

Developmental Pathways of Pre-Adolescents' Intrinsic and Extrinsic Values:

The Role of Basic Psychological Needs Satisfaction

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Abstract

The purpose of the study was to examine longitudinally how intrinsic and extrinsic values develop during pre-adolescence within a mother-child context by comparing three different developmental pathways – direct value transmission, indirect value transmission, and value origination. Two hundred and thirty-three Korean mother-child dyads of late elementary students ($M_{age}=11.4$ years; 55% girls) participated in a year-long online questionnaire survey. A longitudinal structural equation modeling analysis revealed two contrasting developmental pathways for intrinsic and extrinsic values in pre-adolescents. Intrinsic values developed via value origination, while extrinsic values developed via direct transmission. In other words, intrinsic values originated from the child's own inner psychological experiences and developed in accordance with changes in basic psychological needs satisfaction, whereas extrinsic values were transmitted from mothers in accordance with the degree to which they endorsed extrinsic values.

Keywords: life aspirations, self-determination theory, psychological needs, value development, pre-adolescence

Introduction

Personal values contribute to the motivational aspect of personality, influencing attitudes, goals, and choices (Feather, 1995). In adolescence, values serve as guiding principles around which identity and a sense of self may be established (Hitlin, 2003; Maio et al., 2009; Padilla-Walker & Carlo, 2007). By definition, values are concepts of what is desirable and what is not. It is generally thought that individuals acquire these values by being socialized into the culture from childhood, with parents as proximal socializing agents. However, such a conception may not apply to certain types of values that are evolutionarily based and closely tied to human nature, such as values for meaningful relationships in one's life. Such a conception necessitates a different mechanism by which these values emerge and develop. The present study attempts to test three different pathways to value development during pre-adolescence by following the change that occurs over a one-year period during late-elementary school to answer this basic question: Where do children's values come from?

Intrinsic vs. Extrinsic Values and their Consequences

According to self-determination theory (SDT; Ryan & Deci, 2017), values exist and operate within a motivational system based on the three basic psychological needs for autonomy, relatedness, and competence. The basic premise of an SDT view on values is that *not all values are equal*. Pursuing some values tends to foster greater well-being and adjustment because of their association with basic psychological needs. Prototypical *intrinsic* values are aspirations for personal growth, community contribution, and meaningful relationships (Kasser, 2002). They are inherently satisfying to pursue because their pursuit affords people with multiple and recurring opportunities to experience psychological needs satisfaction (Sheldon et al., 2004). Prototypical *extrinsic* values are aspirations for financial success, popularity, and social image. Pursuing

extrinsic values orients people's daily activities in a direction in which they experience psychological needs frustration or, at best, indirect needs satisfaction that is short-lived and contingent on social approval or validation (Niemi et al., 2009; Vansteenkiste & Ryan, 2013). Overall, holding, pursuing and even attaining one type of values (i.e., intrinsic values) sets the person up for a lifestyle replete with frequent needs satisfaction; while holding, pursuing and attaining another type of values (i.e., extrinsic values) sets the person up for a lifestyle relatively devoid of need satisfaction or even marked by need frustration.

Longitudinal studies, intervention experiments, and meta-analyses all showed that the pursuit of intrinsic values was associated with psychological well-being and that this benefit has been replicated universally regardless of the culture (Dittmar et al., 2014; Kasser et al., 2014; Kim et al., 2003; Leikes et al., 2010; Ryan et al., 1999). When people pursued intrinsic values, they tended to experience greater vitality, more positive emotions, and higher levels of life satisfaction with lesser symptoms of anxiety and depression. Among adolescents who pursued intrinsic values, they less likely engaged in risky behaviors (e.g., use of tobacco and marijuana) and more likely showed greater motivations to learn and adopted mastery goals (rather than performance goals) in achievement contexts (Ku et al., 2012; Williams et al., 2000). Higher intrinsic value orientations predicted more altruistic and cooperative attitudes in experimentally manipulated situations of scarcity (Sheldon et al., 2000). Pursuing intrinsic values was also associated with more pro-environmental activities and fewer carbon footprints (Hurst et al., 2013; Unanue et al., 2016). On the other hand, extrinsic value orientations predicted more ethnic and racial prejudice, authoritarianism, and Machiavellianism (Duriez et al., 2007).

Overall, the pursuit of intrinsic (rather than extrinsic) values in one's life has important psychological and social implications. These benefits (and costs) prompted the research question that drove the current study: *How do intrinsic and extrinsic values develop in pre-adolescence?*

Possible Developmental Pathways of Values

Parents have long been considered primary agents of socialization who have the most proximal role in shaping children's values (Grusec & Hastings, 2014). Past research suggested three possible explanations through which value development occurs, namely (1) *direct value transmission* in which children's values resemble those of their parents because of parents' value-laden words and behaviors; (2) *indirect value transmission* in which children's internalization of values is either facilitated or hindered by certain parenting behaviors that are informed by parental values; and (3) *children's own value origination* in which children's experience of needs satisfaction is vitalized as an inner resource from which values may emerge. Each of these three possible explanations appears in graphical form in Figure 1. The first two developmental pathways to children's values are rooted in the definition of values as cognitive structures, while the third pathway is rooted in the definition of values as the transformation of psychological needs.

Developmental pathways that conceptualize values as cognitive structures. Rokeach (1973) proposed two definitions of values, which correspondingly suggest three potential developmental pathways. According to the first and more widely known definition, values are *cognitive* beliefs about what is desirable and important in life. Theorists who define values in terms of their cognitive nature hold the assumption that people acquire values through the process of socialization, especially by identifying with important people in life such as parents

(Grusec & Goodnow, 1994). And certain characteristics of parenting climate either facilitate or hinder this socialization process. In line with this thinking, two possible pathways of value development can be identified – namely, direct value transmission (Line 1 in Figure 1), and indirect value transmission (Lines 2 in Figure 1).

Direct value transmission. In direct value transmission, parents announce to their children—through words and behaviors—their values, such as a priority to pursue personal growth (i.e., intrinsic value) or a priority to pursue “fame and fortune” (i.e., extrinsic values). Parents can publicly and explicitly communicate to children what is desirable and what should be valued in life. Other times, parents’ values can be communicated more implicitly through parental aspirations and expectations for their children. For instance, a parent might encourage a child to pursue a particular value, or the parent might react more positively to the child when the child does pursue that value. Children can then use these communicated value messages as a marker for their daily and life aspirations.

Past studies have reported correlations between parents’ and children’s reports of values to indicate the extent of successful value transmission. These correlations generally fell within a wide spectrum from .18 to .98 depending on the types of values being examined (Barni et al., 2011; Friedlmeier & Trommsdorff, 2011; Rohan & Zanna, 1996; Schönplflug, 2001; Whitbeck & Gecas, 1988). One study led by Kasser et al. (1995) examined the transmission of intrinsic and extrinsic value profiles from mothers to eighteen-year-olds. The average correlation across subscales was .27. The “significant, but rather weak” (Taskinen et al., 2015, p. 103) correspondence between parental values and children’s values suggests that other psychological processes are at work in qualifying the extent of value transmission and in facilitating the formation of pre-adolescents’ values (Grusec & Hastings, 2014) such as parenting style and

children's own experiences of psychological needs satisfaction. Accordingly, the indirect value transmission is a mediation model embedded within the direct value transmission model to explain the latter's otherwise direct effects.

Indirect value transmission. One mechanism that can explain parent-child value transmission is parenting styles. Parenting styles, which are determined to some extent by the types of parental values also determine the extent of parent-child value similarity (Rohan & Zanna, 1996). Kohn (1989) argued that parental values were, in part, responsible for informing parental behaviors. In support of this proposition, the parental value of self-direction positively predicted maternal involvement and warmth (Luster et al., 1989), while parental trust in the child's organismic development predicted more autonomy-supportive behaviors from mothers (Landry et al., 2008). Conversely, Wang et al. (2012) found that the more parents valued self-development as a central socialization goal for their children, the less psychologically controlling they were toward their children. Likewise, teachers' endorsement of extrinsic instructional goals predicted an increase in controlling behaviors over a semester (Jang, 2019).

SDT suggests three parenting dimensions: (1) warmth vs. rejection; (2) autonomy support vs. control; (3) structure vs. chaos (Skinner et al., 2005; Soenens et al., 2017). The optimal constellation of parenting was shown to be the provision of warmth, autonomy support, and structure. Positive parenting increases the likelihood of value transmission by facilitating internalization, a process of "taking over the values and attitudes of society as one's own" (Grusec & Goodnow, 1994, p. 333). Parental behaviors of autonomy support and warmth create a climate of open and accurate communication between parents and children (Knafo & Schwartz, 2003), a climate which fosters value internalization in children (Knafo & Assor, 2007). This explains the "why" in Line 2b (perceived parenting → child's values). Past studies showed that

children better internalized the values promoted by parents when they perceived their parents to be empathic, flexible, and understanding, rather than restrictive and authoritarian (Bureau & Mageau, 2014; Friedlmeier & Trommsdorff, 2011; Grolnick et al., 1997; Kasser et al., 2002). Similar patterns of findings were observed with intrinsic and extrinsic values. A cross-cultural study comparing Chinese and American samples also reported that, regardless of the culture, adolescents who perceived their parents to be autonomy supportive were more likely to value intrinsic life goals (Lekes et al., 2010).

While the direct value transmission focuses on a direct effect of parents' value on children's value development, the indirect value transmission specifies parenting styles as an intervening mechanism (a mediator) that either fosters or hinders processes of value internalization. Parents' intrinsic values can inform their parenting behaviors to be involved, autonomy supportive, and structuring toward their children, hence creating an interpersonal climate conducive for children to accurately perceive and internalize values promoted by their parents. Likewise, it should be said that parents' extrinsic values inform their parenting behaviors to be rejecting, controlling, and chaotic toward their children, hence creating an interpersonal climate less conducive for children's internalization. While the indirect transmission model provides a plausible explanation for the development of intrinsic values, it still leaves two questions unanswered about the transmission of extrinsic values. The first question concerns to what extent parents' controlling, rejecting, and chaotic parenting behaviors are informed by their *own* extrinsic values. And the second question pertains to the internalization of extrinsic values. Negative parenting behaviors hinder internalization, so the indirect transmission pathway seems to be an unlikely mechanism by which children develop extrinsic values. For instance, controlling parenting generally leads adolescents to report valuing

extrinsic values (Flouri, 2004; Kasser et al., 2002; Kasser et al., 1995; Williams et al., 2000), which suggests only a direct value transmission pathway for extrinsic values.

Value as an expression of basic psychological needs. The second and lesser-known definition of values is that values are “transformation of needs” (Rokeach, 1973, p. 20). The SDT of values argues that the origin of values is not society, but the *self* (Kasser, 2002)¹. Contrary to the predictions from both the direct and indirect transmission models, an alternative view argues that not all values need to be socialized but that some are self-generated and originate from people’s own internal experiences. While need satisfaction is an outcome of the pursuit of intrinsic values, it is also the inner resource that vitalizes the development of intrinsic values (Vansteenkiste & Ryan, 2013). A developmental history of psychological needs satisfaction (i.e., autonomy, competence, and relatedness) tends the person toward intrinsic values, while a developmental history of the needs frustration tends the person toward extrinsic values as need substitutes.

Value origination. The third pathway of value development is value origination. Value origination is qualitatively different from the first two pathways. Intrinsic and extrinsic values are seen as a reflection and manifestation of individual’s psychological needs experience, rather than as an internalized cognitive structure of what is desirable or not. This pathway of development corresponds to Lines 3 in Figure 1.

When environmental conditions and interpersonal relationships are need supportive, people experience need satisfaction, and intrinsic values “*emerge*” as an expression of needs satisfaction (Rogers, 1964). The satisfaction of basic psychological needs orients the person toward intrinsic values –opportunities to express oneself and to pursue one’s interests, to interact

effectively with one's surroundings, and to work toward building close and intimate relationships with others. However, when environmental conditions and interpersonal relationships are need neglecting and need thwarting, people experience need dissatisfaction and need frustration (Cheon et al., 2019). Persistent experiences of need frustration leave people vulnerable and insecure, a psychological state that motivates people to search for external indicators of worth. Such a person focuses on "obtaining external rewards, approval of others, and feelings of safety as a way to garner some sense of worth and security as well as to compensate for their need deprivation" (Kasser et al., 2002, p. 827). In this light, intrinsic values are understood to be an expression of psychological need satisfaction, while extrinsic values are understood to be need substitutes for the frustration of the psychological needs.

Most of the studies that examined the associations between needs satisfaction (vs. frustration) and intrinsic (vs. extrinsic) values used a cross-sectional research design (Davids et al., 2016; Leikes et al., 2011; Roest et al., 2012), which only implies associations among variables and limits conclusions on the directionality of these associations. A more rigorous testing with a longitudinal design is warranted to clarify the strength and directionality of these associations. According to Collins et al. (2000), short-term longitudinal designs are good strategies to show over-time effects of parenting on child development when randomized experimental designs are unrealistic. By controlling for autoregressive effects and ensuring time precedence, examining value development in a longitudinal design provides indirect evidence for over-time effects of parent's values, parenting styles, and children's need satisfaction on children's value development— rather than a mere co-occurrence.

Hypotheses

While all three pathways to children's development of intrinsic and extrinsic values are plausible, the study hypotheses were informed by the value origination model (Pathway 3) and a conceptualization of values as the transformation of psychological needs. Specifically, we hypothesized that a change in children's intrinsic values would occur because of children's own needs satisfaction, and that a change in needs satisfaction would occur because of a change in perceived need-supportive parenting. Likewise, we hypothesized that a change in children's extrinsic values would occur because of children's own needs frustration and that a change in needs frustration would occur because of a change in perceived need-thwarting parenting. That said, values are multi-sourced. So, changes in children's values may be supplemented and further informed by an indirect transmission process involving parenting behaviors (Pathway 2) as well as by a direct transmission process rooted in parents' own values (Pathway 1). By testing the merits of all three possible models, we sought to test the comprehensive process through which pre-adolescents' intrinsic and extrinsic values develop within the mother-child context. These hypotheses were set *a priori* but were not pre-registered.

Mothers and Children

The present study is interested in mothers, their values, and their parenting styles as a social context in which children's values develop. Although both mothers and fathers are important in children's values development, the current study only looked at the maternal influence. The findings as to what extent mothers and fathers differentially exert an influence on children's values are not conclusive yet. Past studies on parent-child value transmission have examined both mother- and father-child dyads, but no systematic pattern has been reported. Across the globe, mothers are generally considered to be primary caregivers and are more

involved in parenting. The parent who spends more time with the child tends to forge a more intimate relationship and plays a more proximal role in shaping the child's values.

Children in the study were late elementary students at Time 1. At this age, children's values are only somewhat undifferentiated, and children's values reflect and are influenced rather strongly by their parents—even significantly more so than by their best friends (Padilla-Walker & Carlo, 2007). As late elementary school children transition into adolescence, the influence of parents on their values, aspirations, and behaviors begins to decline, while the influence from their peers begins to increase, as does children's reliance on their own personal experiences to inform their values, aspirations, and behaviors. Because we were interested in mothers' socializing effect on their children, we recruited child participants who were aged 10 to 12 and followed them for a year.

Method

Participants

Prior to recruitment, we considered whether or not our statistical tests were adequately powered. To estimate the sample size needed to reach generalizable conclusions, we calculated for the minimal sample size necessary for a *F*-test-based multiple regression that used conventional statistics ($\alpha = 0.05$, power = 0.95) in detecting the capacity of three predictors with a medium effect size ($f^2 = 0.15$) to predict the outcome measure among a set of 8 total predictors (6 predictors in Figure 1 plus 2 statistical controls). That minimal sample size would be 120, based on Faul, Erdfelder, Lang, and Buchner's (2007) G*Power 3 software program. However, considering the potential attrition rate that might occur over a 4-wave, 12-month time frame, we targeted a total of 230 dyads at Time 1.

Two-hundred forty-one mother-child dyads were recruited nationwide in South Korea to participate in a year-long online questionnaire study. Out of 241 dyads at Time 1, 8 dyads dropped out at Time 2; 15 dyads at Time 3; and another 50 dyads at Time 4. Those that dropped out at Time 2 (who only had T1 scores) were excluded from the final sample for analysis, while the data from dropouts at other time points (T3 and T4) were retained. Independent sample t-tests revealed that the 8 dyads that were excluded at T2 were not significantly different from the rest of the sample in all study variables. The final sample included 233 dyads. At T1, 52% of the child participants were 6th graders, 41% were 5th graders, and 7.7% were 4th graders ($M_{age} = 11.4$ years; 55% girls). The families mostly came from the middle socioeconomic status. Table 1 describes the sample characteristics in more detail.

Procedure

As shown in Figure 2, data collections took place at four time points across one year. T1 data were collected in October 2016; T2 in January 2017; T3 in May 2017; and T4 in October 2017. For recruitment, information flyers were distributed in an elementary school in an urban area in South Korea, and posts were uploaded in online parent groups. We clarified the study purpose and procedure by making phone calls to the mothers who initiated contact with the researchers expressing interest in the study. Then, online survey links for both mothers and children were sent via text messages.

Because mothers received the text message with the survey link of the questionnaires for both mothers and children, we requested the mothers to make sure to provide private space and time for the children when answering the questionnaires. This was done to ensure that children could answer as honestly as possible. As a token of appreciation, a \$5 gift certificate was given

to both mothers and children at each wave of data collection. Mothers completed a questionnaire once at T1 regarding their own values, whereas children completed the study questionnaire at each wave. The child questionnaire included assessments of perceived maternal parenting style, need satisfaction experiences, and child's own values.

Measures

For all the measures, translation and back-translation procedures were followed using the guidelines recommended by Brislin (1970). Initially, the principal researcher translated the original English instruments into Korean. Then, the translated versions of the questionnaires were back-translated by two bilinguals who were fluent in both languages. A third person, with an in-depth understanding of the constructs being measured, compared the original and back-translated items to inspect their equivalence. Any discrepancies were resolved through discussion with the experts and the bilinguals. All the measures used in the study can be viewed on the Open Science Framework page (https://osf.io/2aqmv/?view_only=b02f638e6eb24d6aa2612a59413a87c2).

Values. Intrinsic and extrinsic values of children and mothers were assessed by two different versions of the *Aspirations Index* (AI; Kasser & Ryan, 1993, 1996). Mothers completed the original 30-item AI, while children completed a 24-item AI developed specifically for school-aged children (Nishimura et al., 2017). Both questionnaires asked participants to rate the importance of intrinsic and extrinsic goals on a response scale, from 1 (*not at all important*) to 5 (*very important*) for children and to 7 (*very important*) for mothers. Intrinsic values were measured with three subscales, which included personal growth (e.g. “*It is important for me to grow and learn new things.*”), meaningful relationship (e.g. “*It is important for me to have good*

friends that I can count on.”), and community contribution (e.g. *“It is important for me to work to make the world a better place”*). Extrinsic values were measured with three subscales, which included wealth (e.g. *“It is important for me to be financially successful”*), social image (e.g. *“It is important for me to have an image that others find appealing”*), and fame (e.g. *“It is important to for me to be admired by lots of different people.”*). All subscales showed acceptable internal consistency (see Tables 2 and 3).

Perceived parenting style. Perceived parenting style was assessed by the 24-item *Parents As Social Context Questionnaire* (Skinner et al., 2005). Children indicated on a 5-point rating scale how well each sentence described their mothers, from 1 (*not at all true*) to 5 (*very true*). Need-supportive parenting style was measured with three subscales, which included warmth (e.g. *“My mom lets me know that she loves me.”*), structure (e.g. *“When I want to do something, my mom shows me how.”*), and autonomy support (e.g. *“My mom tries to understand my point of view.”*). Need-thwarting parenting style was measured with three subscales, which included rejection (e.g. *“My mom thinks I am always in the way.”*), chaos (e.g. *“My mom gets mad at me with no warning.”*) and control (e.g. *“My mom is always telling me what to do.”*). All subscales showed satisfying reliability coefficients (see Tables 2 and 3).

Need experience. Need experience was assessed by the 24-item *Basic Psychological Need Satisfaction and Frustration Scale* (Chen et al., 2015). Children indicated on a 5-point rating scale how well each statement described their experience in daily life, from 1 (*not at all true*) to 5 (*very true*). Need satisfaction was measured with three subscales, which included autonomy satisfaction (e.g. *“I feel a sense of choice and freedom in the things I undertake.”*), competence satisfaction (e.g. *“I feel I can successfully complete difficult tasks.”*), and relatedness satisfaction (e.g. *“I feel that the people I care about also care about me.”*). Need frustration was

measured with three subscales, which included autonomy frustration (e.g. “*I feel pressured to do too many things.*”), competence frustration (e.g. “*I feel disappointed with many of my performances.*”), and relatedness frustration (e.g. “*I have the impression that people I spend time with dislike me.*”). All subscales showed satisfying reliability coefficients (see Tables 2 and 3).

Plan of Analysis

Two separate models for the development of intrinsic values and extrinsic values were tested because the two values are theorized to develop from different origins within the “value origination” model – namely, need satisfaction for intrinsic values and need frustration for extrinsic values (Vansteenkiste & Ryan, 2013).

To test our assumption that intrinsic values and extrinsic values are largely independent of one another and that they develop from different origins—that is, baseline intrinsic values do not affect the development and change of extrinsic values just as baseline extrinsic values do not affect the development and change of intrinsic values, we performed a preliminary structural equation modeling (SEM) analysis. As shown in Figure 3, children’s intrinsic and extrinsic values were somewhat undifferentiated at T1 (i.e., overlapping and positively correlated), $\beta = .34, p < .000, 95\% \text{ CI } [0.19, 0.48]$ and at T4, $\beta = .23, p = .014, 95\% \text{ CI } [0.05, 0.41]$. T1 intrinsic values did not predict a longitudinal change in T4 extrinsic values, $\beta = -.17, p = .054, 95\% \text{ CI } [-0.34, 0.00]$, just as T1 extrinsic values did not predict a longitudinal change in T4 intrinsic values, $\beta = -.03, p = .784, 95\% \text{ CI } [-0.20, 0.15]$. These data largely support our assumption about late elementary children’s values and confirm our analytic strategy of estimating the two models separately.

In the main analyses for hypothesis testing, SEM was performed using *Mplus 7.11* in two phases—a measurement phase and a structural phase. The models were estimated using full-information maximum likelihood to treat missing data and to derive less biased estimates (Muthén & Muthén, 1998-2012; Newman, 2003).

Test of measurement invariance is prerequisite to estimating structural paths in a longitudinal data set, because it ensures that the meaning of the variables did not change over the time (Meredith & Horn, 2001). In our study, a number of variables were assessed repeatedly across different waves. The measurement invariance test proceeded in three steps—configural, metric and scalar invariance (Bollen, 1989; Little, 1997). We followed Cheung and Rensvold's (2002) recommended criterion of ΔCFI of $-.01$ paired with $\Delta RMSEA$ of $.01$ as the cut-off to evaluate each test of model invariance. In testing configural invariance, we estimated the baseline model, and indicator-specific effects were allowed to vary (i.e., the covariance between errors of the same indicator variables across time points was estimated). This test of the baseline model provides evidence that the indicators fit well to the latent variables and load respectively onto the latent construct they purport to represent. This test is equivalent to the classic test of the measurement model. Second, we imposed equality constraints on the factor loadings of the same indicator variables across time points, because metric invariance implies that the relation of the latent variables to the indicators is constant across time (Marsh, 1994). Metric invariance holds when the equality constraints on the factor loadings are not accompanied by a significant loss in fit (Cheung & Rensvold, 2002). Third, we imposed equality constraints on the intercepts of the same indicator across time points. Scalar invariance holds when the equality constraints on the intercepts are not accompanied by a significant loss in fit.

Once the measurement invariance was established, we tested the structural model. To evaluate the goodness-of-fit of the models, we used the Standardized Root Mean Square Residual (SRMR), the Root Mean Squared Error of Approximation (RMSEA), and Comparative Fit Index (CFI). The combined cut-off values of 0.08 for SRMR, 0.06 for RMSEA and 0.95 or above for CFI indicate a good model fit (Hu & Bentler, 1999). After testing the overall model, we examined each individual path for statistical significance. To evaluate statistical significance of hypothesized indirect effects (or mediation; in this paper, we use these two words interchangeably), we conducted bootstrapping with 5,000 samples and 95% confidence intervals (CI), which correspond to the $p < .05$ alpha level (MacKinnon et al., 2004). If the lower bounds and upper bounds at the 95% CI do not include 0, the indirect effect is considered statistically significant. The dataset and the reproducible scripts for statistical analysis on *Mplus* can be accessed on the Open Science Framework page with the same link in the measures section.

Results

Descriptive Statistics and Correlations

Inspection of univariate normality indices showed that skewness and kurtosis values for all dependent measures were less than |2| and |4|, respectively (Curran et al., 1996). As can be seen in Table 2, most of the variables included in the intrinsic value model were positively correlated, although a few correlations between mothers' values and children's values were insignificant. As can be seen in Table 3, many variables included in the extrinsic value model were positively correlated, although the correlations between (both mothers' and children's) values and need frustration were mostly insignificant. Similar patterns emerged in correlations among latent variables (see Tables 4 and 5).

Measurement Invariance

Table 6 summarizes the three-step tests of the intrinsic and extrinsic value models. First, the baseline model showed an adequate fit to the data for both models. Second, the equality constraints on the factor loadings were not accompanied by a significant increase in misfit in the intrinsic value model, $\Delta RMSEA = .001$, $\Delta CFI = -.001$, nor in the extrinsic value models, $\Delta RMSEA = -.001$, $\Delta CFI = .000$, demonstrating longitudinal metric invariance. Third, equality constraints on intercepts did not bring about a significant increase in misfit in the intrinsic value model, $\Delta RMSEA = .004$, $\Delta CFI = -.009$, nor in the extrinsic value models, $\Delta RMSEA = -.001$, $\Delta CFI = -.002$, providing support for scalar invariance of the model across time. All the equality constraints for the test of measurement invariance were retained in the test of structural models. Factor loadings of the measurement part of the model for intrinsic and extrinsic values are presented in Table 7.

Primary Analysis

Development of intrinsic values. Estimation of the intrinsic value model yielded a good fit to the data, $\chi^2(262) = 404.24$, $p < .001$; $RMSEA = .048$ (.039, .057); $CFI = .946$; $SRMR = .066$ (see Figure 4). The overall model explained 33% of the variance in child's intrinsic values at T4, $R^2 = .33$. Among the covariates, only child's grade level was statistically significant. Grade level negatively predicted the change in child's T3 needs satisfaction, $\beta = -.12$, $p = .036$, 95% CI [-0.23, -0.01], and the change in T2 perceived supportive parenting, $\beta = -.12$, $p = .044$, 95% CI [-0.23, -0.01].

Mother's intrinsic values positively predicted the change in T2 perceived supportive parenting, $\beta = .14$, $p = .027$, 95% CI [0.02, 0.27], but mother's intrinsic values did not predict the

change in child's T4 intrinsic values, $\beta = .10$, $p = .295$, 95% CI [-0.09, 0.30]. The change in T2 perceived supportive parenting positively predicted the change in child's T3 need satisfaction, $\beta = .31$, $p < .001$, 95% CI [0.18, 0.44], but it did not predict the change in child's T4 intrinsic values, $\beta = -.18$, $p = .115$, 95% CI [-0.40, .04]. The single statistically significant predictor of the change in child's T4 intrinsic values was the change in child's T3 needs satisfaction, $\beta = .29$, $p = .011$, 95% CI [0.07, 0.51], controlling for the initial level of child's T1 intrinsic values, $\beta = .39$, $p < .001$, 95% CI [0.19, 0.59]. The hypothesized mediation (Perceived supportive parenting \rightarrow Need satisfaction \rightarrow Child's intrinsic values) was tested by entering T1 and T2 perceived supportive parenting as antecedents and T3 need satisfaction as a mediator to predict child's T4 intrinsic values. The indirect effect from T1 perceived need-supportive parenting to child's T4 intrinsic values via T2 perceived parenting and T3 need satisfaction was weak but statistically significant, $\beta = .05$, 95% CI [0.004, 0.14], and the 95% CI did not include zero.

Development of extrinsic values. Estimation of the extrinsic value model yielded an adequate fit to the data, $\chi^2(262) = 425.18$, $p < .001$; $RMSEA = .052$ (.043, .061); $CFI = .944$; $SRMR = .056$ (see Figure 5). The overall model explained 49% of the variance in child's extrinsic values at T4, $R^2 = .49$. Among the covariates, only the child's grade level negatively predicted the change in child's T4 extrinsic values, $\beta = -.16$, $p = .009$, 95% CI [-0.29, -0.04].

Only one expected path was statistically significant – mother's extrinsic values positively predicted the change in child's T4 extrinsic values, $\beta = .15$, $p = .034$, 95% CI [0.01, 0.28]. Mother's extrinsic values did not predict a change in T2 perceived thwarting parenting, $\beta = .01$, $p = .932$, 95% CI [-0.12, 0.13]; the change in T2 perceived thwarting parenting did not predict the change in child's T4 extrinsic values, $\beta = .15$, $p = .055$, 95% CI [-0.00, 0.31]; and the change in

child's T3 need frustration did not predict the change in child's T4 extrinsic values, $\beta = .09$, $p = .284$, 95% CI [-0.08, 0.26].

Discussion

The present study, in a four-wave longitudinal design over a one-year span, simultaneously tested three potential developmental pathways of pre-adolescents' intrinsic and extrinsic values – direct value transmission, indirect value transmission, and value origination. The findings showed that child's own need satisfaction singly predicted a change in child's intrinsic values, while mother's extrinsic values singly predicted a change in child's extrinsic values. These findings provide support for the value origination pathway in the intrinsic value model and for the direct value transmission pathway in the extrinsic value model.

Pathway 1: Direct Value Transmission

Direct value transmission predicted a direct effect of mother's values on changes in child's T4 values. This prediction was supported in the extrinsic value model but not in the intrinsic value model.

In the intrinsic value model, mother's intrinsic values did not significantly predict the longitudinal change in child's T4 intrinsic values, $\beta = .10$, $p = .295$, 95% CI [-0.09, 0.30] (see Figure 4). Mother's intrinsic values did correlate with child's T4 intrinsic values, $r = .22$, $p = .022$ (see Table 4), however, this otherwise direct association disappeared when other predictors were entered. Extrinsic values, on the other hand, did seem to be directly transmitted from mother's extrinsic values. Mothers' extrinsic values predicted the longitudinal change in child's T4 extrinsic values, $\beta = .15$, $p = .034$, 95% CI [0.01, 0.28] (see Figure 5). Mother's extrinsic values also correlated significantly with child's T4 extrinsic values, $r = .27$, $p = .001$.

These results suggest that mothers do directly transmit their extrinsic values—but not their intrinsic values—to their children.

Pathway 2: Indirect Value Transmission

Indirect value transmission predicted an indirect effect of mother's values on changes in child's T4 values via child's perception of parenting style. This prediction was not supported in the extrinsic value model but was partially supported in the intrinsic value model.

In the intrinsic value model, mother's intrinsic values predicted the change in T2 perceived supportive parenting, $\beta = .14, p = .027, 95\% \text{ CI } [0.02, 0.27]$ (see Figure 4). However, T2 perceived supportive parenting did not predict the change in child's T4 intrinsic values, $\beta = -.18, p = .115, 95\% \text{ CI } [-0.40, .04]$. This finding builds on previous studies that examined associations between parental values and a single dimension of parenting behaviors (Landry et al., 2008; Luster et al., 1989) by broadening the concept of parenting behaviors to include autonomy support, structure, and warmth. Contrary to the hypothesis, need-supportive parenting style, as a manifestation of mother's intrinsic values, is not responsible for the development of child's intrinsic values in the presence of another predictor (i.e., need satisfaction). In the extrinsic value model, none of the anticipated paths were statistically significant.

Pathway 3: Value Origination

As the primary hypothesis of this study, value origination hypothesized for the indirect effect of perceived parenting style on changes in child's T4 values via the child's own need experience. This hypothesis was supported only in the intrinsic value model but not in the extrinsic value model.

In the extrinsic value model, need frustration did not predict the longitudinal change in child's T4 extrinsic values, $\beta = .09$, $p = .284$, 95% CI [-0.08, 0.26] (see Figure 5). This result is inconsistent with SDT, which suggests that materialism or extrinsic values function as compensatory need substitutes when one's psychological needs are frustrated (Vansteenkiste & Ryan, 2013). A similar null finding was reported with pre-adolescent girls' reasons for endorsing extrinsic (image) goals (Thøgersen-Ntoumani et al., 2010). Evidently, extrinsic values do not originate or emerge out of experiences of need frustration but, rather, function more like cognitive structures that develop through the process of internalizing a belief system communicated by key socializing agents as desirable and important in life.

In the intrinsic value model, as expected, the longitudinal change in T2 perceived supportive parenting did significantly and directly predict a longitudinal change in child's T3 need satisfaction, $\beta = .31$, $p < .001$ (see Figure 4), and this change in T3 need satisfaction, in turn, did significantly predict a longitudinal change in child's T4 intrinsic values, $\beta = .29$, $p = .011$, even after controlling for the initial level of child's T1 intrinsic values, $\beta = .39$, $p < .001$. The indirect effect test also demonstrated that, consistent with the hypothesis, perceiving the parents as need-supportive vitalizes the experience of need satisfaction, and the experience of need satisfaction leads to an increase in child's intrinsic values. These findings build on the existing findings of Davids et al. (2016), which found an association between need satisfaction and intrinsic values and lend empirical support to the theoretical conjectures from both SDT (Kasser et al., 2014; Sheldon et al., 2003) and Rogers (1964) that the *self* is the integrative center of an organism equipped with organismic valuing process, and that need satisfaction provides psychological energy to the *self*. Evidently, intrinsic values do originate or emerge out of experiences of need satisfaction.

Different Socio-Motivational Origins of Intrinsic and Extrinsic Values

The examination of the developmental pathways of intrinsic and extrinsic values in SDT suggests that the two types of values may spring from different sources. The pathway by which intrinsic values develop was a need-satisfaction-based origination. When an individual's basic psychological needs are satisfied in a supportive social context characterized by autonomy support, warmth, and structure, the *self* is energized and provided "nutriments" to explore, experience, weigh and select one's values. And the valuing process seems to take a common direction: the direction towards intrinsic values – to develop oneself as an individual, to build intimate and meaningful relationships, and to contribute to the betterment of one's community (Sheldon et al., 2003). As Ryan and Deci (2017) argued, satisfaction of the needs for autonomy, competence, and relatedness is the psychological and motivational basis of human well-being and flourishing, one aspect of which is the pursuit of intrinsic values.

On the other hand, extrinsic values develop in a direct transmission pathway through exposure to salient socio-cultural messages. The mechanism by which such transmissions take place is not clearly explicated in this study. However, it can be argued that that extrinsic values are largely social messages of the society and culture (or of their representative spokesperson, the mother) that are partially internalized or introjected by individuals into their sense of self (Kasser et al., 2007). Because extrinsic values do not originate from within the self, it makes sense to conclude that pre-adolescents' extrinsic values develop as internalized cognitive structures (i.e., beliefs). The question as to how extrinsic values might serve as need substitutes when the psychological needs are frustrated needs further investigation.

Limitations and Future Directions

Five features of the study limit the conclusions that may be drawn from these findings. First, the sample recruited was a convenience sample and is, therefore, not representative of all types of families. Most of the dyads came from middle-class two-parent families (see Table 1). Families from lower socioeconomic status or those with nonconventional family structures (e.g., divorced, single, widowed, etc.) were not sufficiently represented. Second, the assessment of parenting styles and values relied solely on children's self-report. Use of more objective measures such as raters' scoring of parent-child interactions and value-endorsing behaviors is recommended for future research. Third, the study relied on mothers only as a proximal context in influencing children's value development. Given that fathers play a key role in instrumental activities and in orienting the children to the outside world (Collins & Russel, 1991; Paquette, 2004), future studies can include both parents to investigate the unique influence as well as the complementary influence of the two parents on children's value development. Considering the effects of other agents of socialization outside the family, such as teachers, peers, and media, will be another interesting avenue of future research to gain a more comprehensive view on adolescent's value development. Fourth, all of our mother-child dyads were ethnic Korean. This means that Asian-based socialization practices such as *filial piety* (elevated respect for one's parents) and *guan* (parents training or disciplining their children to adopt socially desirable behaviors such as academic excellence; Chao et al., 1994) were likely operative in our sample of Korean mothers and children to a greater degree than might be expected in a sample of Western mothers and children. Lastly, the study spanned one year during pre-adolescence. It is not clear how much or how little children's values change in a year, so future longitudinal studies with a longer time span and with varying age ranges will be important to explicate how these two values (i.e., intrinsic and extrinsic) develop and change; and how these values influence other

developmental processes (e.g. identity development) in transition to adolescence and emerging adulthood.

Conclusions

The findings demonstrate support for different developmental pathways of the two values. Intrinsic values developed and emerged from the satisfaction of basic psychological needs, while extrinsic values developed from taking in the value messages advocated by one's mother (i.e., an important aspect of one's proximal environment). Given this pattern of findings, the key to fostering healthy value development in pre-adolescents is to offer need-supportive relationships while minimizing socio-cultural messages that promote extrinsic values as life's most important pursuits.

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Footnotes

1. SDT's proposition on the origin of needs resonates with Rogers' theory of organismic valuing process, which argues that people are equipped with an inherent organismic basis of choosing what is and what is not valuable (Rogers, 1964). This process is effective to the extent that we are free to choose what we deeply value based on trust in our own experiencing, rather than on other people's conceptions of what is valuable. And there emerges a common and universal direction; a direction toward intrinsic values and away from extrinsic values, at least when the direction is supported by a developmental context of need satisfying experiences.

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Tables

Table 1

Sample Characteristics

Characteristics	% in sample
Child's gender	
Boys	44.6%
Girls	55.4%
Child's grade level at Time 1	
4 th Grade	7.7%
5 th Grade	40.8%
6 th Grade	51.5%
Maternal education level	
Middle school diploma	1.3%
High school diploma	17.6%
University diploma or higher	81.1%
Monthly household income ¹	
Below KRW 2 million	5.7%
KRW 2 million – 3.5 million	24.3%
KRW 3.5 million – 5 million	36.5%
Above 5 million	33.5%
Mother working in any forms vs. not working	63.2% vs. 36.8
Mother's marital status	
Married	93.2%
Single	5.0%
Divorced	1.4%
Widowed	0.5%
Mother's average age (range)	42.30 (32-58.5)

2,000,000 KRW equals about 1,800 USD, while 5,000,000 KRW equals about 4,500 USD.

Table 2

Descriptive Statistics, Reliability and Correlations among the Indicator Variables in Intrinsic Value Model

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. M PG	1																				
2. M MR	.67	1																			
3. M CC	.56	.65	1																		
4. T1 PG	.26	.16	.09	1																	
5. T1 MR	.27	.27	.12	.67	1																
6. T1 CC	.20	.18	.23	.49	.57	1															
7. T1 Warmth	.16	.16	.14	.42	.44	.26	1														
8. T1 Structure	.14	.18	.11	.31	.36	.27	.64	1													
9. T1 AS	.15	.14	.06	.39	.46	.26	.71	.66	1												
10. T1 A Satis	.18	.10	.10	.44	.49	.36	.50	.46	.55	1											
11. T1 C Satis	.15	.08	.08	.40	.47	.42	.46	.35	.46	.71	1										
12. T1 R Satis	.24	.20	.09	.40	.48	.35	.56	.51	.56	.58	.63	1									
13. T2 Warmth	.14	.19	.16	.22	.20	.22	.54	.42	.36	.30	.27	.38	1								
14. T2 Structure	.17	.16	.11	.25	.25	.24	.43	.51	.32	.33	.24	.32	.68	1							
15. T2 AS	.17	.19	.19	.32	.27	.25	.45	.43	.43	.39	.25	.35	.76	.70	1						
16. T3 A Satis	.07	.07	.06	.25	.26	.19	.32	.29	.32	.53	.46	.40	.40	.27	.39	1					
17. T3 C Satis	.07	.00	.05	.25	.19	.21	.31	.30	.32	.43	.48	.33	.36	.27	.38	.73	1				
18. T3 R Satis	.17	.15	.07	.32	.34	.25	.47	.41	.44	.47	.43	.54	.46	.35	.45	.65	.63	1			
19. T4 PG	.15	.07	.09	.28	.30	.28	.17	.17	.20	.17	.30	.20	.05	.10	.03	.22	.23	.16	1		
20. T4 MR	.12	.18	.06	.19	.31	.32	.13	.22	.20	.14	.22	.24	.07	.16	.14	.14	.25	.22	.47	1	
21. T4 CC	-.00	.14	.19	.07	.12	.35	.12	.13	.10	.14	.23	.04	.08	.08	.07	.22	.24	.18	.52	.57	1
<i>M</i>	6.23	6.26	5.96	4.44	4.46	4.25	4.43	4.08	4.24	3.89	4.20	4.15	4.37	4.06	4.19	3.90	4.09	4.23	4.52	4.52	4.19
<i>SD</i>	.59	.62	.78	.53	.51	.59	.65	.73	.71	.75	.70	.73	.74	.79	.74	.75	.76	.72	.50	.46	.72
<i>α</i>	.68	.74	.83	.71	.91	.75	.79	.73	.79	.75	.83	.81	.85	.79	.82	.79	.86	.86	.78	.64	.86

Note. Mother’s measure is in the range of 1-7; children’s measures are in the range of 1-5. M=mother’s reports; T1=child’s reports at Time1; T2=child’s reports at Time2; T3=child’s reports at Time3; PG=personal growth; MR=meaningful relationship; CC=community contribution; AS=autonomy support; A_satis=autonomy satisfaction; C_satis=competence satisfaction; R_satis=relatedness satisfaction. Correlations significant at $p < .05$ are in boldface.

Table 3

Descriptive Statistics, Reliability and Correlations among the Indicator Variables in Extrinsic Value Model

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. M Wealth	1																				
2. M Image	.69	1																			
3. M Fame	.65	.76	1																		
4. T1 Wealth	.25	.13	.13	1																	
5. T1 Image	.18	.17	.17	.77	1																
6. T1 Fame	.16	.13	.15	.73	.73	1															
7. T1 Reject	.12	.05	-.04	.08	.03	-.03	1														
8. T1 Chaos	.14	.11	.04	.21	.20	.11	.62	1													
9. T1 Control	.23	.14	.12	.24	.17	.12	.66	.70	1												
10. T1 A Frus	.16	.11	.07	.18	.13	.11	.47	.53	.55	1											
11. T1 C Frus	.12	.06	.02	.09	-.01	-.05	.56	.45	.48	.56	1										
12. T1 R Frus	.05	.06	-.01	.07	-.00	.03	.53	.39	.44	.41	.64	1									
13. T2 Reject	.11	.08	.01	-.05	-.03	-.03	.52	.41	.36	.33	.44	.39	1								
14. T2 Chaos	.09	.09	.07	.01	.00	.01	.33	.52	.45	.37	.36	.32	.69	1							
15. T2 Control	.10	.05	.03	.00	-.07	-.05	.39	.45	.55	.40	.31	.29	.66	.74	1						
16. T3 A Frus	.15	.13	.10	.16	.15	.09	.35	.34	.38	.47	.43	.31	.31	.28	.33	1					
17. T3 C Frus	-.04	-.08	-.14	.01	-.07	-.11	.48	.35	.35	.42	.64	.42	.39	.22	.25	.57	1				
18. T3 R Frus	.11	.07	.01	.04	-.07	-.07	.35	.30	.27	.33	.52	.46	.43	.32	.32	.50	.66	1			
19. T4 Wealth	.23	.15	.23	.57	.46	.42	.01	.11	.17	.17	.05	.02	.00	.04	.06	.18	-.01	.05	1		
20. T4 Image	.18	.11	.15	.44	.51	.37	.04	.11	.08	.08	.04	.07	.08	.07	.08	.10	.04	.09	.73	1	
21. T4 Fame	.22	.14	.26	.45	.46	.47	.03	.14	.16	.15	.04	.09	.12	.12	.11	.20	-.05	.11	.71	.74	1
<i>M</i>	4.55	4.19	3.89	3.39	3.54	3.66	1.81	2.34	2.37	2.84	2.21	1.81	1.76	2.30	2.34	2.89	2.31	1.83	3.50	3.55	3.69
<i>SD</i>	1.08	1.04	1.09	.94	.88	.84	.81	.85	.96	.92	.92	.86	.84	.86	.89	.96	.93	.78	.85	.87	.79
<i>α</i>	.84	.78	.85	.88	.83	.84	.77	.82	.66	.73	.80	.79	.78	.74	.78	.76	.82	.81	.85	.87	.82

Note. Mother’s measure is in the range of 1-7; children’s measures are in the range of 1-5. M=mother’s reports; T1=child’s reports at Time1; T2=child’s reports at Time2; T3=child’s reports at Time3; A_frus=autonomy frustration; C_frus=competence frustration; R_frus=relatedness frustration. Correlations significant at $p < .05$ are in boldface.

Table 4

Correlation Matrix for Latent Variables in the Intrinsic Value Model

	1	2	3	4	5	6
1. Mother's intrinsic values	1					
2. T1 Supportive parenting	.21**	1				
3. T2 Supportive parenting	.24**	.58***	1			
4. T1 Need satisfaction	.18*	.73***	.42***	1		
5. T3 Need satisfaction	.17**	.54***	.54***	.63***	1	
6. T1 Child's intrinsic values	.28***	.58***	.33***	.67***	.42***	1
7. T4 Child's intrinsic values	.22*	.31***	.16	.39***	.40***	.44***

Note. T1=Time 1; T2=Time 2; T3=Time 3; T4=Time 4. * $p < .05$. ** $p < .01$. *** $p < .001$

Table 5

Correlation Matrix for Latent Variables in the Extrinsic Value Model

	1	2	3	4	5	6
1. Mother's extrinsic values	1					
2. T1 Thwarting parenting	.13	1				
3. T2 Thwarting parenting	.09	.60***	1			
4. T1 Need frustration	.09	.76***	.45***	1		
5. T3 Need frustration	.06	.58***	.44***	.73***	1	
6. T1 Child's extrinsic values	.20**	.18**	.11*	.06	.04	1
7. T4 Child's extrinsic values	.27**	.24***	.24**	.17*	.17*	.63***

Note. T1=Time 1; T2=Time 2; T3=Time 3; T4=Time 4. * $p < .05$. ** $p < .01$. *** $p < .001$

Table 6

Test of Measurement Invariance

	<i>df</i>	χ^2	Δdf	$\Delta \chi^2$	<i>p</i>	<i>RMSEA</i> (90% CI)	<i>CFI</i>	<i>SRMR</i>	$\Delta RMSEA$	ΔCFI
<i>Intrinsic value model</i>										
Baseline ^a	156	241.88	-	-	-	.049 (.036, .060)	.967	.051	-	-
Metric ^b	162	254.56	6	12.68	.049	.050 (.038, .061)	.964	.069	+0.001	-.003
Scalar ^c	171	282.28	9	27.72	.001	.053 (.042, .064)	.957	.075	+0.003	-.007
<i>Extrinsic value model</i>										
Baseline ^a	156	269.21	-	-	-	.056 (.044, .067)	.960	.054	-	-
Metric ^b	162	278.05	6	8.84	.183	.055 (.044, .066)	.959	.057	-.001	-.001
Scalar ^c	171	290.31	9	12.26	.199	.055 (.044, .065)	.958	.058	0	-.001

Note. ^aBaseline model does not include any equality constraints, but covariance between errors of the same indicator variables across time was allowed. ^bMetric invariance was tested by imposing equality constraints on the factor loadings of the same indicator variables. ^cScalar invariance was tested by imposing equality constraints on the intercepts of the same indicator variables.

Table 7

Factor Loadings of Indicator Variables in the Intrinsic and Extrinsic Value Model

Intrinsic value model			Extrinsic value model		
	Factor loadings			Factor loadings	
	<i>B</i> ^a (SE)	β		<i>B</i> ^a (SE)	β
<i>Mothers' report</i>					
Intrinsic Values			Extrinsic Values		
Personal growth	1.00 ^b	.76	Wealth	1.00 ^b	.78
Meaningful relationship	1.20 (.10)	.87	Fame	1.10 (.08)	.85
Community contribution	1.28 (.12)	.74	Image	1.10 (.08)	.89
<i>Children's reports</i>					
Intrinsic Values			Extrinsic Values		
Personal growth	1.00 ^b	.75 ^c / .69 ^d	Wealth	1.00 ^b	.86 ^c / .86 ^d
Meaningful relationship	1.10 (.09)	.86 ^c / .80 ^d	Fame	.99 (.05)	.89 ^c / .86 ^d
Community contribution	1.13 (.10)	.71 ^c / .59 ^d	Image	.90 (.05)	.84 ^c / .86 ^d
Need-supportive Parenting			Need-thwarting Parenting		
Warmth	1.00 ^b	.84 ^c / .84 ^d	Rejection	1.00 ^b	.80 ^c / .81 ^d
Structure	1.00 (.06)	.76 ^c / .78 ^d	Chaos	1.07 (.06)	.81 ^c / .85 ^d
Autonomy support	1.10 (.06)	.85 ^c / .90 ^d	Control	1.15 (.07)	.82 ^c / .85 ^d
Need satisfaction			Need frustration		
Autonomy	1.00 ^b	.83 ^c / .86 ^d	Autonomy	1.00 ^b	.68 ^c / .66 ^d
Competence	.96 (.05)	.84 ^c / .83 ^d	Competence	1.24 (.10)	.85 ^c / .84 ^d
Relatedness	.87 (.06)	.74 ^c / .77 ^d	Relatedness	.97 (.08)	.71 ^c / .78 ^d

Note. ^a Unstandardized estimates and standard errors of the indicators measured twice were identical between time points due to equality constraints imposed for invariance test. ^b For each latent variable, factor loading of one indicator was conventionally fixed to 1 for scaling purposes. ^c Standardized estimates of the corresponding indicator in Time 1. ^d Standardized estimates of the corresponding indicator in Time 2, 3 or 4.

Figures

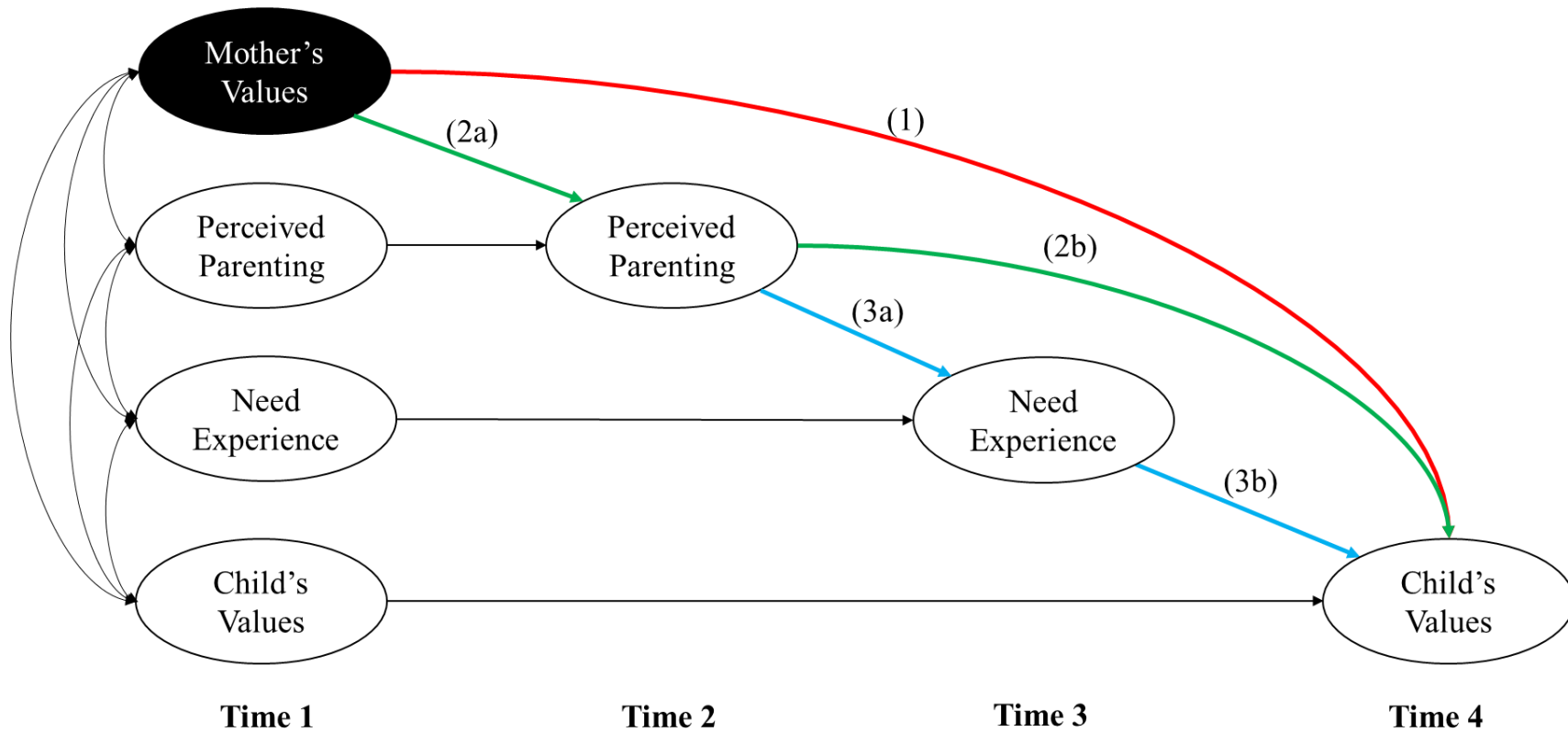


Figure 1. Hypothesized Model of Value Development. Arrow (1) indicates direct value transmission, while Arrows (2a) and (2b) represents value indirect value transmission through internalization. Arrows (3a) and (3b) reflect value origination as an expression of basic psychological needs. The blackened oval, Mother's values, represents reports from from mothers, while the remaining six ovals represent reports from children.

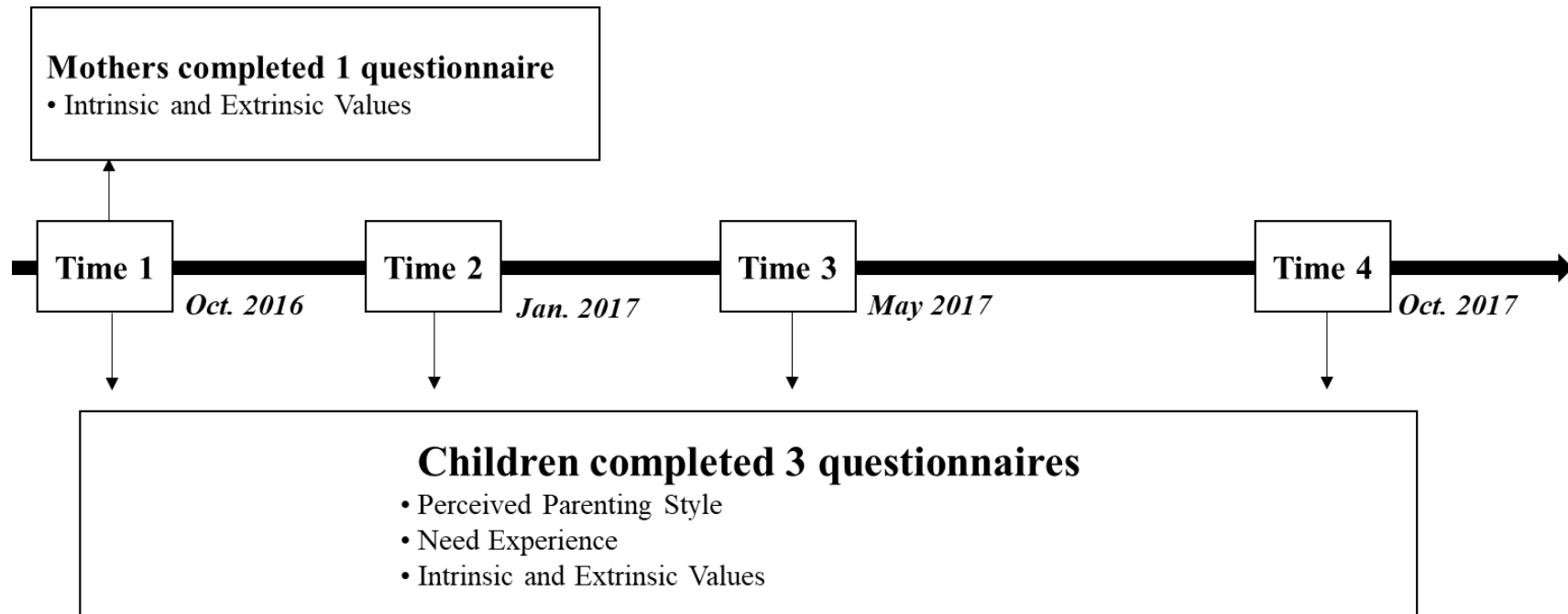


Figure 2. Procedural Timeline. The first three time points are 3 months apart, whereas Time 4 is 6 months after Time 3, or one year since Time 1.

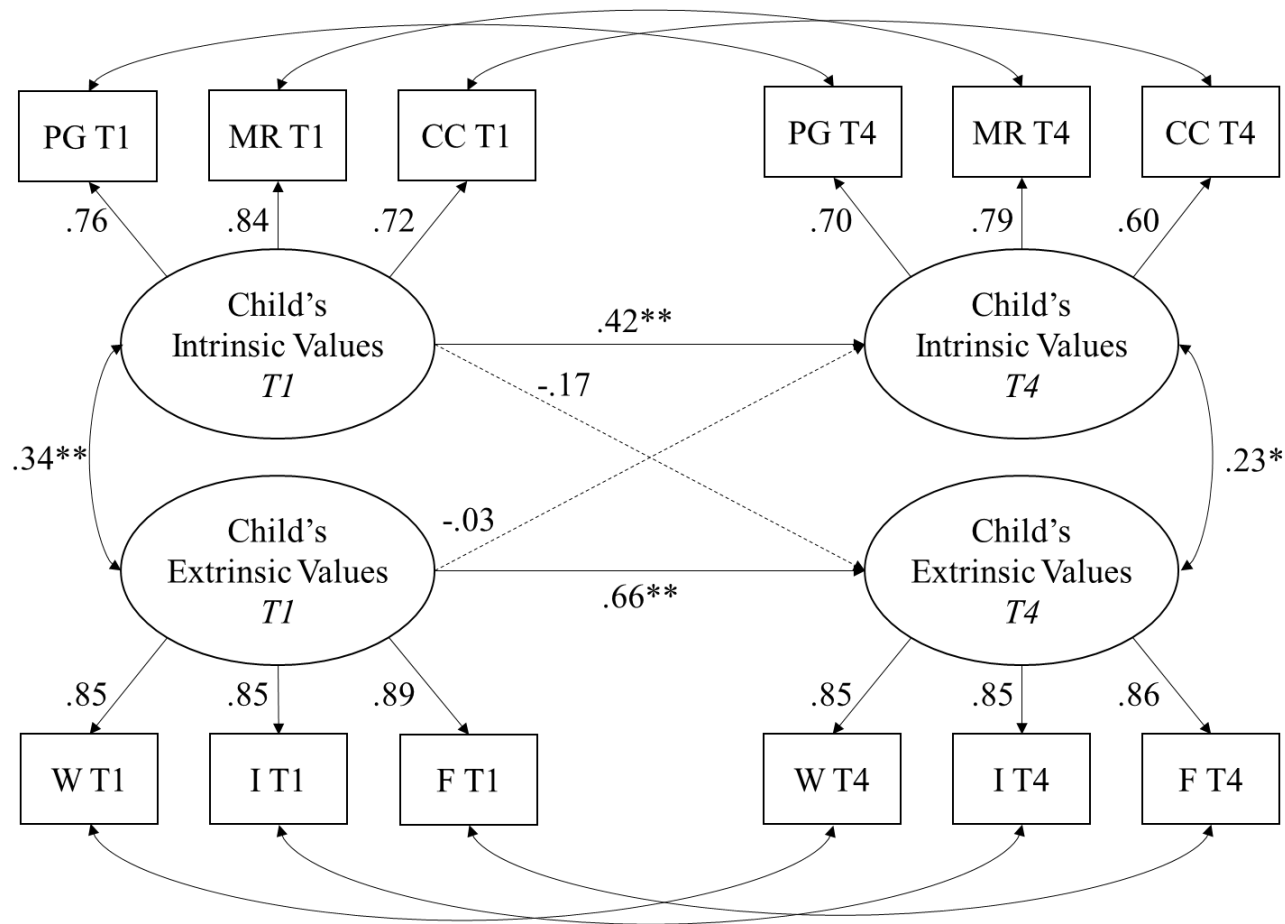


Figure 3. Independent development of intrinsic and extrinsic values. Solid lines are significant at $p < .05$, while dotted lines are insignificant. $\chi^2(51) = 104.416, p < .001$; $RMSEA = .067 (.049, .085)$; $CFI = .948$; $SRMR = .096$. PG=personal growth; MR=meaningful relationship; CC=community contribution; W=wealth; I=image; F=fame. * $p < .05$. ** $p < .001$

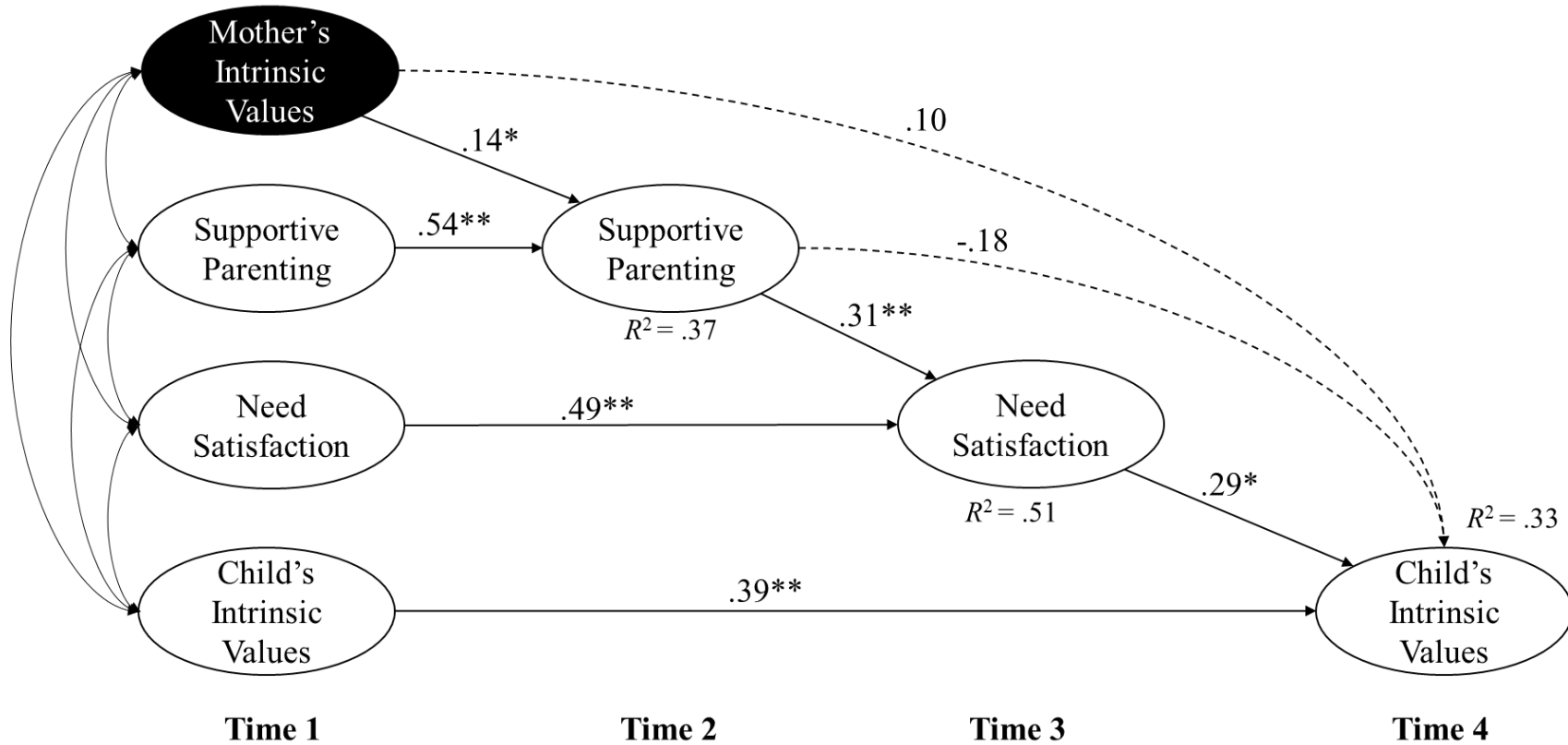


Figure 4. Model for Intrinsic Values. Standardized solution of the structural part of the model for intrinsic values. Solid lines are significant at $p < .05$, while dotted lines are insignificant. Covariates (i.e., child's gender, grade, mother's age, and education), covariance among exogenous variables, and the residual covariance are omitted from the figure for parsimony. Indicator variables for each latent variable were also omitted. The blackened oval, Mother's intrinsic values, represents reports from mothers, while the remaining six ovals represent reports from children. $\chi^2(262) = 404.24, p < .001$; $RMSEA = .048 (.039, .057)$; $CFI = .946$; $SRMR = .066$.

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

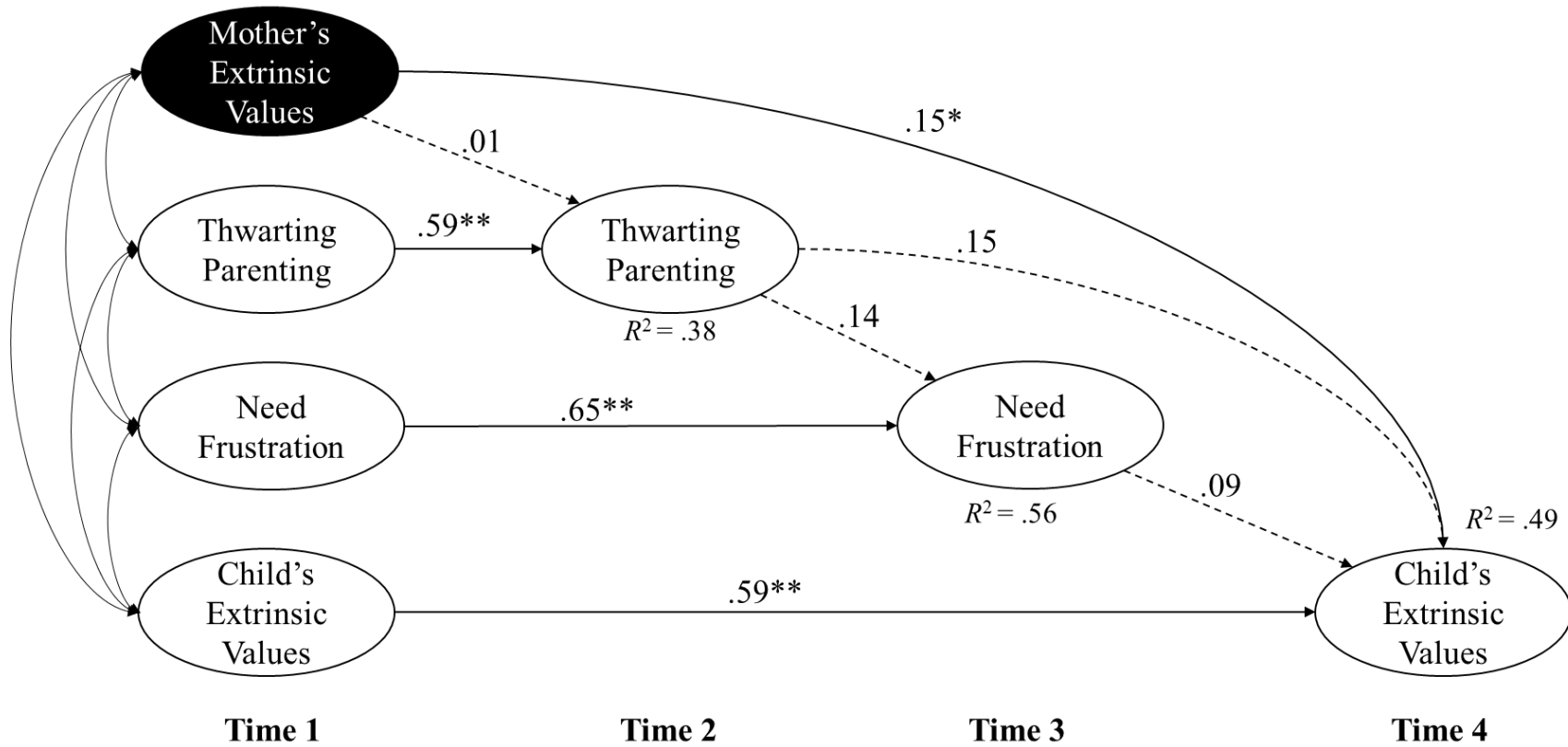


Figure 5. Model for Extrinsic Values. Standardized solution of the structural part of the model for extrinsic values. Solid lines are significant at $p < .05$, while dotted lines are insignificant. Covariates (i.e., child's gender, grade, mother's age, and education), covariance among exogenous variables, and the residual covariance are omitted from the figure for parsimony. Indicator variables for each latent variable were also omitted. The blackened oval, Mother's extrinsic values, represents reports from mothers, while the remaining six ovals represent reports from children. $\chi^2(262) = 425.18, p < .001$; $RMSEA = .052 (.043, .061)$; $CFI = .944$; $SRMR = .056$.

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