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Reciprocal Associations between Educational Identity and Vocational Identity in Adolescence: A Three-wave Longitudinal Investigation

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Abstract

Education and vocation are core identity domains in adolescence. School is a normative social context in this developmental time frame and the formation of an educational identity is embedded in the goals that youth pursue in school. One of the main goals of education is to prepare young people for their future careers. Hence, educational identity should support the formation of vocational identity during adolescence. Considering the limited evidence on the longitudinal links between these two domain-specific identities, we conducted a three-wave investigation, testing the moderating role of age group, gender, and type of school. Participants (N = 1,030; 59.3% female) were adolescents (M_{age} = 16.72 years, SD_{age} = 1.23, age range 14-19 years) who completed self-report measures of educational and vocational identity three times during an academic year. We underscored reciprocal associations between educational identity and vocational identity. The results indicate that strong educational commitments supported the formation of strong vocational commitments across time. Adolescents who were involved in the in-depth exploration of their educational choices also reported more vocational exploration during the school year. In turn, vocational identity processes also supported educational identity formation, especially the reconsideration of educational commitments. In terms of moderators, we underscored that vocational commitment making and vocational flexibility bolstered educational commitment only in early-to-middle adolescents. Educational in-depth exploration fostered the identification with vocational commitments only in girls. Educational reconsideration of commitment promoted vocational self-doubt only in adolescents attending work-bound high-schools. Implications for research and practice are discussed.

Keywords*: educational identity; vocational identity; longitudinal study; adolescence*

Introduction

Adolescence is a time-frame when young people gain the capacity to set and pursue long-term goals and to adapt these goals to dynamic social contexts (Crone & Dahl, 2012). Education and vocation are two core life-domains for self-development in this time frame and many of the goals young people set and pursue encompass these domains. School is the dominant social context in adolescence and recent statistical data indicate that "in 2015, 85% of 15-19 year-olds were still in education on average across OECD countries" (Organization for Economic Cooperation and Development - OECD, 2017, p. 248). Hence, educational pursuits craft the development of the self in this life stage. One of the main goals of education is to prepare youth for their future work lives, as "students who are able to internalize the connection between school and work are in a much better position to become engaged in school and develop their basic skills" (Blustein, 2006, p. 304). Therefore, during adolescence educational and vocational pursuits are supposed to be closely intertwined. Nonetheless, adolescents pursue vocational goals and decisions (e.g., choice of university-bound or work-bound schools) at a time when work is just an abstract concept and little is understood regarding the life-style changes imposed by specific careers, their developmental implications, and the general impact of a type of job on one's life.

Against this background, adolescent identity formation in the domains of education and vocation needs to be analyzed more closely, in terms of associations and prediction patterns, to shed more light on their links. Though theoretical tenets of vocational development (e.g., Brown & Lent, 2016) posit strong associations between educational and vocational strivings throughout adolescence, there is limited research on these links. Additionally, we need to investigate the role that key demographic variables play in this relation, to identify strengths and vulnerabilities of young people in this developmental time frame and to better ground need analyses in applied interventions targeting identity issues. Hence, in-depth accounts of how educational and vocational identity support or inhibit each other across time have theoretical and applied implications.

In the current study, we set out to untangle the longitudinal relations between educational identity and vocational identity in adolescence through a three-wave longitudinal design, spanning across an academic year. We also investigated if adolescents' age (i.e., early-to-middle versus middle-to-late adolescents), gender (i.e., girls versus boys), and the type of school they attend moderate these relations. In terms of the type of school, we analyzed two high-school educational tracks (Creed, Patton, & Hood, 2010): university-bound high-schools (i.e., an educational track that focuses on the provision of general knowledge in preparing youth for university) and work-bound high-schools (i.e., an educational track that trains adolescents for a specific occupation, through the development of vocational skills and knowledge).

Educational Identity in Adolescence

Personal identity revolves around the question "Who am I?", as adolescents analyze and progressively commit to clear life goals and values (Marcia, 1966). Marcia initially viewed identity formation as a combination of exploration and commitment, deriving four identity statuses (i.e., achievement, foreclosure, moratorium, diffusion). Recent identity models (e.g., Crocetti, Rubini, & Meeus, 2008; Luyckx, Goossens, Soenens, Beyers, & Vansteenkiste, 2005; Luyckx, Goossens, Soenens, & Beyers, 2006) have unpacked identity exploration and commitment into multiple identity processes, hence facilitating a more nuanced investigation of identity development. One such model is the *three-factor identity model* (Crocetti et al., 2008; Crocetti, 2017). This model views identity as a dynamic interplay of identity formation and identity maintenance, through three distinct but interrelated processes: commitment (i.e., strong and enduring allegiance to a personal goal/ choice), in-depth exploration (i.e., detailed investigation of current choices/ personal goals, through diverse strategies of self-analysis and other/ information analysis), and reconsideration of commitment (i.e., relinquishment of current personal goals/ choices when they are no longer useful/ appropriate). The latter process was an important addition to existing theoretical approaches on personal identity, as it brought forward the role of giving up on present choices when they are no longer desirable. Hence, the relinquishment of present

commitments, though taxing for personal and social functioning (see Meeus, 2016 for a review), is much needed in the long term, to ensure authentic self-development across the life span. These processes form two identity cycles: the identity formation cycle that creates strong commitments by relinquishing no longer satisfactory ones and the identity maintenance cycle that focuses on the in-depth exploration of current commitments to further strengthen them.

In this context, educational identity refers to the goals and values that people investigate and then follow in the educational domain. Research on educational identity has underscored that it plays a core role in adaptive development for this age group (Flum & Kaplan, 2012). Cross-sectional and cross-cultural evidence have shown that strong educational commitments doubled by extensive in-depth exploration are linked to high levels of well-being; conversely, increased reconsideration of educational commitments is related to low levels of multidimensional well-being (Karaś, Cieciuch, Negru, & Crocetti, 2015).

From a longitudinal perspective, academic achievement has been linked to educational identity (Pop, Negru-Subtirica, Crocetti, Opre, & Meeus, 2016). High levels of academic achievement across the school year reinforce firm educational commitments and reduce reconsideration of these commitments. Educational identity is also longitudinally related to identity styles, which refer to the strategies that youth employ in processing identity relevant information (Berzonsky, 2011). Strong educational commitments support a normative identity style longitudinally, which focuses on strong adherence to the norms and prescriptions of significant others. In-depth educational exploration promotes an informational identity style, where self-relevant information is actively sought and reflectively analyzed. Reconsideration of educational commitments endorses a diffuse-avoidant identity style, which is driven by procrastination and postponement of identity-relevant issues (Negru-Subtirica, Pop, & Crocetti, 2017a). To conclude, firm educational commitments and in-depth educational exploration are longitudinally related to adaptive psychosocial functioning, while the reconsideration of educational commitments is mostly linked to maladaptive psychosocial functioning, at least on short term.

Vocational Identity in Adolescence

The way adolescents construct their vocational self has long term implications for how they select their future occupational paths (Duffy, Blustein, Diemer, & Autin, 2016). The construction of their vocational identity encompasses a meaningful integration of goals, values, and interests, in gradually constructing a coherent representation of oneself in the world of work (Skorikov & Vondracek, 2007). Theoretical and empirical evidence pointed out that young people construct their representations of work long before they become workers (Gottfredson, 2005). Hence, it is very important to research youth vocational identity development.

Capitalizing on current identity process models (e.g., Crocetti et al., 2008; Luyckx et al., 2005, 2006), Porfeli, Lee, Vondracek, and Weigold (2011) developed a *model of vocational identity*, integrating three dimensions (i.e., commitment, exploration, and reconsideration of commitment), each composed of two processes. Commitment comprises commitment making (i.e., the level of certainty regarding a career decision that has been made) and identification with commitment (i.e., the level of personal investment in a career decision that has been made). Exploration incorporates in-breadth exploration (i.e., different career options are globally surveyed) and in-depth exploration (i.e., specific career options are extensively researched). Reconsideration of commitment means self-doubt (i.e., anxious reflection upon the experience of career decision-making) and commitment flexibility (i.e., openness to and readiness for future changes in occupational preferences and choices). This further segmentation of identity dimensions allows a very fine-grained analysis of identity processes changes and it distinguishes between a dark side and bright side of reconsideration of commitments, an endeavor that has not yet been thoroughly considered in identity research.

Vocational identity promotes vocational and career adaptation throughout adolescence. Longitudinal studies indicate that vocational commitments are linked to increases in adolescent life satisfaction, more so than vocational exploration (Hirschi, 2012). The latter is associated

with more distress, but also with a stronger intrinsic focus regarding career choices (Nurmi, Salmela-Aro, & Koivisto, 2002). Vocational identity has also been longitudinally linked to career adaptability (i.e., career concern, control, curiosity, confidence), vocational commitment processes being the most robust positive predictors for career adaptability (Negru-Subtirica, Pop, & Crocetti, 2015). The study uncovered the dual nature of vocational reconsideration of commitments. On the one hand, commitment flexibility strengthens adolescents' inquisitiveness toward their vocational future (i.e., career curiosity) and the trust in their abilities to overcome career obstacles (i.e., career confidence). On the other hand, vocational self-doubt has a debilitating impact on adolescents' active focus on their vocational development (i.e., career concern) and their self-discipline in vocational planning (i.e., career control). Hence, strong vocational commitments doubled by increased vocational exploration are important resources for positive youth adaptation. Also, the reconsideration of vocational commitments has an adaptive (i.e., flexibility) and a maladaptive (i.e., self-doubt) influence for adolescent career development.

Relations between Educational and Vocational Identity in Adolescence

School is the social context where adolescents spend most of their time across adolescence. Therefore, adolescents' stance toward school and education (i.e., their educational identity) also influences their vocational identity. In the long run, this interplay has important implications for the personal, social, and economic development (Skorikov & Vondracek, 2011). When the formation of a vocational identity is supported by enduring educational commitments, adolescents can link their education with their vocational choices and can develop a sense of continuity in their vocational pursuits (e.g., "My education prepares me for the work I will be doing in the future"). In this manner, they can capitalize on the skills developed in school when making work-relevant decisions (e.g., choice of an apprenticeship or internship program), hence reducing the economic costs of their life-long education.

Against this background, surprisingly few studies have addressed the relation between educational and vocational identity. In a cross-sectional adolescent sample, Negru-Subtirica, Pop, and Crocetti (2017b) underscored that adolescents with a certain educational identity profile, characterized by specific combinations of identity processes, have similar vocational identity profiles. For instance, adolescents with an Undifferentiated educational identity profile, characterized by low levels in all educational identity processes, are more likely to have a similar, Undifferentiated vocational identity profile. The same was the case for Achieved educational and vocational intra-personal profiles, respectively (i.e., high levels of commitment and exploration, low levels of reconsideration of commitments). Also, adolescents with search-centered educational identity profiles (i.e., Moratorium, Searching Moratorium) had similar search-focused vocational identity profiles. These results indicate that educational and vocational identity are closely linked in adolescence, following the rule good goes with good, bad goes with bad (Meeus, 2016).

An aspect that has not been previously analyzed resides in possible bidirectional relations: Does educational identity foster the development of adolescents' vocational identity and can vocational identity also drive the formation and maintenance of educational identity? Existing theoretical and empirical evidence has mainly focused on the relation from educational to vocational development (Zimmer-Gembeck, & Mortimer, 2006). But it may be that in adolescence the vocational self also primes and supports educational commitments. As adolescents reflect more on their vocational paths, they may also understand better how their renewed involvement in their education can help them achieve these paths. Nevertheless, these are exploratory questions that need longitudinal proof.

These relations can vary depending on multiple factors and possible moderators need to be considered when analyzing the relation between educational and vocational identity. First, age group differences (i.e., early-to-middle versus middle-to-late adolescents) need to be tested, to investigate if the same level of schooling (i.e., high-school studies, meaning grades 9 to 12) fosters similar longitudinal connections. Existing evidence tends to indicate similar associations across

time for early-to-middle and middle-to-late adolescents for identity processes and other variables (Meeus, 2011). Next, in terms of gender differences, previous research showed that girls have an advantage over boys in terms of involvement in identity formation and maintenance processes (e.g., Klimstra, Hale III, Raaijmakers, Branje, & Meeus, 2010), especially when identity strivings are investigated in the occupational domain (e.g., Goossens, 2001; Solomontos-Kountouri & Hurry, 2008). Hence, it is important to investigate to what extent this advantage holds up also for the relation between educational commitment and in-depth exploration, and vocational exploration and commitment processes. Lastly, the type of school adolescents attend may influence the relation between educational and vocational identity; in this study, we investigate two types of educational tracks in high-school: work-bound versus university-bound. For adolescents attending work-bound schools, education is directly connected to their work choices, while for students attending university-bound schools, their education is just another step to college (Creed et al., 2010). Longitudinal evidence on the dynamics of vocational identity in work-bound school students indicates that their vocational commitments and reconsideration of vocational commitments were more sensitive to changes across time, compared to their university-bound counterparts (Negru-Subtirica et al., 2015).

Current Study

In this study, we set out to investigate the longitudinal reciprocal associations between educational and vocational identity, which are two core life domains in adolescence. First, we expected positive associations between educational commitments and vocational commitments. Adolescents who are satisfied with and engaged in their education will also be able to identify suitable vocational goals (i.e., vocational commitment making) and to gradually integrate these goals into their self-system (i.e., vocational identification with commitment). Evidence on identity formation in different life domains indicate that strong commitments in one life domain support the formation of durable commitments in related domains (e.g., Branje, Laninga-Wijnen, Yu, & Meeus, 2014). This may be linked to the fact that adolescents can transfer skills, cognitions, and behaviors

that support commitments in one identity domain to the other domain. We did not expect reciprocal associations (i.e., also from vocational commitment to educational commitment), as in this developmental time frame vocational commitments are less stable and more likely to change in light of new occupational information (Heckhausen & Shane, 2015; Skorikov & Vondracek, 2011). Hence, it is less probable that vocational commitments can drive educational commitments longitudinally.

Second, we expected positive reciprocal associations between educational in-depth exploration and vocational exploration processes (i.e., vocational in-breadth exploration, vocational in-depth exploration) and vocational commitment processes, respectively (i.e., vocational commitment making, vocational identification with commitment). In line with the identity maintenance cycle described by the three-process model (Crocetti, 2017), adolescents who are involved in thorough and critical appraisals of their education will further strengthen and add flexibility to their identity choices. The educational and vocational domains are closely intertwined throughout adolescence for youth attending school (Yeager, Bundick, & Johnson, 2012). Hence, increased in-depth educational exploration will also support vocational exploration processes, in that it will stimulate adolescents to question and analyze which vocational choices are more suitable for them. The more they will explore their education, the more they will also explore their career options. Additionally, also in line with the identity maintenance cycle, we expected educational in-depth exploration to foster vocational commitment processes. As a core aim of schooling is to prepare youth for their future work life, by becoming more involved in comprehensive analyses of their education, they will also become more devoted to their vocational choices. In turn, as an exploratory hypothesis, we expected that the more adolescents explore their vocational paths, the more they "make sense" of their education, in that they become more involved in further exploring it. As adolescents become able to process and analyze abstract contents, they may also become more aware of how their selves project into the future and of the multi-dimensionality of their selves (Crone & Dahl, 2012).

Third, we anticipated that educational reconsideration of commitment will be positively linked to vocational self-doubt and it will be negatively linked to vocational commitment processes. As adolescents grow more disillusioned with their education, their level of distrust in the suitability of the vocational choices they consider also increases, while their vocational commitments weaken. Because education is a core domain in adolescent identity formation (Flum & Kaplan, 2012), dissatisfaction with educational choices may foster discontentment regarding goals and choices in related life domains (i.e., vocation). Conversely, as an exploratory hypothesis, we expected a similar pattern of relations from vocational to educational identity processes; strong vocational commitments and reduced doubts about these choices will be longitudinally linked to low levels of educational reconsideration of commitment. We formulated this hypothesis considering the developmental milestones that approach at the end of high-school studies (e.g., choice of a university or a work-place). These important decisions can prompt adolescents in reevaluating their initial educational choices, which were most likely made during middle-school, in light of present vocational pursuits.

In terms of moderators, for age we expected similar patterns of associations for early-to-middle and middle-to-late adolescents. Both age groups attend the same educational level (i.e., high-school), which imposes similar educational and vocational challenges. For gender, considering existing evidence (e.g., Goossens, 2001; Klimstra et al., 2010), we expected that for girls strong educational commitments and educational in-depth exploration will strengthen vocational commitments and vocational exploration, respectively, more than for boys. Girls tend to be more focused on their academic development in adolescence (Voyer & Voyer, 2014) and therefore they may connect their educational experiences to their vocational development in a more coherent and self-conscious manner. For type of school, for adolescents attending work-bound schools we expected that reconsideration of educational commitments will reinforce reconsideration of vocational commitments more than for those attending university-bound schools. For adolescents in work-bound schools, their educational choices are directly related to their vocational choices, as

their schooling prepares them for a specific work field (Creed et al., 2010). Hence, their dissatisfaction with this education track may be linked across time with increasing skepticism regarding the suitability of their vocational choices.

Methods

Participants and Procedure

The present study used data drawn from the Transylvania Adolescent Identity Development Study (TRAIDES; Negru-Subtirica et al., 2015), a three-wave longitudinal research on adolescents from the North-Western part of Romania. Participants (N = 1,030; 59.3% female) were all adolescents, aged 14-19 (M_{age} = 16.72 years, SD_{age} = 1.23 at Time 1). They were students from the 9th to the 12th grade recruited from seven university-bound (46.2%) and work-bound (53.8%) high-schools. From the total sample, 33% were early-to-middle adolescents (age range = 14-16 years) and 67% middle-to-late adolescents (age range = 16-19 years). Most participants in our study were living with both (75.9%) or one of their parents (15.6%), while 8.5% were living with other students or relatives. Parents of 81.6% of the adolescents in this study were married, while 18.4% were divorced or separated. From the total sample, 88% of adolescents were fully financially supported by their parents and only few of them reported having some personal income (e.g., state-provided student allocation, scholarship) that supplemented the financial support provided by their parents (9.4%) or other situations (2.6%).

The study was approved by the Faculty of Psychology and Educational Sciences of the first author's university and by the schools' headmasters through a written collaboration protocol. Participation in the study was voluntary and confidential. Participants were invited to complete, in their classrooms and during school hours, the same paper and pencil questionnaires at three different time points during one academic year, at an interval of 3 to 4 months between measurement points.

Overall, 21.76% of data were missing at Time 1 - Time 3. The range of missing items varied from 16.02% to 29.13% across the three waves. Little's (1988) Missing Completely at

Random (MCAR) test on the variables of interest yielded a normed χ^2 (χ^2/df) of 1.12, indicating that data were probably missing at random (Bollen, 1989). To handle cases with missing values, we used the Full Information Maximum Likelihood (FIML) procedure available in M*plus* 6.12 (Muthén & Muthén, 1998-2010).

Measures

Educational Identity. We used the Romanian version (Crocetti et al., 2015) of the 13-item Utrecht-Management of Identity Commitments Scale (U-MICS, Crocetti et al., 2008) to assess three educational identity processes: commitment (e.g., "My education gives me certainty in life"; 5 items), in-depth exploration (e.g., "I think a lot about my education"; 5 items), and reconsideration of commitment (e.g., "I often think it would be better to try to find a different education"; 3 items). Participants responded to each item on a scale from 1 (does not apply to me at all) to 5 (applies to me very well).

Vocational Identity. We used the Romanian version (Negru-Subtirica et al., 2015) of the 30-item Vocational Identity Status Assessment (VISA, Porfeli et al., 2011), to assess six vocational identity processes: commitment making (e.g., "I have invested a lot of energy into preparing for my chosen career"; 5 items), identification with commitment (e.g., "Becoming a worker in my chosen career will allow me to become the person I dream to be"; 5 items), in-depth exploration (e.g., "Trying to find people that share my career interests"; 5 items), in-breadth exploration (e.g., "Trying to have many different experiences so that I can find several jobs that might suit me"; 5 items), flexibility (e.g., "I need to learn a lot more before I can make a career choice"; 5 items), and self-doubt (e.g., "I may not be able to get the job I really want"; 5 items). For each item, participants chose a response from 1 (strongly disagree) to 5 (strongly agree).

Cronbach's Alphas for all educational and vocational identity subscales are reported in Table 1.

Results

Preliminary Analyses

Table 1 displays descriptive statistics and within-time correlations among all study variables. Stability paths for all variables appear in Table 2.

Regarding significant within-time correlations at Time 1 (T1), results indicated that educational commitment was positively correlated with both vocational commitment (i.e., vocational commitment making and identification with commitment) and vocational exploration (i.e., in-breadth exploration and in-depth exploration), and negatively correlated with vocational reconsideration of commitment (i.e., vocational self-doubt). Educational in-depth exploration was positively correlated with all vocational identity processes. Moreover, educational reconsideration of commitment was positively correlated with vocational exploration (i.e., in-breadth exploration) and vocational reconsideration of commitment (i.e., vocational self-doubt and flexibility), and negatively correlated with vocational commitment (i.e., vocational commitment making and identification with commitment). All significant within-time correlations found at T1 were also found at Time 2 (T2) and at Time 3 (T3).

In addition to these associations, we also found significant correlated changes between educational identity and vocational identity. Table 3 presents significant correlated changes between educational and vocational identity processes at T2 - T3. Specifically, changes in educational commitment were positively related to changes in vocational commitment and vocational exploration, but negatively related to changes in vocational reconsideration of commitment (i.e., vocational self-doubt). Furthermore, changes in educational in-depth exploration were positively related to changes in vocational commitment (i.e., vocational commitment making), vocational exploration, and vocational reconsideration of commitment. Finally, changes in educational reconsideration of commitment were positively associated with changes in vocational reconsideration of commitment and negatively associated with changes in vocational commitment (i.e., identification with commitment). These findings support our expectations that educational and vocational identity domains are interrelated in adolescence.

Cross-Lagged Analyses

The purpose of this study was to examine reciprocal associations between adolescent educational and vocational identity. To address this aim, we conducted cross-lagged analyses in M*plus* 6.12, using the Maximum Likelihood Robust estimator (MLR; Satorra & Bentler, 2001)[1]. Specifically, we tested for cross-lagged associations between educational identity processes and vocational identity processes (e.g., educational identity processes measured at T1 predicting vocational identity processes at T2 and vocational identity processes at T1 predicting educational identity processes at T2), controlling for: (a) 3-to-4 months stability paths (e.g., educational identity processes at T1 predicting vocational identity processes at T2); (b) 6-to-8 months stability paths (e.g., educational identity processes at T1 predicting vocational identity processes at T3); and (c) within-time correlations among all variables.

To model the reciprocal associations between educational identity and vocational identity as parsimoniously as possible, we examined whether cross-lagged effects were time invariant (i.e., assumption of stationarity). Thus, we compared the baseline unconstrained model (Model 1), in which cross-lagged paths were free to vary, with the model in which cross-lagged paths were fixed across time (Model 2). To evaluate each model fit, we inspected three indices: the Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Square Residual (SRMR). CFI with values higher than .90 indicates an acceptable fit, while CFI with values higher than .95 suggests an excellent fit. Values lower than .08 of the RMSEA and SRMR indices suggest an acceptable fit, while values lower than .05 indicate a good fit (Byrne, 2012). To determine significant differences between these two models, we inspected whether at least two out of these three criteria match: $\Delta\chi 2$ significant at $p < .05$, $\Delta CFI \geq -.010$, and $\Delta RMSEA \geq .015$ (Chen, 2007). Results indicate that Model 1 ($\chi_{SB}^2 = 71.301$, $df = 72$; CFI = 1.000, RMSEA =

[1] We tested longitudinal measurement invariance to establish whether the tested model was invariant across the three-waves. Specifically, we compared the configural (baseline) model with the metric model, in which factor loadings were constrained to be equal across time, considering changes in fit indices (e.g., Chen, 2007). As model comparisons indicated that metric invariance could be clearly established, we could reliably proceed with analyses aimed at revealing over time associations among all study variables (Little, 2013).

.000 [.000-.018], SRMR = .013), in which cross-lagged effects are allowed to vary across time is not significantly different ($\Delta\chi^2$ (36) = 44.991, p = 0.144, ΔCFI = -.001, ΔRMSEA = .009) from Model 2 (χ_{SB}^2 = 116.154, *df* = 108; CFI = .999, RMSEA = .009 [.000-.019], SRMR = .018), in which cross-lagged effects are time invariant. Model 2 fit the data very well and therefore we retained this more parsimonious time-invariant model as the final one. Figure 1 displays significant standardized cross-lagged paths between educational and vocational identity processes. Since the assumption of time-invariance was confirmed, we reported cross-lagged effects only once. Findings revealed reciprocal longitudinal associations between adolescent educational and vocational identity processes; educational identity had nevertheless stronger effects on vocational identity than the other way around.

In terms of longitudinal associations from educational identity to vocational identity, educational commitment reinforced vocational commitment across time, at the level of vocational commitment making and vocational identification with commitment. Educational in-depth exploration supported both types of vocational exploration: in-breadth or global vocational exploration and in-depth or detailed vocational exploration. In addition, adolescents who were involved in educational in-depth exploration also strengthened their vocational commitments. Increased reconsideration of educational commitments reinforced doubts regarding one's vocational future, but also strengthened the allegiance toward a specific vocational goal (i.e., vocational commitment making).

In terms of longitudinal links from vocational identity to educational identity, the internalization of vocational choices (i.e., vocational identification with commitment) aided the decrease of educational reconsideration of commitment. Vocational flexibility proved to be a positive facet of vocational reconsideration, as it supported educational commitments across time. Vocational self-doubt was a negative facet of vocational reconsideration, as it fostered educational reconsideration of commitment longitudinally.

To test whether cross-lagged paths from educational identity to vocational identity and from

vocational identity to educational identity were moderated by age group, gender, and the type of school, we conducted pairwise comparisons with the Wald test (Byrne, 2012; Little, 2013). Our hypotheses were partially confirmed. For age group, vocational commitment making increased educational commitment (β = .17, p < .01) and vocational flexibility heightened educational commitment (β = .21, p < .01) only for early-to-middle adolescents. For gender, educational in-depth exploration longitudinally supported vocational identification with commitment only in girls (β = .10, p < .01). For the type of school, educational reconsideration of commitment contributed to increases in vocational self-doubt only for adolescents from work-bound high-schools (β = .13, p < .01).

Discussion

As school is one of the core social and developmental contexts for adolescents, their vocational growth is dependent on their stance towards their education (Flum & Kaplan, 2012). Therefore, thorough investigation of the relations between educational and vocational identity are much needed to untangle how these two identity domains can support each other in the construction of a coherent and authentic self across adolescence and into adulthood (Goossens, 2001; Yeager et al., 2012). Considering the very limited evidence on their longitudinal links, the current study focused on a three-wave investigation that tapped into the reciprocal associations between educational and vocational identity, testing the moderating role of age group, gender, and the type of school.

Findings revealed that changes in educational identity processes were strongly linked to changes in vocational identity processes in adolescence. Correlated changes indicated that on the one hand, adolescents with firm educational commitments tended to have firm vocational commitments, to conduct more in-breadth and in-depth vocational exploration, and to doubt less their vocational commitments. On the other hand, adolescents with weak educational commitments (i.e., high reconsideration of educational commitments) had weaker vocational commitments and high levels of vocational commitment flexibility and vocational self-doubt. Furthermore,

adolescents who explored in-depth their educational commitments also explored more their vocational commitments and assumed vocational commitments. However, they doubted more their vocational commitments and were more prone to change their options (i.e., high levels of vocational commitment flexibility). As we hypothesized, educational and vocational identity development are interconnected. Thus, results pointed out that firm educational commitments supported the formation of strong vocational commitments across time, while educational in-depth exploration endorsed an investment in vocational exploration processes. Moreover, we found that vocational identity also aided the formation of educational identity, especially at the level of educational reconsideration of commitments. Interestingly, increased levels of vocational flexibility strengthened educational commitments across time. In terms of moderators, we underscored that vocational commitment making and vocational flexibility bolstered educational commitment only in early-to-middle adolescents. Also, during the academic year, educational in-depth exploration fostered the identification with vocational commitments only in girls. Last, educational reconsideration of commitment promoted vocational self-doubt only in adolescents attending work-bound high-schools.

Longitudinal Links from Educational Identity to Vocational Identity

Educational commitment supported vocational commitment across time. Strong educational commitments strengthened vocational commitment making and identification with vocational commitments across time. This finding is in line with our expectations, and it indicates that a firm allegiance toward an educational path also helped adolescents in making vocational choices and in integrating these choices into their self-system (Negru-Subtirica et al., 2017b). On the one hand, these results further confirm the core role of commitment processes for positive adaptation in adolescence (Meeus, 2011, 2016). Moreover, they stress that striving for identity synthesis in one life domain (Erikson, 1968) can aid the level of synthesis in a related life domain, perhaps through a meaningful integration of personal goals and values from the two domains into the self-system (Goossens, 2001). On the other hand, adolescents with low educational commitments also

weakened their vocational commitments across the school year. This points out that identity confusion in the educational domain negatively impacts vocational choices in adolescence. Also, it draws attention to practitioners on the importance of identifying students at-risk for low educational commitment and on the long-term implications of strengthening these commitments through classroom-based identity interventions (Schachter & Rich, 2011).

Educational in-depth exploration fostered vocational commitment and exploration processes. Nevertheless, educational in-depth exploration strengthened vocational identification with commitment only in girls. As hypothesized, these results stress that by further exploring their chosen educational paths, adolescents additionally became more involved in global, in-breath vocational exploration and in domain-specific, in-depth vocational exploration. Additionally, their level of certainty regarding vocational decisions also increased across time. This complex buffering role of educational exploration may support vocational MAMA cycles (i.e., Moratorium-Achievement), which involve strong and flexible vocational commitments continuously strengthened by exploration processes (Stephen, Fraser, & Marcia, 1992). In terms of moderators, the finding that educational in-depth exploration sustained the active integration of vocational commitments only in girls, emphasizes the extra-work girls invest in attaching vocational meaning to their educational strivings. Girls tend to outperform boys in terms of academic achievement and global academic demeanor (Voyer & Voyer, 2014). Recent studies explained these differences in terms of earlier brain maturation (Crone & Dahl, 2012), but also by linking them to conscious efforts to overcome gender stereotypes (Solomontos-Kountouri & Hurry, 2008). Therefore, our study further highlights an adaptive strategy that girls employ to make the best out of their educational exploration experiences, by projecting them into their vocational development.

Educational reconsideration of commitment prompted increases in vocational commitment making. This somewhat surprising finding indicates that adolescents who were dissatisfied with their education tended to focus more on strengthening their confidence in their present vocational

choices. It may be that we tapped into an identity-relevant coping mechanism, in that adolescents who were disillusioned with their educational choice tried to overcome this negative aspect by increasing their investment in the selection of an attractive vocational goal/ alternative. In the Romanian school system, adolescents have extremely limited free will in changing educational paths; even high-school admittance is decided through a computerized system, based on previous academic achievements (Damian, Negru-Subtirica, Pop, & Baban, 2016; Negru-Subtirica et al., 2017b). Hence, when the power to control educational changes is very limited, adolescents may invest their efforts to prompt changes in related identity domains (i.e., vocation). Nevertheless, this is just a tentative explanation, which needs to be further explored in future longitudinal studies, in different cultural and social contexts.

Educational reconsideration of commitment promoted vocational self-doubt only in adolescents attending work-bound schools. As expected, this category of adolescents was more vulnerable to becoming apprehensive and confused regarding their vocational choices when they disliked their education. Their education is directly linked to their work and vocational choices (Creed et al., 2010). Therefore, they are more primed to process educational situations and information that confirm their dissatisfaction with their schooling and the need to reconsider the type of schooling and respectively the work path they chose. In many countries as work-bound schools focus on vocational education and training, they represent a rather undesirable educational path and they are "neglected and marginalized in policy discussion, often overshadowed by the increasing emphasis on general academic education" (OECD, 2017, p. 56). In Romania, for instance, low-achieving students are pushed to attend these schools by the national high-school admittance system (Damian et al., 2016). Thus, educational policies may consider that by reducing the level of discontentment regarding educational choices in these adolescents, policy-makers and teachers could also target their degree of apprehension in approaching work goals and decisions. As this youth category aims at rapid labor-market integration after graduation, the implications for global work-force development are quite valuable.

Longitudinal Links from Vocational Identity to Educational Identity

Increased vocational in-breadth exploration, low identification with vocational commitments, and high vocational self-doubt fostered the reconsideration of educational commitments across time. Adolescents who analyzed multiple vocational paths, who did not integrate their current vocational decisions into their self-system, and who were dissatisfied with these vocational decisions, tended to become more disillusioned with their education across the academic year. These patterns of relations from vocational to educational identity processes highlight that in adolescence, regardless of age group, gender, or type of school, young people do connect their work self to their educational self. In our study, the prediction pattern was focused on the reconsideration of educational commitments, indicating that this educational identity process was more strongly linked to adolescents' vocational identity. It may be that the perceived meaningfulness (or lack thereof) in personal educational goals and choices is influenced by how meaningful adolescents view their work-related pursuits (McLean, Syed, Yoder, & Greenhoot, 2016). More specifically, our results emphasize that identity confusion in the vocational domain (i.e., low integration of present vocational commitments into the self-system, doubled by increased apprehension regarding the correctness of present vocational choices) stimulates the dissatisfaction with present educational choices. This is in line with existing evidence on the debilitating impact of identity confusion (e.g., Kroger, Martinussen, & Marcia, 2010). On a more surprising note, the fact that in-breadth vocational exploration sustained the reconsideration of educational commitments across time can be tentatively linked to the maladaptive dimension of in-breath exploration (Luyckx et al., 2006). This process can decenter the individual, by consuming existing resources on uncoordinated analyses of multiple goals/ options. Hence, adolescents who invest a lot of time and energy in analyzing very diverse vocational paths, can become "lost", in that they do not grasp anymore how their education helps their many potential vocational pursuits.

Vocational commitment making bolstered educational commitment only in early-to-middle adolescents. Contrary to our hypothesis regarding age differences, results indicated that early-to-middle adolescence is an important time frame for strengthening the relation from vocational to educational commitments. As young people enter high-school, their goals and choices regarding their vocation (e.g., choice of extra-curricular activities, volunteering) change compared to middle-school, due to changes in age-appropriate developmental goals (Heckhausen, Chang, Greenberger, & Chen, 2013). Therefore, those early-to-middle adolescents who can clearly identify a career or vocational path for themselves (i.e., vocational commitment making) will be able to internalize their educational choices in a more meaningful manner.

High levels of vocational flexibility supported educational commitment across time. This interesting finding indicates that adolescents who were open to future vocational opportunities and changes increased in their allegiance toward their education. Additionally, this relation was moderated by adolescents' age, as it was significant only for early-to-middle adolescents. In the context of a future labor market marked by multiple and unexpected changes (Duffy et al., 2016), this result highlights an adaptive dimension of reconsideration of commitment. The fact that reconsideration of commitment is a necessary process in the relinquishment of no longer satisfactory choices has been brought forward by previous research studies (e.g., Klimstra et al., 2010; Negru-Subtirica et al., 2015). When looking at the dynamic of an academic year, it may be that adolescents who perceived their vocational choices in light of a changing vocational future, could better understand why their education is valuable and why learning so many school contents could make them more employable in an ever-changing future labor market. Also, the fact that this relation only applied to early-to-middle adolescents indicates that the beginning of high-school (i.e., grades 9 and 10) is a key time for relinquishing vocational goals and for being open to new vocational opportunities and activities. It may be that in this period youth relinquish vocational commitments that they made during middle-school in order to better ground and strengthen their present educational choices. Hence, we underscored the adaptive role of vocational flexibility in

preparation for job markets that, at a global level, are becoming increasingly unstable (even sometimes unpredictable) for young people.

Summing up, the longitudinal links we found from educational identity to vocational identity processes and vice-versa confirm the reciprocal associations between the two identity domains. We also identified multiple moderated relations, for age (i.e., in early-to-middle adolescents, vocational commitment making and vocational flexibility increased educational commitment), for gender (i.e., in girls, educational in-depth exploration prompted vocational identification with commitment), and for the type of school (i.e., in work-bound students, educational reconsideration of commitment endorsed vocational self-doubt). These findings bring important new information on the relations between two core identity domains in adolescence: education and vocation.

Limitations and Suggestions for Future Research

This study has several limitations that can open avenues for new research studies. First, we relied only on questionnaire self-report measures to appraise identity processes. Though existential concerns are reliably appraised through this type of measures (Meeus 2011, 2016), in future studies we could additionally employ narrative accounts of identity-central personal experiences in the educational and vocational domains (e.g., McLean et al., 2016). Also, we could collect diary data reflecting daily behavioral investment in identity processes (e.g., monitoring of exploratory behaviors in both life domains) across different periods of time (e.g., Yip & Fuligni, 2002).

Second, we did not capture school-to-work or school-to-school transitions in our research design. We did investigate educational and vocational identity relations across three data waves, proving a unique account on how these identity processes stimulate or inhibit each other in a normative developmental time frame for adolescents: the school year. Nevertheless, as existing research points out, transition periods bring forward more clearly young people's assets and limitations in approaching age-graded educational and vocational tasks (e.g., Heckhausen & Shane, 2015). Additionally, transitions between different types of institutions (e.g., high-school to

university, high-school to employing organizations) offer a more ecological account on how personal identity interacts with social dimensions of identity formation (e.g., organizational identification).

Third, we did not appraise the role of family factors in the longitudinal relations between adolescents' educational and vocational identity. Families play a central role in adolescents' educational and vocational decisions (Duffy et al., 2016) and family attitudes toward education and work further may influence the relations between the two identity domains. For instance, parents who view school as an important step towards work may support their children in understanding how their education is linked to their vocation and the other way around. Therefore, by investigating parents' perceptions of their children's education and vocation, we can tap into social capital factors that can influence adolescent identity formation (Côté, 2005).

Conclusion

This study investigated cross-lagged longitudinal associations between two core identity domains in adolescence: education and vocation. We underscored the complexity of identity formation in this developmental time frame and once again we highlighted the importance of domain-specific identity research (Solomontos-Kountouri, & Hurry, 2008; Vosylis, Erentaite, & Crocetti, 2017). Results indicated that strong educational commitments support the formation of strong vocational commitments across time, while educational in-depth exploration assists vocational exploration processes. Moreover, we found that in adolescence vocational identity also fosters the formation of educational identity, especially at the level of educational reconsideration of commitments. These longitudinal relations suggest that the goals adolescents pursue in these identity domains are intertwined and that by strengthening their intentional pursuits in one domain, young people can further define and clarify their goals in the other domain.

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Table 1

Descriptive Statistics and Within-Time Correlations between Educational Identity and Vocational Identity

	Descriptives		Educational identity		
			Commitment	In-depth exploration	Reconsideration of commitment
	α	*M* (*SD*)	T1/T2/T3	T1/T2/T3	T1/T2/T3
Vocational identity					
InbE1	.66	3.26 (0.72)	.24***/.14***/.18***	.35***/.22***/.23***	.12***/.13***/.01
InbE2	.71	3.22 (0.69)	.18***/.21***/.16***	.21***/.27***/.22***	.11***/.13***/.14***
InbE3	.75	3.22 (0.71)	.11***/.20***/.26***	.22***/.30***/.33***	.06/.10**/.19***
IndE1	.67	3.66 (0.74)	.30***/.20***/.20***	.40***/.26***/.24***	.01/.01/.02
IndE2	.70	3.58 (0.70)	.25***/.32***/.26***	.27***/.31***/.24***	-.01/-.08*/-.01
IndE3	.74	3.47 (0.72)	.24***/.30***/.41***	.27***/.37***/.37***	-.00/-.02/.01
Com1	.78	3.43 (0.93)	.30***/.27***/.20***	.17***/.11***/.10**	-.13***/-.13***/-.12***
Com2	.81	3.37 (0.90)	.26***/.35***/.24***	.13***/.16***/.10**	-.13***/-.23***/-.13***
Com3	.82	3.40 (0.85)	.28***/.34***/.40***	.22***/.24***/.28***	-.03/-.07*/-.06
IdCom1	.71	4.04 (0.67)	.41***/.30***/.26***	.22***/.20***/.15***	-.16***/-.15***/-.11***

IdCom2	.78	3.88 (0.74)	.36***/.47***/.36***	.15***/.24***/.14***	-.13***/-.24***/-.14***
IdCom3	.78	3.75 (0.75)	.31***/.36***/.51***	.18***/.27***/.21***	-.08*/-.14***/-.22***
Sedo1	.69	2.27 (0.84)	-.15***/-.14***/-.15***	.14***/.10**/.07*	.44***/.34***/.19***
Sedo2	.74	2.32 (0.83)	-.12***/-.18***/-.15***	.06/.13***/.09**	.33***/.50***/.25***
Sedo3	.81	2.58 (0.91)	-.01/-.03/-.16***	.12***/.16***/.28***	.19***/.31***/.55***
Flex1	.78	2.90 (0.86)	-.05/-.04/-.00	.13***/.12***/.10**	.35***/.27***/.20***
Flex2	.80	2.88 (0.83)	-.04/-.07*/-.04	.09**/.18***/.10**	.25***/.44***/.19***
Flex3	.83	3.02 (0.85)	.02/.07*/.03	.05/.16***/.24***	.16***/.26***/.41***
α			.82/ .89/ .89	.75/ .79/ .81	.84/ .83/ .84
M (*SD*)			4.15 (0.72)/ 4.03 (0.82)/ 4.00 (0.84)	3.24 (0.82)/ 3.20 (0.84)/ 3.27 (0.84)	2.11 (1.03)/ 2.23 (1.03)/ 2.48 (1.07)

Note. InbE = in-breadth exploration; IndE = in-depth exploration; Com = commitment making; IdCom = identification with commitment; Sedo = self-doubt Flexi = flexibility; T1 = Time 1, T2 = Time 2, T3 = Time 3; α = Alpha Cronbach; *M* = Mean; *SD* = Standard Deviation.

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

Table 2

Stability Paths for Educational Identity and Vocational Identity

	T1-T2	T2-T3	T1-T3
Educational Identity			
Educational commitment	.53***	.39***	.25***
Educational in-depth exploration	.32***	.31***	.23***
Educational reconsideration of commitment	.41***	.14**	.18***
Vocational Identity			
Vocational commitment making	.42***	.44***	.13**
Vocational identification with commitment	.37***	.24***	.12**
Vocational in-breadth exploration	.33***	.25***	.18***
Vocational in-depth exploration	.32***	.29***	.09*
Vocational self-doubt	.43***	.26***	.13**
Vocational flexibility	.37***	.31***	.15***

Note. T = Time.

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

Table 3

Correlated Change between Educational Identity and Vocational Identity at Times 2-3

Variable	Educational commitment		Educational in-depth exploration		Educational reconsideration of commitment	
	Time 2	Time 3	Time 2	Time 3	Time 2	Time 3
Vocational commitment making	.25***	.27***	.11**	.21***	-.16***	-.01
Vocational identification with commitment	.34***	.37***	.16***	.07	-.17***	-.20***
Vocational in-breadth exploration	.15***	.17***	.15***	.19***	.08	.17***
Vocational in-depth exploration	.22***	.28***	.19***	.21***	-.08	.00
Vocational self-doubt	-.12**	-.19***	.10*	.25***	.38***	.50***
Vocational flexibility	-.03	-.02	.15***	.20***	.37***	.36***

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

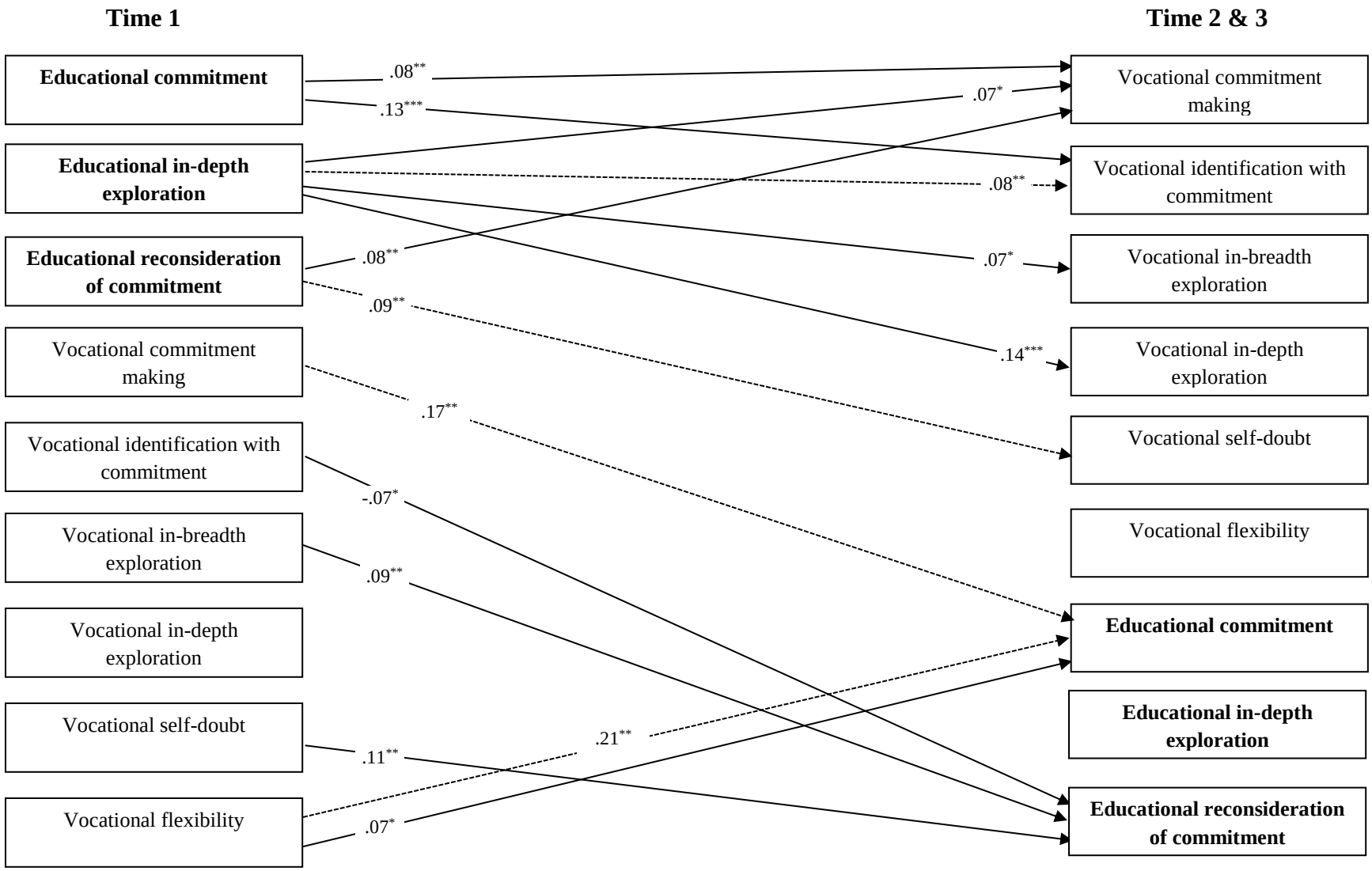

Figure 1. Significant Standardized Cross-Lagged Paths. Cross-lagged paths marked by dashed lines are moderated by age (for vocational commitment making and vocational flexibility), gender (for educational in-depth exploration), and school-type (for educational reconsideration of commitment). For the sake of clarity, within-time correlations, stability paths, and regression paths between educational identity processes and for vocational identity processes are not reported. As we retained the model with time-invariant coefficients as the final one, we only report two time-points and the cross-lagged paths are the average of the standardized coefficients.

$^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.