure. Moreover, social desirability has been shown to be a personality trait that is meaningfully related to value importance, not a bias in the reporting of values (Schwartz, Verkasalo, Antonovsky, & Sagiv, 1997). Second, some of the values' reliabilities were moderate ($M_{\alpha}=.69$, $SD = .07$). However, these increased during the study period, and were similar to previously reported reliabilities, as values capture broad dimensions and not narrow, specific concepts (Schwartz et al., 2001). Lastly, the rise in value stability could be attributed to increased acquaintance with the questionnaire items in the course of the study. However, the questionnaires were completed at approximately a year's interval, thus reducing the likelihood of recall and increasing the likelihood of an underlying developmental trend.

In conclusion, we investigated the crystallization during adolescence of value priorities, a specific aspect of identity (Döring et al., 2016). We found that adolescence is a time of both stability and change in values. Adolescents crystallize their values gradually, making them increasingly coherent and stable. They report a stable value hierarchy distinct from the adult hierarchy. Lastly, they also change in value importance, with increases in self-focused values, and decreases in other-focused

values. This value development occurs in an organized and orderly fashion, thus substantiating the theory of associations between values.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Table 1

Definitions of Values (Schwartz, 2012), *Cronbach's α* Reliabilities of Values at Time

1 to Time 4, and their Comparison across Time

Value	Definition	T1 α	T2 α	T3 α	T4 α	χ^2	<i>P</i>
Conformity	Limiting actions and impulses likely to upset or violate social expectations and norms	.69	.63	.67	.70	3.28	.350
Tradition	Respect for and acceptance of customs and ideas provided by culture or religion	.56	.65	.60	.68	7.91	.048
Security	Protection of safety and stability of the social structure and the self	.65	.66	.73	.79	27.59	.001
Power	Aspiration for social status, control and dominance	.60	.60	.58	.68	6.32	.097
Achievement	Acquisition of success by demonstrating competence according to social standards	.73	.71	.78	.81	15.19	.001
Hedonism	Pleasure and sensual satisfaction for oneself	.70	.68	.74	.79	11.85	.007
Stimulation	Change, challenge, and excitement	.50	.56	.65	.65	11.10	.011
Self-direction	Independent thought and action	.67	.66	.66	.76	11.49	.009
Universalism	Understanding, appreciation and protection of the welfare of all people and nature	.74	.76	.76	.83	18.58	.000
Benevolence	Care for the welfare of those in personal contact	.65	.71	.68	.75	8.09	.044

Table 2.

Means and Standard Deviations of the Study Variables and a Linear Contrast between the Values across Times

	Time 1		Time 2		Time 3		Time 4		<i>F(df = 1)</i>	<i>p=</i>
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>		
Conformity	3.92	.71	3.94	.70	3.87	.74	3.87	.70	.33	.57
Tradition	3.54	.78	3.53	.87	3.48	.81	3.44	.92	.26	.61
Security	4.15	.59	4.14	.58	4.11	.61	4.06	.66	3.62	.06
Power	2.70	1.18	2.76	1.18	2.83	1.07	2.97	1.27	10.83	.001
Achievement	4.25	.69	4.22	.70	4.28	.73	4.27	.66	.06	.81
Hedonism	4.45	.84	4.40	.79	4.45	.81	4.42	.77	1.05	.31
Stimulation	4.08	.82	4.10	.79	4.09	.82	4.07	.79	.40	.53
Self-direction	4.29	.60	4.33	.58	4.40	.58	4.39	.57	8.40	.004
Universalism	4.03	.60	4.04	.60	4.03	.58	4.06	.62	.00	.98
Benevolence	4.32	.60	4.31	.59	4.28	.64	4.26	.62	3.35	.07

Table 3.

Test-Retest Correlations of Value Importance across Time Points among Jewish and Arab Adolescents

Values	Jewish Adolescents						Arab Adolescents					
	T1 - T2	T2 - T3	T3 - T4	T1 - T3	T2 - T4	T1 - T4	T1 - T2	T2 - T3	T3 - T4	T1 - T3	T2 - T4	T1 - T4
Conformity	.43**	.45**	.48**	.41*	.46**	.39**	.21**	.26**	.24**	.20**	.12	.14*
Tradition	.51**	.67**	.68**	.56**	.50**	.48**	.31**	.35**	.47**	.18**	.35**	.35**
Security	.51**	.65**	.62**	.34**	.55**	.34**	.35**	.26**	.33**	.34**	.39**	.34**
Power	.58**	.67**	.72**	.53**	.58**	.51**	.42**	.53**	.56**	.46**	.48**	.38**
Achievement	.52**	.51**	.5**	.39**	.41**	.36**	.25**	.35**	.37**	.25**	.24**	.18*
Hedonism	.32**	.43**	.50**	.49**	.34**	.28**	.35**	.33**	.3**	.27**	.23**	.24**
Stimulation	.52**	.54**	.66**	.48**	.48**	.40**	.38**	.35**	.43**	.38**	.32**	.32**
Self-direction	.29**	.53**	.50**	.32**	.34**	.34**	.13	.14*	.26**	.13	.14*	.14
Universalism	.58**	.53**	.58**	.46**	.42**	.4**	.29**	.31**	.24**	.26**	.18*	.21**
Benevolence	.37**	.46**	.62**	.21**	.43**	.26**	.26**	.19**	.17*	.16*	.22**	.17*
Mean	.46	.54	.59	.42	.45	.38	.29	.31	.34	.26	.27	.25
SD	.10	.09	.08	.10	.08	.07	.08	.10	.11	.10	.11	.09

Note. * $p < .05$. ** $p < .01$. Bold correlations significantly differ between Jewish and Arab adolescents.

Table 4.

Linear Growth Curve Model Estimates and Fit Statistics for Each Value

Value	Ethnic group	Intercept		Slope		% positive slope	Fit measures		
		Mean	SD	Mean	SD		RMSEA	CFI	SRMR
Conformity		3.75**	.43**	.04	.12	40%	0	1	.03
Tradition		3.46**	.51**	-.08**	.15*	38%	.04	.99	.03
Security		4.10**	.39**	-.01	.10	28%	0	1	.02
Power		3.18**	.79**	.09*	.20*	85%	.04	.99	.03
Achievement		4.29**	.48**	-.003	.15**	59%	0	1	.04
Hedonism		4.55**	.50**	-.05	.15*	47%	.02	.99	.04
Stimulation		4.10**	.58**	-.04	.16**	47%	0	1	.03
Self-direction	Jewish Majority	4.29**	.98**	.07**	.01	96%	.01	.99	.08
Self-direction	Arab Minority	4.22**	.04**	.004	.01	72%	.01	.99	.08
Universalism		3.96**	.43**	-.01	.12*	48%	.04	.97	.03
Benevolence		4.29**	.31**	.01	.13**	34%	0	1	.02

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

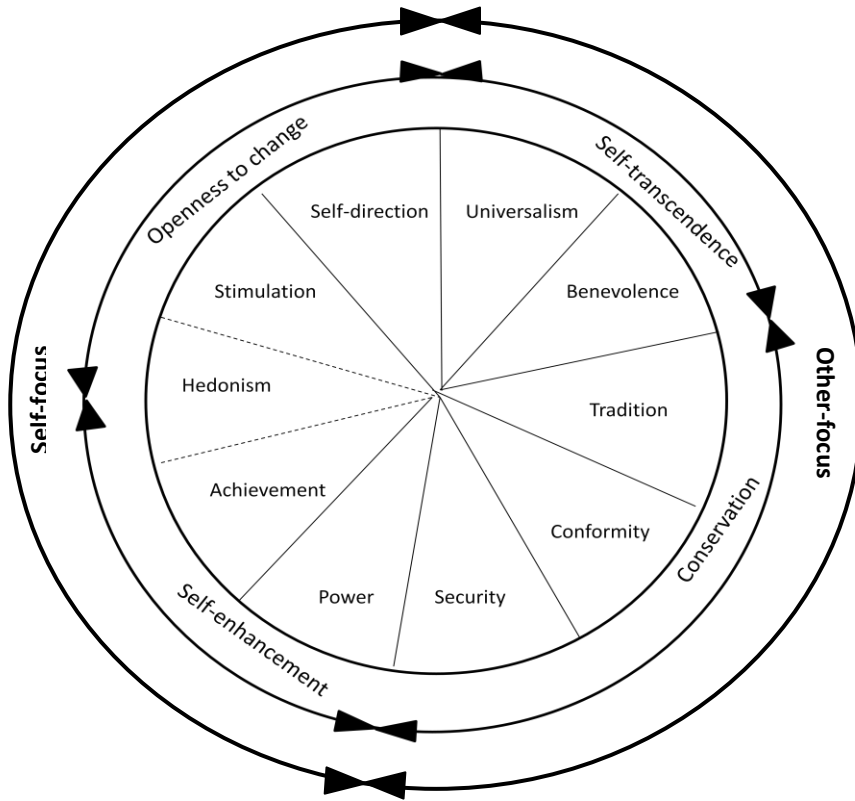


Figure 1. Theoretical model of the structure of relations among ten motivational types of values (Schwartz, 2010).

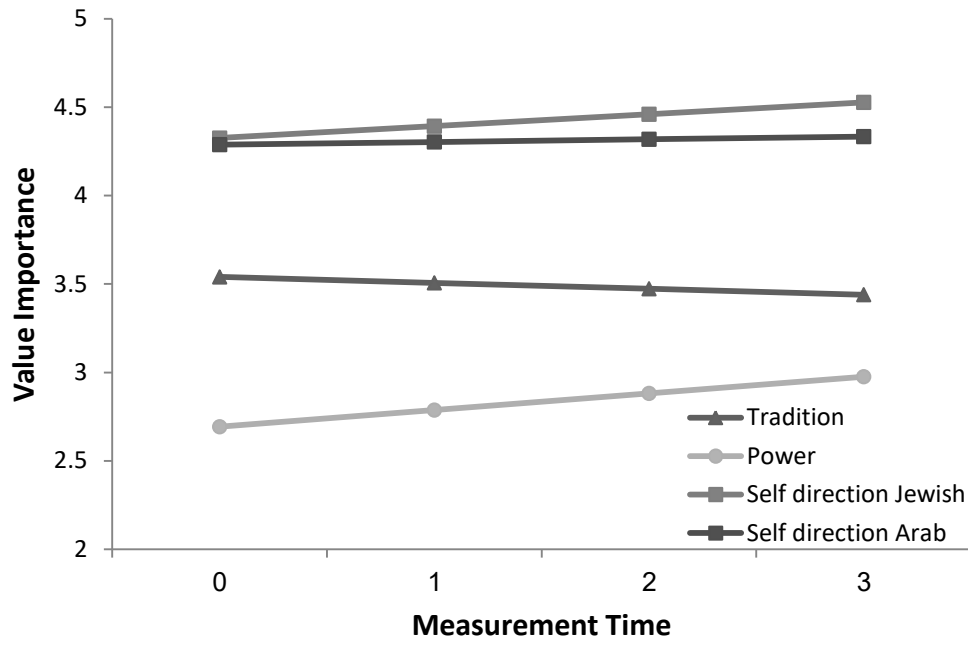
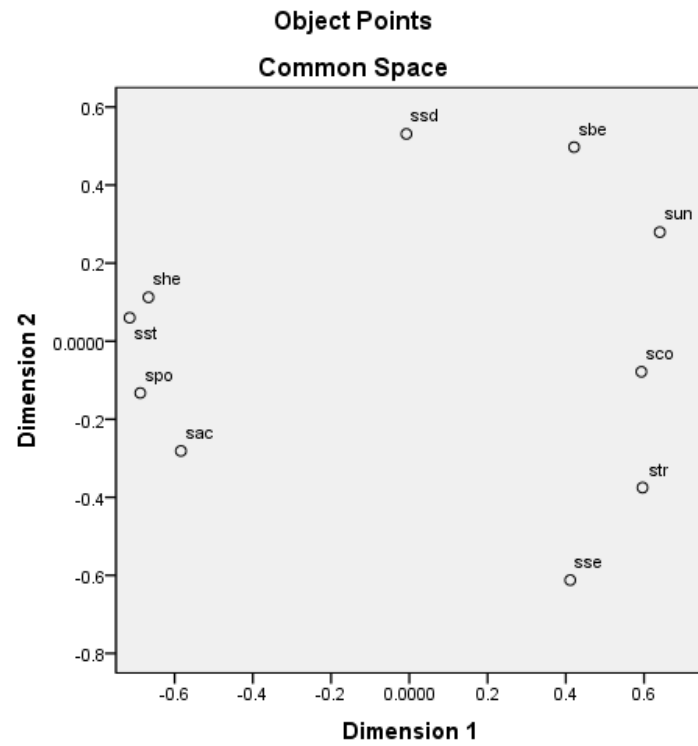
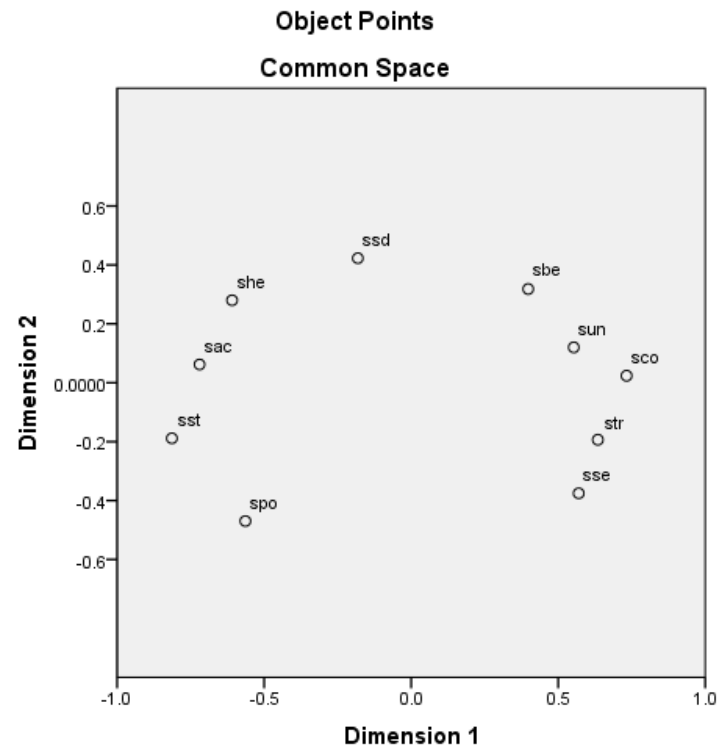


Figure 2. Growth curves of tradition, power and self direction values.



3A Jewish Israelis



3B Arab citizens of Israel

Figure 3. A Multidimensional Space Analysis of slopes of value change. sco = Conformity, str = Tradition, sse= Security, spo = Power, sac = Achievement, she = Hedonism, sst = Stimulation, ssd = Self-direction, sun = Universalism, sbe = Benevolence.

Supplemental Materials

1. Correlation table.

The table below includes the correlations between the ten values at the four time points.

	1	2	3	4	5	6	7	8	9	10
Time 1										
1. Conformity	1									
2. Tradition	.15**	1								
3. Security	.16**	.04	1							
4. Power	-.30**	-.15**	-.22**	1						
5. Achievement	-.16**	-.31**	-.09	.08	1					
6. Hedonism	-.37**	-.22**	-.22**	.18**	-.02	1				
7. Stimulation	-.35**	-.14**	-.42**	.08	-.11*	.21**	1			
8. Self direction	-.33**	-.25**	-.18**	-.14**	.11*	.09*	.20**	1		
9. Universalism	.12*	-.11*	.03	-.40**	-.19**	-.3**	-.18**	-.147**	1	
10. Benevolence	-.01	-.07	-.20**	-.29**	-.25**	.06	-.08	.004	.055	1
Time 2										
11. Conformity	.35**	.10*	.12*	-.13**	-.13*	-.19**	-.20**	-.14**	.08	.08
12. Tradition	.08	.44**	.04	-.12*	-.15**	-.07	-.09	-.08	-.10*	.03
13. Security	.16**	.07	.43**	-.17**	-.04	-.10*	-.29**	-.17**	.09	-.06
14. Power	-.15**	-.11*	-.12*	.52**	.13*	.09	.09	-.07	-.24**	-.20**
15. Achievement	-.05	-.18**	-.08	.11*	.40**	.07	-.07	.11*	-.10*	-.19**
16. Hedonism	-.17**	-.11*	-.08	.07	.01	.36**	.15**	.04	-.21**	.02
17. Stimulation	-.14**	-.01	-.25**	.02	-.09	.08	.45**	.12*	-.09	-.00
18. Self direction	-.11*	-.12*	-.19**	-.03	.07	.09	.28**	.20**	-.12*	.04
19. Universalism	.01	-.11*	.08	-.19**	-.08	-.19**	-.10*	.02	.45**	.06
20. Benevolence	-.04	-.08	-.07	-.12*	-.10	.00	-.05	.08	.10*	.32**

	1	2	3	4	5	6	7	8	9	10
Time 3										
21. Conformity	.32**	.20**	.12*	-.11*	-.12*	-.21**	-.24**	-.04	.07	-.01
22. Tradition	.12*	.41**	.03	-.06	-.17**	-.06	-.09	-.13**	-.12*	-.03
23. Security	.17**	.07	.41**	-.17**	.01	-.13**	-.32**	-.17**	.13*	-.08
24. Power	-.10*	-.21**	-.10*	.50**	.12*	.09	.04	-.12*	-.21**	-.10*
25. Achievement	.00	-.17**	.01	.05	.33**	.03	-.06	-.01	-.10	-.08
26. Hedonism	-.19**	-.11*	-.04	.02	-.03	.38**	.12*	.06	-.13**	.06
27. Stimulation	-.15**	-.11*	-.26**	-.00	-.06	.15**	.43**	.14**	-.07	.06
28. Self direction	-.17**	-.17**	-.12*	.04	.05	.12*	.17**	.22**	-.03	.01
29. Universalism	.01	-.00	-.03	-.24**	-.08	-.24**	.02	.06	.39**	.06
30. Benevolence	-.14**	-.05	-.17**	-.01	.00	.08	.13*	.12*	-.04	.20**
Time 4										
31. Conformity	.28**	.17**	.14*	-.11*	-.00	-.21**	-.29**	-.06	.04	.03
32. Tradition	.13*	.45**	.03	-.06	-.16**	-.12*	-.04	-.18**	-.06	-.11*
33. Security	.12*	.10	.34**	-.14**	-.08	-.13*	-.26**	-.11	.10	-.04
34. Power	-.12*	-.16**	-.22**	.47**	.07	.15**	.04	-.04	-.19**	-.05
35. Achievement	-.08	-.15**	-.04	.05	.27**	.07	.04	.08	-.09	-.08
36. Hedonism	-.19**	-.18**	-.02	.05	.04	.30**	.14*	.08	-.13*	.04
37. Stimulation	-.15**	-.08	-.27**	-.00	-.03	.15**	.36**	.12*	-.01	.03
38. Self direction	-.11*	-.19**	-.088	-.04	.03	.11*	.24**	.24**	-.07	-.00
39. Universalism	.06	-.00	.06	-.21**	-.05	-.21**	-.06	-.03	.34**	.03
40. Benevolence	-.09	-.14**	-.07	-.05	-.02	.07	.04	.10	.01	.23**

	11	12	13	14	15	16	17	18	19	20
Time 2										
11. Conformity	1									
12. Tradition	.08	1								
13. Security	.09	-.01	1							
14. Power	-.22**	-.25**	-.26**	1						
15. Achievement	-.19**	-.33**	-.06	.11*	1					
16. Hedonism	-.35**	-.17**	-.17**	.03	.05	1				
17. Stimulation	-.30**	-.11*	-.33**	.01	-.09	.29**	1			
18. Self direction	-.22**	-.22**	-.30**	-.06	.10*	.15**	.21**	1		
19. Universalism	.01	-.13**	.04	-.26**	-.26**	-.38**	-.26**	-.19**	1	
20. Benevolence	.01	-.08	-.10*	-.28**	-.22**	-.07	-.10*	-.14*	.11*	1
Time 3										
21. Conformity	.36**	.13**	.19**	-.11*	-.16**	-.20**	-.19**	-.25**	.09	.01
22. Tradition	.16**	.57**	.02	-.16**	-.22**	-.11*	-.06	-.16**	-.13*	-.07
23. Security	.12*	.05	.44**	-.11*	-.10	-.13**	-.28**	-.26**	.14**	.00
24. Power	-.15**	-.16**	-.17**	.60**	.12*	.10*	.05	.03	-.25**	-.23**
25. Achievement	-.10	-.22**	-.05	.14**	.44**	.01	-.09	.10*	-.10	-.09
26. Hedonism	-.13**	-.10*	-.11*	-.04	.06	.38**	.15**	.19**	-.16**	-.07
27. Stimulation	-.21**	-.06	-.31**	.07	-.06	.16**	.44**	.23**	-.12*	.02
28. Self direction	-.18**	-.25**	-.15**	-.04	.11*	.09	.22**	.34**	-.01	.07
29. Universalism	.04	-.04	.08	-.27**	-.12*	-.17**	-.06	-.05	.41**	.13*
30. Benevolence	-.00	-.04	-.08	-.16**	-.01	.03	-.05	.05	.06	.31**

	11	12	13	14	15	16	17	18	19	20
Time 4										
31. Conformity	.31**	.18**	.15**	-.11*	-.12*	-.20**	-.17**	-.19**	.04	-.02
32. Tradition	.04	.48**	.05	-.11*	-.11	-.11	.01	-.13*	-.12*	-.14*
33. Security	.22**	.09	.46**	-.21**	-.07	-.14**	-.29**	-.25**	.09	-.01
34. Power	-.16**	-.11*	-.17**	.54**	.03	.11	.03	-.00	-.18**	-.17**
35. Achievement	-.05	-.22**	-.16**	.11*	.33**	-.01	-.06	.17**	-.02	.01
36. Hedonism	-.07	-.16**	-.08	.06	.01	.30**	.15**	.08	-.15**	-.00
37. Stimulation	-.20**	-.11*	-.27**	.11*	-.03	.19**	.40**	.14**	-.09	-.02
38. Self direction	-.11*	-.19**	-.13*	-.02	.11*	.12*	.10	.25**	-.03	.07
39. Universalism	-.04	-.06	.08	-.24**	-.06	-.13*	.02	.03	.32**	.07
40. Benevolence	.02	-.09	-.09	-.19**	-.03	.02	-.04	.05	.12*	.34**

	21	22	23	24	25	26	27	28	29	30
Time 3										
21. Conformity	1									
22. Tradition	.13**	1								
23. Security	.20**	.02	1							
24. Power	-.23**	-.22**	-.27**	1						
25. Achievement	-.28**	-.33**	-.16**	.20**	1					
26. Hedonism	-.30**	-.18**	-.21**	-.01	.09	1				
27. Stimulation	-.35**	-.21**	-.36**	.07	-.03	.28**	1			
28. Self direction	-.32**	-.33**	-.27**	-.05	.09*	.19**	.15**	1		
29. Universalism	.06	-.03	.04	-.33**	-.33**	-.41**	-.21**	-.12*	1	
30. Benevolence	-.16**	-.07	-.18**	-.22**	-.15**	.02	-.04	.05	.03	1
Time 4										
31. Conformity	.36**	.20**	.18**	-.09	-.10	-.20**	-.23**	-.27**	-.02	-.01
32. Tradition	.16**	.62**	.08	-.16**	-.23**	-.12*	-.05	-.22**	-.09	-.11*
33. Security	.15**	.08	.47**	-.19**	.05	-.10	-.31**	-.21**	.04	-.10
34. Power	-.16**	-.13*	-.18**	.62**	.02	.05	.10	-.01	-.22**	-.09
35. Achievement	-.12*	-.26**	-.07	.05	.44**	.13*	-.07	.19**	-.16**	.00
36. Hedonism	-.26**	-.19**	-.06	.09	.11*	.40**	.17**	.15**	-.24**	.04
37. Stimulation	-.29**	-.20**	-.31**	.11*	-.01	.16**	.54**	.21**	-.01	-.01
38. Self direction	-.17**	-.24**	-.20**	-.04	.16**	.05	.07	.40**	.06	.00
39. Universalism	.08	-.03	.09	-.27**	-.15**	-.18**	-.03	-.07	.45**	.02
40. Benevolence	.06	-.13*	-.18**	-.13*	-.15**	.04	-.01	.11*	.09	.41**

	31	32	33	34	35	36	37	38	39	40
Time 4										
31. Conformity	1									
32. Tradition	.17**	1								
33. Security	.14**	.03	1							
34. Power	-.16**	-.15**	-.34**	1						
35. Achievement	-.21**	-.34**	-.09	-.04	1					
36. Hedonism	-.31**	-.30**	-.16**	.05	.03	1				
37. Stimulation	-.36**	-.26**	-.37**	.20**	-.01	.29**	1			
38. Self direction	-.31**	-.33**	-.26**	-.02	.12*	.30**	.14**	1		
39. Universalism	-.03	-.06	.04	-.40**	-.20**	-.38**	-.14**	-.22**	1	
40. Benevolence	-.07	-.17**	-.20**	-.24**	.02	-.06	-.14**	-.01	.10	1

2. Means, standard deviations and correlations.

The table includes means and standard deviations of value importance at four time points, and of an Israeli representative sample (European Social Survey, round 7); correlations between value importance means across time points, and between adolescents and a representative sample; the table is divided by ethnicity

	T1		T2		T3		T4		Representative Sample	
Jewish Majority Group										
Means and Standard Deviations										
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Conformity	3.73	0.74	3.83	0.73	3.8	0.78	3.8	0.73	3.7	0.99
Tradition	3.40	0.79	3.27	0.93	3.23	0.9	3.11	0.91	3.99	0.99
Security	4.10	0.63	4.13	0.60	4.09	0.66	4.03	0.68	4.53	0.80
Power	3.04	1.16	2.99	1.12	3.00	0.99	3.34	1.04	3.13	0.96
Achievement	4.28	0.78	4.3	0.76	4.37	0.78	4.34	0.70	4.11	0.81
Hedonism	4.68	0.87	4.55	0.77	4.53	0.84	4.58	0.77	3.83	0.93
Stimulation	4.09	0.85	4.02	0.83	4.01	0.87	4.03	0.86	3.19	1.07

Self-direction	4.30	0.63	4.38	0.59	4.49	0.64	4.47	0.61	4.29	0.80
Universalism	3.93	0.71	4.03	0.65	3.95	0.62	3.94	0.76	4.38	0.65
Benevolence	4.39	0.62	4.36	0.6	4.43	0.6	4.38	0.66	4.63	0.70

Correlations

T1		0.98		0.98		0.95		0.49
T2				0.99		0.96		0.54
T3						0.97		0.54
T4								0.41

Arab Minority Group

Means and Standard Deviations

	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Conformity	4.07	0.64	4.03	0.66	3.93	0.70	3.93	0.67	4.11	0.61
Tradition	3.65	0.75	3.73	0.75	3.67	0.68	3.71	0.84	4.27	0.69
Security	4.18	0.55	4.14	0.56	4.12	0.57	4.08	0.64	4.21	0.76
Power	2.42	1.13	2.58	1.2	2.69	1.11	2.67	1.36	3.49	0.70
Achievement	4.22	0.62	4.16	0.63	4.22	0.67	4.21	0.62	3.89	0.61

VALUE DEVELOPMENT DURING ADOLESCENCE

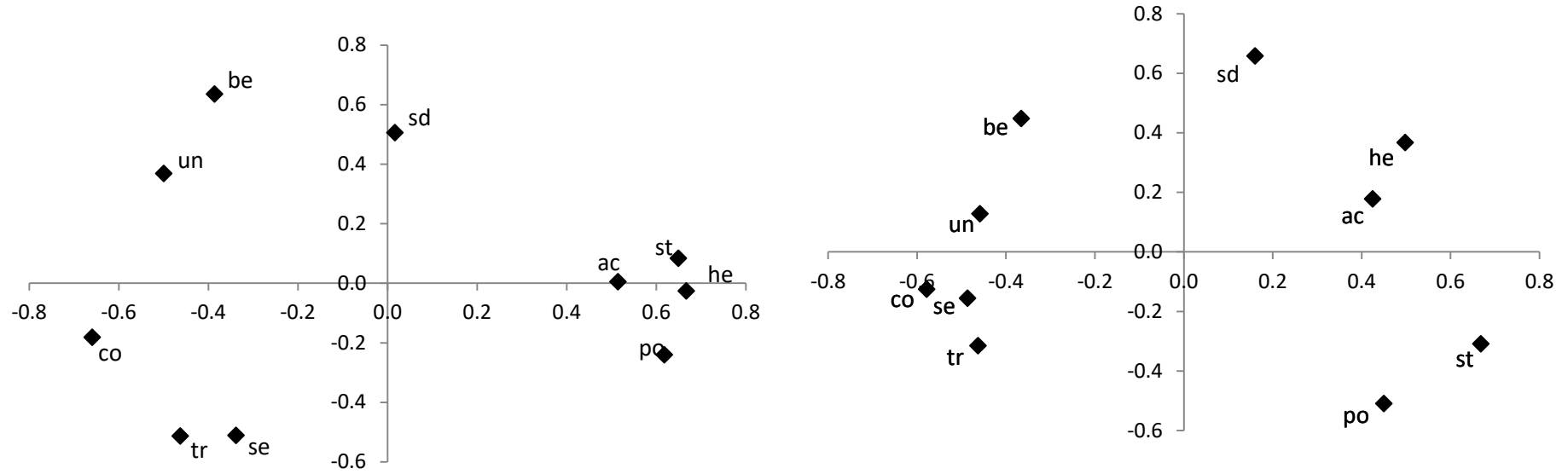
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Hedonism	4.26	0.77	4.28	0.78	4.37	0.78	4.3	0.75	3.94	0.65
Stimulation	4.08	0.79	4.17	0.75	4.15	0.77	4.1	0.74	3.27	0.95
Self-direction	4.29	0.58	4.30	0.56	4.33	0.51	4.33	0.54	4.00	0.60
Universalism	4.12	0.49	4.05	0.55	4.10	0.54	4.15	0.46	4.22	0.50
Benevolence	4.27	0.59	4.27	0.58	4.16	0.64	4.16	0.56	4.47	0.61
<hr/>										
Correlations										
T1			0.99		0.99		0.99		0.43	
T2					0.99		0.99		0.39	
T3							0.99		0.34	
T4									0.37	

Note. The representative sample is taken from the European Social Survey, Round 7, 2014

3. Changes in the value system estimated using principal component analysis.

We first subjected the linear slopes of value change across the study period to a *principal component analysis*. This analysis transforms the ten value slopes into two components, that convey the pattern of associations between them. The two component solution in the Jewish majority group explained 40.95% of the variance, and in the Arab group 35.43% of the variance. In order to illustrate the value change associations, we used the loading of value slopes on the two components to draw the order of the slopes on the component plot (Figure 1A, 1B). The resulting plots are very similar to the theoretical model of the values, and the order of the values around the circle preserves the two dimensional structure, although the hedonism and stimulation values are located behind the self-enhancement values in the plot. Nevertheless, self-transcendence values oppose the self-enhancement values, and openness to change values oppose the conservation values. Two small deviations appears in the model for the Jewish group: benevolence and universalism values, and conformity and tradition values have switched places. In the Arab group, an additional deviation exists, with stimulation and hedonism values switching places.



1A Jewish Israelis

1B Arab citizens of Israel

Figure 1. Component plot of slopes of value change in a two dimensional space. CO = Conformity, TR = Tradition, SE= Security, PO = Power, AC = Achievement, HE = Hedonism, ST = Stimulation, SD = Self direction, UN = Universalism, BE = Benevolence.