



Identity Structure and Processes in Adolescence: Examining the Directionality of Between- and Within-Person Associations

Annabel Bogaerts¹ · Laurence Claes^{1,2} · Seth J. Schwartz³ · Andrik I. Becht⁴ · Margaux Verschueren¹ · Amarendra Gandhi¹ · Koen Luyckx^{1,5}

Received: 28 May 2018 / Accepted: 11 September 2018 / Published online: 24 September 2018
© Springer Science+Business Media, LLC, part of Springer Nature 2018

Abstract

Developing a stable and coherent identity structure (i.e., a synthesized sense of self that can support self-directed decision making) represents a lifelong task. A person's identity structure is continually revised through ongoing processes of identity exploration and commitment. However, longitudinal studies linking identity structure to identity processes are largely lacking. The present three-wave longitudinal study among 530 Flemish high school students [50.6% female; $M_{\text{age}} = 15$; $SD = 1.85$; age range = 11–19 years] examined the directionality of both between- and within-person associations linking identity synthesis and confusion to identity exploration and commitment processes. Between-person cross-lagged models indicated that adolescents who scored high on identity synthesis relative to their peers also scored high on proactive exploration and commitment processes, and low on ruminative exploration one year later, again relative to their peers. Adolescents who scored high on identity confusion relative to their peers also scored high on ruminative exploration one year later, again relative to their peers. With respect to effects of identity processes on identity structure, adolescents who scored high on identification with commitment relative to their peers also scored low on identity confusion one year later. Within-person cross-lagged models indicated that, when adolescents scored high on identity synthesis relative to their own average score, they reported increased proactive exploration processes one year later. In general, reaching a degree of identity synthesis appears to represent a prerequisite for proactive identity exploration at both the between- and within-person levels.

Keywords Identity structure · Identity processes · Adolescence · Between-person · Within-person · Longitudinal

Introduction

Especially when individuals reach late adolescence and emerging adulthood, the fundamental task of developing an

identity becomes most prominent (Arnett 2000; Erikson 1968). During the transition to adulthood, adolescents are expected to form a stable and coherent identity structure that provides them with a specific set of goals, plans, and beliefs (Côté and Levine 2002; Erikson 1950, 1968). In other words, adolescents and emerging adults must optimally acquire a synthesized sense of self that can support self-directed decision making (Schwartz et al. 2005). The onset of formal operational thought in adolescence enables counterfactual thinking, which sets the stage for exploration of identity alternatives (Moshman 2011). Compared to individuals who have reached adulthood, adolescents and emerging adults typically focus more on themselves and are more open to a variety of possibilities (Arnett 2000). This self-focus and consideration of possibilities encourages them to consider alternatives in areas such as career, relationships, religion, and values (Schwartz et al. 2013). However, to date, the direction of effects is unclear between (a) a stable (or unstable) identity structure and (b) the

✉ Annabel Bogaerts
annabel.bogaerts@kuleuven.be

¹ Faculty of Psychology and Educational Sciences, KU Leuven, Leuven, Belgium
² Faculty of Medicine and Health Sciences, University Antwerp, Antwerp, Belgium
³ Department of Public Health Sciences, Leonard M. Miller School of Medicine, University of Miami, Miami, FL, USA
⁴ Research Centre Adolescent Development, Utrecht University, Utrecht, The Netherlands
⁵ UNIBS, University of the Free State, Bloemfontein, South Africa

identity processes through which such an identity structure may be obtained.

As conceptualized by Erikson (1968), one's overall identity structure can be characterized by some degree of both identity synthesis and confusion. Individuals high on *identity synthesis* experience a sense of self-continuity over time and across situations, and have developed a stable set of goals, plans, and beliefs (Erikson 1968; Kaufman et al. 2014). Individuals high on *identity confusion* experience a fragmented sense of self that does not support self-directed decision making (Schwartz et al. 2013). As a consequence, they struggle to find purpose and direction in life (Schwartz et al. 2009). Erikson (1950) proposed that identity is represented as a sense of balancing identity synthesis with identity confusion. Accordingly, Erikson (1950) portrayed successful identity development as the extent to which synthesis predominates over confusion. It should be noted that synthesis and confusion can coexist to some extent (Marcia 2002)—for example, one can be sure of one's sense of self in some domains but unsure in others. As such, identity synthesis and confusion thus represent two interrelated but separate constructs, that relate differently to adolescent outcomes (Schwartz et al. 2009).

In Marcia's view Marcia (1966, 1980), identity synthesis implies the possession of an internal, self-constructed, dynamic organization of drives, abilities, and beliefs, most optimally acquired through a process of *exploring* options and then *committing* to one or more of the options considered (Bosma and Kunnen 2001; Marcia 1988; Schwartz et al. 2009). As such, identity exploration and commitment represent behavioral markers of identity formation along which individual differences in identity development can be described (Marcia 1966, 1980). Based on these processes of exploration and commitment, Marcia (1966, 1980) derived four identity statuses, each of which represents a way of working through identity issues: achievement (commitments enacted after a period of exploration), moratorium (ongoing exploration without much commitment), foreclosure (commitments enacted without prior exploration), and diffusion (absence of systemic exploration and commitment).

Subsequently, Luyckx and colleagues (2008) have expanded and refined Marcia's status approach (1980) by developing a process-oriented identity model, consisting of two commitment processes and three exploration processes. *Exploration in breadth* indicates the active search for and consideration of different identity alternatives, where such consideration optimally occurs prior to *commitment making*. Once a commitment has been enacted, *exploration in depth* represents the careful evaluation of one's existing commitments. Individuals assess the degree to which their

commitments match their identity standards or goals (Meeus et al. 2002), and this match (or lack thereof) leads them to feel more or less confident about these commitments (i.e., *identification with commitment*). If one is unsatisfied with one's commitments, the process may cycle back to a new round of exploration in breadth (Luyckx et al. 2006). Therefore, developing a synthesized identity structure is framed as a long-term dynamic process of constructing and revising one's identity (Bosma and Kunnen 2001; Luyckx et al. 2006). However, research has indicated that identity exploration is also associated with internalizing symptoms (Luyckx et al. 2006; Schwartz et al. 2009). Consequently, Luyckx et al. (2008) added a maladaptive exploration process to their model, labeled *ruminative exploration*. This process captures the degree to which a person is stuck in a cycle of hesitation and self-criticism (Luyckx et al. 2008). The degree to which the aforementioned five identity processes are implemented during identity development, as well as the extent to which these identity processes develop and influence one another over time, differs among individuals (Luyckx et al. 2006). The implementation of these processes, and the interrelationships among them, may also differ *within* individuals over time.

With regard to age and gender differences in identity variables, previous studies have yielded inconsistent findings. For age, given that identity represents a developmental process, it can be expected to change over the life course with most identity changes occurring in adolescence and emerging adulthood (Arnett 2000; Erikson 1968). Luyckx et al. (2006) found an increase in both exploration and commitment processes in emerging adulthood. Similarly, Luyckx et al. (2013a, 2013b) demonstrated that commitment processes tend to increase in a linear fashion across ages 14–30, whereas proactive exploration processes are characterized by quadric trends, with the highest levels occurring in emerging adulthood. Furthermore, the transition from adolescence to adulthood is characterized by a progressive strengthening of one's sense of identity (Verschuere et al. 2017). Individuals in the diffused status tend to be significantly younger, whereas individuals in the achievement status are significantly older, suggesting an increase in identity synthesis over time, as achievement and diffusion may be taken to represent Erikson's (1950) identity synthesis and identity confusion outcomes (Côté and Schwartz 2002). With respect to gender differences, Verschuere and colleagues (2017) found that women tend to explore more, whereas men tend to engage more in commitment processes. Finally, Schwartz et al. (2011) found women to be overrepresented in the achievement status (i.e., higher degrees of identity synthesis), whereas men were overrepresented in the diffused status (i.e., higher degrees of identity confusion).

Linking Identity Structure and Identity Processes

The directionality of effects between identity structure and identity processes is not yet clear. Does a certain degree of identity synthesis serve as a prerequisite for identity-related exploration and commitment, or does identity synthesis arise as a result of proactive exploration and commitment processes? Schwartz (2001) as well as Schwartz et al. (2005) have suggested that reaching a state of identity synthesis represents a necessary condition for arriving at enduring life commitments. They suggest that having a clear sense of who one is and where one wishes to go, guides the process of identity-related decision making (Schwartz et al. 2005). The directionality inherent in these propositions is that an increasing sense of identity synthesis predicts (or is at least a marker of) more mature exploration and commitment processes. In line with this reasoning, identity researchers have hypothesized that the general increase in identity-related commitment making during adolescence and emerging adulthood serves as a behavioral indicator of a progressively strengthening sense of identity synthesis—which in turn facilitates an agentic approach to selecting ideals, relationship preferences, and aspirations (Harter 1999; Koepke and Denissen 2012). Erikson (1950, 1968) also suggested a similar direction of effects for identity confusion—specifically, the absence or loss of identity synthesis leads to a prolonged and aggravated feeling of identity confusion and, consequently, to difficulties in committing to enduring and prosocial societal roles.

Importantly, many identity researchers who consider identity synthesis as a structural foundation for engaging in exploration and commitment processes also emphasize the potentially bi-directional associations between identity synthesis/confusion and identity processes. That is, identity synthesis may facilitate further exploration and commitment, and exploration and commitment processes might lead to synthesis. For example, Crocetti (2017) notes that one's existing identity structure will be maintained only as long as it is consistent with the context and relational network in which one operates. When one's commitments no longer appear to support adaptive functioning, they will be dismissed or revised through renewed exploration and commitment processes (Crocetti et al. 2008). Grotevant (1987) described that this process of reconsideration continues until new satisfactory commitments are enacted. However, discarding or loosening current commitments may lead to elevated levels of identity confusion (Crocetti 2017; Schwartz et al. 2009)—even if this sense of confusion is temporary.

In line with these ideas, Schwartz and colleagues have provided empirical evidence for a bidirectional relationship between self-concept clarity and commitment processes

(Schwartz et al. 2012). Self-concept clarity is conceptually similar to identity synthesis (Schwartz et al. 2017) and is defined as the extent to which one's view of oneself is internally consistent, stable, and confident (Campbell et al. 1996). Research has indeed shown that commitment (i.e., enduring life choices and the self-confidence that derives from these choices) may help one to maintain a sense of self-concept clarity and that, in turn, this sense of self-concept clarity may prompt one to maintain one's commitments (Schwartz et al. 2011). Although concentrating on different theoretical identity models, the present study also examines associations between identity structure (as assessed by the degree of identity synthesis or confusion) and exploration and commitment processes (as assessed within a five-dimensional identity model; Luyckx et al. 2008).

Examining both Between- and Within-Person Associations

Although identity formation is generally regarded as a highly idiosyncratic developmental process, the majority of previous longitudinal studies have used standard cross-lagged panel models to investigate the directionality of effects involving identity formation (Luyckx et al. 2012, 2014). Despite the fact that these standard cross-lagged models do not fully separate the between-person variance from the within-person variance over time (Keijsers 2015), researchers consider these standard models to be a representation of between-person differences (Mercer et al. 2017). In these models, adolescents' scores on different identity process variables are compared to other adolescents' scores on these identity process variables. Such models inform us, for example, as to whether adolescents who score high on identity synthesis relative to their peers also score high on proactive identity exploration and commitment processes one year later, again relative to their peers (Mercer et al. 2017). Hence, between-person models compare adolescents' scores relative to other adolescents' scores in the same sample, but fail to provide unambiguous information on how the relations between variables fluctuate within a person over time. Additionally, effects at the between-person level are sometimes unrelated to within-person effects (e.g., Hamaker et al. 2015).

Hence, given the idiosyncratic character of identity development, it is essential to examine identity processes within, as well as between, individuals (Becht et al. 2017). Therefore, scholars have increasingly stressed the need to study identity formation at both the between- and within-person levels (Klimstra et al. 2016; Lichtwarck-Aschoff et al. 2008). Within-person models consider adolescents' identity formation in comparison to their own average score and, hence, provide information on the dynamic relation between variables within one person across time (Papp

2004). For example, a within-person model informs us whether an increase in an adolescent's own score on identity synthesis would lead to an increase in the same adolescent's proactive identity exploration and commitment processes over time (Mercer et al. 2017). Learning about these within-person changes in identity formation is of great importance for improving identity theory and facilitating the development of intervention programs. For instance, within-person models could indicate the extent to which increased identity synthesis predicts increased proactive identity processes, which between-person models do not allow us to conclude.

The present study utilized both between- and within-person approaches to examine longitudinal linkages between identity structure (synthesis/confusion) and identity processes of exploration and commitment. This aim was pursued given that between- and within-person approaches index different types of developmental processes (Mercer et al. 2017). Between-person models can be used to identify which individuals are more prone to experiencing identity-related difficulties, and which individuals are more likely to be more successful in developing a sense of identity, relative to other individuals in the sample. On the other hand, within-person models map intra-individual changes in identity formation over time. By combining between- and within-person models, it may be able to identify (1) individuals at risk for identity-related difficulties (i.e., in terms of increased or decreased scores on certain identity variables relative to the rest of the sample) and (2) potential identity mechanisms toward which one can focus intervention efforts at the within-person level (as these within-person associations may relate to causal processes; Mercer et al. 2017) (Luyckx et al. 2012).

The Present Study

The present study was guided by two primary research objectives. Broadly, these included mapping (1) between-person and (2) within-person associations between identity structure (synthesis and confusion) and identity processes (exploration and commitment). First, the present study examined the longitudinal between-person associations linking identity structure to identity exploration and commitment processes by performing standard cross-lagged panel modeling using three waves of longitudinal data. Based on prior research at the between-person level (Koepke and Denissen 2012; Schwartz et al. 2005), identity structure was expected to predict engagement in identity processes, in such a way that having a clear sense of who one is and where one wishes to go may stimulate proactive exploration and commitment in identity-related domains. It was further hypothesized that identity synthesis would positively predict

proactive identity processes—that is, exploration in breadth, exploration in depth, commitment making, and identification with commitment—and would negatively predict ruminative exploration. Further, it was hypothesized that identity confusion would positively predict ruminative exploration and would negatively predict proactive identity processes (Erikson 1968; Schwartz et al. 2005).

Additionally, at the between-person level, some evidence of bi-directionality was expected, such that scoring relatively high on proactive exploration and commitment processes might positively predict identity synthesis and negatively predict identity confusion (Crocetti et al. 2008; Schwartz et al. 2012). Finally, adolescents who scored relatively high on ruminative exploration were expected to also score relatively high on identity confusion and relatively low on identity synthesis (Schwartz et al. 2009).

Second, the present study examined prospective within-person associations linking identity structure to identity processes by performing random-intercept cross-lagged panel modeling. At the within-person level, one's identity structure was expected to predict engagement in identity processes (Koepke and Denissen 2012; Schwartz et al. 2005). Specifically, it was hypothesized that when an adolescent had a higher level of identity synthesis compared to that adolescent's own average, s/he would report increased exploration in breadth, exploration in depth, commitment making, and identification with commitment, and decreased ruminative exploration the following year. An opposite pattern of effects was expected for identity confusion, such that when an adolescent reported a higher level of identity confusion compared to her/his own average, s/he would report increased ruminative exploration and decreased proactive exploration and commitment the following year (Erikson 1968; Schwartz et al. 2005).

Also at the within-person level, evidence of bi-directionality was expected, such that when an adolescent reported a higher level of proactive exploration and commitment processes compared to her/his own average, s/he would report increased identity synthesis and decreased identity confusion the following year (Crocetti et al. 2008; Schwartz et al. 2012). Finally, an adolescent with a higher level of ruminative exploration compared to her/his own average was hypothesized to report increased identity confusion and decreased identity synthesis the following year (Schwartz et al. 2009).

Methods

Participants and Missing Data

Data for the present longitudinal study were collected from a single high school in Flanders, the Dutch-speaking part of

Belgium, using three annual measurement waves between 2015 and 2017 (Gandhi et al. 2017). This school expressed its interest and willingness to collaborate in the present data collection. Through convenience sampling, a total of 1115 high school students (grade 7–12) were contacted for participation at T1. Of those contacted, 530 students agreed to participate (50.6% female, response rate = 47.53%). Mean age for girls at T1 was 14.85 years ($SD = 1.79$, range = 11–19 years). Mean age for boys at T1 was 15.16 years ($SD = 1.89$, range = 12–19 years). Boys and girls did not significantly differ from one another on age ($t(528) = 1.96$, $p = .05$). Mean age for the complete sample at T1 was 15 years ($SD = 1.85$, range = 11–19 years). At T2, a total of 387 students participated (52.71% female; retention rate = 73.02%). Mean age at T2 was 15.52 years ($SD = 1.68$; range = 12–20 years). At T3, 327 students participated in the study (54.63% female; retention rate = 61.70%), with a mean age of 16.34 years ($SD = 1.64$; range = 13–21 years). A total of 314 students (59.25% of the total sample) participated at all measurement points. Given that the sample was collected in a high school, it consisted for the most part of late teens and for a smaller part of early twenties, the age range in which the development of a stable and coherent identity structure comes to ascendance (Arnett 2000; Erikson 1968).

Participants with and without complete data were compared using Little's (1988) Missing Completely at Random (MCAR) test at all three measurement points. A non-significant test statistic indicated that the results were most likely not biased as a result of missing data ($\chi^2(210) = 205.58$; $p = .57$). Consequently, all available data were used in the analyses through the Full Information Maximum Likelihood (FIML) approach in Mplus version 8.0 (Little and Rubin 1987; Muthén and Muthén 2017; Schafer and Graham 2002).

Procedure

Participation in the study was voluntary, and students were asked to sign an informed consent form. Students younger than 18 years were allowed to participate in the study only if active parental consent was obtained. Data collection was carried out during school hours. Students completed the surveys using paper and pencil and were requested to give the completed questionnaires to the researchers (who were present during data collection) in a sealed envelope. At T2 and T3, students who switched to another high school, graduated, or dropped out of school were contacted by e-mail and were asked to complete the questionnaires online at the remaining assessment points. At every wave, students who participated received a movie ticket as compensation. To ensure confidentiality and anonymity, all students were assigned a unique code number that was used during the

entire data collection process. The study was approved by the ethical committee (SMEC) of the Faculty of Psychology and Educational Sciences at the University of Leuven.

Measures

Identity structure

Identity synthesis and confusion were assessed using the Dutch translation of the 12-item Identity subscale from the Erikson Psychosocial Stage Inventory (EPSI; Rosenthal et al. 1981), a self-report questionnaire assessing the extent to which individuals have a clear sense of who they are and what they believe in. The English version was translated into Dutch using the translation/back-translation procedure (Claes et al. 2014). Two Dutch–English bilingual researchers translated the questionnaire into Dutch. Differences in the two translators' Dutch versions were discussed and disagreements were resolved through consensus. Next, one independent bilingual person translated the items back into English, and another independent bilingual person matched the original and the back-translated English versions. Correct matching was achieved for all items. The Dutch version of the EPSI has already been administered in several studies (e.g., Claes et al. 2015; Luyckx et al. 2015). The Identity subscale from the EPSI has been shown to be best represented as a two-factor solution, with separate subscales for synthesis and confusion (Schwartz et al. 2009). Each of these subscales consists of six items, which are rated on a 5-point Likert scale ranging from 1 (*totally disagree*) to 5 (*totally agree*). An example item for identity synthesis is: "I know what kind of person I am". An example item for identity confusion is: "I feel mixed up". Cronbach's alphas for identity synthesis and confusion ranged from .74 to .79, and from .67 to .74, respectively, across T1–T3.

The factor structure of the EPSI was examined using confirmatory factor analysis (CFA) in order to explore whether identity synthesis and identity confusion can be best conceptualized and modeled as two separate factors in the present study. At all three measurement points, CFA using robust maximum likelihood estimation (MLR) was performed in Mplus 8 (Muthén and Muthén 2017) for one- and two-factor solutions. Three criteria were used to evaluate CFA model fit: (1) the comparative fit index (CFI), with values above .95 indicating good fit and values between .90 and .95 indicating acceptable fit (Hu and Bentler 1999); (2) a non-significant chi-square test (although nonsignificance is rarely achieved in large sample sizes); and (3) the root-mean-square error of approximation (RMSEA), for which values below .08 refer to acceptable model fit and values below .06 refer to good fit (Hu and Bentler 1999).

Table 1 Descriptive statistics of study variables at times 1–3

Variable	Time 1	Time 2	Time 3
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Identity synthesis	3.67 (0.60)	3.71 (0.57)	3.67 (0.66)
Identity confusion	2.64 (0.62)	2.58 (0.62)	2.61 (0.67)
Commitment making	3.25 (0.85)	3.27 (0.88)	3.29 (0.87)
Identification with commitment	3.37 (0.81)	3.31 (0.79)	3.30 (0.82)
Exploration in breadth	3.31 (0.77)	3.36 (0.76)	3.37 (0.82)
Exploration in depth	2.97 (0.83)	2.98 (0.84)	3.08 (0.81)
Ruminative exploration	2.50 (0.83)	2.55 (0.83)	2.52 (0.88)

At all measurement points, CFA on the EPSI scores indicated that a two-factor solution ($\chi^2(53) = 168.81$, $p < .001$; CFI = .912; RMSEA = .064 at T1; $\chi^2(53) = 140.05$, $p < .001$; CFI = .914; RMSEA = .065 at T2; and $\chi^2(53) = 116.654$, $p < .001$; CFI = .940; RMSEA = .061 at T3) provided a better fit to the data compared to a one-factor solution ($\chi^2(54) = 199.798$, $p < .001$; CFI = .890; RMSEA = .072 at T1; $\chi^2(54) = 158.902$, $p < .001$; CFI = .896; RMSEA = .071 at T2; and $\chi^2(54) = 136.204$, $p < .001$; CFI = .922; RMSEA = .068 at T3). To examine the possibility that identity synthesis and confusion might be part of a higher-order identity consolidation factor, also a second-order model with two first order latent variables was examined, but this model did not converge. Hence, identity synthesis and identity confusion were treated as two separate factors in subsequent analyses.

Identity processes

Participants completed the Dimensions of Identity Development Scale (DIDS; Luyckx et al. 2008), which was originally developed in Dutch and consists of 25 items rated on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The DIDS contains five subscales assessing five identity processes: exploration in breadth (e.g., “I think about different things I might do in the future”), commitment making (e.g., “I know which direction I am going to follow in my life”), exploration in depth (e.g., “I think about whether my future plans match with what I really want”), identification with commitment (e.g., “I am sure that my plans for the future are the right ones for me”), and ruminative exploration (e.g., “I worry about what I want to do with my future”). The DIDS appears to produce valid and reliable scores in community samples (Luyckx et al. 2008). Cronbach’s alphas ranged from .77 to .87 at T1, .80 to .91 at T2, and .79 to .91 at T3.

Results

Preliminary Analyses

Descriptive statistics of all study variables at T1–T3 are presented in Table 1. To investigate gender differences at baseline, two MANOVAs with gender as a fixed factor and (1) identity structure and (2) identity processes as dependent variables were conducted. For identity structure, a significant multivariate effect emerged [Wilks’ $\lambda = .97$, $F(2, 523) = 6.94$, $p < .01$, partial $\eta^2 = .026$]. Table 2 displays follow-up univariate F -values, indicating that boys scored higher on identity synthesis, and lower on identity confusion, compared to girls at T1. With regard to exploration and commitment processes, a significant multivariate effect again emerged [Wilk’s $\lambda = .92$, $F(5, 522) = 8.98$, $p < .001$, partial $\eta^2 = .079$]. Follow-up univariate analyses, displayed in Table 2, indicated that boys scored higher on commitment making and identification with commitment, and lower on ruminative exploration, compared to girls at T1.

With respect to age at baseline, identity confusion ($r = .09$, $p < .05$), exploration in breadth ($r = .10$, $p < .05$), exploration in depth ($r = .22$, $p < .001$), and ruminative exploration ($r = .10$, $p < .05$) were positively associated with age at T1. It should be noted, however, that only one of these correlations exceeded .20.

Table 3 presents correlations among the study variables at each time point. At each time point, identity synthesis was negatively associated with identity confusion, positively related to all proactive identity processes, and negatively related to ruminative exploration. Conversely, at each time point, identity confusion was negatively related to both commitment processes and positively associated with ruminative exploration.

Between-Person Associations Linking Identity Structure to Processes

To investigate the directionality of effects between identity structure and processes at the between-person level, a standard cross-lagged panel modeling using robust maximum-likelihood estimation (MLR) was conducted in Mplus version 8.0 (Muthén and Muthén 2017). To evaluate model fit, three standard fit indices were used (Kline 2015): (1) the Satorra–Bentler scaled chi-square index ($S-B\chi^2$), which uses a correction factor to account for non-normality and should be as small as possible, preferably non-significant; (2) the root-mean-square error of approximation (RMSEA), which should be less than .08 for reasonable fit, and less than .06 for excellent fit, and (3) the comparative fit index (CFI), which should be higher than .90 for reasonable fit, and higher than .95 for excellent fit.

Table 2 Gender distribution of identity synthesis and confusion, and identity exploration and commitment processes with means, standard deviations, and univariate ANOVAs at time 1

Variables	Boys <i>M (SD)</i>	Girls <i>M (SD)</i>	<i>F</i> (1, 524)	Cohen's <i>d</i>
Identity synthesis	3.77 (0.59)	3.58 (0.59)	12.79*	0.32
Identity confusion	2.56 (0.60)	2.72 (0.64)	8.68**	0.26
Commitment making	3.33 (0.86)	3.18 (0.83)	3.96***	0.18
Identification with commitment	3.54 (0.78)	3.20 (0.80)	25.47*	0.43
Exploration in breadth	3.30 (0.80)	3.31 (0.75)	0.00	–
Exploration in depth	2.93 (0.85)	3.01 (0.81)	1.22	–
Ruminative exploration	2.37 (0.78)	2.61 (0.85)	11.76**	0.29

p* < .001, *p* < .01, ****p* < .05

Table 3 Correlations among the study variables at all measurement points

Variables		2	3	4	5	6	7
Identity synthesis	T1	–.59*	.16*	.23*	.36*	.56*	–.34*
	T2	–.63*	.28*	.30*	.41*	.59*	–.37*
	T3	–.70*	.17**	.31*	.39*	.58*	–.45*
Identity confusion	T1		.05	–.02	–.32*	–.40*	.56*
	T2		–.08	–.17**	–.38*	–.46*	.52*
	T3		–.04	–.20*	–.034*	–.50*	.53*
Commitment making	T1			.65*	.29*	.39*	–.25*
	T2			.69*	.33*	.45*	–.28*
	T3			.69*	.34*	.47*	–.24*
Identification with commitment	T1				.37*	.47*	–.24*
	T2				.39*	.49*	–.27*
	T3				.41*	.47*	–.30*
Exploration in breadth	T1					.61*	.30*
	T2					.58*	.26*
	T3					.61*	.37*
Exploration in depth	T1						.23*
	T2						.17**
	T3						.18*
Ruminative exploration	T1						–
	T2						–
	T3						–

p* < .001, *p* < .01

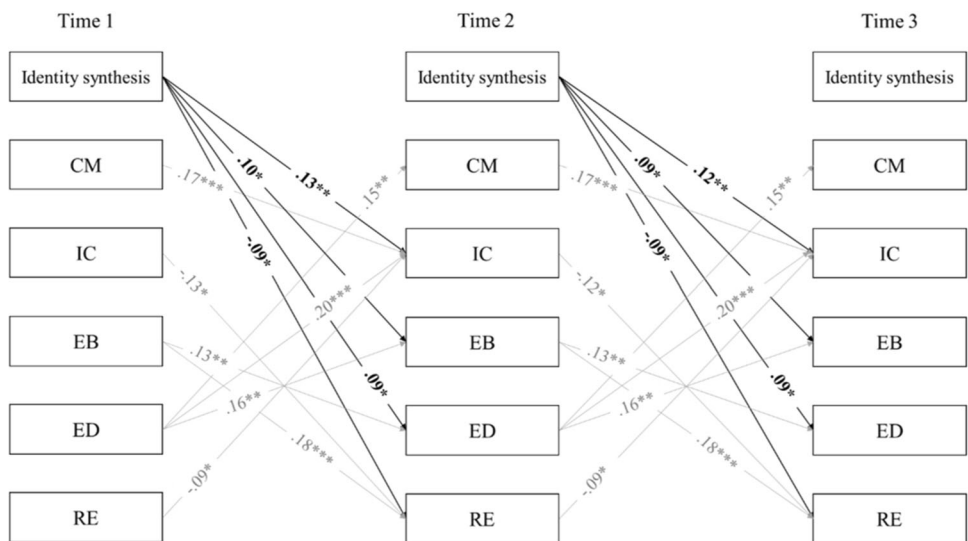
Two-step analyses were performed for identity synthesis and identity confusion separately. In the first step, two baseline models were freely estimated representing the temporal between-person associations between (1) identity synthesis and identity exploration and commitment processes (Model 1) and (2) identity confusion and identity exploration and commitment processes (Model 2). These two baseline models included all freely estimated within-time associations at T1–T3, all autoregressive or stability paths for each variable between adjacent time points, and all cross-lagged paths linking identity structure to identity processes (and vice versa) over time (Anderson and Kida 1982; Kline 2015). The analyses controlled for age and

gender at T1 by estimating paths from these covariates to each construct in the model. Moreover, all possible cross-lagged effects between identity exploration and commitment processes were included in the model. The resulting models fit the data adequately [Model 1: linking identity synthesis to processes: $S-B\chi^2(36) = 91.533, p < .001$; CFI = .984; RMSEA = .054; and Model 2: linking identity confusion to processes: $S-B\chi^2(36) = 99.434, p < .001$; CFI = .982; RMSEA = .058].

In the second step, all corresponding cross-lagged paths (e.g., identity confusion to exploration in breadth from T1–T2 and from T2–T3) were set equal across time to evaluate the assumption of time invariance—that is, whether corresponding cross-lagged effects were similar across time. To compare the model fit of the more parsimonious constrained model to the baseline model, a $S-B\chi^2$ difference test was conducted (Satorra and Bentler 2001). Additionally, differences in CFI and RMSEA values between the constrained and baseline models were calculated, which should not exceed .010 and .015, respectively, to indicate a significant model fit difference (Chen 2007). Model comparisons indicated that, in both models, the constrained and unconstrained models fit the data equivalently [Model 1: linking identity synthesis to processes: $\Delta S-B\chi^2(30) = 34.12, p = .28$; $\Delta CFI = .001$; $\Delta RMSEA = .013$; and Model 2: linking identity confusion to processes: $\Delta S-B\chi^2(30) = 32.71, p = .34$; $\Delta CFI = .001$; $\Delta RMSEA = .015$]. Hence, the more parsimonious constrained model was used to examine the direction of effects between identity structure and processes at the between-person level.

Figures 1 and 2 display significant standardized cross-lagged path coefficients from both models. In the first model (Model 1, Fig. 1), autoregressive coefficients ranged between .52 and .59 for identity synthesis, and between .25 and .45 for identity processes (all *ps* < .001). In terms of cross-lagged coefficients, identity synthesis positively predicted exploration in breadth, exploration in depth, and identification with commitment, and negatively predicted ruminative exploration over time. Exploration and commitment processes did not significantly predict identity

Fig. 1 Standard cross-lagged model for identity synthesis. Significant paths linking identity synthesis to identity processes are shown in black. Significant paths linking identity processes over time are shown in grey. CM commitment making, IC identification with commitment, EB exploration in breadth, ED exploration in depth, RE ruminative exploration. * $p < .05$, ** $p < .01$, *** $p < .001$



synthesis. In the second model (Model 2, Fig. 2), autoregressive coefficients ranged between .51 and .54 for identity confusion, and between .29 and .45 for identity processes (all $ps < .001$). In terms of cross-lagged coefficients, identity confusion positively predicted ruminative exploration over time and identification with commitment negatively predicted identity confusion over time. In both models, exploration and commitment processes predicted one another over time. Exploration in breadth positively predicted exploration in depth and ruminative exploration. Exploration in depth positively predicted exploration in breadth and both commitment processes. Commitment making positively predicted identification with commitment, which, in turn, negatively predicted ruminative exploration. Finally, ruminative exploration negatively predicted identification with commitment.

Within-Person Associations Linking Identity Structure to Processes

To investigate the directionality of effects at the within-person level, random-intercept cross-lagged panel modeling (Hamaker et al. 2015) using robust maximum-likelihood estimation (MLR) was performed in Mplus version 8.0 (Muthén and Muthén 2017). This multilevel modeling approach differs from standard cross-lagged panel modeling in that it disaggregates cross-lagged effects at the within-person level from between-person differences (Becht et al. 2017). Specifically, the random-intercept cross-lagged panel modeling splits the variance of each construct in the model into a stable (trait-like) component and a within-person component; where the within-person component provides a mechanism for indexing adolescents’ fluctuations around their own “overall” mean across time. That is, for each variable in the model, the individual has an expected score,

which is based on the sample mean across three years and each individual’s stable trait factor (i.e., the random intercept). As a result, the variance at the within-person level captures adolescents’ fluctuations from year-to-year relative to their own personal mean across time.

Similar to the between-person cross-lagged panel models, two-step path analyses were performed for identity synthesis and confusion separately. In the first step, two baseline models were constructed, where all random intercepts, all within-time associations at T1–T3, all autoregressive paths between adjacent time points, and all cross-lagged paths were freely estimated. Additionally, all possible cross-lagged effects between identity exploration and commitment processes were included in the model. The resulting models fit the data adequately [Model 3: linking identity synthesis to processes: $S-B\chi^2(15) = 14.18, p = .51$; CFI = 1.00; RMSEA = .000; and Model 4: linking identity confusion to processes: $S-B\chi^2(15) = 16.89, p = .33$; CFI = .999; RMSEA = .015]. In the second step, time invariance was tested by constraining all corresponding cross-lagged paths to be equal across time, and the model fit of the constrained models was compared to the fit of the unconstrained models. Model comparisons indicated that, for both models, the assumption of stationarity could be retained [Model 3: linking identity synthesis to processes: $\Delta S-B\chi^2(30) = 33.18, p = .32$; $\Delta CFI = .001$; $\Delta RMSEA = .010$; and Model 4: linking identity confusion to processes: $\Delta S-B\chi^2(30) = 27.88, p = .58$; $\Delta CFI = .001$; $\Delta RMSEA = .015$]. Hence, the more parsimonious constrained model was used to examine the directionality of effects between identity structure and processes at the within-person level.

Figures 3 and 4 display Models 3 and 4 with (1) the between-person correlations (i.e., the random intercepts) and (2) all significant standardized cross-lagged path coefficients at the within-person level. In the third model (Model

Fig. 2 Standard cross-lagged model for identity confusion. Significant paths linking identity confusion to identity processes are shown in black. Significant paths linking identity processes over time are shown in grey. CM commitment making, IC identification with commitment, EB exploration in breadth, ED exploration in depth, RE ruminative exploration. * $p < .05$, ** $p < .01$, *** $p < .001$

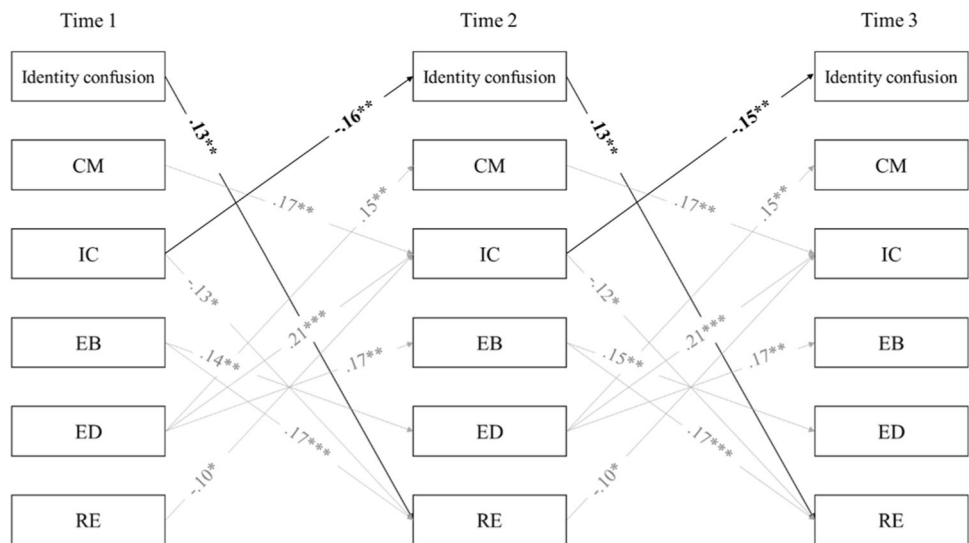
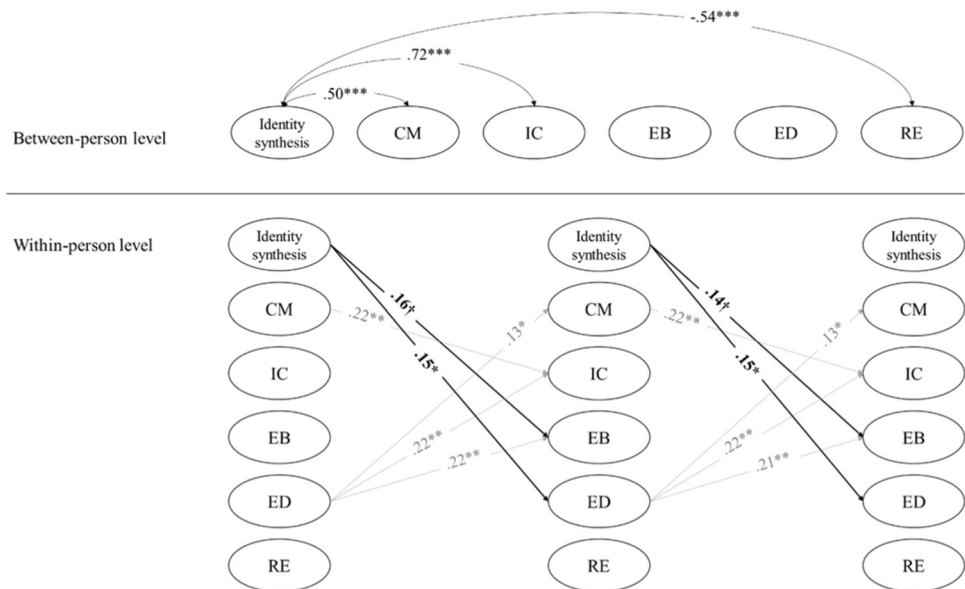


Fig. 3 Correlations between time-invariant between-person latent variables (upper figure) and standardized within-person cross-lagged paths linking identity synthesis to identity processes (shown in black), and linking exploration and commitment processes (shown in grey) (lower figure). * $p < .05$, ** $p < .01$, *** $p < .001$, † = approaching significance



3, Fig. 3), identity synthesis and both commitment processes were positively correlated, whereas identity synthesis and ruminative exploration were negatively associated at the between-person level. Autoregressive coefficients ranged between .13 and .24 for identity synthesis, and between .02 and .33 for identity processes. The within-person cross-lagged coefficients indicated that identity synthesis positively predicted exploration in depth and approached significance as a positive predictor of exploration in breadth ($p = .054$) over time. Exploration and commitment processes did not significantly predict identity synthesis at the within-person level. In the fourth model (Model 4, Fig. 4), identity confusion and both commitment processes were negatively correlated, whereas identity confusion and ruminative exploration were positively correlated at the between-person level. Autoregressive coefficients ranged between

-.03 and .07 for identity confusion, and between -.01 and .34 for identity processes. No significant within-person cross-lagged effects emerged between identity confusion and exploration or commitment processes. Between-person correlations linking exploration and commitment processes over time are shown in Table 4.

Although the findings indicated that identity confusion did not significantly predict, and was not significantly predicted by, identity processes at the within-person level, both within-person models produced significant cross-lagged paths linking exploration and commitment processes over time. Specifically, commitment making positively predicted identification with commitment over time. Exploration in depth positively predicted exploration in breadth, commitment making, and identification with commitment over time.

Fig. 4 Correlations between time-invariant between-person latent variables (upper figure) and standardized within-person cross-lagged paths linking identity confusion to identity processes, and linking exploration and commitment processes (shown in grey) (lower figure). * $p < .05$, ** $p < .01$, *** $p < .001$

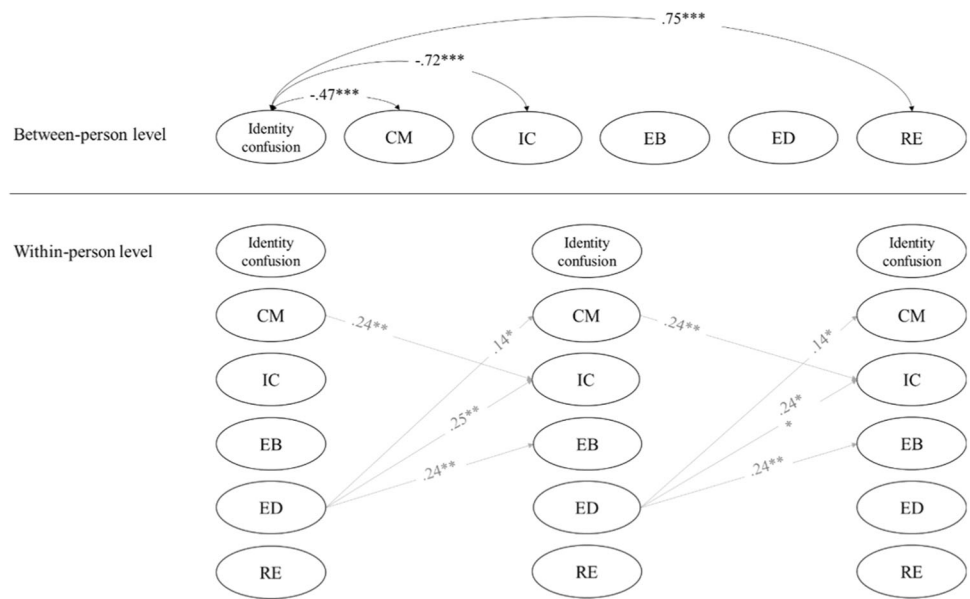


Table 4 Between-person correlations among identity exploration and commitment processes

Variables	Identity synthesis/confusion			
	2	3	4	5
1. Commitment making	.68*/.69*	.24/.20	.43*/.42*	-.60*/-.63*
2. Identification with commitment		.29/.27	.29/.26	-.64*/-.66*
3. Exploration in breadth			.57*/.58*	.36**/.36**
4. Exploration in depth				.09/.07
5. Ruminative exploration				-

* $p < .001$, ** $p < .01$

Discussion

Developing a stable and coherent identity structure is a lifelong developmental task (Erikson 1968). Although identity formation is generally regarded as a highly idiosyncratic process, research to date has primarily focused on between-person differences in identity processes. Identity researchers have stressed the importance of investigating identity development using longitudinal designs and have emphasized the need to focus on within-person changes in identity formation (Becht et al. 2017; Lichtwarck-Aschoff et al. 2008; Schwartz et al. 2012). Accordingly, the present three-wave longitudinal study examined how identity structure is related to exploration and commitment processes across adolescence. Furthermore, these over-time associations were examined at both the between- and within-person levels to provide an overview of how between-person or rank-order differences and within-person

changes in identity structure and identity processes are related across time.

Between-Person Differences

With respect to standard cross-lagged associations linking identity structure to identity processes at the between-person level, results supported the hypothesis that identity structure appears to predict engagement in exploration and commitment processes (Schwartz et al. 2005). Findings indicated that, relative to other adolescents in the sample, adolescents who scored higher on identity synthesis were more likely to report increased exploration in breadth, exploration in depth, and identification with commitment, and decreased ruminative exploration one year later. On the other hand, relative to other adolescents in the sample, adolescents who were more confused about their identities were more likely to report increased ruminative exploration. Identity confusion did not significantly predict proactive exploration and commitment processes. Overall, at the between-person level, adolescents who have a clear idea of who they are and where their life is heading (i.e., identity synthesis) also seem to have the necessary focus to invest in identity-related work by stimulating proactive exploration and identification with commitments in identity-related domains (Schwartz et al. 2005). Conversely, adolescents who lack a clear sense of identity (i.e., identity confusion) also seem to struggle with ongoing ruminative exploration, suggesting that lacking a clear structural foundation for one’s sense of self may render identity exploration unproductive. These findings thus seem to confirm Schwartz et al. (2005) hypothesis that adolescents and emerging adults must first undertake the task of developing a stable and

coherent identity structure, that, in turn, can guide and sustain identity commitments.

Contrary to expectations (Schwartz et al. 2011, 2005), adolescents who scored higher on identity synthesis were *not* more likely to report higher scores on commitment making. Although this was unexpected, the finding may be consistent with Marcia (1994, 1995), who suggested that commitment making is not always positively associated with identity synthesis. Marcia claimed that, when commitments are enacted without a prior period of exploration (i.e., foreclosure), sudden changes in external circumstances can trigger an identity crisis, leaving foreclosed individuals confused because they can no longer rely on their accustomed norms, rules, and situations. In line with this reasoning, Waterman et al. (2013) found that identity commitments are predictive of well-being, and protective against internalizing symptoms, only when they are aligned with one's core sense of self. The data indeed suggest that identification with commitment, but not necessarily commitment making, is associated with one's identity structure. However, further longitudinal research is needed to examine these hypotheses.

Results partially supported the hypothesis that exploration and commitment processes would predict identity structure. The present findings suggest a bi-directional relation between identity confusion and identification with commitment at the between-person level. In line with Schwartz and colleagues (2012), as compared to other adolescents in the sample, youth who scored higher on identification with commitment were more likely to report lower levels of identity confusion one year later. That is, adolescents who feel certain about, can identify with, and have internalized their existing commitments also experience less confusion about their identity relative to their peers. However, and rather surprisingly, exploration and commitment processes did not predict identity synthesis over time. This finding contradicts our expectation that engaging in proactive identity processes predicts a more stable identity structure (Schwartz et al. 2012). On the contrary, Schwartz and colleagues (2011) found that identity commitments and identity synthesis are positively predictive of one another across short periods of time (i.e., from one day to the next), suggesting that identity processes and identity structure may be part of a larger self-system (Schwartz et al. 2012). However, in the present study, identity synthesis appears to *precede* proactive exploration and commitment processes, rather than the other way around. The present findings might differ from those obtained by Schwartz and colleagues (2011, 2012) due to differences in research design. For instance, Schwartz et al. (2012) assessed identity structure using the Self-Concept Clarity Scale (SCC; Campbell et al. 1996), whereas the present study used the EPSI (Rosenthal et al. 1981).

Second, Schwartz et al. (2012) assessed identity processes using the Utrecht-Management of Identity Commitments Scale (U-MICS; Crocetti et al. 2008), whereas the present study used a more general measure, the DIDS (Luyckx et al. 2008). Third, Schwartz et al. (2012) focused on early to middle adolescents (12–16 years), whereas the present study sampled both adolescents and (although to a lesser extent) emerging adults (11–21 years). Another explanation for the differences in findings might be based on differential stability of identity structure and process variables. Generally, more stable variables are stronger over-time predictors (Adachi and Willoughby 2015). In the current study, the identity structure variables (i.e., synthesis and confusion) were more stable over time compared to the process variables. As our study sample is slightly older than the sample studied by Schwartz et al. (2012), this may imply that in our sample identity structure had stabilized already a little bit more and may therefore be the strongest predictor.

Thus, although findings indicated that identity structure—and in particular identity synthesis—predicted identity processes over time, results pointed to a bidirectional relation only for identity confusion. Identification with commitment negatively predicted identity confusion, possibly contributing to a more stable identity structure over time (Schwartz et al. 2012). This finding is consistent with Marcia's view Marcia (2006) that individuals' identity structure—especially when confused—undergoes subsequent development throughout life via renewed identity exploration and commitment processes.

At present, it is not entirely clear why bidirectional associations between identity synthesis and identity processes did not emerge. The two-factor structure of the EPSI may provide a potential explanation. Although Erikson (1950, 1968) situated identity development on a one-dimensional continuum of identity synthesis versus identity confusion, he also introduced the concept of *identity consolidation* as the dynamic interplay between identity synthesis and confusion (Hatano et al. 2018). Identity consolidation represents one's overall sense of identity and implies that both synthesis and confusion are necessary for healthy development (Hatano et al. 2018). This reasoning is in line with Marcia's (2002) notion of "identity synthesis *with* identity confusion". Studies have indeed indicated that identity synthesis and confusion are not mutually exclusive, but can co-exist within individuals (Hatano et al. 2018; Schwartz et al. 2009). Hence, identity synthesis and confusion may be differentially associated with identity processes. As mentioned before, research has demonstrated that particularly identity confusion is associated with exploration and commitment processes, because individuals may be more likely to engage in identity work when they are dissatisfied with their current identity structure (Schwartz et al. 2012). In other words, when adolescents are confused about

how to proceed with their life path, reconsideration is likely to (re)occur until new satisfactory commitments are enacted (Crocetti et al. 2008; Schwartz et al. 2012). Yet, it remains unclear why proactive exploration and commitment processes did not predict identity synthesis. It is possible that exploration and commitment may not always be successful, and that they may sometimes lead to synthesis—and sometimes they may not.

Within-Person Changes

With respect to the second study aim, it was investigated how within-person changes in identity structure and identity processes are related across time. Similar to the between-person associations, identity structure predicted engagement in proactive identity exploration processes at the within-person level. More specifically, adolescents whose level of identity synthesis increased (as compared to their own average level) were more likely to report increased exploration in breadth and exploration in depth the following year. That is, individuals may need to experience some degree of self-knowledge and internal coherence before they can explore which way they want to proceed in life and before they can evaluate their current commitments. Also at the within-person level, identity exploration and commitment processes did not significantly predict identity synthesis. Rather unexpectedly, and in contrast to the between-person analyses, there were no significant associations linking identity confusion to identity processes at the within-person level. Adolescents' levels of identity confusion did not provide information regarding their exploration and commitment processes, and vice versa. Hence, these findings may imply that the absence of increased identity synthesis, but not necessarily the presence of increased identity confusion, places individuals at risk for experiencing difficulties with identity formation. Research has indeed indicated that a certain degree of identity-related confusion or instability may be normative during adolescence (Schwartz et al. 2005)—and as a result, confusion may not necessarily be harmful.

Taking together the findings regarding the directionality of effects between identity structure and identity processes, identity synthesis appears to facilitate proactive exploration processes at both the between- and within-person levels. At the between-person level, adolescents and emerging adults who have achieved a degree of coherence within their sense of self, relative to other adolescents in the sample, appear to be more likely to explore how they wish to proceed in life one year later. At the within-person level, adolescents and emerging adults whose levels of synthesis increased over time were more likely to explore their identities in breadth and in depth one year later. Achieving a sense of identity synthesis—having an idea of who one is and where one's

life is going—thus seems to serve as a prerequisite for proactive identity exploration. Only at the between-person level, adolescents and emerging adults who have achieved identity synthesis, relative to other adolescents in the sample, appear to be more likely to report increased identification with commitment and decreased ruminative exploration, again relative to other adolescents in the sample, one year later. Alternatively, individuals who are more confused about their identities are more likely to explore their identities in a ruminative fashion. Only at the between-person level, results pointed to a bidirectional relation between identity confusion and identification with commitment. As compared to other adolescents in the sample, youth who scored higher on identification with commitment may be more likely to report lower levels of identity confusion one year later.

Linking Exploration and Commitment Processes Over Time

Interestingly, both between- and within-person models yielded significant cross-lagged paths linking identity exploration and commitment processes over time. At the between-person level, adolescents who scored high on exploration in breadth were more likely to report increased exploration in depth and increased ruminative exploration over time. In late-modern societies, adolescents and emerging adults often engage in an extended period of exploration and self-examination (i.e., moratorium; Arnett 2000). Being relatively free from limitations and adult responsibilities, adolescents and young adults are able to spend a number of years exploring life alternatives and delaying the onset of adult commitments. However, for some individuals, these limitless possibilities can induce feelings of confusion and intimidation, causing them to feel stuck in a ruminative cycle of continued exploration (Côté and Levine 1987). Further, adolescents who scored high on identification with commitment were likely to report decreased ruminative exploration over time. This finding supports Luyckx and colleagues (2010), who reported that feeling certain about one's identity commitments is positively associated with adjustment. It is thus likely that adolescents and emerging adults who feel certain about, and can identify with, their identity-related choices engage less in ruminative exploration. Further, adolescents who scored high on ruminative commitment were more likely to report decreased identification with commitment over time. This finding is consistent with Luyckx et al. (2008) study, which suggested that ruminative exploration may hinder the formation of, and identification with, identity commitments.

Remarkably, at both the between- and within-person levels, exploration in depth predicted increases in adolescents' exploration in breadth, commitment making, and

identification with commitment one year later. These results were consistent with findings obtained by Luyckx and colleagues (2013a, 2013b). As described earlier, Luyckx et al. (2008) have distinguished five identity processes, four of which are subsumed under two identity cycles. The first cycle includes exploration in breadth and commitment making, and, hence, indexes *identity formation*. The second cycle includes exploration in depth and identification with commitment, and, hence, indexes *identity evaluation* of existing commitments. The second cycle—and particularly exploration in depth—seems to represent a key identity process that further stimulates identity exploration and commitment processes. Finally, in line with Luyckx et al. (2013), increased commitment making predicted an increase in adolescents' identification with commitment one year later at both the between- and within-person levels. As young people enact commitments, they may be more likely to identify with those commitments.

Limitations and Future Directions

The results of the present study should be interpreted in light of some limitations. First, all variables were assessed using self-report questionnaires. Although self-report questionnaires are the best way to gather identity-related information (Achenbach et al. 1987), collecting all data from a single informant might have led to reporting bias and inflated correlations among constructs due to shared method variance (Podsakoff et al. 2003). However, in the present study, shared method variance has been statistically removed by controlling for all within-time associations and autoregressive paths in the analyses (Orth et al. 2008). Nevertheless, future research should include other methods (such as interviews) and other-reported measures to corroborate the obtained findings.

Second, although the present study used a longitudinal design with three measurement points, the time span under consideration was relatively short. Hence, future longitudinal research should track such developmental changes over extended periods of time, from adolescence well into emerging adulthood. As such, future research should examine associations among identity variables during different life phases and should investigate whether identity structure (synthesis/confusion) or behavioral identity processes become more or less important with increasing age. Moreover, future research should examine day-to-day micro-processes of identity formation to capture within-person daily dynamics of identity process variables (Schwartz et al. 2011).

Third, the process of identity development does not happen in a vacuum, but rather is inevitably shaped by social and contextual factors as individuals try to find a balance between their personal needs and societal

expectations when forming their identity structure (Erikson 1968; Koepke and Denissen 2012). The present study did not examine the potential moderating impact of contextual factors on one's identity development. Identity confusion could, for instance, lead to ruminative exploration when the adolescent's direct environment (e.g., parents, peers, school) does not provide adequate support. Erikson (1968) suggested that a supportive social network helps adolescents to make important life decisions, which in turn facilitates growth toward a stable and autonomous sense of personal identity. Hence, future research would benefit from including such moderating contextual and interpersonal factors when examining identity development (Koepke and Denissen 2012).

Fourth, some of the cross-lagged coefficients observed in the present study were rather modest. However, these coefficients were obtained while simultaneously controlling for (1) within-time associations, (2) autoregressive stability paths, (3) cross-lagged paths, (4) age and gender at T1 in the between-person models, and (5) cross-lagged associations linking identity processes over time. As the models control for numerous associations among variables, such relatively modest coefficients are to be expected (Adachi and Willoughby 2015). Further, removing between-person variability from the model may also decrease the magnitude of within-person cross-lagged path coefficients (Keijsers 2015).

Fifth, in the present study, identity synthesis and confusion were measured using the corresponding subscales from the EPSI (Rosenthal et al. 1981). However, Erikson (1950) suggested that identity is represented as both one's overall sense of self (i.e., identity consolidation) and a sense of balancing identity synthesis with identity confusion, in which healthy identity development involves a preponderance of synthesis over confusion. In our view, identity consolidation represents the confluence among identity synthesis and identity exploration and commitment processes. That is, someone consolidating a sense of identity knows who they are, has engaged in consideration of alternatives, and selected one or more of these alternatives. Given that identity consolidation is a key concept in understanding healthy identity development (Erikson 1968), future longitudinal research should focus on identity consolidation above and beyond contributions of synthesis and confusion by assessing other identity constructs (i.e., identity processes). It is essential for the field to develop a new identity measure to assess a broad range of identity constructs.

Sixth, the present study primarily sampled Caucasian European high school students and used identity measures (EPSI and DIDS) that have been developed in Western cultures. However, a recent study has demonstrated the factorial validity of the EPSI in adolescent samples in the

United States and Japan (Dimitrova et al. 2018). Furthermore, the DIDS has also been used in non-Western cultures (e.g., Japan; Hatano and Sugimura 2017), as well as comparable measures that tap into identity processes (i.e., the U-MICS has been validated in 10 different countries across the world; see Crocetti et al. 2015). Moreover, previous studies have indicated empirical commonalities across American and European Caucasian adolescents in personal identity processes (Schwartz et al. 2006), and Schwartz and colleagues (2005) found substantial consistency across three US ethnic groups in identity constructs such as commitment and exploration. Nevertheless, the findings obtained in the present study cannot be generalized to other non-Caucasian or more diverse samples. Hence, future research should investigate how the different identity variables assessed in this study interrelate in non-Western cultures or in non-Caucasians living in other Western cultures.

Seventh, attrition by T3 was quite high (38.3%) and can be considered a limitation. To determine whether data were missing at random, participants with and without complete data were compared using Little's (1988) Missing Completely at Random (MCAR) test at all three measurement points. This test yielded a nonsignificant test result, suggesting that results were not likely biased as a result of missing data. Additionally, it was examined whether the group that dropped out at T3 (38.3%) differed on any mean levels of the study variables at T1 compared to individuals that participated in all waves by performing a MANOVA. This analysis indicated that the two groups did not significantly differ from one another on these variables (Wilks $\lambda = .967$, $F(7, 372) = 1.821$, $p = .082$).

Despite these and other limitations, the present study is among the first studies to provide insight into how identity variables operate at the within-person level. By differentiating stable between-person differences from within-person changes, the present study was able to identify (1) at-risk individuals for suboptimal identity development at the between-person level and (2) potential identity mechanisms on which one can target interventions at the within-person level. Findings indicated that experiencing identity confusion places individuals at risk for experiencing additional ruminative exploration, hence, impeding healthy identity development. At the within-person level, particularly the absence of identity synthesis (rather than the presence of identity confusion) places individuals at risk for suboptimal identity development. Interestingly, exploration in depth emerged as a key identity process further stimulating proactive exploration and commitment, hence, a process on which one can focus in intervention. Unfortunately—and similar to many personal identity theories and research—the present study focuses exclusively on internal psychological identity processes and does not attend to the potential impact of external environmental factors, perhaps

conveying an implicit assumption that identity development occurs in a static environment (Côté and Levine 1988). However, some authors have acknowledged identity formation as a socially embedded process and have emphasized the effect of external socio-cultural influences (upon internal psychological processes) on the individual's identity development (Markovitch et al. 2017; Yoder 2000). Identity interventions must consider the potential limitations that one's socio-cultural environment places on one's identity development.

Conclusion

The development and refinement of a personal identity structure is a lifelong process. However, to date, the directionality of effects is unclear between (a) a stable (or unstable) identity structure and (b) the identity processes through which such an identity structure may be obtained. The present longitudinal study has examined the directionality of both between- and within-person associations linking identity synthesis and confusion to identity exploration and commitment processes across adolescence. The obtained findings are a potentially important contribution to the identity literature. First, having a synthesized sense of self facilitates proactive identity exploration at both the between- and within-person levels. Adolescents and emerging adults who have achieved a degree of coherence within their sense of self, appear to be more likely to explore which way they wish to proceed in life and to identify with existing identity commitments. Alternatively, individuals who are low in identity synthesis may be more likely to explore their identities in a ruminative and unproductive fashion. Moreover, those whose level of synthesis increased over time were more likely to explore their identities in breadth and in depth. Achieving a sense of identity synthesis thus seems to serve as a prerequisite for proactive identity exploration. Second, only at the between-person level a bi-directional relationship between identity structure and processes emerged. Adolescents who identify with their existing commitments also experience less confusion about their identity relative to their peers. Hopefully, these results will find use in further theory and intervention development, as well as in further methodological advances in identity research.

Authors' Contributions A.G. and L.C. oversaw the data collection; A. B., L.C., and K.L. conceived of the study, constructed the hypotheses, analyzed the data, and interpreted the results; A.B. wrote the manuscript with critical revisions from all authors (K.L., L.C., S.J.S., A.I.B., M.V., and A.G.); S.J.S. and A.I.B. contributed to the data analyses and interpretation of the results. All authors read and approved the final manuscript.

Funding There was no funding provided for this study.

Data Sharing and Declaration This manuscript's data will not be deposited.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval The present study was approved by the ethical committee (SMEC) of the Faculty of Psychology and Educational Sciences at the University of Leuven.

Informed Consent Informed consent was obtained from all individual participants included in the study.

References

- Achenbach, T. M., McConaughy, S. H., & Howell, C. T. (1987). Child/adolescent behavioral and emotional problems: Implications of cross-informant correlations for situational specificity. *Psychological Bulletin*, *101*, 213–232. <https://doi.org/10.1037/0033-2909.101.2.213>.
- Adachi, P., & Willoughby, T. (2015). Interpreting effect sizes when controlling for stability effects in longitudinal autoregressive models: Implications for psychological science. *European Journal of Developmental Psychology*, *12*, 116–128. <https://doi.org/10.1080/17405629.2014.963549>.
- Anderson, T. N., & Kida, T. E. (1982). The cross-lagged research approach: Description and illustration. *Journal of Accounting Research*, *20*, 403–414. <https://doi.org/10.2307/2490748>.
- Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, *55*, 469–480. <https://doi.org/10.1037/0003-066X.55.5.469>.
- Becht, A. L., Nelemans, S. A., Branje, S. J. T., Vollebergh, W. A. M., Koot, H. M., & Meeus, W. H. J. (2017). Identity uncertainty and commitment making across adolescence: Five-year within-person associations using daily identity reports. *Developmental Psychology*, *53*, 2103–2112. <https://doi.org/10.1037/dev0000374>.
- Bosma, H. A., & Kunnen, E. S. (2001). Determinants and mechanisms in ego identity development: A review and synthesis. *Developmental Review*, *21*, 39–66. <https://doi.org/10.1006/drev.2000.0514>.
- Campbell, J. D., Trapnell, P. D., Heine, S. J., Katz, I. M., Lavallee, L. F., & Lehman, D. R. (1996). Self-concept clarity: Measurement, personality correlates, and cultural boundaries. *Journal of Personality and Social Psychology*, *70*, 141–156.
- Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling*, *14*, 464–504. <https://doi.org/10.1080/10705510701301834>.
- Claes, L., Luyckx, K., & Bijttebier, P. (2014). Non-suicidal self-injury in adolescents: Prevalence and associations with identity formation above and beyond depression. *Personality and Individual Differences*, *61*–62, 101–104. <https://doi.org/10.1016/j.paid.2013.12.019>.
- Claes, L., Luyckx, K., Bijttebier, P., Turner, B., Ghandi, A., Smets, J., & Schoevaerts, K. (2015). Non-suicidal self-injury in patients with eating disorder: Associations with identity formation above and beyond anxiety and depression. *European Eating Disorders Review: The Journal of the Eating Disorders Association*, *23*, 119–125. <https://doi.org/10.1002/erv.2341>.
- Côté, J. E., & Levine, C. (1987). A formulation of Erikson's theory of ego identity formation. *Developmental Review*, *7*, 273–325.
- Côté, J. E., & Levine, C. (1988). A critical examination of the ego identity status paradigm. *Developmental Review*, *8*, 147–184.
- Côté, J. E., & Levine, C. G. (2002). *Identity formation, agency, and culture: A social psychological synthesis*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Côté, J. E., & Schwartz, S. J. (2002). Comparing psychological and sociological approaches to identity: Identity status, identity capital, and the individualization process. *Journal of Adolescence*, *25*, 571–586. <https://doi.org/10.1006/jado.2002.0511>.
- Crocetti, E. (2017). Identity formation in adolescence: The dynamic of forming and consolidating identity commitments. *Child Development Perspectives*, *11*, 145–150. <https://doi.org/10.1111/cdep.12226>.
- Crocetti, E., Cieciuch, J., Gao, C. H., Klimstra, T., Lin, C. L., Matos, P. M., & Meeus, W. (2015). National and gender measurement invariance of the Utrecht-Management of Identity Commitments Scale (U-MICS): A 10-nation study with university students. *Assessment*, *22*, 753–768.
- Crocetti, E., Rubini, M., & Meeus, W. (2008). Capturing the dynamics of identity formation in various ethnic groups: Development and validation of a three-dimensional model. *Journal of Adolescence*, *31*, 207–222.
- Dimitrova, R., Hatano, K., Sugimura, K., & Ferrer-Wreder, L. (2018). The Erikson Psychosocial Stage Inventory in adolescent samples: Factorial validity and equivalence of identity as measured from the United States and Japan. *European Journal of Psychological Assessment*, 1–5. <https://doi.org/10.1027/1015-5759/a000456>
- Erikson, E. H. (1950). *Childhood and society*. New York, NY: Norton.
- Erikson, E. H. (1968). *Identity, youth and crisis*. New York, NY: Norton.
- Gandhi, A., Luyckx, K., Maitra, S., Kiekens, G., Verschueren, M., & Claes, L. (2017). Directionality of effects between non-suicidal self-injury and identity formation: A prospective study in adolescents. *Personality and Individual Differences*, *109*, 124–129. <https://doi.org/10.1016/j.paid.2017.01.003>.
- Grotevant, H. D. (1987). Toward a process model of identity formation. *Journal of Adolescence Research*, *2*, 203–222.
- Hamaker, E. L., Kuiper, R. M., & Grasman, R. P. P. P. (2015). A critique of the cross-lagged panel model. *Psychological Methods*, *20*, 102–116. <https://doi.org/10.1037/a0038889>.
- Harter, S. (1999). *The construction of the self: A developmental perspective*. New York, NY: Guilford.
- Hatano, K., & Sugimura, K. (2017). Is adolescence a period of identity formation for all youth? Insights from a four-wave longitudinal study of identity dynamics in Japan. *Developmental Psychology*, *53*, 2113–2126. <https://doi.org/10.1037/dev0000354>.
- Hatano, K., Sugimura, K., & Schwartz, S. J. (2018). Longitudinal links between identity consolidation and psychosocial problems in adolescence: Using bi-factor latent change and cross-lagged effect models. *Journal of Youth and Adolescence*, *47*, 717–730. <https://doi.org/10.1007/s10964-017-0785-2>.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *A Multidisciplinary Journal*, *6*, 1–55.
- Kaufman, E. A., Montgomery, M. J., & Crowell, S. E. (2014). Identity-related dysfunction: Integrating clinical and developmental perspectives. *Identity*, *14*, 297–311. <https://doi.org/10.1080/15283488.2014.944699>.
- Keijsers, L. (2015). Parental monitoring and adolescent problem behaviors: How much do we really know? *International Journal of Behavioral Development*, *40*, 271–281.
- Klimstra, T. A., Kuppens, P., Luyckx, K., Branje, S., Hale, W. W., Oosterwegel, A., & Meeus, W. H. J. (2016). Daily dynamics of

- adolescent mood and identity. *Journal of Research on Adolescence*, 26, 459–473. <https://doi.org/10.1111/jora.12205>.
- Kline, R. B. (2015). *Principles and practice of structural equation modeling (4th ed.)*. New York, NY: Guilford press.
- Koepke, S., & Denissen, J. J. A. (2012). Dynamics of identity development and separation-individuation in parent-child relationships during adolescence and emerging adulthood - A conceptual integration. *Developmental Review*, 32, 67–88. <https://doi.org/10.1016/j.dr.2012.01.001>.
- Lichtwarck-Aschoff, A., van Geert, P., Bosma, H., & Kunnen, S. (2008). Time and identity: A framework for research and theory formation. *Developmental Review*, 28, 370–400. <https://doi.org/10.1016/j.dr.2008.04.001>.
- Little, R. J. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, 83, 1198–1202. <https://doi.org/10.2307/2290157>.
- Little, R. J. A., & Rubin, D. B. (1987). *Statistical analysis with missing data*. London: Wiley.
- Luyckx, K., Apers, S., Rassart, J., Klimstra, T., Dezutter, J., Moons, P., & Goossens, E. (2012). The 13-item Sense of Coherence scale in Dutch-speaking adolescents and young adults: Structural validity, age trends, and chronic disease. *Psychologica Belgica*, 52, 351–368. <https://doi.org/10.5334/pb-52-4-368>.
- Luyckx, K., Gandhi, A., Bijttebier, P., & Claes, L. (2015). Non-suicidal self-injury in female adolescents and psychiatric patients: A replication and extension of the role of identity formation. *Personality and Individual Differences*, 77, 91–96. <https://doi.org/10.1016/j.paid.2014.12.057>.
- Luyckx, K., Goossens, L., & Soenens, B. (2006). A developmental contextual perspective on identity construction in emerging adulthood: Change dynamics in commitment formation and commitment evaluation. *Developmental Psychology*, 42, 366–380. <https://doi.org/10.1037/0012-1649.42.2.366>.
- Luyckx, K., Klimstra, T. A., Duriez, B., Petegem, S., Van, Beyers, W., Teppers, E., & Goossens, L. (2013a). Personal identity processes and self-esteem: Temporal sequences in high school and college students. *Journal of Research in Personality*, 47, 159–170. <https://doi.org/10.1016/j.jrp.2012.10.005>.
- Luyckx, K., Klimstra, T. A., Duriez, B., Schwartz, S. J., & Vanhalst, J. (2012). Identity processes and coping strategies in college students: Short-term longitudinal dynamics and the role of personality. *Journal of Youth and Adolescence*, 41, 1226–1239. <https://doi.org/10.1007/s10964-012-9753-z>.
- Luyckx, K., Klimstra, T. A., Duriez, B., Van Petegem, S., & Beyers, W. (2013b). Personal identity processes from adolescence through the late 20s: Age trends, functionality, and depressive symptoms. *Social Development*, 22, 701–721. <https://doi.org/10.1111/sode.12027>.
- Luyckx, K., Schwartz, S. J., Berzonsky, M. D., Soenens, B., Vansteenkiste, M., Smits, I., & Goossens, L. (2008). Capturing ruminative exploration: Extending the four-dimensional model of identity formation in late adolescence. *Journal of Research in Personality*, 42, 58–82. <https://doi.org/10.1016/j.jrp.2007.04.004>.
- Luyckx, K., Schwartz, S. J., Soenens, B., Vansteenkiste, M., & Goossens, L. (2010). The path from identity commitments to adjustment: Motivational underpinnings and mediating mechanisms. *Journal of Counseling and Development*, 88, 52–60.
- Luyckx, K., Soenens, B., & Goossens, L. (2006). The personality-identity interplay in emerging adult women: Convergent findings from complementary analyses. *European Journal of Personality*, 20, 195–215. <https://doi.org/10.1002/per.579>.
- Luyckx, K., Teppers, E., Klimstra, T. A., & Rassart, J. (2014). Identity processes and personality traits and types in adolescence: Directionality of effects and developmental trajectories. *Developmental Psychology*, 50, 2144–2153. <https://doi.org/10.1037/a0037256>.
- Marcia, J. E. (1966). Development and validation of ego-identity status. *Journal of Personality and Social Psychology*, 3, 551–558.
- Marcia, J. E. (1980). Identity in adolescence. In J. Adelson (Ed.), *Handbook of adolescent psychology* (pp. 159–186). New York, NY: Wiley.
- Marcia, J. E. (1988). Common processes underlying ego identity, cognitive/moral development, and individuation. In D. K. Lapsley & F. C. Power (Eds.), *Self, ego, and identity: Integrative approaches* (pp. 211–266). New York, NY: Springer-Verlag.
- Marcia, J. E. (1994). Identity and psychotherapy. In S. L. Archer (Ed.), *Interventions for adolescent identity development* (pp. 29–46). Thousand Oaks, CA: Sage.
- Marcia, J. E. (1995). The empirical study of ego identity. In D. J. de, L. H. A. Bosma, T. L. G. Graafsma & H. D. Grotevant (Eds.), *Identity and development: An interdisciplinary approach* (pp. 67–80). Thousand Oaks, CA: Sage.
- Marcia, J. E. (2002). Identity and psychosocial development in adulthood. *Identity*, 2, 7–28.
- Marcia, J. E. (2006). Ego identity and personality disorders. *Journal of Personality Disorders*, 20, 577–596. <https://doi.org/10.1521/pedi.2006.20.6.577>.
- Markovitch, N., Luyckx, K., Klimstra, T., Abramson, L., & Knafo-Noam, A. (2017). Identity exploration and commitment in early adolescence: Genetic and environmental contributions. *Developmental Psychology*, 53, 2092–2102. <https://doi.org/10.1037/dev0000318>.
- Meeus, W., Iedema, J., & Maassen, G. H. (2002). Commitment and exploration as mechanisms of identity formation. *Psychological Reports*, 90, 771–785.
- Mercer, N., Crocetti, E., Branje, S., van Lier, P., & Meeus, W. (2017). Linking delinquency and personal identity formation across adolescence: Examining both between- and within-person associations. *Developmental Psychology*, 53, 2182–2194.
- Moshman, D. (2011). *Adolescent rationality and development: Cognition, morality, and identity*. 3rd ed Philadelphia: PA: Psychology Press.
- Muthén, L. K., & Muthén, B. (2017). *Mplus: The comprehensive modeling program for applied researchers: User's guide*. Los Angeles, CA: Muthén & Muthén.
- Orth, U., Robins, R. W., & Roberts, B. W. (2008). Low self-esteem prospectively predicts depression in adolescence and young adulthood. *Journal of Personality and Social Psychology*, 95, 695–708.
- Papp, L. M. (2004). Capturing the interplay among within-and between processes using multilevel modeling techniques. *Applied & Preventive Psychology*, 11, 115–124. <https://doi.org/10.1016/j.appsy.2004.09.002>.
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88, 879–903.
- Rosenthal, D. A., Gurney, R. M., & Moore, S. M. (1981). From trust to intimacy: A new inventory for examining Erikson's stages of psychosocial development. *Journal of Youth and Adolescence*, 10, 525–537.
- Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika*, 66, 507–514. <https://doi.org/10.1007/BF02296192>.
- Schafer, J. L., & Graham, J. (2002). Missing data: Our view to the state of art. *Psychological Methods*, 7, 147–177.
- Schwartz, S. J. (2001). The evolution of Eriksonian and, neo-Eriksonian identity theory and research: A review and integration. *Identity*, 1, 7–58. <https://doi.org/10.1207/S1532706XSCHWARTZ>.

- Schwartz, S. J., Adamson, L., Ferrer-Wreder, L., Dillon, F. R., & Berman, S. L. (2006). Identity status measurement across contexts: Variation in measurement structure and mean levels among White American, Hispanic American, and Swedish emerging adults. *Journal of Personality Assessment*, *86*, 61–76.
- Schwartz, S. J., Côté, J. E., & Arnett, J. J. (2005). Identity and agency in emerging adulthood: Two developmental routes in the individualisation process. *Youth and Society*, *37*, 201–229. <https://doi.org/10.1177/0044118X05275965>.
- Schwartz, S. J., Donnellan, M. B., Ravert, R. D., Luyckx, K., & Zamboanga, B. L. (2013). Identity development, personality, and well-being in adolescence and emerging adulthood: Theory, research, and recent advances. In J. M. (Vol. E. I. B. Weiner (Series Ed.), & R. M. Lerner, A. Easterbrooks (Eds.), *Handbook of psychology, vol.6: Developmental psychology*. New York: Wiley.
- Schwartz, S. J., Klimstra, T. A., Luyckx, K., Hale, W. W., Frijns, T., Oosterwegel, A., & Meeus, W. H. J. (2011). Daily dynamics of personal identity and self-concept clarity. *European Journal of Personality*, *25*, 373–385. <https://doi.org/10.1002/per.798>.
- Schwartz, S. J., Klimstra, T. A., Luyckx, K., Hale, W. W., & Meeus, W. H. J. (2012). Characterizing the self-system over time in adolescence: Internal structure and associations with internalizing symptoms. *Journal of Youth and Adolescence*, *41*, 1208–1225. <https://doi.org/10.1007/s10964-012-9751-1>.
- Schwartz, S. J., Meca, A., & Petrova, M. (2017). Who am I and why does it matter? Linking personal identity and self-concept clarity. In K. G. D. (J. Lodi-Smith (Ed.)), *Self-concept clarity: Perspectives on assessment, research, and applications* (pp. 145–164). https://doi.org/10.1007/978-3-319-71547-6_8
- Schwartz, S. J., Pantin, H., Prado, G., Sullivan, S., & Szapocznik, J. (2005). Family functioning, identity, and problem behavior in Hispanic immigrant early adolescents. *Journal of Early Adolescence*, *25*, 392–420.
- Schwartz, S. J., Zamboanga, B. L., Luyckx, K., Meca, A., & Ritchie, R. A. (2013). Identity in emerging adulthood: Reviewing the field and looking forward. *Emerging Adulthood*, *1*, 96–113. <https://doi.org/10.1177/2167696813479781>.
- Schwartz, S. J., Zamboanga, B. L., Wang, W., & Olthuis, J. V. (2009). Measuring identity from an Eriksonian perspective: Two sides of the same coin? *Journal of Personality Assessment*, *91*, 143–154. <https://doi.org/10.1080/00223890802634266>.
- Schwartz, S. J., Zamboanga, B. L., Weisskirch, R. S., & Rodriguez, L. (2009). The relationships of personal and ethnic identity exploration to indices of adaptive and maladaptive psychosocial functioning. *International Journal of Behavioral Development*, *33*, 131–144. <https://doi.org/10.1177/0165025408098018>.
- Verschuere, M., Rassart, J., Claes, L., Moons, P., & Luyckx, K. (2017). Identity statuses throughout adolescence and emerging adulthood: A large-scale study into gender, age, and contextual differences. *Psychologica Belgica*, *57*, 32–42. <https://doi.org/10.5334/pb.348>.
- Waterman, A. S., Schwartz, S. J., Hardy, S. A., Kim, S. Y., Lee, R. M., Armenta, B. E., & Agocha, V. B. (2013). Good choices, poor choices: Relationship between the quality of identity commitments and psychosocial functioning. *Emerging Adulthood*, *1*, 163–174.
- Yoder, A. E. (2000). Barriers to ego identity status formation: A contextual qualification of Marcia's identity status paradigm. *Journal of Adolescence*, *23*, 95–106. <https://doi.org/10.1006/jado.1999.0298>.
- Annabel Bogaerts** is a PhD student in the Department of Psychology, Catholic University of Leuven, Belgium. Her research interests include personal identity structure, identity processes, and the relationship between identity formation and personality disorders in both community and clinical samples.
- Laurence Claes** is a Professor in the Department of Psychology, Catholic University of Leuven, Belgium. Her research interests include psychopathology (eating disorders and non-suicidal self-injury) and personality, and clinical assessment.
- Seth J. Schwartz** is a Professor in the Department of Epidemiology and Public Health, Leonard M. Miller School of Medicine, University of Miami. His research interests include identity (broadly defined), well-being, ethnicity and culture, positive youth development, and drug abuse and HIV prevention.
- Andrik I. Becht** is a PhD student in the Department of Youth and Family, at Utrecht University. His research focuses on identity formation in adolescence, with a specific interest in advanced longitudinal modeling techniques to test both short-term and long-term identity development.
- Margaux Verschuere** is a PhD student in the Department of Psychology, Catholic University of Leuven, Belgium. Her major research interests include identity functioning and eating disorder symptomatology in both community and clinical samples.
- Amarendra Gandhi** is a post-doctoral researcher in the Department of Psychology, Catholic University of Leuven, Belgium. His major research interests include non-suicidal self-injury, disturbances in identity formation, developmental psychopathology, and longitudinal research.
- Koen Luyckx** is a Research Professor in the Department of Psychology, Catholic University of Leuven, Belgium. His research interests include personal identity processes; the transition to adulthood; parenting, parent-adolescent conflict, and parent-adolescent relationships; psychological adaptation to being afflicted with a chronic illness; coping; burn-out and engagement at the work floor; and long-term development of biopsychosocial indices and interdependencies across childhood and adolescence.