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Personal Identity Processes and Self-Esteem:

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Abstract

Based on a dual-cycle identity model, we examined how identity processes were associated with self-esteem in high school and college students. Cross-lagged analyses in three longitudinal studies found that commitment making and identification with commitment were positively related and ruminative exploration was negatively related to self-esteem. A self-esteem main-effects model was supported in high school students (with self-esteem predicting these identity processes) and a reciprocal model was supported in college students (with identification with commitment and ruminative exploration being reciprocally related to self-esteem). Apparently, high self-esteem functions as a resource for tackling identity-related issues in high school and college students. When adolescents enter college and make the transition to adulthood, identity consolidation, in turn, increasingly plays into self-esteem as well.

Key words: identity; self-esteem; self; adolescence; transition to adulthood.

Personal Identity Processes and Self-Esteem:

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Personal identity and self-esteem are accorded a prominent role in adolescence and the transition to adulthood in various theories of personality development (Erikson, 1968; Harter, 1999). Put simply, one's personal identity provides the answer to the question "Who am I and what do I want to do in my life?". Self-esteem typically refers to a global evaluation of one's self-worth (Rosenberg, 1965). Intimate links between identity and self-esteem have been posited in various theories. Erikson, for instance, viewed identity and identity confusion as the polar outcomes of the late adolescent psychosocial crisis. Individuals resolve the identity crisis either by the achievement of a synthesized identity or by ending up in a state of identity confusion, in which commitments to identity issues are vague or even non-existent. The stronger their identity, the more aware individuals appear to be of their strengths and weaknesses and the stronger their self-esteem. Conversely, the more diffused this identity structure, the more confused individuals seem to be and the weaker their self-esteem. Self-esteem theorists, for their part, also state that identity and self-esteem are interdependent and mutually reinforcing mechanisms in a common self-system (Heppner & Kernis, 2011; Leary & Tangney, 2003). No study to date, however, investigated how personal identity processes and self-esteem actually influence one another over time. Hence, the present studies examined longitudinal associations linking identity processes and global self-esteem during the high school and college periods using a dual-cycle model of personal identity formation (Luyckx, Goossens, & Soenens, 2006).

Personal Identity Processes and Self-Esteem

The Classical Approach to Examining Personal Identity Formation

The construct of ego identity refers to an aspect of personality that articulates the place of individuals within society and affords them a sense of uniqueness (McAdams & Olson, 2010). Most previous studies on identity formation have been guided by Marcia's (1980) identity status

paradigm, in which the processes of exploration and commitment are distinguished. Exploration refers to the active questioning of various identity alternatives, whereas commitment pertains to the adherence to a set of convictions, goals, and values. Based on these two processes, Marcia defined four identity statuses: achievement (strong commitments after exploration), foreclosure (strong commitments without past exploration), moratorium (exploring alternatives without arriving at commitments), and diffusion (no current commitments or exploration). A recent meta-analysis indicated that, in general, foreclosed and achieved individuals display the highest levels of self-esteem, whereas individuals in diffusion and moratorium display the lowest levels (Kroger & Marcia, 2011). Put differently, strong identity commitments seem to be accompanied by high levels of self-esteem, whereas the absence of commitments (which may or may not be coupled with exploration) seems to be accompanied by lowered self-esteem.

A Dual-Cycle Model of Personal Identity Formation

Several identity theorists have moved beyond the identity status paradigm and have developed broader process-oriented models of identity, in which they "unpack" exploration and commitment into a larger set of specific processes. One example is the work of Luyckx, Schwartz, Berzonsky, and colleagues (2008) who empirically distinguished among five separate but interrelated identity processes. Four of these five processes are subsumed under two consecutive identity cycles (Luyckx, Goossens, & Soenens, 2006). Whereas the first cycle, the commitment formation cycle, represents Marcia's (1980) classical paradigm, the second cycle, the commitment evaluation cycle, reflects more recent views on identity. When forming their commitments, young people can consider different identity alternatives before they decide upon a given commitment. This first cycle, therefore, may be described in terms of two processes, that is, *exploration in breadth* or the pro-active exploration of various identity alternatives, and *commitment making*, or the adherence to a set of convictions and values. Hence, both of these processes map onto Marcia's processes of exploration and commitment. However, as soon as individuals have formed commitments, they can start to evaluate these commitments. They engage in an in-depth

exploration of the commitments that are already in place (e.g., by gathering additional information or talking with others about the choice made) and, if all goes well, increasingly identify with and grow certain and confident about these choices (Grotevant, 1987). The second cycle, therefore, may also be described in terms of two processes, that is, *exploration in depth* of current commitments and *identification with commitment*. A fifth identity process, referred to as *ruminative exploration*, was later added to the model. This particular form of exploration is conceptualized as a process that delays or inhibits identity development. Individuals scoring high on this process experience difficulty settling on satisfying answers to identity questions. Partially troubled by what they perceive as inadequate progress towards personally important identity goals, they keep asking themselves the same questions, resulting in feelings of uncertainty and incompetence (Luyckx, Schwartz, Berzonsky, et al., 2008).

Among the four processes in the original dual-cycle model, both commitment variables showed positive concurrent associations with the Rosenberg (1965) Self-Esteem Scale (RSES) – which taps into global self-esteem – whereas exploration in breadth and exploration in depth showed negative associations with that same measure. Ruminative exploration also showed a negative correlation with self-esteem. When looking at unique variability in each exploration process, ruminative exploration was negatively related to self-esteem, whereas the other two processes were rather unrelated to self-esteem. Similarly, when looking at unique variability in each commitment variable, identification with commitment in particular was positively related to self-esteem (Luyckx, Schwartz, Berzonsky, et al., 2008). However, the prospective associations between these five identity processes and self-esteem in both high school and college students remain unexplored. A detailed view on such prospective associations is needed to inform intervention efforts targeting individuals struggling with their self-concept and identity.

Self and Identity in High School and College

Development and Prospective Associations

High school and college students are likely to show substantial changes in self-esteem and

identity, because of the many maturation processes and life transitions occurring (Erikson, 1968; Harter, 1999). Self-esteem, as operationalized in the present studies, refers to the overall evaluation of one's worth or value as a person (Harter, 1999; Rosenberg, 1965). Cognitive maturation through adolescence gradually allows individuals to arrive at balanced, realistic, and relatively stable self-views of both positive and negative attributes. Middle adolescents still struggle with apparent contradictions in self-images and have difficulty in dealing with differing standards and opinions of others. This awareness of opposing self-attributes renders these individuals vulnerable for confusion, distress, and lowered self-worth (Fischer, 1980; Harter, 1999). However, by the time individuals reach late adolescence and make the transition to adulthood, they increasingly rely on their own self-standards that govern personal choices. A recent longitudinal study confirmed that global self-esteem increases through adolescence and continues to increase (although more slowly) through the twenties (Erol & Orth, 2011).

These changes in self-esteem may be interrelated with one's personal identity formation. For instance, the formation of identity commitments could help individuals to partially overcome the self-image uncertainty typical of middle adolescence. Further, the self-confident use of personally endorsed standards by late adolescents and college students motivates them to evaluate their identity commitments made earlier in life and, consequently, to arrive at an integrated and consolidated identity and subsequent feelings of self-worth. In sum, reciprocal pathways linking identity processes and self-esteem can be expected to emerge through adolescence and the transition to adulthood (Grotevant, 1987; Heppner & Kernis, 2011).

Intertwined with these cognitive maturation processes, individuals experience different life events and normative expectations in high school and in college. When adolescents attend high school, personal identity formation comes into prominence as they launch themselves in the exploration process (Meeus, van de Schoot, Keijsers, Schwartz, & Branje, 2010). More specifically, high school students have to figure out what they want to achieve in their lives, such as exploring which educational pathway would suit them best (Skorikov & Vondracek, 2011). By

exploring and setting such future-oriented goals, adolescents can direct their own development and negotiate their passage into adulthood (Duriez, Luyckx, Soenens, & Berzonsky, 2012; Erikson, 1968; Seginer & Halabi-Kheir, 1998). For instance, in Belgium, where the present studies were conducted, college students need to choose a specific major when starting with their first year of higher education. Hence, the educational system and the societal context expect high school students to commit to a college major by the end of high school (Kalakoski & Nurmi, 1998).

Next, college students have to rebalance their lives and find their way into college and adult life. Most freshmen can no longer fully rely on their existing social network of friends and family and have to deal with many life changes and choices, which can lead to substantial changes in identity and self-esteem (Montgomery & Côté, 2003). Pascarella and Terenzini (2005) indeed illustrated that college students change in an integrated way on a broad array of value, attitudinal, and psychosocial dimensions. For instance, freshmen have to adapt to a new academic environment and living situation and have to invest in independent time management because, in Belgium, they live away from their parental home during the week (Montgomery & Côté, 2003). At the same time, they become exposed to peers stemming from different backgrounds (with different values and attitudes), which can lead to substantial re-evaluations of personal choices and commitments. Due to all these changes, the in-depth assessment, evaluation, and consolidation of identity commitments and choices have been shown to be a prominent identity task in college students (Klimstra, Hale, Raaijmakers, Branje, & Meeus, 2010). Hence, in line with the dual-cycle model of identity formation (Luyckx, Goossens, & Soenens, 2006), initial commitment formation primarily emerges as a key functional process in high school, whereas commitment evaluation – although it already emerges during the high school years – represents a key developmental task in college students (Bosma & Kunnen, 2008; Klimstra, Luyckx, et al., 2010).

It remains to be investigated whether such identity processes have different consequences for, or are differentially grounded in, self-esteem for high school and college students. As adolescents start preparing for adult roles, strong commitments and a clear life path might increase

the clarity of the self and could increasingly play into feelings of self-worth (Schwartz, Côté, & Arnett, 2005). Meeus, Iedema, Maassen, and Engels (2005) established that, with increasing maturation through adolescence, the making of steady identity commitments becomes increasingly important for one's emotional adjustment, providing indirect evidence that identity processes may relate differently to self-esteem depending on the developmental period. Further, in related identity research building explicitly on Marcia's (1980) work (such as ethnic identity research; Phinney, 1990), additional evidence for the importance of the developmental context can be found. For instance, Yip, Seaton, and Sellers (2006) found a meaningful relationship between ethnic identity resolution and depressive symptoms but only in college students and not in high school students. They explicitly framed these results within a developmental framework and stated: "If ethnic identity resolution is also a primary developmental task for college students, then we might also expect that there would be greater psychosocial consequences for resolving such a task within this developmental period" (Yip et al., 2006, p. 1515).

General Form of Associations

Despite the predominantly cross-sectional nature of previous studies on the link between identity and self-esteem, many researchers interpreted the results as evidence for a dominant pathway going from identity to self-esteem - referred to as the *identity main-effects model*. However, no previous research has justified the claim that processes of exploration or commitment lead to increases or decreases in self-esteem. Hence, this central tenet of identity theorizing (Erikson, 1968; Waterman, 1992) remains to be investigated. Further, several identity theorists also drew attention to the reverse model – referred to as the *self-esteem main-effects model* – in which self-esteem is conceived of as a driving force behind identity processes (Heppner & Kernis, 2011; Vignoles, Regalia, Manzi, Golledge, & Scabini, 2006). Grotevant (1987), among others, stressed that this reversed path also merits empirical attention because self-esteem could influence identity processes. High self-esteem could be a resource for making strong identity commitments. A sense of competence, which is closely linked to self-esteem (Orth, Robins, & Roberts, 2008),

has been demonstrated to lead to increased commitment making and subsequent identification with these commitments over time (Luyckx, Vansteenkiste, Goossens, & Duriez, 2009).

When analyzing the mechanisms forwarded in these two main-effects models, it becomes clear that these models are not mutually exclusive and could be combined into a third, more complex model: the *reciprocal model* (cf. Orth et al., 2008). For instance, the fact that students make self-endorsed identity choices could increase their self-esteem levels. Conversely, if students experience high self-esteem, they might feel more competent in making identity choices and, hence, identify themselves to a higher degree with them. As such, the reciprocal model asserts that self-esteem could be both an outcome and an antecedent of identity formation processes.

The Present Studies

To ascertain the direction of effects in the identity – self-esteem link, three longitudinal studies were conducted: one assessing high school students (Study 1) and two assessing college students (Studies 2 and 3). A cross-lagged design was used to investigate temporal sequences and allows for investigating how inter-individual differences in certain variables can come about over time. In a cross-lagged design, two or more variables are measured at two or more points in time, yielding estimates of synchronous relations, autoregressive or stability coefficients, and cross-lagged effects. The former two refer to the association between the different variables at each point in time, and the prediction of a variable by its level at previous time points, respectively. The latter effects refer to the prediction of a variable by other variables that have been measured before, controlling for the baseline level of the predicted variable (Asendorpf & van Aken, 2003).

Inspired by previous cross-sectional research and the dual-cycle model of identity formation (Luyckx, Goossens, & Soenens, 2006), we expected that especially identification with commitment and ruminative exploration would be related to self-esteem over time in high school and college students. With respect to pro-active exploration, our expectations were less clear. For instance, on the one hand, exploration in breadth is thought to lead to the making of firm commitments over time (Luyckx, Goossens, & Soenens, 2006), which could lead to increases in

self-esteem. On the other hand, a broad and continued exploration of alternatives, especially on the verge of adulthood, might induce feelings of uncertainty and might be accompanied by concurrent distress and lowered self-esteem (Schwartz, Zamboanga, Weisskirch, & Rodriguez, 2009). With respect to the reverse path, high self-esteem levels could provide individuals with the psychological resources necessary to invest in identity exploratorion (Grotevant, 1987; Luyckx et al., 2009). But then again, low self-esteem individuals have more poorly articulated notions of who they are (Campbell, 1990), also necessitating the need for a broad-based identity exploration.

In line with the reciprocal model outlined earlier, bi-directional associations involving identification with commitment and ruminative exploration were expected to emerge in both high school and college. However, given that identity evaluation and consolidation become increasingly normative when transitioning to adulthood, we expected that self-esteem would be more strongly rooted in such identity processes in college students as compared to high school students (cf. Lerner & Kaufman, 1985). More specifically, as adolescents start preparing for adult roles, having strong identity commitments might increase the clarity of the self and play into feelings of self-worth (Schwartz et al., 2005), possibly more so than when adolescents are still in high school.

Additionally, we examined gender differences in identity and self-esteem and examined prospective relationships between identity and self-esteem when controlling for these potential gender differences. Previous research on identity and self-esteem found gender differences in mean levels, with males scoring higher than females on self-esteem and, although not consistently across studies, males scoring somewhat lower than females on identity exploration (Kling, Hyde, Showers, & Buswell, 1999; Luyckx et al., 2009; Orth et al., 2008). Finally, we explored whether the associations between identity processes and self-esteem would be moderated by gender. In line with previous research focusing more broadly on identity and psychosocial functioning (Berzonsky, 2011), we did not expect gender to moderate these relationships.

Study 1

In Study 1, we examined associations between all five identity processes in the expanded

model and self-esteem across two measurement waves (with a one-year interval) in high school students. Our main expectation was that reciprocal associations would hold, with identification with commitment and ruminative exploration being linked to self-esteem over time. As such, in line with the reciprocal model detailed above, self-esteem was hypothesized to be both an antecedent and an outcome of these identity processes.

Method

Participants and procedure. Data were collected in 2010 at one high school in the Dutch-speaking part of Belgium during a regular class period. Students in 9th, 10th, and 11th grade at Time 1 were included in the present study. One year later, participants completed the same set of questionnaires during a regular class period. Data collections were supervised by the sixth author. Parental consent was obtained for this particular study. For all three studies, participants signed a standard consent form at Time 1 and were informed that they could discontinue their participation at any time. Participation in the study was voluntary and anonymity was guaranteed at both waves; all participants were assigned a unique code number to protect their confidentiality. The sample was comprised of 662 adolescents drawn from the academic, technical, and vocational tracks; 65.4% were girls. No information was available with respect to ethnic composition of the sample. The mean age at Time 1 was 15.37 years (*SD* = 1.00; range 14 - 18 years).

Individuals were included in the present study if they participated in at least one of both measurement waves. More than 99% of the sample participated both at Times 1 and 2. Hence, less than 1% of the data at the scale level was missing. Participants with and without complete data were compared using Little's (1988) Missing Completely At Random (MCAR) test which was non-significant, χ^2 (39) = 0.82, *ns*. Accordingly, we used the full information maximum likelihood (FIML) procedure provided in Mplus 4.0 (Muthén & Muthén, 2002). This procedure uses all available information (including information from participants with missing data) to estimate the model parameters (Enders, 2010).

Questionnaires. All questionnaires in Studies 1-3 were in Dutch.

Identity processes. Participants completed the Dimensions of Identity Development Scale (DIDS), which has been shown to be a highly reliable instrument in Belgian and US student samples (Luyckx, Schwartz, Berzonsky, et al., 2008; Schwartz et al., 2011). Evidence for its factorial structure and external validity has been provided in different samples (Luyckx, Schwartz, Berzonsky, et al., 2008). The DIDS assesses identity processes with respect to future plans and possible life-paths. Each identity process was measured by five items on a 5-point Likert-type rating scale, ranging from 1 ("*strongly disagree*") to 5 ("*strongly agree*"). Sample items read: "I have decided on the direction I want to follow in my life" (commitment making), "I sense that the direction I want to take in my life will really suit me" (identification with commitment), "I regularly think over a number of different plans for the future" (exploration in breadth), "I regularly talk with other people about the plans for the future I have made for myself" (exploration in depth), and "It is hard for me to stop thinking about the direction I want to follow in my life" (ruminative exploration). Cronbach's alphas were .91, .86, .80, .77, and .82, respectively, at Time 1, and .93, .88, .84, .81, and .84, respectively, at Time 2.

Self-esteem. Self-esteem was measured using the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965). This scale contains 10 items scored on a 4-point Likert-type rating scale, ranging from 1 ("*does not apply to me at all*") to 4 ("*applies to me very well*"). This questionnaire was translated into Dutch by Van der Linden, Dijkman, and Roeders (1983), who have provided evidence for the validity and reliability of this Dutch translation. A sample item is "I feel that I have a number of good qualities". Cronbach's alphas were .90 and .91 at Times 1-2, respectively.

Results and Discussion

Preliminary analyses. Table 1 shows all means and standard deviations. Using one-way multivariate analysis of variance (MANOVA) at Time 1, a multivariate effect of gender was found (Wilks' $\lambda = .93$; $F\ (6, 655) = 8.26$; $p < .001$). Follow-up univariate analyses revealed that girls scored higher than boys on exploration in depth ($M = 3.22$, $SD = 0.70$; and $M = 3.10$, $SD = 0.72$, respectively; $F\ (1, 660) = 4.51$; $p < .05$, Cohen's $d = .17$) and ruminative exploration ($M = 2.86$,

SD = 0.83; and *M* = 2.69, *SD* = 0.79, respectively; *F* (1, 660) = 6.76; *p* < .01, Cohen's *d* = .21). Further, girls scored lower than boys on self-esteem (*M* = 2.87, *SD* = 0.62; and *M* = 3.19, *SD* = 0.53, respectively; *F* (1, 660) = 44.08; *p* < .001, Cohen's *d* = .55). Correlations at Times 1-2 are reported in Table 1[1]. As expected, both commitment variables related positively and ruminative exploration related negatively to self-esteem across time.

Cross-lagged analyses. Structural Equation Modelling (SEM) was used to test the temporal sequences linking identity processes and self-esteem. In the model being tested, all within-time associations at Times 1-2 and all autoregressive paths were estimated. Further, gender and age were controlled for by estimating paths to each of the constructs in the model (Bollen, 1989). Finally, all lagged effects among the identity processes were included because omission of a subset of paths may bias the estimates of the remaining paths (Cole & Maxwell, 2003; Reichardt, 2002). All parameter estimates in the subsequent models being tested in the present studies were sensible and there were no Heywood cases. To evaluate model fit, we used the chi-squared index, which should be as small as possible; the Root Mean Square Error of Approximation (RMSEA), which should be less than .10, and preferably .06, for adequate fit; the Standardized Root Mean Square Residual (SRMR), which should be less than .10; and the Comparative Fit Index (CFI), which should exceed .90, and preferably .95 (Hu & Bentler, 1999; Kline, 2005). The model estimated had zero degrees of freedom and, hence, had a perfect fit to the data. Figure 1 displays all significant standardized autoregressive paths and cross-lagged paths from identity processes to self-esteem and vice versa[2]. Self-esteem positively predicted identification with commitment and negatively predicted ruminative exploration over time. Overall, findings favored the self-esteem main-effects model.

Multi-group cross-lagged analyses were conducted to assess whether the structural coefficients obtained would differ between boys and girls. A constrained model (with all coefficients set equal across gender) was compared with an unconstrained model (with all coefficients allowed to vary across gender). The null hypothesis of invariant path coefficients

across gender would be rejected if at least two of the following criteria were satisfied (Cheung & Rensvold, 2002; Vandenberg & Lance, 2000): $\Delta\chi^2$ significant at $p < .05$; $\Delta CFI \geq .01$; and $\Delta RMSEA \geq .015$. Invariance tests indicated that no significant differences emerged between both models ($\Delta\chi^2$ (36) = 39.86, *ns*; $\Delta CFI < .01$; $\Delta RMSEA = .018$), favoring the more parsimonious constrained model. Consequently, we could conclude that structural paths applied equally well to boys and girls.

In sum, in line with hypotheses, self-esteem predicted the identity processes of identification with commitment and ruminative exploration over time. However, rather contrary to expectations, these associations were unidirectional in nature in high school students and supported the self-esteem main-effects model instead of the reciprocal model. In Studies 2 and 3, similar models were tested on college students.

Study 2

Study 2 examined how the four identity processes in the original dual-cycle model (i.e., commitment making, identification with commitment, exploration in breadth, and exploration in depth) related to self-esteem over time in college students. Four-wave longitudinal data (with measurement intervals of 1 year) were used. We again assessed whether the across-time associations would be of the unidirectional or the reciprocal type. Given the fact that identity evaluation and consolidation become increasingly normative when transitioning to adulthood, we expected that self-esteem would be more strongly rooted in such identity processes in college students (assessed in Study 2) as compared to high school students (assessed in Study 1).

Method

Participants and procedure. Data were collected at a large university (mainly attracting Caucasian students with a middle-class background) in the Dutch-speaking part of Belgium in the context of the Leuven Trajectories of Identity Development Study (L-TIDES; Luyckx, Goossens, & Soenens, 2006).[3] The first wave was conducted in 2002. Identity and self-esteem were assessed on a yearly basis at four measurement occasions. Questionnaires were distributed in lecture halls

or by mail. At Time 1, all participants were freshmen from the Faculty of Psychology and Educational Sciences, which serves a predominantly female student population. Initially, 638 students were contacted but 73 of them refused to participate for reasons unknown (participation rate of 89%). Hence, our sample was comprised of 565 Caucasian students; 85.3% were women. The mean participant age at Time 1 was 18.66 years (*SD* = 0.66; range 17-22 years). In total, at the scale level, 19.5% of the data was missing because of participant drop-out. A non-significant MCAR test statistic, χ^2 (80) = 6.26, *ns*, suggested that missing values could be reliably estimated. A one-way MANOVA pointed to mean differences on identity and self-esteem at Time 1 between participants who dropped out after Time 1 and those who participated at all measurement times (Wilks' λ = .97; *F* (5, 559) = 3.17; $p < .01$). A detailed inspection at the univariate level revealed that participants who dropped-out only scored somewhat lower on identification with commitment than those who participated at Times 1-4 (*F* (1, 563) = 4.50; $p < .05$, Cohen's *d* = .19). Accordingly, we used the FIML procedure to deal with missing data[4].

Questionnaires.

Identity processes. Participants completed the 32-item Ego Identity Process Questionnaire (EIPQ; Balistreri, Busch-Rossnagel, & Geisinger, 1995), measuring exploration in breadth and commitment making at a global level (i.e., across different content domains such as politics, education, friendship, and values). In the Dutch version, Items 9, 10, 13, and 18 were dropped because they did not pattern significantly on their hypothesized factor (Luyckx, Goossens, Beyers, & Soenens, 2006). All items were answered on a 5-point Likert-type rating scale, ranging from 1 ("*strongly disagree*") to 5 ("*strongly agree*"). Sample items are "I have definitely decided on the occupation I want to pursue" (commitment making; 15 items), and "I have never questioned my views concerning what kind of friend is best for me (reverse coded)" (exploration in breadth; 13 items). Both the English and the Dutch version showed adequate factorial and convergent validity (Balistreri et al., 1995; Luyckx, Goossens, Beyers, & Soenens, 2006). Cronbach's alphas were .72, .80, .75, and .77 at Times 1-4, respectively, for commitment making; and .74, .77, .75, and .76 at

Times 1-4, respectively, for exploration in breadth.

In addition, participants completed the 26-item Utrecht-Groningen Identity Development Scale (U-GIDS; Meeus, 1996) developed for use with Dutch-speaking adolescents, and measuring exploration in depth and identification with commitment (again across content domains). All items were answered on the same 5-point Likert-type rating scale. Sample items are "My education gives me certainty in life" (identification with commitment; 16 items), and "I try to figure out regularly what other people think about my best friend" (exploration in depth; 10 items). Meeus, Oosterwegel, and Vollebergh (2002) provide an overview of concurrent and construct validity of the measure. Cronbach's alphas were .82, .83, .86, and .85 at Times 1-4, respectively, for identification with commitment; and .64, .68, .68, and .69 at Times 1-4, respectively, for exploration in depth.

Self-esteem. Self-esteem level was again measured using the RSES. Cronbach's alphas were .91, .91, .92, and .92 at Times 1-4, respectively.

Results and Discussion

Preliminary analyses. Table 2 shows means and standard deviations. Using a one-way MANOVA at Time 1, a multivariate effect of gender was found (Wilks' $\lambda = .93$; F (5, 559) = 8.27; $p < .001$). Follow-up univariate analyses revealed that men scored lower than women on identification with commitment ($M = 3.39$, $SD = 0.51$, and $M = 3.50$, $SD = 0.44$, respectively; F (1, 563) = 4.17; $p < .05$, Cohen's $d = .23$) and exploration in depth ($M = 3.47$, $SD = 0.46$, and $M = 3.62$, $SD = 0.39$, respectively; F (1, 563) = 10.55; $p < .001$, Cohen's $d = .35$), but significantly higher than women on self-esteem ($M = 3.23$, $SD = 0.57$, and $M = 2.98$, $SD = 0.56$, respectively; F (1, 563) = 14.27; $p < .001$, Cohen's $d = .44$). Correlations at Times 1-4 are also reported in Table 2. Both commitment variables related positively and exploration in breadth related negatively to self-esteem.

Cross-lagged analyses. As in Study 1, SEM was used with all synchronous or within-time associations and all autoregressive paths between adjacent measurement times being included.

Gender and age were controlled for in all models. Finally, all lagged effects among the identity processes were included. Path analyses then proceeded in two steps. In the first cross-lagged model, the structural paths included in the model were freely estimated. This model provided an adequate fit to the data (χ^2 (75) = 309.30, $p < .001$; RMSEA = .07; CFI = .95; SRMR = .04). In the second cross-lagged model, these structural paths were constrained to be equal across all three time intervals (χ^2 (125) = 382.48, $p < .001$; RMSEA = .06; CFI = .95; SRMR = .07). Invariance tests indicated that the more parsimonious invariant model fitted the data equally well ($\Delta\chi^2$ (50) = 73.18, $p < .05$; but ΔCFI < .01; ΔRMSEA < .015). Consequently, we retained this model with longitudinal constraints. Figure 2 displays all significant standardized autoregressive paths and cross-lagged paths from identity processes to self-esteem and vice versa[5]. Multi-group analyses indicated that, as in Study 1, the structural paths applied equally well to men and women ($\Delta\chi^2$ (25) = 15.64, *ns*; ΔCFI < .01; ΔRMSEA < .015).

Results were in line with our expectations and favored the reciprocal model. Self-esteem level consistently and positively predicted commitment making and identification with commitment (i.e., partially in line with Study 1). In turn, commitment making and identification with commitment consistently and positively predicted self-esteem level (i.e., in contrast to Study 1). As the latter findings generally differ from the results of Study 1, Study 2 suggests that identity formation seems to have increasing repercussions for one's self-esteem when adolescents enter college and start making the transition to adulthood. Study 3 was conducted to replicate the latter findings.

Study 3

Study 3 examined how the five identity processes in the expanded dual-cycle model related to self-esteem over time in college students. We used three-wave longitudinal data (with measurement intervals of 3 months) in a sample of college students. As in Study 2, we expected that (a) especially commitment making and identification with commitment would exhibit significant associations with self-esteem over time and that (b) the across-time associations would

be of the reciprocal rather than the unidirectional type (and particularly so for identification with commitment). In addition, ruminative exploration, which was not assessed in Study 2, would be negatively associated with self-esteem over time.

In Study 3, we also made a distinction between level and stability of self-esteem. Most researchers who studied self-esteem focused exclusively on its level. More recently, however, multiple components of self-esteem have been emphasized, with the distinction between secure versus fragile self-esteem (i.e., the degree to which self-esteem is vulnerable to or affected by positive or negative external influences) being an important aspect of this heterogeneity (Kernis, 2003). Self-esteem instability refers to the magnitude of short-term fluctuations in contextually-based feelings of self-worth (Heppner & Kernis, 2011). Notably, self-esteem instability has been found to predict psychosocial outcomes over and above self-esteem level. For instance, self-esteem instability has been linked to more reactivity to positive and negative daily events, greater anger and hostility proneness, and more depression in the face of daily hassles (Kernis, 2005). It therefore seems appropriate, when examining links between identity processes and self-esteem, to assess the stability of self-esteem in addition to level of self-esteem. To assess self-esteem instability, individuals are generally asked to complete a measure of global self-esteem on a daily basis during one or two weeks, with specific instructions to base their answers on how they feel at the moment of questionnaire completion. In a next step, the standard deviation of individuals' total scores across these daily assessments is conceptualized as an indicator of self-esteem instability, with larger standard deviations pointing to greater instability (Kernis, 2005).

Commitment making and identification with commitment, as an indication of a clear and consolidated identity, were expected to be negatively related to self-esteem instability. As indirect support for this hypothesis, self-esteem instability has been linked to lower self-concept clarity and to less self-determination and experienced meaning in life (Kernis, 2005). We further expected that ruminative exploration would primarily accompany unstable, fragile feelings of self-worth over time. Having a poorly developed identity and ruminating over different identity elements might

render individuals more vulnerable for specific evaluative information, thereby enhancing unstable feelings of self-esteem (Kernis & Waschull, 1995). In support of this hypothesis, previous research documented associations between unstable self-esteem and feelings of incompetence, suboptimal coping strategies, and depressive attribution styles (Kernis, 2005). Hence, besides ascertaining the temporal sequence between identity processes and self-esteem level, by assessing self-esteem instability in-between Times 2-3 we could ascertain whether identity at Time 2 would predict self-esteem stability and whether self-esteem stability would predict identity at Time 3. Further, we also included a measure of average current or state self-esteem in-between Times 2-3 to examine whether the analyses involving trait-like self-esteem level (as also assessed in Studies 1-2) and average state self-esteem would yield similar findings (Kernis et al., 1991). If similar temporal associations would be uncovered with respect to these two indicators of self-esteem level, the validity of the findings obtained would be strengthened.

Method

Participants and procedure. Data were collected at the same university as in Study 2. The first wave was conducted in 2009. Individuals participated in three measurement waves, each 3 months apart. In between Times 2-3 (i.e., in the midst of this time interval), individuals completed daily assessments of self-esteem during two five-day weeks (i.e., from Monday to Friday). At Time 1, all participants were freshmen from the Faculty of Psychology and Educational Sciences. Due to the fact that our Time 1 assessment was organised as a collective testing session for which students received course credit, none of the students refused participation at Time 1. Our sample was comprised of 458 students, of whom 84.9% were women; 94% of participants were Caucasian. Mean age at Time 1 was 18.25 years (*SD* = 0.97; range 17-24 years). Individuals were included in the present study if they participated in at least one measurement wave and if they completed at least 6 out of 10 daily self-esteem assessments, reducing our final sample to 413 participants. In this final sample, 4.1% of the data at the scale level was missing. A non-significant MCAR test statistic, χ^2 (134) = 12.33, *ns*, suggested that missing values could be reliably

estimated. A one-way MANOVA was conducted to investigate mean differences in identity and self-esteem at Time 1 between participants who dropped out after Time 1 and those who participated at Times 1-3. No significant differences emerged (Wilks' $\lambda = .99$; F (6, 368) = 0.55; *ns*, $\eta^2 = .01$). Accordingly, as in Studies 1 and 2, we used FIML to deal with missing data.

Questionnaires.

Identity processes. As in Study 1, the DIDS was used to assess commitment making, identification with commitment, exploration in breadth, exploration in depth, and ruminative exploration. Cronbach's alphas were .92, .87, .84, .76, and .85, respectively, at Time 1, .90, .83, .86, .81, and .86, respectively, at Time 2, and .92, .86, .88, .84, and .88, respectively, at Time 3.

Self-esteem. Self-esteem level was again measured using the RSES. Cronbach's alphas were .92, .92, and .93 at Times 1-3, respectively. In addition, over the course of two five-day weeks, participants' self-esteem stability was assessed by asking them to complete an internet assessment of the RSES once every evening and to indicate how they felt at that moment (i.e., state self-esteem). Questionnaires were put online every evening at 6:00 P.M. and participants were instructed to complete the measures during the evening. Hence, 10 daily self-esteem assessments were available. As recommended by Kernis, Granneman, and Mathis (1991), 10-point scales were used, anchored by 1 ("*strongly disagree*") and 10 ("*strongly agree*"). The standard deviation of total scores across the multiple assessments served as the index of self-esteem instability, with higher standard deviations indicating more unstable self-esteem ($M = .78$; $SD = .44$). We also created a measure of average state self-esteem for each individual by computing the mean across these daily assessments ($M = 6.84$; $SD = 1.18$) (Kernis et al., 1991). In line with previous research (Kernis, 2005), average state self-esteem and self-esteem stability were negatively correlated ($r = -.39$; $p < .001$).

Results and Discussion

Preliminary analyses. Table 3 shows means and standard deviations. Using one-way MANOVA at Time 1, no multivariate effect of gender was found (Wilks' $\lambda = .98$; F (6, 405) =

1.35; *ns*). Correlations at Times 1-3 are also reported in Table 3. Both commitment variables related positively and ruminative exploration related negatively to self-esteem.

Cross-lagged analyses. As in Studies 1 and 2, SEM was used and all within-time associations at Times 1-3 and all autoregressive paths were controlled for. Again, all lagged effects among the identity processes were included. The measures of average state self-esteem and self-esteem instability resulting from the daily assessments were incorporated in the cross-lagged design as shown in Figure 3. The concurrent association between average state self-esteem and self-esteem instability was included as an additional control. Further, additional paths were included from self-esteem level at Time 2 to average state self-esteem and from average state self-esteem to self-esteem level at Time 3, respectively. Gender and age were controlled for.

Path analyses proceeded in two steps. In the first model, structural path coefficients were freely estimated, which provided an adequate fit to the data (χ^2 (58) = 132.52, $p < .001$; RMSEA = .06; CFI = .98; SRMR = .03). Next, in the second model, we constrained these structural parameters to be equal across all time intervals. With respect to the structural paths stemming from and leading to the daily assessments of self-esteem, the paths from Time 2 identity to average state self-esteem were constrained to be equal to those from Time 1 identity to Time 2 self-esteem level; the paths from average state self-esteem to Time 3 identity were constrained to be equal to those from Time 1 self-esteem level to Time 2 identity. This constrained model provided an adequate fit to the data (χ^2 (96) = 340.23, $p < .001$; RMSEA = .08; CFI = .94; SRMR = .08) but invariance tests indicated that this model had a substantially worse fit than the unconstrained model ($\Delta\chi^2$ (38) = 207.71, $p < .001$; ΔCFI = .04; ΔRMSEA = .02). Hence, we rejected the longitudinal constraints and retained the unconstrained model. Significant standardized structural coefficients are presented in Figure 3[6]. Further, multi-group cross-lagged analyses indicated that, as in Study 1, the longitudinal paths applied equally well to men and women ($\Delta\chi^2$ (74) = 108.65, $p < .01$; but ΔCFI < .01; ΔRMSEA < .015).

As in Study 2, findings were in line with the reciprocal model. Again in line with Study 2,

self-esteem level and average state self-esteem consistently and positively predicted identification with commitment. In addition, self-esteem level and average state self-esteem consistently and negatively predicted ruminative exploration, and self-esteem level at Time 2 positively predicted commitment making at Time 3. Further, whereas in Study 2 identification with commitment consistently and positively predicted self-esteem level, this path was replicated from Time 1 to Time 2 in Study 3. Ruminative exploration consistently and negatively predicted self-esteem level and average state self-esteem. In addition, ruminative exploration at Time 2 positively predicted self-esteem instability. Apparently, ruminative exploration did not only play into lower levels of self-esteem over time but also seemed to render individuals more vulnerable for unstable self-esteem.

General Discussion

Using three longitudinal datasets and measures of five personal identity processes (i.e., commitment making, identification with commitment, exploration in breadth, exploration in depth, and ruminative exploration) and two components of self-esteem (i.e., level and stability), we examined cross-lagged associations between identity processes and self-esteem. Our main concern was the cross-sectional nature of most previous studies focusing on the link between personal identity and self-esteem, raising questions about temporal order. In order to design intervention efforts based on self and identity constructs, a detailed outlook on temporal sequences needs to be established. Across studies, especially identification with commitment and ruminative exploration were consistently related to self-esteem over time. However, the exact form of these associations differed somewhat for high school students and college students. Whereas self-esteem predicted these identity processes in high school students, reciprocal associations emerged in the college setting. Apparently, as the evaluation and consolidation of identity commitments and choices becomes increasingly functional in the college context (Bosma & Kunnen, 2008; Luyckx, Goossens, & Soenens, 2006), these identity processes could increasingly have repercussions for one's self-esteem. Before we discuss the different temporal sequences obtained, readers should

note that the present studies do not allow for drawing definite conclusions with respect to how these temporal sequences potentially differ between high school and college students. A long-term longitudinal study in which cohorts of individuals are followed through high school and college is needed to make more authoritative claims. Nonetheless, the present studies in combination already shed some light on this intriguing question.

Temporal Sequences Linking Personal Identity and Self-Esteem in High School and College

Our cross-lagged analyses provided support for the self-esteem main-effects model in high school students (Study 1) and the reciprocal model in college students (Studies 2 and 3). Readers should note that the cross-lagged associations obtained were not moderated by gender. Hence, despite the fact that some mean gender differences were obtained, findings applied equally well to males and females, again underlining the robustness of the findings obtained. Consistent across studies, the same identity processes were intertwined with self-esteem over time. Further, some of the core mechanisms identified seemed to be invariant across the high school and college periods. More specifically, in line with previous research documenting the pervasive influence of self-esteem on human behavior (Campbell, 1990; Kernis, 2005), self-esteem was found to be an important predictor of especially identification with commitment and ruminative exploration across both developmental periods. These findings substantially extend previous cross-sectional research indicating that self-esteem not only constitutes an important correlate of identity (as again confirmed at the different time-points of our longitudinal studies) but that self-esteem could also function as a resource for tackling identity-related questions. Feelings of self-worth facilitate an internal frame of reference and, as such, enable both high school and college students to make and identify themselves with identity commitments (Erikson, 1968; Harter, 1999). High self-esteem also seemed to protect against identity worry and rumination, again testifying to the confidence and competence individuals with high self-esteem display in addressing the many identity options and alternatives they are confronted with. In sum, experiencing high levels of self-esteem could set individuals on a pathway to achieving a mature and synthesized sense of identity.

Further, processes of identity evaluation and consolidation increasingly have ramifications for individuals' self-esteem when they enter college and start making the transition to adulthood (Bosma & Kunnen, 2008; Luyckx, Goossens, & Soenens, 2006). In other words, a reciprocal model with bi-directional influences was supported in Studies 2 and 3. Identification with commitment and ruminative exploration influenced subsequent feelings of self-worth in college students. Commitment making, however, did not provide a consistent foundation for subsequent changes in self-esteem in college students. This finding indicates that, when looking at unique associations, particularly the degree to which individuals identify themselves with their commitments influences self-esteem (Luyckx, Schwartz, Berzonsky, et al., 2008). Hence, although self-esteem seems to influence both commitment processes to some extent, especially identification with commitment, in turn, seems to influence self-esteem in the college setting. Apparently, increasing confidence over one's identity choices could provide college students with a sense of self-worth over time. The consolidation of identity commitments indeed constitutes a crucial identity task in the transition to adulthood, providing opportunities for college students to thrive and to experience increases in self-esteem over time. Hence, although the college setting may be characterized by a diversity of choices and life options for individuals in Western societies (Arnett, 2000), individuals need to come to grips with themselves and their lives in order to negotiate the transition to adulthood successfully (Côté & Levine, 2002; Schwartz et al., 2005). As a further illustration of this tenet, a ruminative approach to identity issues in which identity choices are postponed rendered college students vulnerable for a lowered and fragile sense of self-worth in Study 3.

In sum, two reciprocal loops were identified that link identity and self-esteem. The first loop linked identification with commitment to self-esteem. As noted, self-esteem level was found to serve as a catalyst for the making and internalization of identity choices in Studies 1-3 (cf. Vignoles et al., 2006). Conversely, as noted, identification with commitment positively predicted self-esteem over time in Studies 2-3. Collectively, these findings suggest that high self-esteem and

a strong identification with identity commitments reinforce one another across time, possibly leading to a stable, strong, and consolidated self (Trzesniewski, Donnellan, & Robins, 2003). Such a secure self-system could provide an important inner resource for tackling the challenging transition to adulthood and the many psychosocial tasks college students are confronted with (Côté, 2000; Côté & Levine, 2002; Montgomery & Côté, 2003).

A second reciprocal loop linked ruminative exploration and self-esteem. Self-esteem was found to negatively predict ruminative exploration in Studies 1 and 3, and ruminative exploration, in turn, negatively predicted self-esteem in Study 3, possibly leading to a negative vicious cycle. Such a pathway could play into a fragile self, which implies that college students do not succeed in arriving at a solid self (Campbell, 1990), but instead worry about the future and feel insecure about their own self-worth. As a further illustration of this fragile self, ruminative exploration was found to lead to greater daily instability in self-esteem in Study 3. Accordingly, especially in the college setting, personal identity formation, self-esteem level, and self-esteem stability appeared to be components of an interlocking system that have reciprocal effects on one another (Kernis, 2005).

Although Studies 2 and 3 sampled highly similar participants in terms of demographic and educational background, there were a number of methodological and measurement differences. First, Study 2 had longer measurement intervals compared to Study 3. Second, Study 2 measured identity processes across different content domains whereas Study 3 measured identity processes with respect to future life-plans and goals. Third, in Studies 2 and 3, global self-esteem was measured using the RSES and average state self-esteem (as based on daily assessments) was used as an additional index of self-esteem level in Study 3 (Kernis, 2003). Regardless of these differences, the general pattern of findings was quite similar (although the strength of the cross-lagged paths differed somewhat), testifying to the validity of the temporal sequences obtained in the college setting.

Theoretical and Practical Implications

In all three studies, self-esteem was found to be an important resource for the ways

individuals tackle identity-related questions and issues, and self-esteem influences were found on commitment making, identification with commitment, and ruminative exploration. As such, the present findings are relevant for the debate on whether self-esteem has any benefits for the individual or not (Baumeister, Campbell, Krueger, & Vohs, 2003; Donnellan, Trzesniewski, & Robins, 2011; Swann, Chang-Schneider, & McClarty, 2007). Although critics have indicated that efforts to boost self-esteem are of little value because self-esteem appears to be inconsequential (Baumeister et al., 2003), the present findings indicate that individuals' self-esteem does matter when it comes to forming a self-endorsed sense of identity (cf. Swann et al., 2007). Hence, due to the fact that self-esteem was prospectively linked with core identity processes, facilitating or strengthening a stable and secure self-esteem could be a pathway for strengthening and improving identity-related work in high school and college students. Such interventions might be most relevant in contemporary late-modern societies that lack the structure and guidance on which to rely in forming a sense of identity (e.g., Côté, 2000). The importance of individual resources such as self-esteem indeed becomes increasingly important for individuals to deal with the many options they are confronted with on the road to adulthood. Feelings of self-worth make individuals more confident in relying on personally endorsed identity standards, enabling them to make identity choices and protecting them against regression to a state of chronic identity worry or rumination.

Provided that future studies following a single cohort through adolescence and emerging adulthood replicate the present findings, it could also be useful for counselors to focus their interventions directly on a faulty identity formation process. If some individuals are guided through a difficult identity process, some of the pain and misfortune associated with this process may be alleviated and self-esteem may benefit when these individuals transition to adulthood. Moreover, treatment programs promoting general competence and problem-solving skills can have a salutary influence on self-related processes (Ferrer-Wreder et al., 2002; Petersen et al., 1993). However, the (long-term) effects of intervention-induced changes in identity-relevant processes

remain to be investigated. The present findings could provide a rationale to investigate this uncharted territory. Importantly, for such interventions to be successful in the long run, they should focus on individuals' identity and self-esteem simultaneously because, due to the developmental interdependence of identity and self-esteem, changes in one construct must be reinforced by corresponding changes in the other construct (Swann et al., 2007).

Limitations and Suggestions for Future Research

Some of the cross-lagged coefficients were rather small, but these coefficients were obtained while simultaneously controlling for all within-time associations and autoregressive paths. Further, such relatively modest coefficients could be expected given that identity and self-esteem are multiply determined (Swann et al., 2007). The present studies also have some limitations which provide suggestions for future research. First, we could not rule out the rival hypothesis that important third variables were causing the relationships. One likely candidate could be self-concept clarity, a variable closely linked to both personal identity development and self-esteem (Campbell, 1990). For instance, in a recent cross-sectional study (Luyckx, Schwartz, Soenens, Vansteenkiste, & Goossens, 2010), identity integration (which is operationally very close to self-concept clarity; Campbell, 1990) was found to relate strongly to commitment making, identification with commitment, and self-esteem. Due to their cognitive maturation, late adolescents become increasingly capable of dealing with seemingly opposing or conflicting self-attributes which can lead to a more integrated identity and, hence, an increased sense of self-worth (Harter, 1999).

Second, identity processes and self-esteem were assessed through self-report questionnaires. Although questionnaires are most appropriate to gather information about identity and self-esteem, the reliance on a single informant might artificially inflate correlations among constructs. However, such shared method variance has been statistically removed by controlling for all within-time associations and autoregressive paths in the analyses (Orth et al., 2008).

Third, as noted, the present studies focused on very specific aspects of identity, that is,

commitment and exploration processes. Hence, the findings obtained cannot be generalized to other relational, social, and collective identity aspects (Schwartz, Luyckx, & Vignoles, 2011). Relatedly, the present studies primarily sampled Caucasian European participants. Previous research has demonstrated empirical parallels and commonalities across American and European Caucasian adolescents in personal identity processes and how they relate to psychosocial functioning (Schwartz, Adamson, Ferrer-Wreder, Dillon, & Berman, 2006). More diverse samples in terms of ethnic background, however, should be used in future research. Although Schwartz and colleagues (2005) found substantial consistency across three US ethnic groups in identity constructs such as commitment and exploration, it remains to be investigated how the different variables assessed in the present studies interrelate in non-Western cultures or in non-Caucasians living in other Western cultures. For instance, non-Caucasians may have unique ethnicity-related identity concerns that may relate differently to self-esteem. Likewise, previous cross-cultural research found that variables such as identity consolidation or consistency can have different implications for one's self-esteem depending on one's ethnic or cultural background (Kiang & Fuligni, 2009; Suh, 2002). Collectively, these findings urge future research to rely on ethnically diverse samples, paying attention to the role of the broader socio-cultural context.

Similarly, future research should focus on college samples from different majors that are also more balanced in terms of gender to make more definite claims with respect to the role of gender in the identity - self-esteem link. Although the present studies consistently indicated that the over-time associations were not moderated by gender, a more balanced gender distribution would allow for making more authoritative claims with respect to the influence of gender. Finally, our college student samples excluded individuals who do not seek higher education, a group often referred to as the "forgotten half" (Halperin, 2001). Recent research conducted in Belgium suggested that college students were more likely than their working counterparts to engage in ruminative exploration, and less likely to have made commitments (Luyckx, Schwartz, Goossens, & Pollock, 2008). Indeed, the entrance into steady employment directs future decision-making and, hence,

leads to the establishment of steady future commitments. Working late adolescents and emerging adults may be granted less time to spend on identity exploration, because they do not have access to the psychosocial moratorium provided by the college setting (Montgomery & Côté, 2003). Hence, it remains to be investigated if the associations between identity processes and self-esteem differ between college students and their working peers.

Finally, future studies using techniques such as latent growth curve modelling and latent class growth analysis should assess how inter-individual differences in intra-individual change in identity processes and self-esteem emerge and potentially develop in tandem through the transition to adulthood. Such a complementary view on development and change could further enhance our knowledge on the exact mechanisms linking identity and self-related processes.

Despite these limitations and cautions, the present series of studies has established important links between key processes of personal identity development and self-esteem level and stability. A prominent strength of the present article is the use of three longitudinal data-sets tapping into two different developmental periods. Collectively, these three studies provide preliminary insight into the ways in which personal identity and self-esteem influence one another over time. In so doing, these studies illustrate the strategic value of this type of research. Hence, we hope that the present series of studies will instigate future researchers to disentangle further the fascinating link between identity and self-esteem.

Endnotes

1. For all correlations among the study variables of Studies 1-3, please contact the first author of this article.
2. With respect to the significant cross-lagged paths among the identity processes, Study 1 indicated that commitment making at T2 was positively predicted by identification with commitment (β = .11; $p < .05$) and exploration in depth (β = .08; $p < .05$) at T1. Identification with commitment at T2 was positively predicted by commitment making (β = .24; $p < .001$) and exploration in depth (β = .09; $p < .05$) at T1. Exploration in breadth at T2 was positively predicted by identification with commitment (β = .11; $p < .05$) and exploration in depth (β = .18; $p < .001$) at T1. Exploration in depth at T2 was positively predicted by exploration in breadth (β = .10; $p < .05$) at T1. Finally, ruminative exploration at T2 was negatively predicted by commitment making (β = -.11; $p < .05$) at T1.
3. Parts of the data of Study 2 have been used in previous articles based on L-TIDES. No previous article focused on cross-lagged associations between identity and self-esteem. Readers should note that at the time L-TIDES was conducted, no measure of ruminative exploration was available yet.
4. We repeated our cross-lagged analysis on those participating at all four measurement times (longitudinal $N = 316$). Results were virtually identical as the ones reported in the article. The same applies to Study 3 (longitudinal $N = 369$).
5. Study 2 indicated that commitment making was negatively predicted by exploration in breadth (T1 to T2: β = -.04; $p < .05$; T2 to T3: β = -.04; $p < .05$; and T3 to T4: β = -.04; $p < .05$) and positively by identification with commitment (T1 to T2: β = .07; $p < .01$; T2 to T3: β = .06; $p < .01$; and T3 to T4: β = .07; $p < .01$) over time. Identification with commitment was positively predicted by commitment making (T1 to T2: β = .11; $p < .001$; T2 to T3: β = .10; $p < .001$; and T3 to T4: β = .12; $p < .001$) over time. Exploration in breadth was negatively predicted by commitment making (T1 to T2: β = -.05; $p < .05$; T2 to T3: β = -.05; $p < .05$; and

T3 to T4: β = -.05; $p < .05$) over time. Finally, exploration in depth was positively predicted by commitment making (T1 to T2: β = .09; $p < .01$; T2 to T3: β = .07; $p < .01$; and T3 to T4: β = .08; $p < .01$) over time.

6. Study 3 indicated that commitment making at T2 was negatively predicted by ruminative exploration at T1 (β = -.16; $p < .001$) and commitment making at T3 was positively predicted by exploration in breadth at T2 (β = .17; $p < .01$). Identification with commitment was positively predicted by commitment making (T1 to T2: β = .20; $p < .001$; and T2 to T3: β = .23; $p < .001$) and exploration in breadth (T1 to T2: β = .10; $p < .05$; and T2 to T3: β = .16; $p < .05$). Exploration in breadth was positively predicted by exploration in depth (T1 to T2: β = .18; $p < .001$; and T2 to T3: β = .19; $p < .001$), and exploration in breadth at T2 was positively predicted by commitment making at T1 (β = .15; $p < .05$). Exploration in depth at T3 was positively predicted by exploration in breadth at T2 (β = .16; $p < .05$). Finally, ruminative exploration was positively predicted by exploration in depth (T1 to T2: β = .21; $p < .001$; and T2 to T3: β = .15; $p < .01$) and negatively by identification with commitment (T1 to T2: β = -.17; $p < .01$; and T2 to T3: β = -.13; $p < .05$).

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Figure 1.

Final cross-lagged model linking self-esteem to identity processes in Study 1. Only significant structural path coefficients are displayed. Within-time correlations, paths from gender and age, and cross-lagged paths among the identity processes are not presented for reasons of clarity. All path coefficients are standardized.

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

Figure 2.

Final cross-lagged model linking self-esteem to identity processes in Study 2. Only significant structural path coefficients are displayed. Within-time correlations, paths from gender and age, and cross-lagged paths among the identity processes are not presented for reasons of clarity. All path coefficients are standardized.

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

Figure 3.

Final cross-lagged model linking self-esteem to identity processes in Study 3. Only significant structural path coefficients are displayed. Within-time correlations, paths from gender and age, and cross-lagged paths among the identity processes are not presented for reasons of clarity. All path coefficients are standardized.

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

Table 1

Descriptive Statistics and Pearson Correlations Between Identity Processes and Self-Esteem at Times 1 and 2 in Study 1

	M (*SD*)	*M* (*SD*)	*r*s with self-esteem	
Variable	T1	T2	T1	T2
1. Commitment making	3.38 (0.88)	3.48 (0.93)	.10**	.21***
2. Identification commitment	3.43 (0.73)	3.47 (0.75)	.26***	.34***
3. Exploration in breadth	3.55 (0.68)	3.65 (0.70)	.06	.10**
4. Exploration in depth	3.18 (0.71)	3.36 (0.73)	.01	.11**
5. Ruminative exploration	2.80 (0.82)	2.84 (0.85)	-.32***	-.33***
6. Self-esteem	2.98 (0.61)	3.06 (0.60)	--	--

Note.T = Time; *M* = mean; *SD* = standard deviation.

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

Table 2

Descriptive Statistics and Pearson Correlations Between Identity Processes and Self-Esteem at Times 1 Through 4 in Study 2

	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*r*s with self-esteem			
Variable	T1	T2	T3	T4	T1	T2	T3	T4
1. Commitment making	3.17 (0.43)	3.20 (0.45)	3.28 (0.42)	3.31 (0.38)	.24***	.39***	.38***	.40***
2. Identification	3.48 (0.45)	3.49 (0.42)	3.49 (0.43)	3.51 (0.38)	.36***	.34***	.44***	.50***
3. Exploration in breadth	3.26 (0.50)	3.33 (0.48)	3.35 (0.47)	3.37 (0.41)	-.11*	-.17***	-.18***	-.18***
4. Exploration in depth	3.60 (0.40)	3.63 (0.39)	3.68 (0.36)	3.70 (0.36)	.01	-.02	.07	.04
5. Self-esteem	3.02 (0.57)	3.14 (0.53)	3.18 (0.54)	3.25 (0.48)	--	--	--	--

Note.T = Time; *M* = mean; *SD* = standard deviation.

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

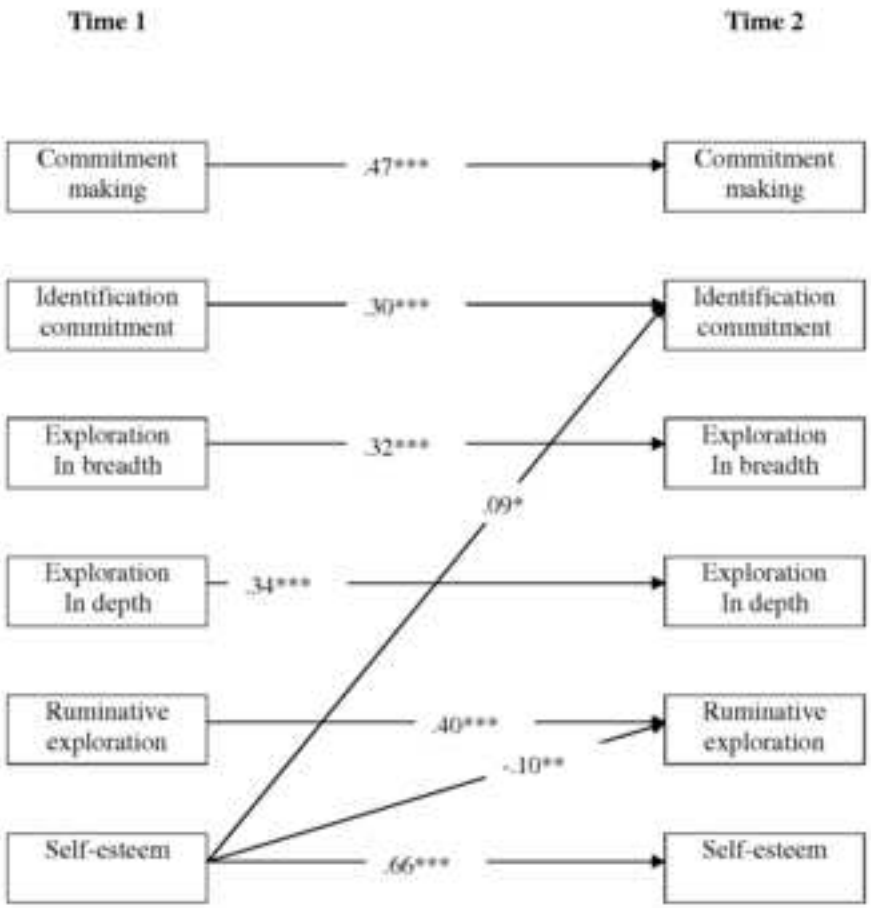
Table 3

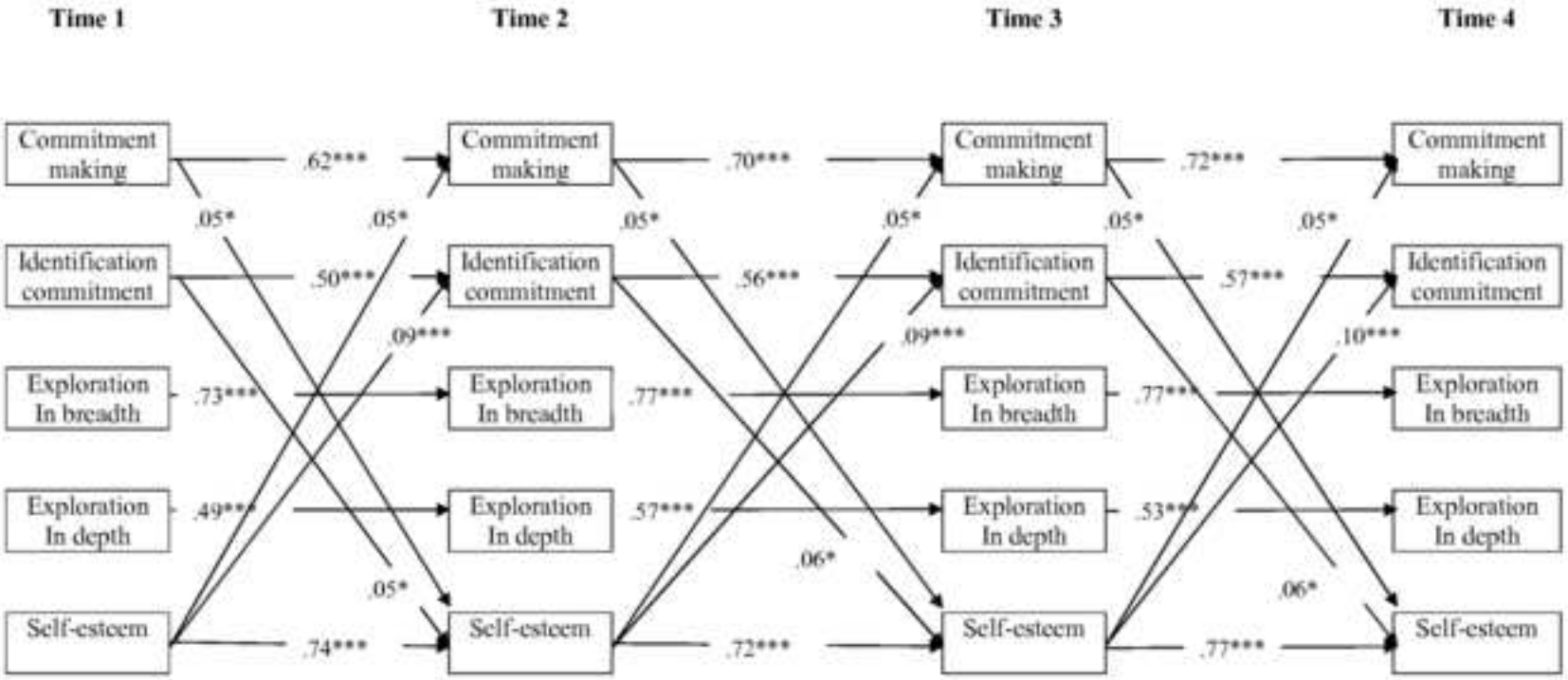
Descriptive Statistics and Pearson Correlations Between Identity Processes and Self-Esteem at Times 1, 2, and 3 in Study 3

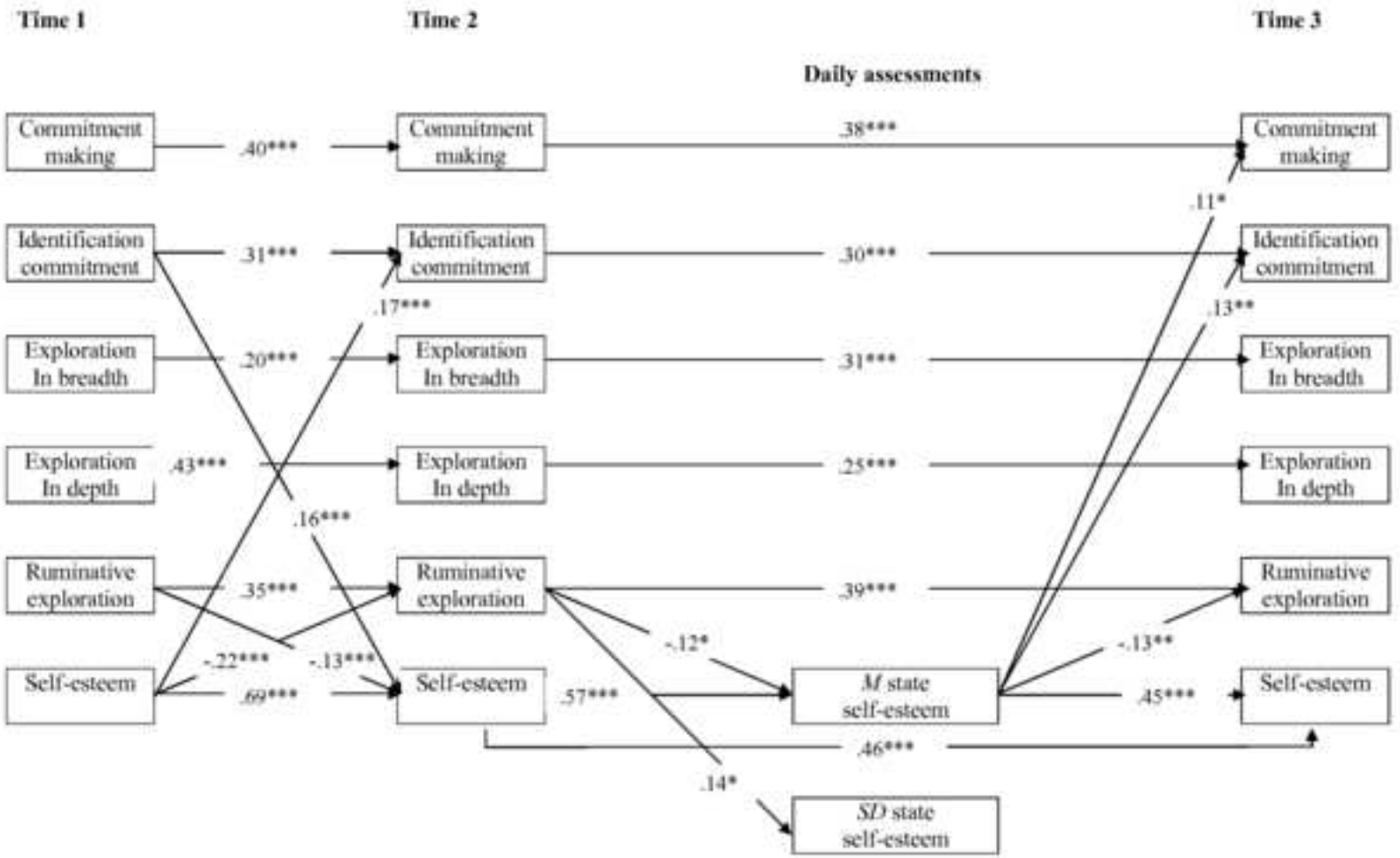
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*r*s with self-esteem		
Variable	T1	T2	T3	T1	T2	T3
1. Commitment making	3.72 (0.84)	3.58 (0.85)	3.60 (0.84)	.21***	.27***	.32***
2. Identification commitment	3.49 (0.72)	3.53 (0.73)	3.52 (0.77)	.39***	.39***	.36***
3. Exploration in breadth	3.69 (0.67)	3.49 (0.80)	3.54 (0.83)	.01	-.08	-.01
4. Exploration in depth	3.50 (0.67)	3.31 (0.80)	3.37 (0.80)	.07	.01	.02
5. Ruminative exploration	2.79 (0.83)	2.83 (0.89)	2.81 (0.94)	-.41***	-.49***	-.44***
6. Self-esteem	3.01 (0.58)	3.04 (0.56)	3.14 (0.58)	--	--	--

Note.T = Time; *M* = mean; *SD* = standard deviation.

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







Identity processes and self-esteem influenced one another over time.

Especially commitment making, identification with commitment, and ruminative exploration were related to self-esteem.

In high school students, a self-esteem main-effects model was supported.

In college students, a reciprocal model was supported.