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FACULTY OF PSYCHOLOGY AND EDUCATIONAL SCIENCES
APPLIED COGNITIVE PSYCHOLOGY DOCTORAL SCHOOL

Ph.D. Thesis

Summary

PERSONAL GOALS AND IDENTITY FORMATION: THE DEVELOPMENT OF A MOBILE APPLICATION

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Awards

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Abstract

Even though there now is a mobile application for almost everything one can imagine, to the best of our knowledge, there are no applications specifically designed for researching or enhancing identity development. The first chapter of the thesis presents theories and models of identity development, personal goals, goal motivation, goal disengagement, action crisis, and also includes literature on mobile applications and self-tracking. Against this background, the present thesis set out to explore how to design, develop, and test mobile applications which can be used both as research tools and as mediums for delivering psychological interventions in the identity domain. The third chapter includes our published research composed of three studies. The first original study explored educational identity trajectories over a two-year period and identified five stable trajectories in terms of commitment and in-depth exploration. By using a mobile application, the second study investigated identity at the micro-level. The results showed that identity commitments increased between disengaging and reengaging into a new goal and that the increase correlated with the intensity of the action crisis just prior to disengagement. Through an interdisciplinary approach, the third study follows the development of a mobile app targeted at improving identity commitments from establishing design requirements to development and finally testing of the application. Results point towards an increase of commitment processes after using the app for one month. The final chapter of the thesis outlines the main contributions of the paper, while also discussing limitations and future directions.

Keywords: personal identity, identity development, micro-identity, goal pursuit, mobile applications, self-tracking, human-computer interaction, goal disengagement, action crisis, emerging adults

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CHAPTER I. THEORETICAL FOUNDATIONS AND LITERATURE REVIEW

1.1. Introduction

"Who am I?", "What I am going to become?", or "What am I going to do with my life?" are all commonly asked questions by many adolescents and emerging adults in their transition from high-school to univesity studies and adulthood. The expected answers could be manifold and sometimes hard to come by, but seen through an identity development lens, the answer captures action-related concepts, plans for the future, goals, values, and beliefs (Vignoles et al., 2011). The pursuit of forming one's personal identity has always been a key developmental task for adolescents and emerging adults (Arnett, 2000, 2004; Crocetti et al., 2008). However, now in the age of the Internet, the smartphone, and the mobile applications (apps), this endeavor becomes ever more complex (Gardner & Davis, 2013).

For the app generation, the smartphone is seen almost as an extension of themselves, being there for them to solve any need, recording every aspect of their life, while also being unnoticeable as each interaction is done naturally and without hurdles (Gardner & Davis, 2013). In this respect, the present thesis employs a multidisciplinary approach to bridge psychological theories and frameworks (i.e., identity development, self-determination theory, action crisis, goal motivation) with important HCI considerations (i.e., app design, app development, user experience, usability, self-tracking). Specifically, the current thesis explores how mobile apps can be used both as a research tool to collect ecologically valid data in real-time and as an intervention delivery instrument to promote better identity commitment processes.

1.2. Development of Personal Identity in Adolescence and Emerging Adulthood

The idea of identity formation as an essential developmental task in adolescence can be traced back to Erikson's (1950, 1968) writings about the stages of psychosocial development.

According to Erikson's *psychosocial theory*, adolescence represents a prolific ground for questioning who one is. Adolescents need to resolve one salient task, namely to explore various identities and eventually see which fits them best. Notably, identity development does not end after adolescence, but continues throughout the entire life course on different domains and in various degrees of intensity (Erikson, 1968).

Recent socio-economic changes in industrialized societies have increased the age when young adults become independent from their parents, form their own families, and enter the workforce (Arnett, 2000, 2004). Now, it is the norm for young adults to move away from their parents while still being financially supported by them in order to continue their studies during their twenties. These societal changes have given rise to a new developmental period marked by increased identity exploration and self-focus, when many young people feel "in-between" adolescence and adulthood, a period termed *emerging adulthood* (Arnett, 2000, 2004). This time frame usually starts at the end of secondary education and typically extends through mid and even late twenties (Arnett, 2000, 2004).

Drawing on the Eriksonian theory, Marcia (1966) proposed the *identity status theory*. Marcia's identity theory is based on two pivotal dimensions: *exploration* and *commitment*. Exploration is viewed as actively seeking information, weighing multiple identity alternatives, and evaluating personal resources in one's living context (Marcia, 1966). Commitment entails making an identity choice and finding ways to implement it, thus taking responsibility for one's decision (Marcia, 1966). Based on the presence or absence of exploration and commitment, four identity statuses emerge: *identity achievement* (i.e., high exploration, high commitment), *identity diffusion* (i.e., low exploration, low commitment), *identity moratorium* (i.e., high exploration, low commitment), and *identity foreclosure* (i.e., low exploration, high commitment; Marcia, 1966).

1.3. Models of Personal Identity Development

The three-factor model of identity (Crocetti et al., 2008) views identity development as a dynamic interaction of three processes: *commitment*, *in-depth exploration*, and *reconsideration of commitment* (Crocetti, 2017). According to this model, through the commitment process, people show strong dedications towards a goal, value, or belief. After the commitment is made, through in-depth exploration individuals actively pursue the commitment and gain more information. The information is then analyzed to decide whether the commitment is still relevant or not. Thus, through the process of reconsideration, commitments no longer important are relinquished making way for new endeavors (Crocetti et al., 2008; Negru-Subtirica et al., 2017).

The dual-cycle model of identity (Luyckx et al., 2006, 2008) explains identity development as an interplay between two complementary cycles (i.e., *identity formation* and *identity evaluation*). Each cycle is composed of two processes. During the identity formation cycle, individuals start by gathering information and exploring many possible different future alternatives (i.e., *exploration in breath*). After exploring the available options, individuals show a strong dedication towards a possible future self (i.e., *commitment making*). After the identity formation cycle, the identity evaluation cycle comes to the fore. During this cycle, new information regarding the commitments is constantly obtained (i.e., *exploration in depth)* and the information is used to analyze and reevaluate the commitments (i.e., *identification with commitments)*. After the reevaluation process, commitments may be deemed no longer worth pursuing and thus, the evaluation cycle ends, making way for a new cycle of identity formation in order to explore new options (Luyckx et al., 2006). In addition to the four adaptive processes of the dual-cycle model of identity (i.e., *exploration in breath*, *commitment making*, *exploration in depth*, *identification with commitment*), the model also includes a fifth maladaptive process (i.e., *ruminative exploration*). Ruminative exploration is seen as a process which consumes the

individual's internal resources and often impedes decision making, hindering commitment making (Luyckx et al., 2008).

Empirically, identity processes have been studied both cross-sectionally and longitudinally. Cross-sectionally, inspired by Marcia's (1966) identity status theory, an important strain of research has been investigating identity statuses. Through identity statuses, researchers group individuals into statuses defined by a combination of different levels of each identity process (Kroger et al., 2010).

As identity develops continuously throughout the entire life, even though valuable, identity statuses do not capture this dynamic change. To address this, more recent studies have proposed the identity trajectories approach. Through identity trajectories, researchers investigate how statuses change longitudinally. As research on identity trajectories is relatively few and the results are different across cultural contexts, we consider it is useful to investigate this topic also in the Romanian context in order to have an informative baseline for our target audience before building the app.

1.4. Personal Goals

Personal goals are at the core of one's identity. Together with values, desires, and beliefs, goals represent the content of one's identity (Crocetti, 2017; Karaś et al., 2018; Vignoles et al., 2011). Goal pursuit lies at the foundation of many aspects of life from motivation to cognition and action (Carver & Scheier; 1998). Personal goals are commonly defined as internal representations of desired (or feared) states (Austin & Vancouver, 1996; Elliot & Fryer, 2008).

Personal goals can be analzyed both qualitatively (i.e., *idiothetic method*) and quantitatively by looking at how the goals are evaluated (i.e., *nomothetic method*). When setting goals, individuals analyze their existing opportunities and challenges while also considering their motivation and resources (Nurmi, 2004; Salmela-Aro, 2009). During this

process, individuals appraise their new goals on multiple dimensions, such as importance, enjoyment, difficulty, visibility, effort, progress (Little, 1983; Salmela-Aro, 2001).

1.5. Goal Motivation

According to the *self-concordant model of goal striving* (Sheldon & Elliot, 1999) built as an extension of the *self-determination theory* (Deci & Ryan, 2000; Ryan & Deci, 2017), people pursue goals for *controlled* and *autonomous* reasons. The reasons for goal pursuit are distributed on a continuum of internalization ranging from external (e.g., to gain rewards or avoid punishments) to intrinsic motivation (e.g., out of genuine interest or for obtaining pleasure).

Controlled motivation includes *external regulation* and *introjected motivation*, the two forms of motivation which are the least internalized into the self (Deci & Ryan, 2000; Ryan & Deci, 2017). External regulation comprises actions that are pursued to achieve positive reinforcements or avoid negative consequences from the environment and represent the most extrinsic form of motivation.

Autonomous motivation, as opposed to controlled motivation, encompasses *intrinsic*, *integrated*, and *identified motives* (Deci & Ryan, 2000; Ryan & Deci, 2017). Intrinsic motivation represents the typical form of autonomous motivation (Deci & Ryan, 2000). The main criteria to evaluate if an activity or goal is autonomously regulated is represented by the integration in someone's self (Deci & Ryan, 2000).

1.6. Goal Disengagement

During goal pursuit, people are generally in what is called the *implemental mindset* (Gollwitzer, 1990, 2012). That is, they are focused on performing the required steps in order to achieve their goals (Gollwitzer, 2012). During this phase, most of their resources are allocated towards doing rather than thinking at the big picture of why they are pursuing their goals.

However, sometimes significant setbacks may occur during the goal pursuit, hindering progress to the degree that people exit the implemental mindset and instead start to question their goals by entering a *deliberative mindset* (Gollwitzer, 1990, 2012). This mental shift changes the focus from "how to achieve the goal" to "why am I pursuing this goal" (Brandstätter & Schüler, 2013, p. 544). During this phase, people weigh the costs and benefits of further goal pursuit (Brandstätter & Schüler, 2013) and start searching for alternative goals which seem more achievable, pleasant, or desirable compared to their current goals. At the same time, the decision to disengage from the current goal is very hard to make, especially when a person has already invested many resources in their goal or has sacrificed a lot in terms of disappointments and setbacks. When the goal is part of someone's self-concept, the feeling of discontinuing one's past actions may be seen as a self-threat and lead to anguish and distress (Carver & Scheier, 2012). Thus, to disengage, sometimes people need to first no longer see the goal as part of who they are (Carver & Scheier, 2012).

The aforementioned theoretical considerations make up a concise picture of the critical phase preceding goal disengagement. To offer an empirical support of these assumptions, Brandstätter and Schüler (2013) introduced the concept of *action crisis*. The concept of action crisis represents the intrapsychic decisional conflict between continuing to pursue a goal and disengagement (Brandstätter & Schüler, 2013).

1.7. Action Crisis: Concept and Measurement

Action crisis represents the intrapsychic decisional conflict between persisting to pursue and disengage from a goal (Brandstätter & Schüler, 2013). During this phase, action towards goal pursuit is hindered, as most internal resources are focused on analyzing if the goal is still worth pursuing. At the core of an action crisis lies the decisional conflict between persistence and disengagement (Brandstätter & Schüler, 2013).

The action crisis represents a multi-faceted construct which can be captured using the Action Crisis Scale (ACRISS, Brandstätter & Schüler, 2013). The scale includes six Likert items which cover cognitive (i.e., decisional conflict, rumination, disengagement impulses, disorientation) and behavioral (i.e., procrastination) aspects together with outcomes (i.e., setbacks) characteristic of action crises (Brandstätter & Herrmann, 2016). The scale has been used successfully in multiple studies and has shown high internal consistency, indicating that the distinct aspects measured form a set of concurrent experiences (Brandstätter & Herrmann, 2016; Ghassemi et al., 2017; Herrmann et al., 2019). The ACRISS can be and has been used in idiographic-nomothetic approaches. Specifically, ACRISS can be applied to specific self-set goals, allowing both for between-person and within-person analyses of participant's individual goals (Brandstätter & Herrmann, 2018; Holding et al., 2017).

1.8. Mobile Applications

Nowadays, people live in a truly "appified" world (Morris & Murray, 2018), where apps are so much intertwined with our everyday lives that they have started to be called "mundane software" (Morris & Elkins, 2015). That is, apps are so smoothly integrated in our everyday habits that they are no longer noticeable. Apps are ready to run at a single finger tap, swipe, or vocal cue launching an array of possibilities and supporting mundane activities, from communication, health, work productivity, or finances to shopping, entertainment, and information seeking (Clark & Lupton, 2022). Nowadays, almost every need is translated into a mobile app ready to roll and immerse ourselves within the digital realm.

The apps by themselves are nothing without their users and the meaning users attribute to their interactions. Young adults (18-29) are usually first adopters when it comes to new mobile apps and have been found to use mobile apps more than the general population. The extent to which today's youth are immersed in technology is something new, but the desire and need to find out who they are is not. Born within the digital world, "the app generation"

(Gardner & Davis, 2013) or "digital natives" (Prensky, 2001) got access to a smartphone even before receiving a laptop or a personal computer. Most young adults do not even remember a time before the smartphone and the app. Their entire lives unfold between the offline and online contexts. They act both as consumers and creators of digital content by both watching, listening, and reading other's posts, but also reacting to existing content and generating new digital creations, such as pictures, text, music, or videos.

1.9. Self-Tracking

Self-tracking represents a self-reflexive practice embraced by people, characterized by the recording and monitoring of different dimensions of ones' life with the aim of meaning making and gaining self-knowledge through self-analysis and reflection (Lupton, 2018). By and large, self-tracking implies positive outcomes over someone's life through personal optimizations. The resulting self-knowledge can be publicly shared with others or kept privately for oneself.

Human-computer interaction scholars draw both on theory and on user testing to make requirements and designs for functionalities of new products. Theory is relied upon both when deciding which characteristics need to be supported, but also on how to implement such characteristics. Most apps aimed at improving one's life put a high emphasis on how goals are set, employing various techniques from having long lists of possible goals, having a set of questions about the desired outcome, or prompting the user to type their goals in a specific domain (Villalobos-Zúñiga & Cherubini, 2020).

1.10. Informing the Design of the Mobile Applications

Two mobile apps were developed for the second and third study included in the thesis, respectively. For the first app, the main focus was to develop a data collection medium suitable

for the needs of the study, whereas for the second, the aim was to create an app which may strengthen participants' identity commitments through goal pursuit.

The second study included in the present thesis investigated goal disengagement in relation to learner identity and action crisis. To achieve this, we developed an app which tracked users' study goals by regularly asking participants about the status of their goal (attained, pursuing, disengaged). Additionally, the mobile app prompted users to set new goals and to complete surveys related to identity processes, action crisis, and goal motivation. Moreover, the app reminded users about the surveys regularly, through push notifications, and saved the responses to a remote database. An important consideration was to include as many participants as possible, thus the app was designed to be easy to use without external guidance through a clear interface with proper labels and instructions at every step. Additionally, to not exclude participants due to technological barriers, the app was developed to work on both iOS and Android operating systems and was tested on a multitude of devices ranging from lower-end to higher-end handhelds.

The InstaGoal app, developed during the third study of the current thesis, leveraged in its design psychology theories of identity processes, goal-setting, and HCI research on self-tracking. To design the app, the research team first envisioned the mechanisms through which identity commitments may be strengthened and proposed a set of requirements both driven by theory and also inspired from other apps featuring goals and self-tracking. At the core experience of the app lay the development of a personal identity, thus all central app features were required to help the users commit to goals (i.e., commitment making), explore their goals (i.e., exploration in depth), and change or refine their existing goals (i.e., identification with commitment). To encourage the setting of personally meaningful goals, the app prompted the users to type their goals instead of selecting from predefined lists and asked users to appraise their goals on several dimensions. Exploration was promoted through the use of daily diaries

in which users were asked to write both subjective experiences related to their goal pursuit and objective measures of progress. Identification with commitments was facilitated through the availability of a history of past app use which enabled self-reflection and a better alignment of the experiencing self with the remembering self. The app also allowed the users to refine and change their goals when they were no longer relevant in the initial form. Exploration was further encouraged by nudging users to stay on track with their goals through the use of reminders.

CHAPTER II. THESIS OBJECTIVES

The present thesis aims to address multiple highly relevant theoretical, methodological, and practical questions in today's digital world. The overarching objective is to *design, develop, and test mobile apps relevant to identity development research*. Through a multidisciplinary approach, the thesis explores the valuable dual-role *(1) mobile apps play as research tools for data collection* and *(2) as possible mediums for delivering psychological interventions in the identity domain*. Through the three original studies, the thesis navigates from theoretical questions related to identity development processes to methodological considerations of developing and using apps in researching questions which require real-time data collection. Finally, the thesis brings forward key practical implications related to the development of apps aimed at improving identity commitments through personal goals.

CHAPTER III. ORIGINAL STUDIES

3.1. Study 1. The Role of Parental Socio-Economic Status and Perceived Career-Related Behaviors in Developmental Trajectories of Educational Identity in Adolescence: A Four-Wave Study[1]

[1] Study 1 was published as an original study:

Introduction

Personal identity formation is a key developmental task of adolescence, with the educational domain being a core life domain (Crocetti, 2017). Recent studies (Becht et al., 2021; Hatano et al., 2020) have underscored that developmental trajectories marked by strong educational commitments and active in-depth exploration tend to be longitudinally linked to positive psychosocial functioning (e.g., satisfaction with life, subjective happiness). The social ecology of educational development in adolescence revolves around the core role of parents as providers of academic support and meaningful interpersonal relationships for their offspring (Skinner et al., 2022). Moreover, educational identity formation is intricately linked to career development in adolescence, as educational choices closely impact future career choices (Negru-Subtirica & Pop, 2018; Negru-Subtirica, Pop, & Crocetti, 2018). As parents are the gatekeepers of adolescent career development, their role in facilitating educational identity formation still needs to be uncovered. Thus, the present study investigated developmental trajectories of educational identity over a period of two academic years.

The Present Study

The aims of the present study were twofold. First, the study aimed to identify educational identity trajectories and second, to explore how these trajectories were associated with perceived parental socio-economic status and perceived parental career-related behaviors.

Method

Participants and Procedure

Timar-Anton, C., Negru-Subtirica, O., & Damian, L. E. (2023). The Role of Parental Socio-Economic Status and Perceived Career-Related Behaviors in Developmental Trajectories of Educational Identity in Adolescence: A Four-Wave Study. *European Journal of Personality*, *0*(0). https://doi.org/10.1177/08902070221150480

The sample comprised 744 Caucasian adolescents of Romanian ethnicity (M_{age} = 15.2 years, *SD* = 1.9, ranging from 11-19 years; 55% girls) from three public high-schools in North-West part of Romania (37 classrooms).

Measures

Educational Identity

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

Parental Socio-Economic Status

Parental SES was appraised with a frequently used measure in research on youth (see Quon & McGrath, 2014, for a meta-analysis; Romanian version: Damian et al., 2020): "Compared to others living in this country, what economic status do you consider your family to have? Where would you put your family on this scale?". Participants responded using a response scale from 1 (*low*) to 5 (*high*).

Perceived Parental Career-Related Behaviors

We used the Parental Career-Related Behaviors scale (Dietrich & Kracke, 2009) to measure three parental career-related behaviors perceived by adolescents: parental support (5 items), parental interference (5 items), and parental lack of engagement (5 items). Participants responded to all items using a response scale from 1 (*totally disagree*) to 5 (*totally agree*).

Plan of Analyses

To uncover the educational identity trajecotries and their associations with percieved SES and perceived career-related behaviors, we performed Latent Class Growth Analysis (LCGA) by following the steps described by Jung and Wickrama (2008) in Mplus 8.2.

Results

Latent Class Growth Analyses: Educational Identity Trajectories

LCGA for educational identity was performed to extract the identity trajectories. Figure 1 shows the identity trajectories while Table 1 presents the estimates for the mean intercepts, linear slopes, and quadratic slopes of the selected 5-class solution.

Class 1 was the largest class (40.05%) and was interpreted as the *undifferentiated trajectory*, with adolescents having medium values for all educational identity processes, which were stable across time. Class 2 (11.02%), interpreted as the *searching moratorium trajectory* was also characterized by stable educational identity processes, with adolescents in this trajectory scoring relatively high on all identity processes. Class 3 (17.47%), interpreted as the *foreclosure trajectory*, included adolescents who scored high on educational commitment but had relatively low values of in-depth exploration and the lowest values of reconsideration. Both educational commitment and in-depth exploration were stable across time, while reconsideration of educational commitments had a decreasing linear slope and a positive quadratic slope. Thus, the reconsideration process for this trajectory initially decreased and later increased but still kept a generally decreasing trend. Class 4 (8.6%), interpreted as the *diffusion trajectory* was characterized by adolescents scoring the lowest on educational commitment and in-depth exploration among all identified trajectories.Reconsideration of educational commitment for this class was medium-low compared to the other classes. All identity processes of the diffusion trajectory were stable. Class 5 (22.85%), interpreted as the *achievement trajectory*, contained adolescents scoring the highest on educational commitment,

relatively high on in-depth exploration, and low on reconsideration of commitments. For this trajectory, educational commitment and exploration processes were stable, whereas the reconsideration slope was positive, indicating an initial decrease followed by an increase.

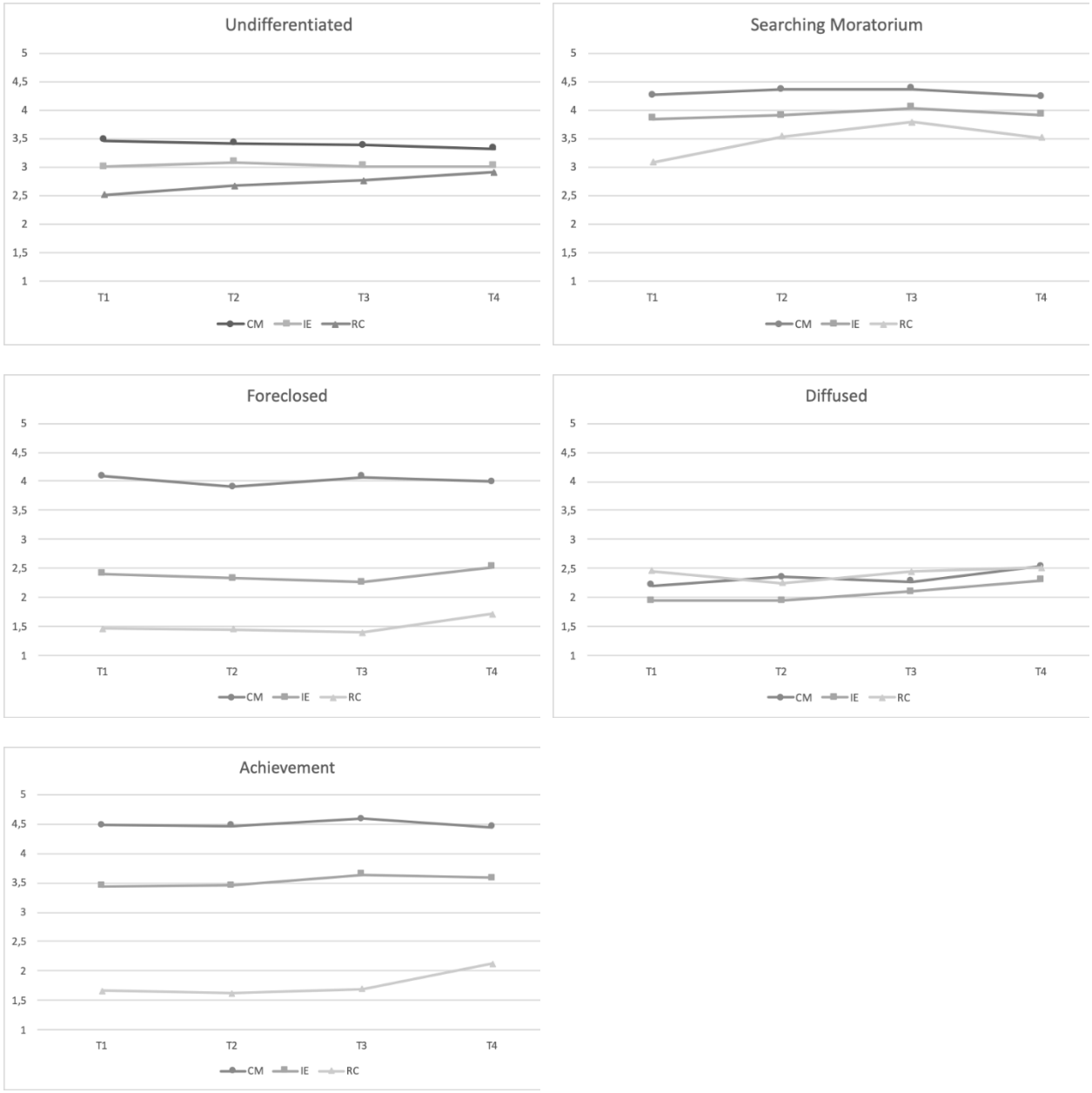
Table 1

Final Parameter Estimates of Latent Class Growth Analysis in Educational Identity

	Identity				
	Undifferentiated	Searching moratorium	Foreclosure	Diffusion	Achievement
N	298	82	130	64	170
%	40.05	11.02	17.47	8.60	22.85
CM intercept	**3.47*****	**4.20*****	**4.03*****	**2.27*****	**4.43*****
CM linear slope	-0.03	0.22	-0.09	0.02	0.08
CM quadratic slope	-0.01	-0.07	0.03	0.01	-0.03
IE intercept	**2.99*****	**3.80*****	**2.52*****	**1.95*****	**3.41*****
IE linear slope	0.11	0.16	-0.26	-0.02	0.06
IE quadratic slope	-0.04	-0.04	0.09	0.05	-0.00
RC intercept	**2.51*****	**3.05*****	**1.58*****	**2.36*****	**1.75*****
RC linear slope	0.15	0.66	**-0.20***	-0.16	-0.22
RC quadratic slope	-0.01	-0.17	**0.08***	0.07	**0.11***

Note. CM = commitment; IE = in-depth exploration; RC = reconsideration of commitment.
*$p < .05$; **$p < .01$; ***$p < .001$.

Figure 1



Note. Means of identity processes for each identity trajectory. CM = commitment; IE = in-depth exploration; RC = reconsideration of commitment. The y axis represents average item scores on a scale from 1 to 5 (see the Measures section).

Table 2

Differences in Mean Characteristics at T1 between Class Memberships model Using the DCAT/BCH Procedure in Mplus

	Undifferentiated	Searching moratorium	Foreclosed	Diffusion	Achievement
	M/%	*M/%*	*M/%*	*M/%*	*M/%*
Age	15.38^{a}	15.07^{ab}	14.80^{bc}	15.55^{a}	15.24^{ac}
Gender (% female)	45.1^{a}	61.0^{bc}	55.6^{abc}	51.5^{ab}	68.4^{c}
Parental socio-economic status	3.27^{ac}	3.66^{b}	3.46^{ab}	3.06^{c}	3.57^{b}
Perceived parental support	3.34^{a}	3.97^{b}	3.51^{a}	2.74^{c}	4.04^{bd}
Perceived parental interference	2.66^{ac}	2.95^{a}	1.73^{b}	2.44^{cd}	2.21^{d}
Perceived parental lack of engagement	2.22^{a}	2.24^{a}	1.24^{b}	2.11^{a}	1.73^{c}

Note. Class means significantly ($p < .05$) differ if they have different superscripts.

Results regarding the gender prevalence for each identified trajectory and mean differences of perceived parental SES and perceived parental career related behaviors between each trajectory can be consulted in Table 2. The analyses indicated that educational identity trajectories characterized by both high educational commitment and high in-depth exploration (i.e., searching moratorium and achievement) consisted of mostly females (61.0% and 68.4% respectively) whereas males were mostly present in the undifferentiated identity trajectory. The foreclosure trajectory was not significantly different in terms of gender compared to any other trajectory. The results indicated that adolescents in the undifferentiated trajectory had significantly lower perceived parental SES than those in searching moratorium or achievement statuses. In terms of perceived parental support, adolescents in searching moratorium and achievement statuses scored the highest whereas those following the diffusion trajectory scored the lowest. Adolescents in the foreclosed trajectory had the lowest scores for both perceived parental interference and parental lack of engagement among the 5 identity trajectories, while adolescents in undifferentiated and searching-moratorium trajectories scored the highest on these two scales.

Parental Socio-Economic Status and Perceived Career-Related Behaviors Associated with Latent Class Membership

The associations between the previously identified identity trajectories, perceived parental socio-economic status and perceived career-related behaviors were analyzed using structural equation modeling. The models showed adequate fit (CFI = .857-.914; RMSEA = .057-.059). The correlations between the identified latent class membership and the intercepts and slopes of perceived parental socio-economic status, perceived parental support, perceived parental interference, and perceived parental lack of engagement are presented in Table 3. Figure 2 details the trajectories of perceived parental socio-economic status and career-related behaviors.

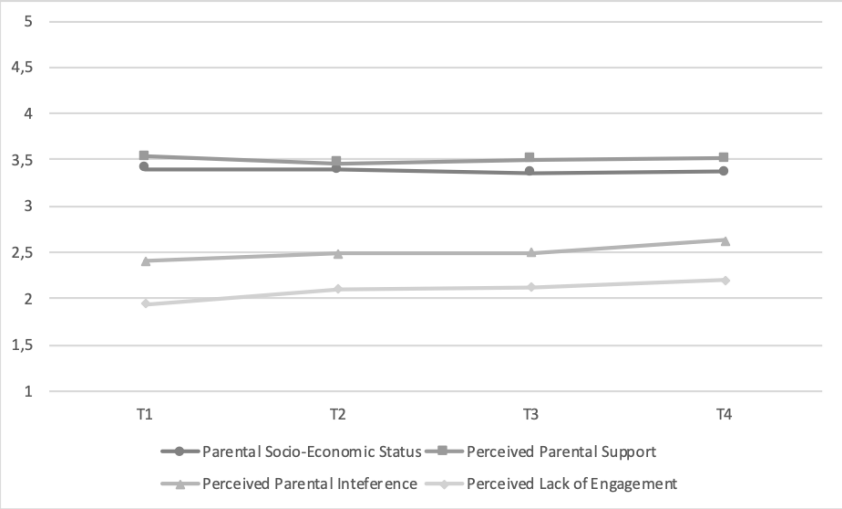
Table 3

Correlations Among Class Membership, Parental Socio-Economic Status and Perceived Parental Career-Related Behaviors

	Career-Related Behaviors							
	Parental socio-economic status		Perceived Parental Support		Perceived Parental Interference		Perceived Parental Lack of Engagement	
Class Membership	Intercept	Slope	Intercept	Slope	Intercept	Slope	Intercept	Slope
Undifferentiated	**-.11****	.01	**-.17*****	.01	**.22*****	.03	**.22*****	.04
Searching Moratorium	**.11***	-.03	**.21*****	-.02	**.27*****	.01	**.16*****	**.06****
Foreclosed	.06	0.03	-.01	-.04	**-.43*****	.00	**-.44*****	.05
Diffusion	**-.19*****	**.05***	**-.34*****	.01	.02	-.01	.04	-.01
Achievement	**.11****	.00	**.30*****	.01	**-.16****	-02	**-.14****	**-.09*****

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

Figure 2



Note. Means of parental socio-economic status and parental career-related behaviors. The y axis represents average item scores on a scale from 1 to 5 (see the Measures section).

Discussion

Educational Identity Trajectories

The findings of the present study are in line with previous research on educational identity statuses in the Romanian context, by uncovering the undifferentiated class as the most populous (40.05%), with a roughly similar percentage of adolescents classified as such in a previous cross-sectional study (34.88%; Negru-Subtirica et al., 2017). The undifferentiated trajectory is characterized by average and stable values for all identity processes, indicative of adolescents who are detached from their identity strivings, both adaptive and maladaptive (Negru-Subtirica et al., 2017). The stability of educational commitment and in-depth exploration for all trajectories is also indicative of the lack of work Romanian adolescents put in their educational identity development. These findings can be seen through the lenses of an educational system (i.e., the Romanian one) which does not encourage exploration and focuses mostly on standardized tests, and a rigid curriculum, leaving adolescents with almost no agency in choosing an individualized educational path (Damian et al., 2016; Negru-Subtirica et al., 2015; Pop et al., 2016). When compared with similar studies performed in other cultural contexts (Hatano et al. 2020; Meeus et al., 2012), the present study did not find changeable trajectories (e.g., diffusion to moratorium) or changes in commitment or in-depth exploration in any of the trajectories. This finding may also indicate that educational systems that capitalize on predetermined educational paths and academic achievement do not stimulate adolescence to actively invest in changes in their educational identity. In line with our expectations, considering the high cultural emphasis on educational achievement, the present study found a greater percentage of adolescents in the achievement status (22.85%) compared to other contexts such as Japan (6.2%; Hatano et al., 2020), or the Netherlands (15.84%; Meeus et al., 2012). However, even though we expected an overrepresentation of adolescents in the

foreclosed trajectory, considering the emphasis parents put on education and the limited opportunities for in-depth educational exploration, we found fewer participants in this trajectory (17.47%) compared to the early closure trajectory found in the Netherlands (39.6%, Meeus et al., 2012).

Parental Socio-Economic Status and Perceived Career-Related Behaviors Associated with Developmental Trajectories of Educational Identity

Adolescents who reported lower parental SES were more likely to follow an undifferentiated educational identity trajectory than a searching moratorium or achievement trajectory. The latter two trajectories were marked by increased educational commitment and in-depth exploration. These findings are in line with the results of Rivnyák and collegues (2021), indicating that less affluent parents may have difficulties in supporting educational identity commitment and exploration of their children also across time. Hence, it may be that strong educational commitments are the privilege of adolescents whose parents do well financially.

For perceived parental support, adolescents following searching moratorium and achievement trajectories reported having the most support from their parents, while those following a diffusion trajectory reported the least support. These findings are in line with existing cross-sectional research (Zammitti et al., 2020) indicating that adolescents who hold firm educational commitments that they actively explore, also perceive that their parents offer psychological and instrumental support for their career development. The present study brings forward the strong links between educational and vocational or career development in this timeframe pointing that perceived parental support for career issues is associated with educational self-formation.

Regarding perceived parental interference and lack of engagement, adolescents in the foreclosed trajectory scored the lowest on both scales whereas adolescents in the

undifferentiated and searching moratorium trajectories scored the highest among the five educational identity trajectories. Intercept results pointed out that across time adolescents who perceived initial high levels of parental interference and lack of engagement tended to follow the undifferentiated and searching moratorium trajectories. Moreover, adolescents who reported initial low levels of parental interference and lack of engagement, tended to follow the foreclosed and achievement trajectories. Importantly, slope results showed that longitudinal increases in perceived parental lack of engagement were associated with a higher probability of adolescents following a searching moratorium trajectory and a lower probability of adolescents following an achievement trajectory. On the dark side, these findings indicate that adolescents who are detached from their educational goals (i.e., undifferentiated trajectory) or are in the "limbo" of searching for alternative educational paths (i.e., searching moratorium) tend to have maladaptive career communication with their parents. Hence, there may be a component of distress that maintains these trajectories, as these parental behaviors have been linked to more anxiety, depressive symptoms, and externalizing problems (Marcionetti & Rossier, 2017; Zhou et al., 2020). Parental lack of career engagement or unpredictable career support might confuse adolescents and bring them to the point of becoming either detached from or overinvolved in their educational strivings, which may be detrimental for their educational identity development. On the bright side, educational identity trajectories high in commitment and low in reconsideration of commitment (i.e., achievement, foreclosure) were supported longitudinally by low parental career interference and lack of involvement. These findings are in line with existing research (e.g., Dietrich & Salmela-Aro, 2013) and show that in adolescence parental control (overdoing it) and parental absence (doing nothing) in the career development of their offspring are maladaptive extremes of parent-child communication. Trajectories marked by unshifting educational commitments (i.e., high commitment with low reconsideration) are reinforced by a parental stance of autonomy support

and very limited control but also reduced lack of engagement. In the Romanian context this is important, as parents view educational achievement as an important predictor of success and thus actively engage in their children's educational choices (Negru-Subtirica et al., 2017; Negru-Subtirica & Damian, 2018).

Conclusions

Five identity trajectories were uncovered, all with stable commitment and in-depth exploration processes. Most adolescents followed the undifferentiated trajectory characterized by medium stable values for all identity processes. Regarding the role parents play in their offspring's educational identity development, adolescents in high commitment and in-depth exploration trajectories (i.e., achievement and searching moratorium) correlated with higher SES and also perceived their parents as more supportive compared to undifferentiated and diffused adolescents who generally came from lower SES families and perceived their parents as less supportive. The findings bring forward important and valuable implications for research and practice on the role parents play in adolescents' educational identity development.

3.2. Study 2. How First-Year Students Manage Their Action Crises and Motivation to Build Their Learner Identity: A Look into the Critical Moment of Goal Disengagement[2]

Introduction

The transition to university often involves a major life shift for many students. This life shift comes with a unique level of freedom which needs to be carefully managed (Capelle et al., 2022). During this crucial life period, students gain considerably more autonomy in all areas of life from moving away from parents to starting to manage money on their own (Arnett, 2018). At the same time, they need to self-organize their study time to accommodate their new life role as university students (Capelle et al., 2022; Corpus et al., 2020). During this life stage, students need to gain the ability to self-regulate their goal pursuit (Grund et al., 2018; Negru et al., 2011) by balancing what they deem important (i.e., *autonomous motivation*) with complying to academic requirements (i.e., *controlled motivation*). This brings forward the important ability not only to set meaningful goals, but also to disengage from what is at odds with the basic preferences of the self (Grund et al., 2018). This complex capacity for intentional self-development becomes especially salient during this time of life as students also start renegotiating their learner identity.

Recent studies highlight the importance of investigating identity from a real-time micro-level perspective (Klimstra & Schwab, 2021; Lichtwarck-Aschoff et al., 2008; Van der

[2] Study 2 was published as an original study:
Timar-Anton, C., Negru-Subtirica, O., & Opre, A. (2022). How first-year students manage their action crises and motivation to build their learner identity: a look into the critical moment of goal disengagement. *Motivation and Emotion*, *46*, 852-867. https://doi.org/10.1007/s11031-022-09965-y

Gaag et al., 2020). At the micro-level, individuals' identity is expressed through concrete actions during daily life (Kunnen & Sugimura, 2021; Sugimura & Kunnen, 2022; Van der Gaag et al., 2020). Identity develops through a dynamic interplay of committing, constantly exploring the choices made and reconsidering what may no longer be appropriate or useful in different life domains (Crocetti, 2017; Karaś et al., 2018; Negru-Subtirica & Pop, 2018). The process of reconsidering and disengaging from a goal is not always straight forward, but often characterized by an intense and arduous process of decisional conflict, termed action crisis (Brandstätter & Schüler, 2013). While both action crisis and identity processes tap into how people reconsider their goals (i.e., disengage and reengage in new goals), scant research on how they are connected exists.

The Present Study

The present study takes a micro-level approach to learner identity by focusing on the expressions of commitment, in-depth exploration, and reconsideration through the concrete act of studying. The study builds upon existing literature by investigating the critical moment of goal disengagement. Specifically, we aim to answer the following exploratory research questions:

1. Does goal disengagement predict changes in commitment, in-depth exploration, reconsideration of commitment, and motivation towards study goals from the disengaged goal to the next?

2. Does the severity of an action crisis prior to goal disengagement predict changes in commitment, in-depth exploration, reconsideration of commitment, and motivation towards study goals from the disengaged goal to the next?

Method

Participants and Procedure

A total of 248 students (86% female, M_{age} = 20.03, years; SD_{age} = 2.26) agreed to participate in the study and provided active informed consent. Participants were asked to use a mobile app for 6 weeks to set goals and respond to questionnaires. Each week participants received 3 reminders to use the mobile app. From the initial sample, 31 participants did not use the app at all and were thus excluded, resulting in a final sample of 217 participants.

The first time the app was opened (i.e., when entering the study), participants were asked to self-set a study goal they wished to pursue in the following week (i.e., idiographic approach) and respond to a series of Likert-scale questions (i.e., nomothetic approach). The questions included measures of identity formation processes, goal motivation, and other variables which were not investigated in the present study. On subsequent time points, when participants opened the app, they were asked about the status of their goal (i.e., attained, disengaged, or still pursued). Depending on their answer, they were either asked to respond to the Action Crisis Scale if the goal was still being pursued, or set a new goal if the goal was attained or disengaged. The questions regarding identity processes and goal motivation were presented at all measurement points regardless of the status of the previous goal.

Measures

Goal Setting

The first time participants opened the mobile app, they were asked to self-set a study goal by typing it. Instructions stated that the goal should be related to their university studies and that they should pursue the goal during the next week (i.e., 7 days). A modified version of a widely used instruction in previous research on goal pursuit adapted for study goals was employed (Koestner et al., 2002). Participants could only have one goal set in the mobile app

at any given time. When the goal was no longer being actively pursued (e.g., the participant attained it or gave up on it by disengaging), the app would prompt users to set a new goal.

Goal Outcome

Goal outcome was assessed on each measurement occasion, but for the first one. Every time the participants opened the app, they were prompted to indicate the status of the goal last set in the app (i.e., in a prior measurement occasion). They could select between "Attained", "Pursuing", or "Disengaged". Answering "Attained" or "Disengaged" recorded the goal's outcome and prompted the participant to set another goal (Brandstätter & Herrmann, 2016).

Learner Identity Formation Processes

Participants were prompted to report on their identity processes at all the measurement occasions, using an adapted form of the single-item version of the Utrecht-Management of Identity Commitments Scale (U-MICS; Klimstra, Luyckx et al., 2010). In line with recent recommendations on investigating micro-level identity (Klimstra & Schwab, 2021), the adapted scale focused more on the concrete act of studying for university classes compared to the original form which included the abstract domain of "education".

Action Crisis

Action crisis was measured using the 6-item Action Crisis Scale (ACRISS; Brandstätter & Schüler, 2013). Each item of the scale assesses a different aspect of goal striving: decisional goal conflict, setbacks, implemental disorientation, rumination, disengagement impulses, and procrastination. The items were evaluated on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Autonomous and Controlled Motivation

Participants were asked to rate the reasons why they pursue their self-set goals (i.e., "Why do you pursue this goal? Please rate each of the following reasons:"). Autonomous and controlled motivation was measured using 6 items, three on autonomous reasons: "out of

pleasure", "out of interest" (intrinsic motivation), and "because it is important to me" (identified motivation) and three items on controlled reasons: "because someone else wants me to", "because the situation requires it" (extrinsic regulation), and "because I would feel guilty or anxious if I didn't do it" (introjected regulation). Participants responded to all items on a scale from 1 (not at all) to 7 (very much).

Results

Means, standard deviations, and correlations between the study variables are presented in Table 1 and Table 2 for the samples used in the analysis of RQ1 and RQ2 respectively. The results pertaining to RQ1 are presented in Table 3. These results indicate that after disengaging from a goal, participants were more controlled motivated and had a higher commitment making process towards their new goal compared to the previous one, at the moment of disengagement.

The results regarding RQ2 are presented in Table 4. Significant positive effects were found for all action crises facets on the change of commitment process, indicating that the more severe the action crisis before the change in goal occurred, the higher the commitment to the second goal had been, compared to the disengaged one. A significant negative effect was also found between the rumination facet of action crisis and the change in the exploration process, suggesting that the more students ruminated before changing their goal, the less they explored in-depth the following goal. All action crisis facets had a significant negative effect on the change in reconsideration of commitment implying that the more severe the action crisis before goal disengagement was, the less students would reconsider their new goal once they set it. Regarding goal motivation, significant positive regression coefficients were found for autonomous motivation on all action crisis facets, indicating that after severe action crisis participants chose a more autonomous goal compared to the previous one. The results also suggest that after severe action crisis, participants set less controlled goals, with significant

regression coefficients found on all facets of action crisis with the exception of decisional conflict.

Table 1

Descriptive Statistics and Correlations between the Study Variables at Consecutive Measurement Points

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. T1 C	3.77	0.84																	
2. T1 E	3.43	0.96	**.18*****																
3. T1 R	2.84	1.05	**-.17*****	**.21*****															
4. T1 Aut	4.88	1.20	**.36*****	**.12*****	**-.17*****														
5. T1 Con	4.31	1.34	.03	**.12*****	**.20*****	**-.22*****													
6. T2 C	3.76	0.83	**.50*****	**.07****	**-.17*****	**.28*****	.01												
7. T2 E	3.40	0.96	**.11*****	**.58*****	**.20*****	**.09****	**.09****	**.15*****											
8. T2 R	2.86	1.05	**-.17*****	**.19*****	**.58*****	**-.14*****	**.13*****	**-.15*****	**.24*****										
9. T2 Aut	4.86	1.23	**.23*****	**.11*****	**-.15*****	**.48*****	**-.16*****	**.34*****	**.11*****	**-.18*****									
10. T2 Con	4.38	1.33	.04	**.13*****	**.18*****	**-.12*****	**.68*****	.05	**.15*****	**.18*****	**-.21*****								
11. T1 A1	2.24	1.11	**-.30*****	.02	**.20*****	**-.16*****	**.16*****	**-.18*****	.03	**.14****	**-.09***	**.17*****							
12. T1 A2	3.34	0.93	**-.24*****	**.11****	**.09***	**-.24*****	**.28*****	**-.22*****	**.14****	**.15*****	-.08	**.18*****	**.26*****						
13. T1 A3	2.89	1.10	**-.19****	.08	**.24*****	**-.22*****	**.33*****	**-.15****	**.09***	**.22*****	**-.09***	**.25*****	**.42*****	**.46*****					
14. T1 A4	2.73	0.98	**-.15*****	**.19*****	**.22*****	-.03	**.27*****	-.04	**.19*****	**.22*****	.05	**.28*****	**.41*****	**.29*****	**.47*****				
15. T1 A5	1.95	1.05	**-.28*****	-.03	**.20*****	**-.27*****	**.19*****	**-.18*****	-.02	**.13****	**-.09***	**.18*****	**.72*****	**.25*****	**.43*****	**.35*****			
16. T1 A6	3.20	1.13	**-.14****	.07	**.16*****	**-.10***	**.32*****	-.09	.08	**.18*****	.04	**.24*****	**.33*****	**.48*****	**.43*****	**.39*****	**.32*****		
17. Att	32.7		**.13*****	-.01	-.05	-.01	.00	**.16*****	-.00	-.07	-.05	-.00	**-.31*****	-.08	**-.20*****	**-.19****	**-.25*****	**-.26*****	
18. Dis	12.8		**-.21*****	-.01	**.11***	-.06	-.03	**-.17*****	-.00	**.15****	-.06	.05	**.39*****	**.28*****	**.20****	**.21****	**.29*****	**.34*****	**-.95*****

Note. $N = 1272$. *M* = Mean; *SD* = Standard deviation. T1 = first-measurement and T2 = the second measurement in a pair of consecutive measures; C = commitment, E = in-depth exploration; R = reconsideration of commitment. Aut = autonomous motivation; Con = controlled motivation. A1 = decisional conflict; A2 = setbacks; A3 = implemental disorientation; A4 = rumination; A5 = disengagement impulses; A6 = procrastination; Att = goal attained; Dis = goal disengaged. For rows indicating goal status (i.e., attained or disengaged) the M column represents the percentage of cases where the first goal in the pair was either attained or disengaged. The remainder percentage represents measurement points where the participants reported that they are still pursuing the goal.

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

Table 2

Descriptive Statistics and Correlations between the Study Variables Capturing Goal Change

Variable	*M*	(*SD*)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. T1 C	3.81	0.84															
2. T1 E	3.45	0.98	**.21*****														
3. T1 R	2.86	1.06	**-.18*****	**.21*****													
4. T2 C	3.79	0.80	**.42*****	**.11***	**-.12***												
5. T2 E	3.38	0.99	**.17*****	**.54*****	**.23*****	**.18*****											
6. T2 R	2.88	1.08	**-.11***	**.21*****	**.53*****	**-.09***	**.28*****										
7. T1 A1	2.26	1.11	**-.23*****	-.00	**.24*****	.03	.12	.05									
8. T1 A2	3.25	0.92	**-.13***	**.14***	**.14***	-.12	**.17***	.13	**.25*****								
9. T1 A3	2.77	1.10	**-.21*****	.06	**.22*****	-.10	.10	**.17***	**.49*****	**.49*****							
10. T1 A4	2.75	0.98	.00	**.36*****	**.19****	.08	**.23*****	**.22****	**.42*****	**.30*****	**.50*****						
11. T1 A5	1.95	1.07	**-.28*****	.01	**.26*****	.01	.10	.04	**.74*****	**.22*****	**.49*****	**.38*****					
12. T1 A6	3.09	1.18	**-.18****	.10	**.20****	-.07	**.14***	**.16***	**.37*****	**.47*****	**.48*****	**.41*****	**.34*****				
13. T1 Aut	4.98	1.20	**.28*****	.06	**-.12****	-.05	.01	.09	.12	**-.26*****	.11	.07	**-.25****	.02			
14. T1 Con	4.39	1.28	**.09***	**.09***	**.16*****	.02	.03	-.08	**-.15***	.12	**.26*****	.02	.08	**.13***	**-.19*****		
15. T2 Aut	4.62	1.23	.06	.07	.01	**.27*****	.03	**-.13***	-.07	.05	-.01	.14	.10	.05	**.18*****	-.02	
16. T2 Con	4.63	1.21	**.10***	.09	.08	.05	**.10***	.06	.10	-.04	.10	.06	.04	.01	-.02	**.51*****	**-.15*****

Note. $N = 750$. *M* = Mean; *SD* = Standard deviation. T1 = last measure before changing a goal, T2 = first measure of a new goal; C = commitment, E = in-depth exploration; R = reconsideration of commitment. A1 = decisional conflict; A2 = setbacks; A3 = implemental disorientation; A4 = rumination; A5 = disengagement impulses; A6 = procrastination; Aut = autonomous motivation; Con = controlled motivation.

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

Table 3

Results of Multiple Linear Regressions with Goal Outcomes, and Time Difference as Predictors of Latent Changes in Identity Processes and Goal Motivation between all Consecutive Measurement Pairs

Predictor	Commitment Latent Change		In-depth Exploration Latent Change		Reconsideration of Commitment Latent Change		Autonomous Motivation Latent Change		Controlled Motivation Latent Change	
	β	*SE*	β	*SE*	β	*SE*	β	*SE*	β	*SE*
(Intercept)	-.02	.04	.01	.04	-.02	.04	**.16*****	**.02**	-.05	.03
Dis	**.32****	**.10**	.07	.10	.12	.12	-.17	.13	**.27****	**.10**
Att	.02	.07	-.02	.07	.06	.07	-.08	.05	.12	.07
Time Difference	-.05	.05	-.06	.04	-.02	.04	**-.16*****	**.03**	**.09***	**.04**

Note. $N = 1272$. β = Standardized regression coefficient; *SE* = standard error. Dis = Goal disengaged; Att = Goal attained.

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

Table 4

Results of Simple Linear Regressions with Action Crisis Facets as Predictors of the Latent Changes in Identity Processes and Goal Motivation when changing a goal

P	Commitment Latent Change		In-depth Exploration Latent Change		Reconsideration of Commitment Latent Change		Autonomous Motivation Latent Change		Controlled Motivation Latent Change	
	β	*SE*	β	*SE*	β	*SE*	β	*SE*	β	*SE*
A1	**.51*****	**.05**	.17	.30	**-.42*****	**.07**	**.43*****	**.07**	-.24	.15
A2	**.35****	**.11**	-.17	.16	**-.33****	**.10**	**.50*****	**.06**	**-.51*****	**.06**
A3	**.46*****	**.06**	-.14	.23	**-.39*****	**.07**	**.45*****	**.06**	**-.44*****	**.06**
A4	**.36****	**.12**	**-.36*****	**.07**	**-.30****	**.10**	**.40*****	**.10**	**-.36*****	**.09**
A5	**.52*****	**.05**	.08	.42	**-.46*****	**.06**	**.51*****	**.06**	**-.32*****	**.09**
A6	**.43*****	**.08**	-.13	.20	**-.36*****	**.08**	**.47*****	**.07**	**-.47*****	**.06**

Note. N = 750. P = Predictor; β = Standardized regression coefficient; *SE* = standard error. A1 = Decisional conflict; A2 = Setbacks; A3 = Implemental disorientation; A4 = Rumination; A5 = Disengagement impulses; A6 = Procrastination.

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

Discussion

Regarding RQ1, the results indicated that at T1 students were generally most committed towards goals they would attain at the next measurement point, followed by goals they were still pursuing at the following measurement point and were least committed towards goals they would disengage from at the following measurement point. At T2, after attaining their goal,

students continued to have the highest levels of commitment making towards their new goal compared to those who were still pursuing their initial goal or those who disengaged from their goal. Interestingly, only students who disengaged from their goal showed an increase in commitment making towards their new goal, a result which is in line with the three-factor model of identity formation (Crocetti et al., 2008) and goal disengagement theories (Brandstätter et al., 2013; Gollwitzer, 2012). That is, people have to first dissolve their initial commitments to be able to give up on their goals and then re-commit more strongly to better alternatives. It appears that the commitment making process towards the initial goal has to decrease, while commitment for an alternative has to increase for disengagement and reengagement in an alternative goal to take place.

The results pertaining to RQ2 revealed that all facets of action crisis were significantly and positively related to the change in commitment processes when one's goal changed. Thus, action crises severity is linked to a higher increase in commitment making process from the last measurement point of the disengaged goal to the first measurement point of the reengaged goal. These results may imply that during action crises, commitment towards the initial goal is decreasing until an alternative goal with higher commitment is embraced. Thus, through the comprehensive deliberative process of action crisis, students devaluate their initial commitment while actively evaluating possible alternatives in order to come up with new commitments to studying (Brandstätter & Herrmann, 2018; Gollwitzer, 2012). This can be seen as a positive side of action crisis which enables students to shape their identity based on behavioral, cognitive, and outcome related characteristics of past goal strivings.

The present study's findings also indicated that the more severe the action crisis, the lower the reconsideration of commitment on the following goals was. Thus, after an arduous period of deliberation and doubts about possible current alternatives (Ghassemi et al., 2021), when students finally managed to disengage from their goal, they reengaged in a new

alternative with firm conviction. This result is consistent with previous findings, which showed that the desirability and decisional certainty regarding new goals is higher after periods of intense action crisis (Brandstätter & Herrmann, 2016; Ghassemi et al., 2017).

With regard to the relation between action crises and motivation, previous studies have found that autonomous motivation acts as a shielding factor against experiencing action crisis (Holding et al., 2017), whereas controlled motivation increases the severity of action crisis (Holding et al., 2021), results which our correlational findings also confirmed. Building on these results, we found that the more severe an action crisis was, the more autonomous and less controlled motivated the following goal was. This is particularly important for first-year university students who seem to benefit from "weathering the storm" to refocus on what they really valued the most.

Conclusion

The start of a new life as a student is marked by challenging changes which require adapting to new demands of academic studying. This exploratory study captured the struggles first-year university students face in building their learner identity during the first semester. The present study brought forward important contributions to existing literature by investigating the critical moment of goal disengagement and reengagement in relation to goal motivation and identity formation processes using longitudinal data. Moreover, the current study underscored that in the case of first-year university students, the experience of an action crisis might be beneficial to forming stronger identity commitments and engaging in more autonomous goals.

3.3. Study 3. The Development and Testing of a Mobile Self-Tracking App to Strengthen Identity Commitments through Personal Goals[3]

Introduction

Developing one's personal identity, that is, establishing meaningful commitments to goals, values, desires, and beliefs, represents a central focus for young adults (e.g., Arnett, 2004). Identity formation takes place in several identity domains, such as career, romantic relationships, friendships (Goossens, 2001). For young adults, the development of one's career identity is both important and complicated to achieve (Skorikov & Vondracek, 2011). By setting career goals, exploring a wide range of career opportunities, and enacting identity commitments in the career domain, young adults can self-construct who they are as a worker or future worker (Nurmi, 1991). However, a large percentage of youth enter young adulthood struggling to form their identity commitments (Kroger et al., 2010).

Nowadays, with the advent of smartphones, millions of mobile applications ('apps') are available to young adults, covering nearly every need (De Nadai et al., 2019). Although previous studies have shown links between how youth present themselves online through social media platforms and their identity (Michikyan, 2020; Michikyan et al., 2015; Thomas et al., 2017; Yang et al., 2017), to the best of our knowledge no app is specifically designed to help facilitate identity processes and help young adults in their identity commitments.

[3] Study 3 was published as an original study:

Timar-Anton, C., Negru-Subtirica, O., & Opre, A. (2021). The development and testing of a mobile self-tracking app to strengthen identity commitments through personal goals. *International Journal of Human-Computer Studies, 151,* 102642. https://doi.org/10.1016/j.ijhcs.2021.102642

The Present Study

The aim of the present exploratory study was to design, develop, and test a self-tracking app prototype aimed at strengthening young adults' identity commitments through personal career goals. To this end, we first identified requirements for the design of the app, created an app prototype based on these requirements, and then proceeded to investigate whether the prototype accomplished its goal of strengthening young adults' identity. We designed and tested the app making use of the dual-cycle model of identity development (Luyckx et al., 2006, 2008). Additionally, to further improve the app in the future, we also investigated how different goal appraisals used in the app related to the users' identity processes and how young adults defined and tracked their goals through the app. Thus, the present study sought to answer the following exploratory research questions:

RQ1: Does the use of a self-tracking app (i.e., InstaGoal) contribute to improvements in identity commitments?

RQ2: How do the career goal appraisals used in InstaGoal relate to identity processes?

RQ3: How do young adults use InstaGoal's features to define, pursue, monitor, and subjectively experience their career goals?

The Design Process

The InstaGoal app was designed with the specific aim to improve young adults' identity commitments drawing on the psychology theories of identity processes and goal-setting, and on HCI research on self-tracking. The requirements informing the design were theory-driven, but also inspired from other apps featuring goals and self-tracking. The research team came up with the following design requirements after multiple brainstorming sessions:

- Users can make identity commitments in the form of career goals (commitment making);
- Users are encouraged to explore in-depth these career commitments (exploration in depth);
- Users can change their commitments (identification with commitment);
- Users are prompted to type their goals instead of selecting from a predefined list (encourage accountability, precision of expression, awareness, and setting of personally meaningful goals);
- Users are encouraged to set meaningful high goals through reflective questions in the form of goal appraisals (e.g., perceived difficulty, perceived novelty, resource allocation, performance orientation, and mastery orientation);
- Users are sent reminders to stay on track with their goals;
- Users can actively self-track their goal pursuit through a journal (which has been previously found to combat rumination, promoting self-awareness and deeper thinking);
- Users can review their history of past use (enabling documentation of activities, self-reflection, self-diagnosis, and better aligns the experiencing self with the remembering self);
- Users are encouraged to focus on their subjective experience;
- Users can easily use the app without external guidance.

The Design and Implementation of the InstaGoal App

Building upon the requirements outlined in the previous section, InstaGoal was designed as a daily self-tracking app for monitoring personal career goals with the aim of enhancing young adults' identity commitments. The app was developed for the Android

Operating System and distributed on Google Play. The app features several core components: goal-setting (Figure 1), goal appraisals (Figure 2), goals dashboard (Figure 3), goal history (Figure 4), and journal (Figure 5, 6).

Figure 1
Goal Setting Screen

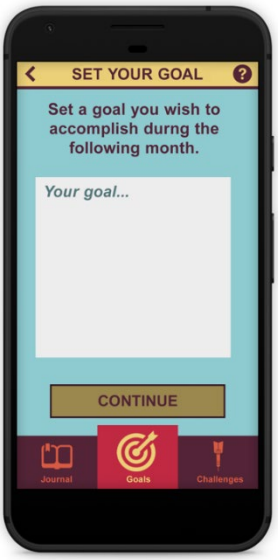


Figure 2
Goal Appraisal Screen

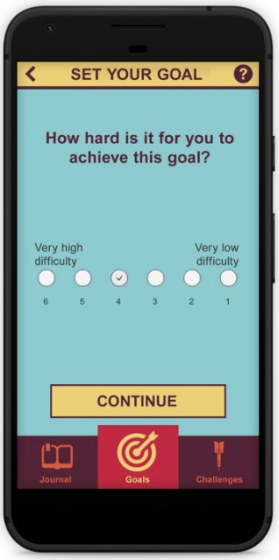


Figure 3
Goals Dashboard

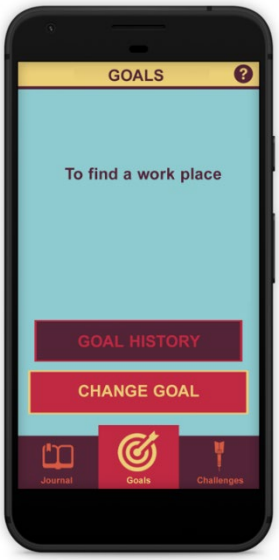


Figure 4
Goals History Screen

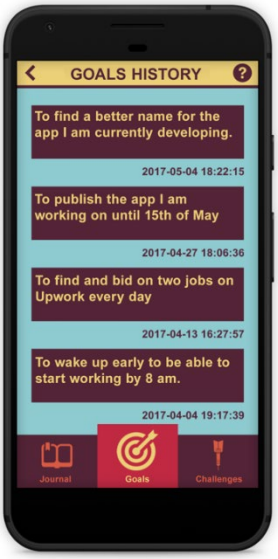


Figure 5
Journal Dashboard

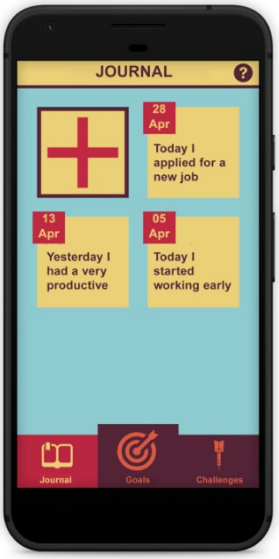
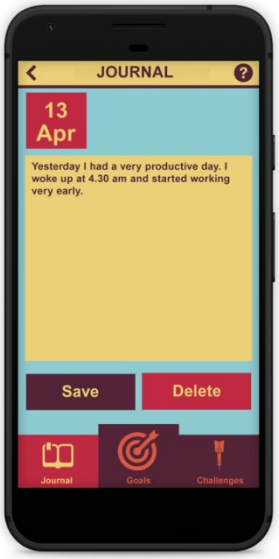


Figure 6
Journal Entry Screen



Note. For the purpose of this paper the app images have been translated into English

An important general requirement for the app was to be easy to use without external guidance. To achieve this, we focused on creating a streamlined First-Time User Experience

(FTUE), designed as a step-by-step process which gave all the necessary information about how to use the app and took the user through the core loop of setting, appraising, and monitoring a career goal. After setting the first goal, the app automatically switched to the journal dashboard where users could type about any thoughts, feelings, challenges, or accomplishments related to their goal.

The central component of the InstaGoal app was the "Goals Dashboard". From here participants could set, appraise, change, and view their career-related goals (Figures 1, 2, 3). A two-step process was employed for goal-setting. First, users were prompted to type a self-relevant goal on a dedicated page which enabled users to set personally meaningful goals (Kocielnik et al., 2018). Second, immediately after setting the goal, users were asked to appraise it on five different dimensions (i.e., perceived difficulty, perceived novelty, resource allocation, performance orientation, and mastery orientation; Negru, 2009). Previous research from HCI highlights that asking reflective questions may aid people in clarifying their underlying motives and goals and thus, it enhances motivation (Fleck & Fitzpatrick, 2010; Lee et al., 2015).

On subsequent uses of the app, the "Goals Dashboard" reminded participants of their current goal (written in the center of the screen) and allowed them to reassess or change the goal. The "Goals Dashboard" also included a "Goals History" page, which gave participants the option to visualize their log of past goals. This feature was designed to enable users to reflect on their past activities, which was also recently supported by Villalobos-Zúñiga and Cherubini's (2020) systematic review of mobile apps.

In addition to the "Goals Dashboard", InstaGoal also featured a "Journal Dashboard". The journal encouraged users to record, visualize, and reflect on their thoughts, feelings, behaviors, challenges, and accomplishments related to their career goals, facilitating subjective self-tracking (Rooksby et al., 2014). Through journaling, young adults were encouraged to

explore in depth their career goals. In addition, journaling was also employed to impede the maladaptive process of ruminative exploration (King, 2001; Pennebaker, 2003; Teismann et al., 2014).

Methods

Participants

The sample for this exploratory study initially consisted of 55 young adults from North-Western Romania. The inclusion criteria were: 18-25 age interval (specific to the young adulthood period) and owning a smartphone capable of running the app (e.g., Android OS). Based on the inclusion criteria, a final sample of $n = 25$ participants ($n = 20$ female; $M_{age} = 22.8$, $SD_{age} = 2.12$) was selected.

Procedure

Upon entering the study, participants were informed that they would need to use a mobile app and fill out an online questionnaire before using the app (T1) and after four weeks of app use (T2). Participants were asked to use the various app features (e.g., goal-setting, goal appraising, journal, log of past use) whenever they observed changes in their goal pursuit or when receiving push notifications.

Measures

Identity Development

The Romanian version (Negru-Subtirica et al., 2015) of the 25-item Dimensions of Identity Development Scale was used (DIDS, Luyckx et al., 2006, 2008) to assess five identity processes: commitment making, exploration in breadth, ruminative exploration, identification with commitment, and exploration in depth. Participants responded to each item on a scale from 1 (completely disagree) to 5 (completely agree).

Career Goal Appraisals

When setting goals in the InstaGoal app, participants were asked to type their current career-related personal goal. After setting the goal, they appraised it by answering one question for each of the following dimensions: perceived difficulty, perceived novelty, resource allocation, performance orientation, and mastery orientation.

Results

RQ1: Does the Use of a Self-Tracking App (i.e., InstaGoal) Contribute to Improvements in Identity Commitments?

The data used in the analysis of RQ1 consisted of the Dimensions of Identity Development Scale (DIDS) before using the InstaGoal app (T1) and after 4 weeks of app use (T2). The five identity processes were modeled as dependent variables and time (T1, T2) as independent variable. Descriptive statistics and internal reliability of the DIDS scale can be consulted in Table 1, while Table 2 presents correlations between the identity processes. We performed a RM-MANOVA to evaluate whether the identity processes improve after using InstaGoal. A significant effect was found, Pillai's Trace = .46, $F(5,20) = 3.38$, $p = .022$, $\eta^2 = .46$. Then, repeated measures analysis of variance (RM-ANOVA) for each of the dependent variables was conducted. The results showed that commitment making ($F(1,24) = 7.06$, $p = .014$, $\eta^2 = .23$) and identification with commitment ($F(1,24) = 13.09$, $p = .001$, $\eta^2 = .35$) increased after using the app. These results provide an indication that after using the InstaGoal app for four weeks, participants were more secure about their goals and considered their commitments as more aligned with their values and beliefs.

Table 1

Descriptive and reliability statistics

	Cronbach's alpha		Descriptive statistics	
	T1	T2	T1	T2

			M	*SD*	*M*	*SD*
Commitment making	.94	.82	3.82	0.90	4.12	0.63
Exploration in breadth	.75	.74	3.78	0.55	3.82	0.69
Ruminative exploration	.91	.91	2.67	1.02	2.58	1.05
Id with commitment	.88	.91	3.90	0.72	4.14	0.73
Exploration in depth	.74	.69	3.23	0.70	3.22	0.72

Note. T1 = measurement before using the app, T2 = measurement after using the app; *M* = mean, *SD* = standard deviation. Id with commitment = Identification with commitment.

Table 2

Pearson correlations between identity processes before and after using the app

	1	2	3	4	5	6	7	8	9
1. T1 Commitment making	–								
2. T1 Exploration in breadth	-.01	–							
3. T1 Ruminative exploration	-.67**	.43*	–						
4. T1 Identification with commitment	.82**	-.15	-.71**	–					
5. T1 Exploration in depth	-.18	.61**	.58**	-.32	–				
6. T2 Commitment making	.79**	.03	-.58**	.79**	-.32	–			
7. T2 Exploration in breadth	.04	.48*	.23	-.09	.41*	-.13	–		
8. T2 Ruminative exploration	-.47*	.36	.82**	-.64**	.59**	-.52**	.54**	–	
9. T2 Identification with commitment	.77**	-.29	-.75**	.89**	-.43*	.81**	-.30	-.76**	–
10.T2 Exploration in depth	-.09	.56**	.41*	-.23	.61**	-.20	.66**	.65**	-.42*

Note. T1 = measurement before using the app, T2 = measurement after using the app; $^{*}p < .05$, $^{**}p < .01$.

RQ2: Is the use of InstaGoal App to Appraise Personal Goals Related to Identity Processes?

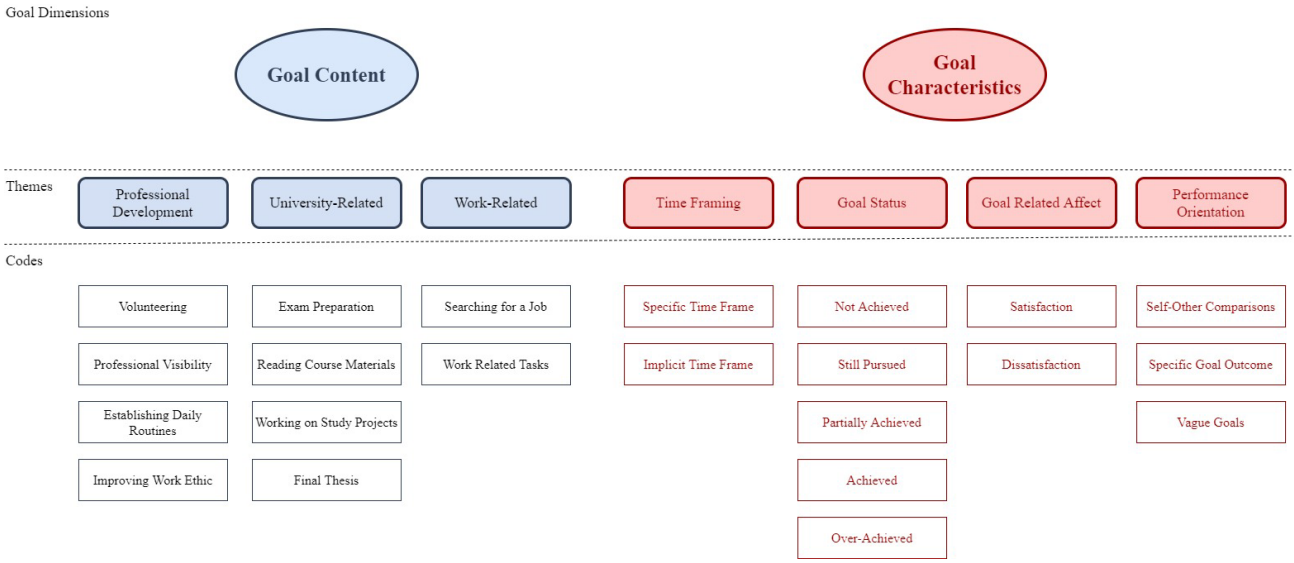
To investigate RQ2, the goal appraisals from the app were correlated with the identity process measurements. Results indicated that performance orientation was positively related to ruminative exploration ($r_s(25) = .53$, $p < .01$) and exploration in depth at T2 ($r_s(25) = .59$, $p < .01$). These results imply that after using InstaGoal, young adults who tended to set goals focused on achieving a higher performance rather than mastering a particular career topic, tended to exhibit recurrent doubts and worries about their career goals, but also explore more.

RQ3: How do Young Adults Use InstaGoal's Features to Define, Pursue, Monitor, and Subjectively Experience their Career Goals?

To answer RQ3, a deductive (i.e., top-down or theory driven) Thematic Analysis (TA) of the self-set goals and journal entries was conducted. Personal goals were analyzed on two dimensions: goal content and goal characteristics (Austin & Vancouver, 1996). Our approach was informed by Braun and Clarke's (2006) guidelines for conducting TA. The resulting thematic map can be seen in Figure 7.

Figure 7

Thematic Map



Discussion

Commitment Making and Identification with Commitment Increased After Using the InstaGoal App

The quantitative results of the study suggest that the processes of commitment making and identification with commitment increased after using the app for four weeks. These results provide indication that the app might have helped young adults set meaningful career goals which better aligned with their values and beliefs system, leading to becoming more certain

about their future career plans. This result builds upon Sharon and Zandbergen's findings (2017) who through a qualitative approach found that self-trackers construct their identity by crafting a personal narrative based on the meaning derived from their self-generated data. We believe that by providing young adults with the necessary tools for self-tracking, namely a goal history and journal, they could better diagnose what aspects of their goal pursuit should be optimized (Rooksby et al., 2014) and hence set subsequent goals which are better aligned with their values and capabilities. Moreover, it is important to note that changes associated with the use of InstaGoal app were found on both cycles of identity development, namely identity formation (i.e., commitment making) and identity evaluation (i.e., identification with commitment). This points to the fact that the app might have helped young adults not only to strengthen their commitment to goals, but also that these goals were in fact evaluated as self-meaningful, as their identification with commitment also increased.

Exploration In-Depth, Ruminative Exploration, and Performance Orientation

The quantitative analysis also found positive correlations between the performance orientation goal appraisal and the identity processes of exploration in depth and ruminative exploration, after using the app. This result might be explained by the fact that exploration in depth involves consulting with others about the commitments one has already made to gain a deeper understanding (Luyckx et al., 2006). Ruminative exploration has been previously found to be linked with performance goals (Flunger et al., 2016), which in turn revolve around comparing one's results on a goal with others', providing precedent to our findings.

How do Young Adults Use InstaGoal's Features to Define, Pursue, Monitor, and Subjectively Experience Their Career Goals?

To better understand if InstaGoal's features were used as intended and how they could be improved in the future, a thematic analysis was conducted on the self-set goals of the users

and on the journal entries. We looked at young people's goals and journal entries attached to their goals on two dimensions: goal content and goal characteristics. The goal content revealed that young adults viewed their careers as something that can be constantly improved by tweaking their habits, routines, and engaging in experimenting with different work roles. Goals were related to young adults' university studies, work- related tasks, and professional development. From a goal characteristic perspective, we identified that participants set performance-oriented goals where the desired outcome was either measurable, focused on comparing oneself with others, or vague. Additionally, the thematic analysis revealed that young adults used the journal to track their progress, write down about the status of their goals, and sometimes write about their feelings related to the goal pursuit.

Conclusion

This exploratory study contributes to the HCI research field by being the first to develop a self-tracking app for monitoring career personal goals and investigate its potential impact on identity commitment processes. The InstaGoal app included features designed to enable and encourage self-reflection, such as goal appraisals, reminders to engage, journal, and log of past use. Results showed that the identity processes of commitment making and identification with commitment increased after using the InstaGoal app, indicating that self-tracking apps represent a promising avenue for enhancing adaptive identity processes.

CHAPTER IV. GENERAL DISCUSSION

The present thesis brings forward significant theoretical, methodological, and practical contributions which will be presented in depth in the following sections. Through an innovative multidisciplinary approach, theories, frameworks, and concepts from the fields of psychology and HCI are brought together to open up new avenues in the study of identity development through mobile apps. The thesis emphasizes that in the current "appified" world (Morris &

Murray, 2018), the role of mobile apps and technology should not be overlooked when investigating identity development of digital natives. As apps are smoothly integrated in the lives of the current generation of adolescents and emerging adults, the present thesis explores the affordances of apps as data collection tools for research and as mediums of identity development through exploration and commitment.

4.1. Empirical and Theoretical Contributions

Building upon the three-factor model of identity (Crocetti et al., 2008), Study 1 aimed to identify trajectories of identity development in a sample of Romanian adolescents. The study found 5 trajectories (i.e., undifferentiated, searching-moratorium, foreclosed, diffusion, and achievement). All the trajectories were stable in terms of commitment and exploration processes. With regards to commitment, previous studies undertook in the Netherlands had mixed findings, ranging from small decreases (Luyckx et al., 2006, 2008), small increases (Meeus et al., 1999) to stable commitments (Klimstra, Hale III et al., 2010). Thus, it seems that in general commitments are rather stable throughout adolescence with no meaningful changes across time. With regards to exploration, previous studies from the Netherlands found increasing trajectories, that is, as they age, adolescents tend to explore more (Klimstra, Hale III et al., 2010; Luyckx et al., 2006, 2008). However, this was not the case in our study. This might be explained by the particularities of the Romanian educational system which leaves little room for exploration (Damian et al., 2016; Pop et al., 2016; Negru-Subtirica et al., 2015).

An important novel finding of the study is the undifferentiated trajectory, which builds upon the previously uncovered undifferentiated status (Negru-Subtirica et al., 2017). This trajectory has not been found in previous studies on identity trajectories performed in other contexts, such as the Netherlands (Meeus et al., 2012) or Japan (Hatano et al. 2020), and thus seems characteristic to the Romanian context. Another particularity of our findings is that we have not found any transitionary trajectory from one status to another, such as diffusion-to-

moratorium found in other studies (Hatano et al. 2020), instead all the trajectories uncovered in our study were stable. Regarding the other trajectories, our study's findings are in line with previous research on identity statuses and trajectories (Hatano et al. 2020; Meeus et al., 2012; Negru-Subtirica et al., 2017).

Study 2 extends our knowledge regarding the role of goal disengagement and action crisis in identity development and goal motivation. Through an innovative approach, the study investigated identity processes at the micro-level, considering concrete self-set study goals as expressions of learner identity. The study brings forward important contributions by exploring action crisis in relation to identity development processes for the first time. Previous studies have generally focused on the negative sides of action crisis and goal disengagement (Brandstätter et al., 2013; Herrmann et al., 2019; Holding et al., 2017). However, our findings point to their valuable role in identity development by reshaping one's commitments and motivation.

Study 3 outlined a key area in which psychology and HCI complement each other, that is, creating software systems to support emerging adults in strengthening their identity commitments. After a thorough review of existing mobile apps featuring goals and self-tracking, the study puts forward a theory-driven list of requirements and guidelines for developing the app. Even though the app developed during the study was just a prototype, the results were encouraging pointing to an increase of the commitment processes after one month of app usage.

4.2. Methodological Contributions

From a methodological perspective, the present thesis extends the literature of identity development in multiple ways. The studies included in the present thesis used a domain-specific approach to identity development (i.e., educational, career domains). A domain-

specific approach provides a greater explanatory power than a global approach as identity develops differently across distinct life domains (Goossens, 2001).

Study 1 employed a longitudinal design. The data collection included 4-time intervals, one each semester over the course of 2 academic years. The data was analysed using Latent Class Growth Analysis (LCGA; Jung & Wickrama, 2008; Nagin, 2005) which represents a combined variable and person-centered approach. This analysis classifies participants in 5 different identity trajectories characterized by different combinations of intercepts, liniar, and quadratic slopes of the three identity processes. Through this approach, the study builds upon previous cross-sectional research on identity statuses in the Romanian context by adding the time dimension and thus, investigating identity trajectories rather than statuses (Negru-Subtirica et al., 2017).

Study 2 made use of an intensive longitudinal design. A proprietary mobile app for iOS and Android operating systems was developed to facilitate data collection. To answer the research questions, the study's design aimed to capture action crisis and the moment of goal disengagement and reengagement as close to real-time as possible. Thus, the app enabled users to change their goals at any time. Users could self-monitor their pursuits and change their goals. This is a novel endeavor, as most past studies on goal disengagement used questionnaires measuring disengagement impulses and not the actual act of disengagement (Skhirtladze et al., 2021). The study took an idiographic-nomothetic approach through the use of self-set goals by asking participants to type their goal in the app and quantitatively appraise their goals.

The methodology employed in Study 3 facilitated the design, development, and testing of InstaGoal, a mobile app aimed at strengthening identity commitments through personal goals. The design process included formulating specific requirements for the app based on psychological theories of identity processes and goal-setting, HCI research on self-tracking, and also built upon other apps featuring goals and self-tracking.

In order to test the application, both qualitative and quantitative methods were employed. A thematic analysis was performed to uncover how the app was used, what goals emerging adults set, and what content they included in the journal. The process employed in conducting the thematic analysis followed the stages described by Braun and Clarke (2006). The quantitative methods included Repeated Measures Multivariate Analysis of Variance (RM-MANOVA) to test how the identity processes changed after using the mobile app.

4.3. Practical Implications

The studies included in the present thesis showcase mobile apps both as an important asset in any researcher's toolset, as well as a promising medium for psychological interventions. Considering the second study of the thesis, the practical implications stem equally from the study's findings themselves related to goal disengagement, action crisis, goal motivation and identity formation, and also from the methodology of developing and using a mobile app to answer research questions. The results confirm that action crisis and goal disengagement play an important role in identity formation by allowing emerging adults to refocus their resources towards new commitments. This result highlights once again the dynamic nature of identity formation as action crises and disengagement seem to lead to the incorporation of new commitments into the self. Thus, persisting against all odds is not always the best course of action and recognizing when to disengage and reengage may often lead to better outcomes. Even though the process of disengagement through the arduous action crisis is hard, the end results may very well be worthwhile.

Developing and using a mobile app for the research of such questions in itself brings forward essential practical implications. Apps prove to be very valuable assets in a researcher's toolset, especially nowadays. Apps afford new methods of data collection which are simply not feasible using traditional paper-and-pencil surveys. One such feature of apps is that they allow for personalized surveys based on past answers or other parameters. For example, in the present

thesis, participants were asked questions related to action crisis only if they pursued the same goal for multiple measurement times. Another important affordance of apps is that they allow for relatively inexpensive collection of intensive longitudinal data as participants can be prompted to answer multiple times without having to be in their physical proximity. Additionally, apps offer increased ecological validity as some data can be collected automatically (e.g., location, app use time, physical activity) and surveys can be distributed multiple times a day, at set intervals, at random intervals, or based on cues (e.g., when the participant is in proximity of a point of interest or when the participant performs a certain action, such as setting a new goal). Moreover, apps reduce logistical costs associated with gathering participants, offering instructions, and collecting data, as installing and using a properly designed mobile app should require minimal effort and guidance.

Through practical guidelines for designing apps for developping identity processes, the third study of the thesis paves the way for future designs in the field. By not only coming up with guidelines, but also applying them in the design, development, and testing of a mobile app, the study pushes the boundaries, showing that apps may be a very valuable medium for psychological interventions. Reading this paper, app designers, psychologists, and HCI researchers have a starting point in developing their own app-based interventions.

4.4. Limitations and Future Directions

Limitations are inherent in any research endeavor, thus, in the following section, a summary of the main constraints of the present research will be presented. Promising future directions which can have broader implications will also be offered in this section.

First, the results of the studies included in the thesis are correlational in nature and do not allow for clear causal conclusions. The analyses employed in Study 1 did not allow for directional conclusions between perceived parental SES, perceived career-related behaviors, and developmental trajectories of educational identity processes. In the case of Study 2, the

temporal order of first experiencing an action crisis, then disengaging from a goal, followed by reengagement in a new goal, makes the inferred causality of action crisis predicting identity development plausible even though other causes may also be possible. Regarding Study 3, the results showed that after using the InstaGoal app for one month participants' commitments increased, however the change in commitment cannot be clearly attributed to the app, due to a lack of a control group. Future studies concerned with delivering identity interventions through mobile apps could go a step further and employ more detailed user testing, A/B testing methods, and control groups to clearly distinguish which app features have the greatest effects, what functionalities are not used at their fullest, and which aspects can be further improved.

Second, the quality of the samples used in Studies 2 and 3 qualify the results as preliminary findings. In both studies, most of the participants were female (80%) undergraduate students. The sample representativeness limits the generalizability of the study findings to different gender or social groups. To overcome this limitation, future studies should employ samples more balanced in terms of gender and from different social groups, such as working emerging adults.

Third, in both Studies 2 and 3, only one goal was tracked at a time. This is not necessarily true in real life, where people generally pursue multiple goals at the same time. By allowing participants to pursue and track multiple goals in the app, future studies may be more ecologically valid while also having the opportunity to tap into questions related to conflicting goals.

4.5. Concluding Remarks

The present thesis investigated the overarching objective of developing, designing, and testing of mobile apps relevant to identity development research. Through the three original studies included in the thesis, we addressed theoretical, methodological, and practical questions related to identity development. The findings of the first study revealed that educational

identity trajectories were stable at the macro-level over the course of two years. At the micro-level, the second study found increases of identity commitments at the moment of goal reengagement and that the increases correlated with the severity of the action crisis prior to disengagement and reengagement. Methodologically, the thesis brings forward important contributions by using state-of the art analyses, such as LCGA in the first study; developing and utilizing mobile apps for data collection in the second study; and by bridging psychology and HCI fields to design, develop, and test a mobile app aimed at increasing identity processes in the third study. From a practical perspective, the thesis provides valuable insights into how apps may successfully be used both as research tools and interventions outlets.

CHAPTER V. REFERENCES

Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist, 55*(5), 469-480. https://doi.org/10.1037/0003-066X.55.5.469

Arnett, J. J. (2004). Adolescence in the 21st century: A worldwide survey. In U. P. Gielen & J. Roopnarine (Eds.), *Childhood and Adolescence: Cross-Cultural Perspectives and Applications* (pp. 277-294). Praeger.

Arnett, J. J. (2018). Conceptual foundations of emerging adulthood. In J. L. Murray & J. J. Jensen Arnett (Eds.), *Emerging adulthood and higher education* (pp. 11-24). Routledge.

Austin, J. T., & Vancouver, J. B. (1996). Goal constructs in psychology: Structure, process and content. *Psychological Bulletin*, *120*(3), 338-375. https://doi.org/10.1037/0033-2909.120.3.338

Becht, A. I., Nelemans, S. A., Branje, S. J., Vollebergh, W. A., & Meeus, W. H. (2021). Daily identity dynamics in adolescence shaping identity in emerging adulthood: an 11-year longitudinal study on continuity in development. *Journal of Youth and Adolescence*, *50*(8), 1616–1633. https://doi.org/10.1007/s10964-020-01370-3

Brandstätter, V., & Herrmann, M. (2016). Goal disengagement in emerging adulthood: The adaptive potential of action crises. *International Journal of Behavioral Development*, *40*(2), 117-125. https://doi.org/10.1177/0165025415597550

Brandstätter, V., & Herrmann, M. (2018). Goal disengagement and action crises. In N. Baumann, M. Kazén, M. Quirin, & S. L. Koole (Eds.), *Why people do the things they do: Building on Julius Kuhl's contributions to the psychology of motivation and volition* (pp. 87–108). Hogrefe Publishing.

Brandstätter, V., & Schüler, J. (2013). Action crisis and cost–benefit thinking: A cognitive analysis of a goal-disengagement phase. *Journal of Experimental Social Psychology*, *49*(3), 543-553. https://doi.org/10.1016/j.jesp.2012.10.004

Brandstätter, V., Herrmann, M., & Schüler, J. (2013). The struggle of giving up personal goals: Affective, physiological, and cognitive consequences of an action crisis. *Personality and Social Psychology Bulletin*, *39*(12), 1668-1682. https://doi.org/10.1177/0146167213500151

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101. https://doi.org/10.1191/1478088706qp063oa

Capelle, J. D., Grunschel, C., Bachmann, O., Knappe, M., & Fries, S. (2022). Multiple action options in the context of time: When exams approach, students study more and experience fewer motivational conflicts. *Motivation and Emotion*, *46*(1), 16-37. https://doi.org/10.1007/s11031-021-09912-3

Carver, C. S., & Scheier, M. F. (1998). *On the Self-regulation of Behavior*. Cambridge University Press.

Carver, C. S., & Scheier, M. F. (2012). Cybernetic control processes and the self-regulation of behavior. In R. M. Ryan (Ed.), *The Oxford handbook of human motivation* (pp. 28–42). Oxford University Press.

Clark, M., & Lupton, D. (2022). The materialities and embodiments of mundane software: exploring how apps come to matter in everyday life. *Online Information Review,* (ahead-of-print). https://doi.org/10.1108/OIR-12-2020-0565

Corpus, J. H., Robinson, K. A., & Wormington, S. V. (2020). Trajectories of motivation and their academic correlates over the first year of college. *Contemporary Educational Psychology*, *63*, 101907. https://doi.org/10.1016/j.cedpsych.2020.101907

Crocetti E., Cieciuch J., Gao C. H., Klimstra T., Matos P. M., Morsunbul U., Negru O.,

Sugimura K., Zimmermann G., Meeus W. (2015). National and gender measurement invariance of the Utrecht-Management of Identity Commitments Scale (U-MICS): A ten-nation study. *Assessment, 22*(6), 753-768. https://doi.org/10.1177/1073191115584969

Crocetti, E. (2017). Identity formation in adolescence: The dynamic of forming and consolidating identity commitments. *Child Development Perspectives, 11(2)*, 145-150. https://doi.org/10.1111/cdep.12226

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*(2), 207-222. https://doi.org/10.1016/j.adolescence.2007.09.002

Damian, L. E., Negru-Subtirica, O., Domocus, I. M., & Friedlmeier, M. (2020). Healthy financial behaviors and financial satisfaction in emerging adulthood: A parental socialization perspective. *Emerging Adulthood, 8*(6), 548-554. https://doi.org/10.1177/2167696819841952

Damian, L. E., Negru-Subtirica, O., Pop, E. I., & Baban, A. (2016). The costs of being the best: Consequences of academic achievement on students' identity, perfectionism, and vocational development. In A. Montgomery & I. Kehoe (Eds.), *Reimagining the purpose of schools and educational organisations* (pp. 173-188). Springer. https://doi.org/10.1007/978-3-319-24699-4_13

De Nadai, M., Cardoso, A., Lima, A., Lepri, B., & Oliver, N. (2019). Strategies and limitations in app usage and human mobility. *Scientific Reports, 9*(1), 1-9. https://doi.org/10.1038/s41598-019-47493-x

Deci, E. L., & Ryan, R. M. (2000). The" what" and" why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227-268. https://doi.org/10.1207/S15327965PLI1104_01

Dietrich, J., & Kracke, B. (2009). Career-specific parental behaviors in adolescents' development. *Journal of Vocational Behavior*, *75*(2), 109-119. https://doi.org/10.1016/j.jvb.2009.03.005

Dietrich, J., & Salmela-Aro, K. (2013). Parental involvement and adolescents' career goal pursuit during the post-school transition. *Journal of Adolescence*, *36*(1), 121-128. https://doi.org/10.1016/j.adolescence.2012.10.009

Elliot, A. J., & Fryer, J. W. (2008). The goal construct in psychology. In J. Y. Shah & W. L. Gardner (Eds.), *Handbook of motivation science* (pp. 235–250). Guilford Press.

Erikson, E. (1950). *Childhood and society*. Norton.

Erikson, E. (1968). *Identity, youth and crisis*. Norton.

Fleck, R., & Fitzpatrick, G. (2010). Reflecting on reflection: framing a design landscape. In S. Viller & B. Kraal (Eds.), *OZCHI '10:Proceedings of the 22nd Conference of the Computer-Human Interaction Special Interest Group of Australia on Computer-Human Interaction (*pp. 216-223*).* ACM. https://doi.org/10.1145/1952222.1952269

Flunger, B., Marttinen, E., Tuominen-Soini, H., & Salmela-Aro, K. (2016). How do young adults orchestrate their multiple achievement-related goals? Associations of achievement goal orientations with identity formation and goal appraisals. *Research in Human Development*, *13*(4), 342-362. https://doi.org/10.1080/15427609.2016.1234309

Gardner, H., & Davis, K. (2013). *The app generation: How today's youth navigate identity, intimacy, and imagination in a digital world*. Yale University Press.

Ghassemi, M., Bernecker, K., Herrmann, M., & Brandstätter, V. (2017). The process of disengagement from personal goals: Reciprocal influences between the experience of action crisis and appraisals of goal desirability and attainability. *Personality and Social Psychology Bulletin*, *43*(4), 524-537. https://doi.org/10.1177/0146167216689052

Ghassemi, M., Wolf, B. M., Bettschart, M., Kreibich, A., Herrmann, M., & Brandstätter, V. (2021). The dynamics of doubt: Short-term fluctuations and predictors of doubts in personal goal pursuit. *Motivation Science, 7(2),* 153–164. https://doi.org/10.1037/mot0000210

Gollwitzer, P. M. (1990). Action phases and mind-sets. In T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition: Foundations of social behavior* (Vol. 2, pp. 53–92). Guilford Press.

Gollwitzer, P. M. (2012). Mindset theory of action phases. In P. A. M. van Lange, A. W. Kruglanski, & T. E. Higgins (Eds.), *Handbook of theories of social psychology* (pp. 526– 545). Sage Publication.

Goossens, L. (2001). Global versus domain-specific statuses in identity research: A comparison of two self-report measures. *Journal of Adolescence*, *24*(6), 681-699. https://doi.org/10.1006/jado.2001.0438

Grund, A., Fries, S., & Rheinberg, F. (2018). Know your preferences: Self-regulation as need-congruent goal selection. *Review of General Psychology*, *22*(4), 437-451. https://doi.org/10.1037/gpr0000159

Hatano, K., Sugimura, K., Crocetti, E., & Meeus, W. H. (2020). Diverse-and-dynamic pathways in educational and interpersonal identity formation during adolescence: Longitudinal links with psychosocial functioning. *Child Development*, *91*(4), 1203-1218. https://doi.org/10.1111/cdev.13301

Herrmann, M., Brandstätter, V., & Wrosch, C. (2019). Downgrading goal-relevant resources in action crises: The moderating role of goal reengagement capacities and effects on well-being. *Motivation and Emotion*, *43*(4), 535-553. https://doi.org/10.1007/s11031-019-09755-z

Holding, A. C., Hope, N. H., Harvey, B., Marion Jetten, A. S., & Koestner, R. (2017). Stuck in limbo: Motivational antecedents and consequences of experiencing action crises in personal goal pursuit. *Journal of Personality*, *85*(6), 893-905. https://doi.org/10.1111/jopy.12296

Holding, A. C., Moore, E., Moore, A., Verner-Filion, J., Ouellet-Morin, I., & Koestner, R. (2021). When goal pursuit gets hairy: A longitudinal goal study examining the role of controlled motivation and action crises in predicting changes in hair cortisol, perceived stress, health, and depression symptoms. *Clinical Psychological Science*, *9*(6), 1214-1221. https://doi.org/10.1177/2167702621995214

Jung, T., & Wickrama, K.A.S. (2008). An introduction to latent class growth analysis and growth mixture modeling. *Social and Personality Psychology Compass*, *2*(1), 302-317. https://doi.org/10.1111/j.1751-9004.2007.00054.x

Karaś D., Topolewska-Siedzik E., & Negru-Subtirica O. (2018). Contemporary views on personal identity formation. *Studia Psychologica: Theoria Et Praxis*, *1*(18), 5-25. https://doi.org/10.21697/sp.2018.18.1.01

Klimstra, T. A., & Schwab, J. R. (2021). Time and identity: An evaluation of existing empirical research, conceptual challenges, and methodological opportunities. *Identity*, *21*(4), 275-288. https://doi.org/10.1080/15283488.2021.1924722

Klimstra, T. A., Hale III, W. W., Raaijmakers, Q. A., Branje, S. J., & Meeus, W. H. (2010). Identity formation in adolescence: Change or stability?. *Journal of Youth and*

Adolescence, 39(2), 150-162. https://doi.org/10.1007/s10964-009-9401-4

Klimstra, T. A., Luyckx, K., Hale, W. A., Frijns, T. v., & Meeus, W. H. (2010). Short-term fluctuations in identity: Introducing a micro-level approach to identity formation. *Journal of Personality and Social Psychology*, *99*(1), 191-202. https://doi.org/10.1037/a0019584

Kocielnik, R., Xiao, L., Avrahami, D., & Hsieh, G. (2018). Reflection companion: a conversational system for engaging users in reflection on physical activity. In *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies* (pp. 1-26). ACM. https://doi.org/10.1145/3214273

Koestner, R., Lekes, N., Powers, T. A., & Chicoine, E. (2002). Attaining personal goals: Self-concordance plus implementation intentions equals success. *Journal of Personality and Social Psychology*, *83*(1), 231. https://doi.org/10.1037/0022-3514.83.1.231

Kroger, J., Martinussen, M., & Marcia, J. E. (2010). Identity status change during adolescence and young adulthood: A meta-analysis. *Journal of Adolescence*, *33*(5), 683-698. https://doi.org/10.1016/j.adolescence.2009.11.002

Kunnen, E. S., & Sugimura, K. (2021). Real-time Identity Processes: Theories and Methods. *Identity*, *21*(4), 271-274. https://doi.org/10.1080/15283488.2021.1985845

Lee, M. K., Kim, J., Forlizzi, J., & Kiesler, S. (2015). Personalization revisited. In *UbiComp '15: Proceedings of the 2015 ACM International Joint Conference on Pervasive and Ubiquitous Computing (*pp. 743-754*)*. ACM. https://doi.org/10.1145/2750858.2807552

Lichtwarck-Aschoff, A., van Geert, P., Bosma, H., & Kunnen, S. (2008). Time and identity: A framework for research and theory formation. *Developmental Review*, *28*(3), 370-400. https://doi.org/10.1016/j.dr.2008.04.001

Little, B. R. (1983). Personal Projects. A Rationale and Method for Investigation. *Environment and Behavior, 15*(3) 273–309. https://doi.org/10.1177/0013916583153002

Lupton D. (2018). Lively data, social fitness and biovalue: the intersections of health self-tracking and social media. In J. Burgess, A. Marwick, & T. Poell (Eds.), *The Sage Handbook of Social Media* (pp. 562-578). Sage.

Luyckx, K., Goossens, L., Soenens, B., & Beyers, W. (2006). Unpacking commitment and exploration: Preliminary validation of an integrative model of late adolescent identity formation. *Journal of Adolescence, 29*(3), 361-378. https://doi.org/10.1016/j.adolescence.2005.03.008

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*(1), 58-82. https://doi.org/10.1016/j.jrp.2007.04.004

Marcia, J. E. (1966). Development and validation of ego-identity status. *Journal of Personality and Social Psychology*, *3*(5), 551-558. https://doi.org/10.1037/h0023281

Marcionetti, J., & Rossier, J. (2017). The mediating impact of parental support on the relationship between personality and career indecision in adolescents. *Journal of Career Assessment*, *25*(4), 601-615. https://doi.org/10.1177/1069072716652890

Meeus, W., Iedema, J., Helsen, M., & Vollebergh, W. (1999). Patterns of adolescent identity development: Review of literature and longitudinal analysis. *Developmental Review*, *19*(4), 419 – 461. https://dx.doi.org/10.1006/drev.1999.0483

Meeus, W., van de Schoot, R., Keijsers, L., & Branje, S. (2012). Identity statuses as developmental trajectories: A five-wave longitudinal study in early-to-middle and middle-to-late adolescents. *Journal of Youth and Adolescence*, *41*(8), 1008-1021.

https://doi.org/10.1007/s10964-011-9730-y

Michikyan, M. (2020). Linking online self-presentation to identity coherence, identity confusion, and social anxiety in emerging adulthood. *British Journal of Developmental Psychology, 38*, 543-565. https://doi.org/10.1111/bjdp.12337

Michikyan, M., Dennis, J., & Subrahmanyam, K. (2015). Can you guess who I am? Real, ideal, and false self-presentation on Facebook among emerging adults. *Emerging Adulthood*, *3*, 55-64. https://doi.org/10.1177/2167696814532442

Morris, J.W., & Elkins, E. (2015). There's a history for that: apps and mundane software as commodity. *The Fibreculture Journal*, *25*. https://doi.org/10.15307/fcj.25.181.2015

Morris, J.W., & Murray, S. (2018). Introduction. In J.W. Morris & S. Murray (Eds.), *Appified: Culture in the Age of Apps* (pp. 1-19). University of Michigan Press.

Nagin D. S. (2005). *Group-based modeling of development*. Harvard University.

Negru, O. (2009). The dynamics of Romanian students' personal goals: Influences of educational level, previous work experience and gender. *Studia Universitatis Babes-Bolyai-Psychologia-Paedagogia Series, 54*, 3-17.

Negru, O., Subţirică, A., & Opre, A. (2011). The dynamics of aspirations in emerging adulthood. *Procedia - Social and Behavioral Sciences, 12*, 205-210. https://doi.org/10.1016/j.sbspro.2011.02.028

Negru-Subtirica, O., & Damian, L. E. (2018). The great escape: Linking youth identity development to growing up in post-communist Romania. In N. Lebedeva, R. Dimitrova, & J. Berry (Eds.) *Changing Values and Identities in the Post-Communist World* (pp. 333-347). Springer International Publishing.

Negru-Subtirica, O., & Pop, E. I. (2018). Reciprocal associations between educational identity and vocational identity in adolescence: A three-wave longitudinal investigation. *Journal of Youth and Adolescence, 47*(4), 703-716.

https://doi.org/10.1007/s10964-017-0789-y

Negru-Subtirica, O., Pop, E. I., & Crocetti, E. (2015). Developmental trajectories and reciprocal associations between career adaptability and vocational identity: A three-wave longitudinal study with adolescents. *Journal of Vocational Behavior*, *88*, 131-142. https://doi.org/10.1016/j.jvb.2015.03.004

Negru-Subtirica, O., Pop, E. I., & Crocetti, E. (2017). A longitudinal integration of identity styles and educational identity processes in adolescence. *Developmental Psychology, 53*(11), 2127-2138. https://doi.org/10.1037/dev0000325

Negru-Subtirica, O., Pop, E. I., & Crocetti, E. (2018). Good Omens? The intricate relations between educational and vocational identity in adolescence. *European Journal of Developmental Psychology – Special Issue: Identity behind the Iron Curtain, 15*(1), 83-98. https://doi.org/10.1080/17405629.2017.1313160

Nurmi, J. E. (1991). How do adolescents see their future? A review of the development of future orientation and planning. *Developmental Review*, *11*, 1–59. https://doi.org/10.1016/0273-2297(91)90002-6

Nurmi, J. E. (2004). Socialization and self-development: Channeling, selection, adjustment, and reflection. In R. Lerner & L. Steinberg (Eds.), *Handbook of adolescent psychology* (pp. 85–124). Wiley.

Pennebaker, J.W. (2003). Telling stories. The health benefits of disclosure. In J.M. Wilce (Ed.), *Social and Cultural Lives of Immune Systems* (pp. 19-34). Routledge.

Pop, E. I., Negru-Subtirica, O., Crocetti, E., Opre, A., & Meeus, W. (2016). On the interplay between academic achievement and educational identity: A longitudinal study. *Journal of Adolescence*, *47*, 135–144. https://doi.org/10.1016/j.adolescence.2015.11.004

Prensky, M. (2001). Digital Natives, Digital Immigrants Part 1. *On the Horizon*, *9(*5), 1-6. https://doi.org/10.1108/10748120110424816

Quon E. C., McGrath J. J. (2014). Subjective socioeconomic status and adolescent health: A meta-analysis. *Health Psychology*, *33*(5), 433. 447, https://doi.org/10.1037/a0033716

Rivnyák, A., Péley, B., Zsidó, A. N., & Láng, A. (2021). The impact of socioeconomic status upon adolescent identity Formation: The mediating role of family characteristics. *Identity*, 22(4), 1-10. https://10.1080/15283488.2021.1954519

Rooksby, J., Rost, M., Morrison, A., & Chalmers, M. (2014). Personal tracking as lived informatics. In *Proceedings of the SIGCHI conference on human factors in computing systems* (pp. 1163-1172). ACM. https://doi.org/10.1145/2556288.2557039

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Publications.

Salmela-Aro, K. (2001). Personal goals during the transition to young adulthood. In J. Nurmi (Ed.), *Navigating through adolescence: European perspectives* (pp. 59–84). RoutledgeFalmer.

Salmela-Aro, K. (2009). Personal goals and well-being during critical life transitions: The four C's – Channelling, choice, co-agency and compensation. *Advances in Life Course Research*, *14*(1-2), 63–73. https://doi.org/10.1016/j.alcr.2009.03.003

Sharon, T., & Zandbergen, D. (2017). From data fetishism to quantifying selves: Self-tracking practices and the other values of data. *New Media & Society, 19*(11), 1695-1709. https://doi.org/10.1177/1461444816636090

Sheldon, K. M., & Elliot, A. J. (1999). Goal striving, need-satisfaction, and longitudinal well-being: The Self-Concordance Model. *Journal of Personality and Social Psychology*, *76*(3), 482-497. https://doi.org/10.1037/0022-3514.76.3.482

Skhirtladze, N., Luyckx, K., & Schwartz, S. J. (2021). Longitudinal associations between Identity processes and goal engagement and disengagement: Directionality of effects and correlated change. *Social Development*, *30*(3), 833-849. https://doi.org/10.1111/sode.12502

Skinner, E. A., Rickert, N. P., Vollet, J. W., & Kindermann, T. A. (2022). The complex social ecology of academic development: A bioecological framework and illustration examining the collective effects of parents, teachers, and peers on student engagement. *Educational Psychologist, 57*(2), 87–113. https://doi.org/10.1080/00461520.2022.2038603

Skorikov, V. B., & Vondracek, F. W. (2011). Occupational identity. In S. J. Schwartz, K. Luyckx, & V. L. Vignoles (Eds.), *Handbook of Identity Theory and Research* (pp. 693-714). Springer.

Sugimura, K., & Kunnen, E. S. (2022). Real-Time Identity Processes: Empirical Applications. *Identity*, *22*(1), 1-5. https://doi.org/10.1080/15283488.2022.2036929

Teismann, T., Het, S., Grillenberger, M., Willutzki, U., & Wolf, O. T. (2014). Writing about life goals: Effects on rumination, mood and the cortisol awakening response. *Journal of Health Psychology, 19*(11), 1410-1419. https://doi.org/10.1177/1359105313490774

Thomas, L., Briggs, P., Hart, A., & Kerrigan, F. (2017). Understanding social media and identity work in young people transitioning to university. *Computers in Human Behavior, 76*, 541-553. https://doi.org/10.1016/j.chb.2017.08.021

Timar-Anton, C., Negru-Subtirica, O., & Damian, L. E. (2023). The Role of Parental Socio-Economic Status and Perceived Career-Related Behaviors in Developmental Trajectories of Educational Identity in Adolescence: A Four-Wave Study. *European Journal of Personality*, *0*(0). https://doi.org/10.1177/08902070221150480

Timar-Anton, C., Negru-Subtirica, O., & Opre, A. (2021). The development and testing of a mobile self-tracking app to strengthen identity commitments through personal goals. *International Journal of Human-Computer Studies, 151,* 102642. https://doi.org/10.1016/j.ijhcs.2021.102642

Timar-Anton, C., Negru-Subtirica, O., & Opre, A. (2022). How first-year students manage their action crises and motivation to build their learner identity: a look into the critical moment of goal disengagement. *Motivation and Emotion*, *46*, 852-867. https://doi.org/10.1007/s11031-022-09965-y

Van der Gaag, M. A., De Ruiter, N. M., Kunnen, S. E., & Bosma, H. (2020). The landscape of identity model: An integration of qualitative and quantitative aspects of identity development. *Identity*, *20*(4), 272-289. https://doi.org/10.1080/15283488.2020.1821154

Vignoles, V. L., Schwartz, S. J., Luyckx, K. (2011). Introduction: Toward an integrative view of identity. In S.J. Schwartz, K. Luyckx, & V.L. Vignoles (Eds.), *Handbook of Identity Theory and Research* (pp. 1-27). Springer.

Villalobos-Zúñiga, G., & Cherubini, M. (2020). Apps That Motivate: a Taxonomy of App Features Based on Self-Determination Theory. *International Journal of Human-Computer Studies*, *140,* 102449. https://doi.org/10.1016/j.ijhcs.2020.102449

Yang, C. C., Holden, S. M., & Carter, M. D. (2017). Emerging adults' social media self-presentation and identity development at college transition: Mindfulness as a moderator. *Journal of Applied Developmental Psychology*, *52*, 212-221. https://doi.org/10.1016/j.appdev.2017.08.006

Zammitti, A., Scuderi, V., & Russo, A. (2020). Perceived career parental support and identity development: a study on adolescents. *Interdisciplinary Journal of Family Studies*, *25*(1), 27-46. https://ijfs.padovauniversitypress.it/2020/1/3

Zhou, N., Cao, H., Nie, Y., Li, X., Yu, S., Liang, Y., Deng, L., Buehler, C., Zang, N., Sun, R., & Fang, X. (2020). Career-related parental processes and career adaptability and ambivalence among Chinese adolescents: A person-centered approach. *Journal of Research on Adolescence*, *30*(1), 234-248. https://dx.doi.org/10.1111/jora.12520