

Associations Between Adolescent Siblings' Relationship Quality and Similarity and Differences in Values

Tina Kretschmer

Institute of Psychiatry, King's College

Alison Pike

University of Sussex

Theoretically framed by a self-determination perspective on value acquisition and taking into account research into sibling similarity and differences, the current study examined links between sibling relationship quality and adolescents' intrinsic values (benevolence and universalism) and extrinsic values (power, achievement, and materialism). Positive sibling experiences were expected to be positively linked to intrinsic values and negatively linked to extrinsic values, and negative experiences were hypothesized to fuel extrinsic values and thwart intrinsic values. Using a sample of 205 adolescent sibling pairs (older children $M = 17.61$ years, younger children $M = 14.63$ years) and multilevel modeling, we assessed within- and between-dyads differences to identify whether the sibling relationship functions as a correlate of values in a similar or different way for 2 siblings. Although siblings were not very similar in their values, sibling competition predicted sibling similarity in higher levels of extrinsic values and lower levels of intrinsic values. Implications for value acquisition research that so far has focused almost solely on parents and failed to acknowledge other processes within families are discussed.

Keywords: sibling relationship, sibling similarity and difference, value acquisition

Adolescents' values are related to their social experiences in that positive and warm relationships with others are linked to intrinsic values (e.g., benevolence and universalism) and cold and negative relations are associated with extrinsic values (e.g., materialism, power, and achievement). Previous research has examined parents as a major source of value socialization, but they are certainly not an exclusive one. Going beyond the parent-child relationship, the current study extends this work by examining associations between sibling relationship quality and adolescents' values. Of particular interest were intrinsic values (benevolence and universalism) and extrinsic values (achievement, power, and materialism) as correlates of positive and negative relationship experiences. The dyadic nature of sibling relationship data required specific multilevel modeling analyses and allowed for stringent tests of child-specific and dyad-wide processes. Thus, links between relationship quality and values were examined with an emphasis on identifying whether sibling relationship quality operates in the same way for all children in a family. Hence, this study

bridged value socialization research as well as sibling research, which is reflected in the following review of literature and our hypotheses.

Adolescents' Values in the Family Context

Values are guiding principles in life, they influence our behavior and how the behavior of others is evaluated. The values that one holds are linked to attitudes (Feather, 2004), violence in schools (Knafo, Daniel, & Khoury-Kassabri, 2008) and well-being (Kasser & Ryan, 1996). Thus, a neglect of values as an important psychological concept, and research into how they are acquired in childhood and adolescence is problematic. Value acquisition was considered an important aspect of identity development (Marcia, 1983) that takes place during adolescence, yet surprisingly little is known about adolescents' values and their correlates. Informed by two paradigmatic approaches, previous studies on adolescents' values have examined either inter-generational values transmission or links between parent-child relationships and values. Value transmission research commonly emphasized the socializing agency of parents and suggested that adolescents' values to a greater or lesser degree model parents' values. Studies in this area usually reported moderate overlap between generations (correlations around $r = .20$, e.g., Boehnke, Ittel, & Baier, 2002). However, parents not only transmit their values to their offspring, the parent-child relationship also creates specific conditions that foster or hinder certain values. This assumption is based on self-determination theory and was brought forward and empirically supported by Kasser and colleagues.

Tina Kretschmer, Institute of Psychiatry, King's College; and Alison Pike, University of Sussex.

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Correspondence concerning this article should be addressed to Tina Kretschmer, MRC SGDP Centre, Institute of Psychiatry, London SE5 8AF, United Kingdom. E-mail: tina.kretschmer@kcl.ac.uk

Self-determination theory (SDT) emphasized that behavior (as well as values; Kasser, 2002) can be motivated intrinsically or extrinsically. While intrinsic motivation involves acts that are carried out because of the enjoyment of the activity itself, extrinsic motivation typically relies on reward or punishment avoidance. The inherent psychological needs for competence, relatedness, and autonomy were a central component of SDT. Ryan and Deci (2000) stressed that individuals by nature are intrinsically motivated to engage in behavior that supports the fulfillment of these psychological needs. Thus, people should also hold values that foster psychological well-being by supporting the fulfillment of psychological needs in that they focus, for instance, on positive relationships with others, because this supports the need for relatedness (Kasser, 2002). Ryan and Deci (2000) noted that intrinsic motivation flourishes in social contexts that are characterized by security and relatedness (p. 71), and it is hypothesized that such positive conditions also increase the importance placed on intrinsic values such as benevolence and universalism as values that focus on relatedness (Kasser, 2002). However, one's social environment if characterized by insecurity, coercion, and negativity can also hinder the engagement in behavior (and hence values) that is supportive of need fulfillment. Negative social experiences elevate the importance placed on values that compensate for need thwarting and promise external reward in form of money or social status, for instance, power over others, achievement, and material success.

Empirical research has confirmed this assumption (e.g., Kasser, Koestner, & Lekes, 2002; Kasser, Ryan, Zax, & Sameroff, 1995), indicating that warm, authoritative parenting is related to children's intrinsic values, whereas cold and uninvolved parenting appears to foster the acquisition of extrinsic values. Although it seems self-evident that parents are of great importance in value formation, the often small-to-moderate links (average $r = .20$) between parenting and adolescents' values indicated that there must be additional aspects in adolescents' lives that explain variance in values. For instance, social contexts that go beyond the parent-child relationship need to be considered in adolescents' value formation.

Sibling Relationships as Contexts for Value Acquisition

As with parents, siblings are more or less constantly present in adolescents' lives. More than 80% of children and adolescents still grow up with at least one sister or brother (U.S. Census Bureau, 2008), and the importance of siblings for development has been shown consistently (see Brody, 1998). Sibling socialization and mutual influence is powerful in the areas of problem behavior (Slomkowski, Rende, Conger, Simons, & Conger, 2001) and interpersonal competence and relationship behavior (Widmer, 1997). Sibling relationship quality has been linked to familism values such as family support and obligation towards one's family (Updegraff, McHale, Whiteman, Thayer, & Delgado, 2005), with findings pertinent to the current study because they revealed significant links between sibling intimacy and

closeness and adolescents' familism values, that as such target positive relationships with close others and thus reflect the psychological need for relatedness. The question of whether supportive and warm sibling relationships are linked to young peoples' pursuit of more broadly defined intrinsic values and whether negativity is related to extrinsic values was the focus of the current study. That is, more positive and less negative sibling relationships should be associated with greater endorsement of intrinsic values and less importance placed on extrinsic values, whereas extrinsic values would be linked to less positivity and greater negativity between siblings.

Differences Within and Between Families

Although analyses would be less complex if one created a sibling relationship quality average that incorporated both siblings' perspectives or reverted to only one sibling's perspective, brothers and sisters by no means have the same perception or experience of sibling conflict (McGuire, Manke, Eftekhari, & Dunn, 2000), warmth (Reiss, Neiderhiser, Hetherington, & Plomin, 2000), or self-disclosure (Slomkowski & Manke, 2004). Different perceptions of sibling relationship quality have been linked to sibling dissimilarity in outcomes. Daniels (1986), for instance, reported that different levels of perceived sibling closeness were linked to differences in the temperamental trait sociability. Similarly, Dunn, Stocker, and Plomin (1990) found a relation between different levels of sibling positivity and negativity and differences in adjustment. To our knowledge, no study has yet explored whether discrepant sibling relationship quality perceptions also account for differences that siblings show in values.

Nonetheless, in addition to the compelling evidence that sibling relationships are experienced differently by two children, there is also empirical evidence that features of the sibling relationship contribute to similarity. Overlap was found, for instance, with regard to substance use (Rende, Slomkowski, Lloyd-Richardson, & Niaura, 2005). Interestingly, the sibling relationship itself appears to be a substantial source of sibling similarity (Neiderhiser, Reiss, & Hetherington, 2007), presumably due to the reciprocal and comparably equal nature of the relationship (Pike & Plomin, 1997). Although many of the studies on sibling similarity and differences relied on genetically sensitive designs, the results that they reported are nonetheless relevant in their implication that the perceptions of children within families should be examined individually as well as part of a sibling dyad in order to fully explore correlates of values.

Aims of Study

Extending research on value acquisition in adolescence by examining the sibling relationship as a salient and developmentally important social context, the analyses presented here were not only based on processes that are similar for siblings (dyad level) but included potential child-specific processes (i.e., processes that differ between sib-

lings). The hypotheses that guided this study were as follows:

Sibling similarity and difference in intrinsic and extrinsic values was explored first to identify the degree of sibling resemblance. On the basis of earlier findings of small-to-moderate overlap between family members, specifically siblings, modest value similarity in the sibling dyad was hypothesized. Sibling relationship quality was assessed using measures of competition and intimacy between siblings, and framed by self-determination theory, it was expected that siblings who reported high levels of intimacy and low levels of competition as indicators of a need-fulfilling relationship would rate the importance of intrinsic values more highly. Likewise, high levels of competition and low intimacy as indicators of need-thwarting sibling relationships were hypothesized to be associated with extrinsic values. Thereby, sibling relationship quality was expected to contribute both to sibling differences (that is, function on a child level) as well as similarity (as a dyad-level correlate).

Method

Participants

The study from which the data for the current analyses were drawn (VERA: Values, Experiences, and Relationships in Adolescence) was carried out in compliance with the ethical standards of the University of Sussex in secondary schools in the southeast of England throughout the years 2007 and 2008. A total number of 368 students aged between 14 and 21 years ($M = 16.58$, $SD = 0.86$) completed a battery of questionnaires regarding their values and interpersonal relationships. Adolescents who reported having a sibling between the ages of 11 and 20 years and living in the same household received a take-home package including a questionnaire booklet for their sibling, a parental consent form for siblings ages 15 years or younger, and a stamped and addressed envelope used to return the completed sibling questionnaire. This target sample and sibling age range was chosen to capture siblings in early to late adolescence and early adulthood who were not too far apart in age. Targeting a secondary school sample ensured that the majority of the sample was around 16 years of age. Approximately 85% of students who took a package home returned the completed materials in the following week. Adolescents whose siblings took part in the study did not differ from adolescents for whom no sibling data were available for any of the measures. Unfortunately, no comparison between adolescents who returned the material and those who failed to (around 15%) is possible, because no record was taken regarding who received a take-home package.

Data from 209 sibling pairs still living in one household were collected. Of these 209 pairs, 4 pairs did not meet the requirements for the use of their value data (lack of discrimination between response alternatives or large amount of missing data; see Schwartz, 2009, for suggestions regarding use of data) and were not included in further analyses. The exclusion of these 4 pairs resulted in a final sample of $N = 205$ sibling pairs with older siblings having a mean age

of $M = 17.61$ years ($SD = 2.00$) and younger siblings $M = 14.63$ years ($SD = 1.76$). Same-sex pairs (51.7%) and opposite-sex pairs (48.3%) were about equally represented, but more girls than boys were included (62.9% of older siblings and 60.5% of younger siblings). In the sample, 64.4% of older siblings were also the oldest siblings in the family, and 70.2% of younger siblings were also the youngest in the family. The sample includes two twin pairs (DZ), but the degree of genetic relatedness in the siblings or its effect on the covariance between values and relationship quality were not purposely examined. Thus, no explicit record of twins, full, half, and step siblings was taken. Finally, the study was conducted in a region with a predominantly Caucasian population, which is reflected in the sample.

Measures

Adolescents' values. The Portrait Values Questionnaire (Schwartz et al., 2001) was used to assess benevolence (4 items) and universalism (6 items), which represent intrinsic values, and power (3 items) and achievement (4 items), which represent extrinsic values. Items were presented as short portraits of fictitious persons (e.g., It's important to him to help the people around him. He wants to care for other people.) and rated on a 6-point scale ranging from 1 = *not like me at all* to 6 = *very much like me*. Cronbach's alphas ranged from $\alpha = .62$ to $.80$, which is comparable to Schwartz' own reliability analyses of the scale (Schwartz et al., 2001).

The Material Values Scale (Richins & Dawson, 1992) consists of 18 items (e.g., Some of the most important achievements in life include acquiring material possessions.), which were rated on a 5-point scale ranging from 1 = *not characteristic of me at all* to 5 = *very characteristic of me*. Internal consistencies were good (Cronbach's $\alpha = .81$ and $.80$ for older and younger siblings) for total scores.

Sibling relationship. Using the Sibling Relationship Questionnaire (Furman & Buhrmester, 1985), we assessed sibling intimacy and sibling competition from two children in the family. Both intimacy (e.g., How much do you share your secrets and private feelings with your sibling?) and competition (e.g., How much do you and this sibling try to do things better than each other?) consist of 3 items that were rated on a 5-point scale (*not at all* to *all the time*). Internal consistencies for sibling relationship measures ranged from Cronbach's $\alpha = .89$ to $.93$.

Analytic Strategy

To shed light on the link between sibling relationship quality and siblings' values, multilevel modeling (MLM) analyses were carried out. MLM accounts for hierarchical (i.e., nested) data structures such as individuals within schools or children within families. Such nested data are nonindependent, that is, dyad or unit members influence each other and therefore require specialized analyses. Multilevel modeling provides the advantage that child-level data as well as dyad-level data can be analyzed in one model. As

was described by Jenkins et al. (2009), applying multilevel modeling to family data yields fixed effects (such as regression coefficients in traditional regression analyses) and random effects, which represent the child- and dyad-level variance estimates. More specifically, multilevel regression analyses not only reveal the prediction of change in one variable by another; they also provide information about whether this prediction explains sibling differences or similarity.

Dyad averages (mean of both siblings' scores) of sibling competition and intimacy were created to explore dyad-wide processes that contribute to sibling similarity. Next, child-specific deviations from dyad means were computed to examine processes that differ between siblings. The child-specific scores provide information about perceptions of competition and intimacy in relation to the sibling's perception and therefore index differences in sibling relationship perception. For example, if the older siblings' conflict score is 3 and the younger sibling's score is 1, the dyad average is 2. The child-level scores are 1 for the older sibling and -1 for the younger sibling, with higher scores indicating higher levels of competition and intimacy than one's sibling, respectively.

Initial baseline models (see left half of Table 2) for all five values were computed to identify the degree of similarity and difference between siblings. Intraclass correlations (ICC) indicate the degree of family clustering in a measure and were computed by dividing dyad-level variance by the total variance.

Following the baseline models, we estimated two-level regression models to examine whether sibling relationship measures predicted adolescents' values on the dyad level or child level. As is described above, two measures of sibling intimacy and competition were entered into each model, one indexing the dyad average of intimacy and competition and a second to reflect child-specific deviations from this family average. These predictors function to statistically explain variance. That is, if the dyad average of sibling intimacy is an important predictor of benevolence, this would lead to a decrease in dyad-level variance, because it explains partially why siblings are more similar to each other in benevolence than they are to children from other families. Similarly, if a child-level measure of sibling relationship is linked to benevolence, this variance estimate would drop as part of the variance that resides between siblings and would show that this difference in perception of sibling relationship quality is linked to differences in values.

Results

Descriptive statistics of values and sibling relationship quality are presented in Table 1. Older and younger siblings' ratings on all measures were compared, yielding a significant effect of ordinal status on benevolence, $t(204) = 2.29, p < .05$, with older siblings rating the importance of this value higher than did younger siblings. Next, gender differences in values were assessed, revealing that older sisters rated benevolence higher, $F(1, 203) = 4.25, p < .05$, and materialism lower, $F(1, 203) = 5.28, p < .05$, than did

Table 1
Descriptive Statistics of Values and Sibling Relationship Quality

Description	Older sibling		Younger sibling		Sibling correlation, r
	M	SD	M	SD	
Intrinsic values					
Benevolence ^a	0.57	0.63	0.46	0.64	.17*
Universalism ^a	0.05	0.65	0.03	0.67	.30**
Extrinsic values					
Achievement ^a	0.25	0.76	0.30	0.76	.09
Power ^a	-0.85	0.97	-0.67	1.08	.12
Materialism	2.94	0.56	3.01	0.55	.16*
Sibling relationship quality					
Intimacy	2.42	1.18	2.48	1.18	.64***
Competition	2.47	1.15	2.57	1.15	.58***

^a Before calculating scale scores for the Schwartz values, individual differences in scale use were corrected by subtracting the score for each item from that participant's average rating across all of their items (S. Schwartz, 2009).

* $p < .05$. ** $p < .01$. *** $p < .001$.

older brothers. Younger female siblings placed more importance on benevolence, $F(1, 203) = 20.50, p < .001$, and universalism, $F(1, 203) = 5.39, p < .05$, and less importance on power, $F(1, 203) = 11.21, p < .01$, than did their male counterparts. All values were correlated with age, revealing significant associations between younger sibling's age and power ($r = -.17, p < .05$) and benevolence ($r = .24, p < .01$), indicating effects of age, gender, and ordinal status that were accounted for in subsequent analyses. Links between sibling relationship quality and siblings' age difference were also examined, but only one marginally significant ($r = -.14, p = .05$) link between older siblings' reports of sibling competition and age difference was found. Finally, comparisons between same- and opposite-sex sibling dyads' reports of sibling intimacy and competition revealed that both older and younger siblings reported greater intimacy with same-sex siblings, $F(1, 203) = 16.98, p < .001$, and $F(1, 203) = 12.33, p < .01$. Older siblings also reported greater competition with same-sex siblings, $F(1, 203) = 4.86, p < .05$. Given the possibility that differential accounts of intimacy and competition in same- versus opposite-sex dyads might alter the relationship between sibling relationship variables and values, a multigroup comparison approach was chosen. Specifically, models were estimated in which same- and opposite-sex sibling dyads were free to have different estimates for all proposed links and compared those unconstrained models with constrained ones, in which same- and opposite-sex dyads were forced to be equal. Constrained and unconstrained models were compared using the Satorra-Bentler χ^2 difference test. In addition, it should be noted that all models were estimated, including age difference between siblings as a parameter with nonsignificant prediction in all cases. This parameter was therefore not included in the models presented below.

The results of the baseline models are depicted in the left half of Table 2 and the results of the predictor models in the

Table 2
Baseline Models and Random and Fixed Effects in the Prediction of Values by Sibling Competition and Intimacy

Description	Baseline model		Regression models				AIC	RMSEA
	Random effects	Random effects	Fixed effects					
			Age	Sex	Competition	Intimacy		
Intrinsic values								
Benevolence								
Child level	.35 (.03)***	.31 (.03)***	.04 (.01)***	.28 (.07)***	-.03 (.05)	.07 (.06)	3058.45	.056
Dyad level	.06 (.03)**	.05 (.03)*			-.15 (.03)***	.06 (.03)*		
Universalism								
Child level	.30 (.03)***	.29 (.03)***		.19 (.07)***	.01 (.05)	.04 (.05)	1304.78	.747
Dyad level	.13 (.03)***	.11 (.03)***			-.15 (.03)***	.01 (.04)		
Extrinsic values								
Achievement								
Child level	.53 (.05)***	.52 (.05)***			.05 (.06)	-.13 (.08)	922.67	.000
Dyad level	.05 (.04)	.02 (.04)			.17 (.04)***	.06 (.04)		
Power								
Child level	.95 (.15)***	.90 (.11)***		-.32 (.12)***	.11 (.08)	-.05 (.12)	3458.34	.030
Dyad level	.12 (.08)	.09 (.07)			.21 (.05)***	-.08 (.05)		
Materialism								
Child level	.33 (.04)***	.32 (.04)***		.01 (.06)	-.00 (.05)	-.15 (.06)**	1251.27	.020
Dyad level	.053 (.03)*	.04 (.03)			.13 (.03)***	.03 (.03)		

Note. The table presents standardized regression coefficients with standard errors in brackets. $N = 410,205$ sibling pairs. AIC = Akaike information criterion. RMSEA = root-mean-square error of approximation.

* $p < .10$. ** $p < .05$. *** $p < .001$.

right half of Table 2. The universalism model must be interpreted with caution because of its very high root-mean-square error of approximation (RMSEA; should be $< .080$), which indicates a bad fit of the model to the data. Fit indices for all other models suggested a good fit.

The baseline models suggest that most of the variance in values resides between siblings, which confirms our hypothesis of little sibling similarity. For benevolence, between-families variance is $\sigma^2 = .064$, and total variance is $\sigma^2 = .410$. This means that the ICC is .16, indicating that siblings have 16% of the variance in benevolence in common. Conversely, 84% of the variance in that value is unique to each child. ICC's for all three extrinsic values were more modest and suggested that between 86% and 91% of variance (i.e., difference) in extrinsic values is between siblings.

Benevolence was significantly predicted by the dyad average of competition ($\beta = -.15, p < .01$), suggesting that higher levels of overall competition in the dyad were related to lower levels of benevolence, thus supporting our hypothesis. In addition, a trend was observable for the prediction of benevolence by dyad average of sibling intimacy ($\beta = .06, p < .10$), indicating that adolescents who report more intimacy also showed higher levels of benevolence, again in line with our expectations. These links did not differ for same- and opposite-sex dyads, as is indicated by a nonsignificant χ^2 difference test statistic. That is, the constrained model was chosen because of its parsimony. It should be noted that analyses pertaining to the universalism model were not significant. Nonetheless, the results for benevolence were in line with our expectation that intrinsic values would be linked to positive interactions.

Notably, very similar results emerged for links between sibling relationship quality and achievement, power, and materialism. For all three extrinsic values, sibling competition on the dyad level was a significant predictor in the hypothesized direction with estimates ranging from $\beta = .13, p < .01$ (materialism) to $\beta = .17, p < .01$ (achievement). That is, sibling dyads that reported more competition also rated all extrinsic values more highly. An additional prediction of materialism by child-specific levels of intimacy was yielded. In other words, adolescents who reported more intimacy than did their siblings also reported less materialism ($\beta = -.15, p < .01$). These findings confirm our hypothesis that extrinsic values are more likely in adolescents who report negative sibling interactions.

Again, nested models were computed in which same- and opposite-sex dyads were free to have different path estimates (unconstrained), followed by more parsimonious but naturally less satisfactory fitting constrained models. The χ^2 difference between both models was nonsignificant, suggesting that constraining same- and opposite-sex dyads to have equal estimates did not worsen the fit of the model.

To calculate whether the addition of child- and dyad-level parameters into the model statistically explains value differences, we used the following calculation: (child-level variance baseline model – child-level variance predictor model)/child-level variance baseline model (and equivalent for the dyad-level variance estimates). As an example, child-level variance in benevolence in the baseline model was $\sigma^2 = .35 (p < .01)$ and in the predictor model was $\sigma^2 = .31 (p < .01)$. The difference of .04 is divided by child-level variance in the baseline model (.35), resulting in a final estimate of $\sigma^2 = .11$,

which equals 11% of variance on the child level that is explained by parameters added into the model. Adding sibling relationship measures as predictors into the benevolence model also decreased dyad-level variance by 17%, indicating that the sibling relationship contributed slightly more to similarity than did difference between siblings for this intrinsic value. Similar effects were yielded for the extrinsic value models. Sibling relationship quality mainly explained similarity rather than difference between siblings. Specifically, between 1% and 5% of child-level variance (i.e., sibling difference) in extrinsic values was explained by sibling intimacy and competition, but as much as 60% of dyad-level variance (sibling similarity) in achievement and 20% to 25% in materialism and power were explained by sibling relationship measures. Although the amount of sibling dissimilarity that was explained by sibling relationship measures was comparably small, these results confirm our expectation that sibling relationships contribute to sibling similarity as well as do differences.

Discussion

The goal of this study was to investigate associations between sibling relationship quality and values from a self-determination perspective. Extrinsic and intrinsic values were expected to be linked to different patterns of the sibling relationship and to contribute to sibling similarity as well as differences. Sibling relations are social environments that foster or thwart the psychological need for relatedness. As such, they were hypothesized to be linked to intrinsic and extrinsic values, respectively. Unexpectedly, associations with values were found mainly for negative aspects of sibling interaction, and the sibling relationship almost exclusively explained similarity in siblings' values. All results are discussed in turn.

Initial analyses concerned sibling similarity in values that exemplify intrinsic values (benevolence and universalism) and extrinsic values (achievement, power, and materialism), and similarly, modest to moderate resemblance as was found between parents and children (e.g., Whitbeck & Gecas, 1988) as well as between siblings (e.g., Boehnke et al., 2002) was expected. In line with previous studies, siblings showed little similarity in their values. From a behavioral genetic perspective, this result is not surprising. Sibling researchers informed by this tradition have consistently reported little sibling similarity in several domains for about two decades (see Plomin, DeFries, McClearn, & McGuffin, 2008). Such compelling differences in values between two children in one family, however, come as a surprise when evaluated from a value transmission theory and research perspective. Parents are regarded as highly important agents of value socialization (e.g., Grusec & Kuczynski, 1997) and are presumed to transmit their values to all of their offspring. In other words, it is proposed that parents aim to educate all of their children in a similar way. Regardless of the specific values that parents aim to transmit to or form in their children, their efforts apparently lead to different results for children within the same family, which underpins the importance of identifying child-specific can-

didates to "explain" such differential outcomes. In doing so, this study focused on the sibling relationship, a proximal social environment of young people that has received less attention both in value research and in studies concerning settings that contribute to sibling differences.

Contrary to expectations, child-specific associations between most values and sibling relationship quality were not found. In fact, one particularly characteristic aspect of the sibling relationship—sibling competition—invariably functioned as a common correlate for all values, hence contributing to sibling similarity in values. Sibling relationships are environments that foster sibling similarity, much more so than do parent-child relationships and plausibly also more so than do extrafamilial relationships (Pike & Plomin, 1997). This conclusion has previously been drawn by epidemiologically oriented researchers (Rende et al., 2005) and appears to be true also when other outcome measures, such as values, are the focus of interest. Siblings compete with each other, and this interactional dimension is linked to their similarity in values. Does that imply that sibling competition leads to their similarity? Looking at the extrinsic value achievement, for which sibling competition was a substantial correlate, it is plausible that striving for the same success and recognition that a sibling receives could result in similar importance being placed on achievement. In other words, if one sibling is highly achievement oriented and earns recognition for success, it stands to reason that sibling competition contributes to the other sibling modeling this achievement orientation to earn the same recognition. Sibling competition also functioned as a dyad-wide influence for all other values, which confirms Pike and Plomin's (1997) suggestion that greater reciprocity and similar contributions to the relationship elevate similarity in outcomes.

Because of the cross-sectional design of the current study, interpretations can only be tentative. Nonetheless, the finding that sibling relationships contribute to sibling similarity in values provides an interesting insight from a value-socialization perspective. As is noted above, siblings should be much more similar in their values if parents provide the same value-relevant environment for all their children. But siblings differ greatly and share little of their values. The small proportion that they have in common is moderately to substantially linked to the sibling relationship, leaving little "room" for parental values to explain similarity between siblings, particularly in the case of achievement. Nevertheless, "family effects," that is, potentially overlapping sibling and parent effects, are possible and need to be assessed in future research. That is, it might not be only competition between siblings that is linked to value similarity but rather a family-wide "climate" of competition.

The role of parents in their children's value acquisition should also be reconsidered when looking at the actual regression coefficients. For significant links, these ranged from $\beta = .13$ to $\beta = .21$, which is in line with previous studies that have reported associations between parenting and children's values (e.g., Flouri, 2003). Hence, siblings may be as important as parents in adolescent's value acquisition. Although it is certainly possible that sibling relationships are affected by parent-

child relationships and thus do not represent an independent social context, the findings of the current study show that research into value acquisition of young people needs to go beyond the parent–child relationship. The role of parents might also be more crucial than that of siblings when correlates of sibling differences in values are assessed. While the results presented here point to an equalizing role of sibling relations, the differentiating source may well be found within the parent–child relationship. That is, differential treatment, whether due to parental favoritism or a natural reaction to age differences between children, could result in children in one family acquiring different values.

Finally, this studies' findings support self-determination theory and research, which suggested that social environments in which psychological needs for relatedness are catered to (such as sibling relationships low in competition) enable intrinsic values to flourish (Kasser, 2002). Highly competitive siblings, however, favored extrinsic values, probably in an attempt to compensate for not having this psychological need fulfilled by placing higher importance on reward-oriented values such as achievement, which promises social recognition, power, and the belief that material goods lead to happiness in life. That such values in fact counteract well-being has been shown repeatedly (e.g., Kasser & Ryan, 1993, 1996), which is why research into correlates of such values particularly in the developmental stage of adolescence is important.

Implications

It remains the case that the vast majority of research concerning the family examines the relationship between one child and the mother. We would not wish to undermine the importance of this relationship, but this research attention has often been at the expense of research into other relationships in the family, including those of siblings. The sibling relationship is an important one for children, even if only considering the sheer amount of time siblings spend with one another (Brody, 1998). The findings presented here link sibling relationships to adolescents' values and thus make a strong case for the potential impact that brothers and sisters can have on one another during childhood and adolescence. More broadly, as one would expect from family systems theory, the current study highlights the fact that relationships between individuals in the family are part of a larger system. This underlines the need to provide holistic support that addresses individual and collective needs within the family and also the links between different aspects of individual and family functioning.

Limitations and Future Directions

The strength of a sibling design enabled the examination of links between sibling relationship quality and adolescents' values. Nonetheless, the data which all analyses were based on are correlational and do not allow for causal inferences. Both intrinsic and extrinsic values were largely dissimilar between siblings, which calls into question the success of parental attempts to transmit their

values equally to all their children. Competition in the sibling relationship contributed to the little similarity that siblings showed in their values. However, some questions remained unanswered and require future studies that go beyond cross-sectional designs to detect potential links between early relationship quality and later values, and to shed more light on value acquisition and development in general. Also, larger samples are needed to reinforce trends found in the current study and to detect possible developmental differences as well as small effects (e.g., resulting from gender composition or age differences between siblings) that might have not been revealed owing to the size of the sample used here. In addition, social environments both within and outside the family are worth considering as correlates of value differences. Adolescents' friendships, for instance, are a promising candidate because differences in experiences within this relationship have been linked to different outcomes previously (e.g., Iervolino et al., 2002). Finally, possible genetic influences could not be identified within the design of this study. More specifically, a limitation of the sample used here was its restriction to "garden variety," that is, non-twin siblings, which precluded from fragmenting variance into genetic and environmental proportions. An examination of sibling similarity in extrinsic and intrinsic values and links between such values and sibling relationship quality for siblings of different degrees of genetic relatedness is a task for future research.

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