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CICLO XXVII

**INTEGRATING VARIABLE- AND PERSON-ORIENTED APPROACHES  
TO THE STUDY OF SELF-EFFICACY BELIEFS DEVELOPMENT  
IN A NURSING EDUCATION SETTING.**

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**GENERAL SUMMARY (ENG)**

The present dissertation aimed to investigate the role of self-efficacy (SE) beliefs development across different life functioning spheres with respect to some relevant health and psychosocial outcomes within a nursing education setting. As a research framework, we integrated the variable-centered and the person-centered approaches in a longitudinal perspective, hypothesizing that intra-individual cross-sectional and longitudinal variability could play an important role in explaining inter-individual differences on nursing students' adjustment process.

Study 1 was aimed to unravel the role of patterned intra-individual differences in some self-efficacy (SE) dimensions (i.e., related to emotional, social and academic regulatory spheres) in explaining inter-individual differences along the adjustment process of two cohorts of nursing students. By adopting the integrated research perspective discussed above, 4 intra-individual configurations of SE beliefs were detected and replicated across cohorts: a group of students showed to enter the nursing program with a high sense of personal efficacy in all the considered dimensions, two groups showed an intermediate functioning (one connoted by lower sense of perceived academic regulatory skills, the second by a lower SE in emotional management dimensions), and a group with an overall low-functioning across dimensions. These pattern were found to explain individual differences in depression, life satisfaction and physical symptoms both concurrently and longitudinally, with the high-functioning group elected as the best adjusted. Moreover, results from alternative informative hypotheses enlightened an adjustment gradient, where intermediate-functioning patterns were found to be not mutually discriminative.

Study 2 investigated a cohort of nursing students by using three-time points of assessment implemented in a longitudinal design. Adopting an integrated social cognitive perspective both on personality and gender development, the aim of present study was

threefold: a) investigating gender differences in self-efficacy in mastering negative emotions (henceforth, SE-MNE) growth; b) identifying unobserved intra-individual trajectories of SE-MNE; and c) evaluating the impact of alternative paths of SE-MNE trajectories on depression. Findings showed that males entered the nursing program with a higher level of SE-MNE than females, whereas girls showed a significant higher increase in SE-MNE during the overall assessment span. Moreover, 4 patterns were found to represent unobserved sub-groups in SE-MNE development: the higher was the probability to be clustered into a high-stable or mean-high increasing trajectory, the lower the probability to be depressed at the last point of assessment, after controlling for its previous levels. Finally, by using a Bayesian approach in testing a set of informative hypotheses, the 4 different patterns were found to be associated to 4 different levels of depression.

Study 3 was designed in order to understand the link between intra-individual conjoint development in SE facets and inter-individual differences in burnout and work engagement within a cohort of nursing students. By adopting a longitudinal design with three time points of assessment, Multi-Process Latent Class Growth Analysis (MP-LCGA) has been used in order to identify longitudinal integrated patterns of SE beliefs in emotional, social and academic spheres of personal functioning. Results provided a 4-class solution, evidencing an overall high-functioning pattern, two intermediate functioning configuration (the first with a less favorable trend of academic regulatory efficacy, the second by low stable trajectories of SE dimensions in emotional management), and an overall low-functioning longitudinal structure of SE beliefs development. These patterns were found to be discriminant for burnout and work engagement at the last point of assessment, where the high-functioning pattern showed to be the best adjusted. Moreover, results from Bayesian evaluation of informative hypotheses suggest that academic regulatory efficacy played a key role along the adaptation continuum, rather than SE beliefs in mastering negative

consequences of affect. Findings and practical implications of the present dissertation are discussed, along with some suggestions to move forward in this direction.

**GENERAL SUMMARY (ITA)**

L'obiettivo principale di questa tesi è stato quello di investigare il ruolo dello sviluppo delle convinzioni di autoefficacia e il loro impatto sul benessere personale e psicosociale all'interno di un contesto universitario relativo alle professioni sanitarie. Come cornice di ricerca, sono stati integrati gli approcci alla variabile e alla persona, ipotizzando che la variabilità intra-individuale potesse giocare un ruolo fondamentale nella spiegazione delle differenze individuali nel processo di adattamento degli studenti target dell'indagine sia rispetto al contesto accademico che di tirocinio.

Il primo studio è stato dedicato all'individuazione di alcune configurazioni intra-individuali delle convinzioni di autoefficacia relative a tre differenti sfere del funzionamento personale (i.e., gestione delle emozioni, relazioni sociali all'interno del contesto accademico e autoregolazione nell'apprendimento universitario). A tal scopo, sono stati utilizzati due gruppi differenti di studenti delle professioni sanitarie. La soluzione che meglio ha rappresentato i dati analizzati prevedeva 4 gruppi: un primo gruppo aveva punteggi alti in tutte le dimensioni, un secondo e un terzo presentavano dei profili intermedi (uno connotato da bassi punteggi nella regolazione dell'apprendimento, l'altro nelle competenze di gestione delle emozioni), e infine un gruppo particolarmente vulnerabile sotto tutti i punti di vista. Questi pattern si sono rivelati essere discriminanti rispetto ad alcuni indicatori di adattamento (i.e., depressione, soddisfazione di vita, sintomi fisici), sia concorrentemente che longitudinalmente. Tuttavia, i pattern intermedi non si sono rivelati mutuamente differenti rispetto al processo di adattamento.

Il secondo studio ha previsto un disegno di ricerca longitudinale a tre tempi di valutazione che ha coinvolto una unica coorte di studenti delle professioni sanitarie. Adottando una prospettiva social cognitiva rispetto allo sviluppo della personalità e delle

differenze di genere, tre sono stati gli obiettivi di questa ricerca: a) investigare le differenze di genere nelle traiettorie relative alle capacità percepite di gestione delle emozioni negative (SE-MNE); b) identificare dei gruppi di studenti relativamente omogenei aventi simili traiettorie intra-individuali nello sviluppo di tali competenze; c) valutare l'impatto di questi percorsi alternativi di SE-MNE durante il periodo dell'indagine rispetto all'insorgenza e allo sviluppo della depressione. I risultati hanno mostrato che i maschi hanno cominciato il corso di studi con una convinzione più forte di poter gestire le emozioni negative rispetto alle femmine, sebbene queste incrementino maggiormente questa competenza durante il periodo preso in considerazione rispetto alla loro controparte maschile. Inoltre, attraverso delle appropriate tecniche di analisi dei dati finalizzate all'individuazione di gruppi longitudinali non osservabili rispetto alle traiettorie di SE-MNE, quattro pattern descrivevano tale fenomeno: un gruppo avente una traiettoria stabile che aveva cominciato il suo percorso da un alto livello, un gruppo che al primo tempo di misura aveva un livello medio-alto di SE-MNE e l'ha incrementato leggermente durante il periodo preso in considerazione, un ulteriore gruppo sostanzialmente parallelo a questo con dei livelli iniziali di SE-MNE medio-bassi e, infine, un gruppo stabile che aveva cominciato la propria esperienza accademica con punteggi bassi. Una maggiore probabilità di essere classificato nel primo o nel secondo gruppo ha rappresentato per gli studenti una protezione dalla depressione all'ultimo tempo di misura, controllando per i suoi livelli precedenti, mentre un effetto opposto veniva esercitato dalla probabilità di essere clusterizzati nell'ultimo gruppo. Inoltre, i 4 pattern longitudinali di SE-MNE si sono rivelati altamente discriminanti tra loro rispetto agli esiti depressivi dell'ultimo tempo di misurazione.

Il terzo studio è stato implementato per comprendere il legame tra lo sviluppo congiunto di alcune dimensioni di autoefficacia a livello intra-individuale e le differenze inter-individuali nel burnout e nel coinvolgimento degli studenti target del progetto di ricerca tanto in ambito accademico quanto in quello di tirocinio clinico. Sono emerse quattro

configurazioni soggiacenti a tale sviluppo: un gruppo di studenti è entrato nel corso di studi con convinzioni alte in ambito emozionale, sociale e accademico e in tali dimensioni è rimasto stabile. Un altro gruppo di studenti ha avuto traiettorie medie e stabili in ambito emozionale e sociale, ma ha mostrato una traiettoria meno favorevole in ambito regolatorio-accademico, comunque stabile. Un terzo gruppo ha avuto traiettorie stabili e medie nello sviluppo delle competenze sociali e regolatorie, mentre un andamento stabile e medio-basso si è palesato per quel che riguarda le competenze di regolazione delle emozioni negative. Infine, un gruppo ha evidenziato un pattern definibile “a basso funzionamento” in tutte le dimensioni. In tutti i casi, il gruppo “ad alto funzionamento” (il primo) ha mostrato un processo di adattamento più favorevole degli altri, che hanno registrato punteggi significativamente più alti nel burnout e minori nel coinvolgimento lavorativo. Inoltre, i pattern longitudinali si sono dimostrati mutuamente escludentisi lungo il continuum del processo di adattamento misurato attraverso i due indicatori descritti in precedenza.

Le implicazioni di ricerca e per la pratica professionale desumibili da tale lavoro sono discusse e argomentate.

## 1. General Introduction

Self-Efficacy (SE) beliefs represent pivotal individual resources for one's adjustment (Bandura, 1997), namely "people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (Bandura, 1994, p. 71).

Such knowledge structures contribute actively to face efficiently life challenges and promote a positive adaptation to work and educational contexts (Bandura, 2006), by fostering fruitful interaction between individuals and social contexts, and help people to succeed in reaching challenging goals by directing their own efforts towards a determined standard of performance. In this sense, as contextualized skills, these can be viewed as crucial personal abilities to address adequate patterns of behavior consistent with personal standards and goal within a specific life sphere (Bandura, 1977).

The importance of SE beliefs in hindering negative consequences of stress and promoting self-adjustment to different contexts has been well documented (Bandura, 1997). Among the possible life stages and contexts in which SE beliefs may make the difference, educational settings represent of course an elective place (Zimmerman, 2000). In particular, college education posits a number of challenges that students have to deal with: individuals cope with stressful life transitions, they are demanded to manage proactively academic and professional training pace and pressures, and they are involved in specific dynamics related to their age (i.e., *emerging adulthood*, Arnett, 2004). Of course, more than one skill is involved in this ongoing adjustment process. For instance, studying for an examination is a complex work: it requires cognitive, emotional and regulatory skills. One student may be prepared by learning a number of notions, but if he/she can't manage negative consequences

of anxiety and inattentiveness during the examination proofs, this will lead to a probable failure.

One context which drew the attention of many research efforts is nursing education programs. In fact, nursing students are highly exposed to stressful conditions both from an academic and a training point of view, since they start conjointly these two learning paths from the very early phases of their academic career (Jimenez, Navia-Osorio, & Diaz, 2010). Recent studies highlighted the early onset of maladjustment symptoms among this population (see Rudman & Gustavsson, 2011), meaning that not all students cope with stressful academic events and conditions in the same way. In this scenario, SE beliefs exert two paramount roles in defining nursing students' adjustment; firstly, a competent intra-individual mindset of SE beliefs across life spheres contribute in hindering the onset and maintenance of undesirable maladjustment outcomes. Secondly, it proactively contributes to promote virtuous circles by affecting positively students' adaptation both to academic context and clinical training settings. In this scenario, made of complex challenges to be overruled under stressful condition, a well-organized and integrated pattern of SE beliefs can make the difference. Unfortunately, to date, the study of SE beliefs in educational settings always followed an inter-individual differences perspective (see Caprara & Cervone, 2000). In other words, SE beliefs have been widely studied in terms of their impact on outcomes or assigning them the role of moderators and mediators of a variety of determinant-outcome links (see Bandura, 1997). However, social cognitive theorists emphasized the study of intra-individual characteristics in terms of patterned structures (see Mischel & Shoda, 1995; Shoda, Mischel, & Wright, 1994). Among these, SE beliefs can be considered intra-individual variables (Cervone, 2005), because they are essentially internal structures of the broader personality architecture assessed idiosyncratically rather than in terms of overt tendencies (Cervone, 2004a, 2004b; Cervone, Shadel, & Jencius, 2001), acting in concert by conjoint patterns (Bandura, 1986).

### **1.1. The Present Dissertation**

The present dissertation blossomed from the basic idea that intra-individual variability can explain inter-individual differences both cross-sectionally and longitudinally. In nursing setting contexts, it is important to track individual variations in SE beliefs across contexts and life spheres to better understand how these shape differences in adjustment outcomes between individuals.

The first study was aimed to understand how students configure SE beliefs in managing their emotion, in social exchange and in regulating their learning activities at the moment of the nursing program entrance. Moreover, it was investigated their discriminant role in determining different levels of adjustment, choosing some relevant indicators of adaptation (i.e., depression, life satisfaction and physical symptoms). Findings enlightened that patterns showing better overall functioning are less likely to be maladjusted, concurrently and longitudinally.

The second study focused on the development of SE in mastering negative affect (SE-MNE) and its link to depression onset and maintenance during nursing education. By adopting an integrated approach using both person-centered and variable-centered research strategies combined with a social cognitive perspective on personality and gender development, it has been highlighted that during the period under study males and females increase both their sense of efficacy in managing negative consequences of affect, and students increase similarly within gender. Moreover, females showed to be slightly more increasing in such competencies than males. Finally, alternative intra-individual patterns of growth in SE-MNE were found to be linked with different levels of depression.

The third study addressed the role of conjoint intra-individual growth in some SE dimensions in shaping different levels of burnout and work engagement. Four distinct longitudinal integrated patterns were found, and students with a high-functioning longitudinal structure showed to be more protected from burnout and more engaged at work than others. Moreover, an important role for individual differences in both adjustment outcomes seemed to be played by SE development in self-regulated learning.

Findings and practical implications about the present dissertation are discussed.

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**THE INGREDIENTS OF PERSONAL ADJUSTMENT:  
PATTERNS OF SELF-EFFICACY BELIEFS  
AMONG TWO GROUPS OF NURSING STUDENTS**

**Abstract:**

Present study was aimed to unravel the role of patterned intra-individual differences in some self-efficacy (SE) dimensions (i.e., related to emotional, social and academic regulatory spheres) in explaining inter-individual differences along the adjustment process of two cohorts of nursing students. By adopting an integrated research perspective (i.e., a combination of person-centered and variable-centered approaches) 4 intra-individual configurations of SE beliefs were detected and replicated across cohorts: a group of students showed to enter the nursing program with a high sense of personal efficacy in all the considered dimensions, two groups showed an intermediate functioning (one connoted by lower sense of perceived academic regulatory skills, the second by a lower SE in emotional management dimensions), and a group with an overall low-functioning across dimensions. These pattern were find to explain individual differences in depression, life satisfaction and physical symptoms both concurrently and longitudinally, with the high-functioning group elected as the best adjusted. Moreover, results from alternative informative hypotheses enlightened an adjustment gradient, where intermediate-functioning patterns were found to be not mutually discriminative. Implications of these findings are discussed.

*Keywords:* Self-efficacy, Stress Symptoms, Person-Oriented Approach, Emerging Adulthood, Nursing Students

## 1. Introduction

Becoming an adult, in modern society, it's a hard work. Especially during the so-called *emerging adulthood* period, which ranges from 18 to 25 years old (Arnett, 2000 & 2004), people face a number of specific life challenges (Arnett, 2007), such as the transition from secondary high school to college (Fromme, Corbin, & Kruse, 2008) or their entry into the labor market (Chow, Krahn, & Galambos, 2014), which can be perceived as critical and stressful (Smith, Christoffersen, & Davidson, 2011). Although this distinctive period of life course can represent the "age of possibilities" (Arnett, 2004) and literature findings showed a general increase in a variety of dimensions of psychosocial functioning and personal well-being (e.g., Galambos, Barker, & Krahn, 2006), some people figure it out as stressful and highly-demanding, as a "potentially critical or sensitive period of development" (Tanner & Arnett, 2011, p. 25), where stress can increase the risk of individual maladjustment (Compas, Orosan, & Grant, 1993; Compas, Hinden, & Gerhardt, 1995; Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001).

For instance, the first year of college represents a crucial period in students' academic path, where several individual resources are involved in determining psychosocial adjustment (Schunk & Pajares, 2005; Arnett, 2012; Gall, Evans, & Bellerose, 2000; Gerdes & Mallinckrodt, 1993). During their "freshmen" status, undergraduates are called to proactively manage a number of challenges under remarkable stressful conditions, such as leaving the family of origin to attend courses (Jordyn & Byrd, 2003), experiencing loneliness (Wei, Russell, & Zalaik, 2005), establishing new friendships with unknown colleagues (Bagwell, Bender, Andreassi, Kinoshita, Montarello, & Muller, 2005), changing their relationship with parents (Wintre & Yaffe, 2000; Lopez & Gormley, 2002), self-regulating and self-managing different academic and job activities (Huie, Winsler, & Kisanta, 2014).

Such a high-demanding scenario can lead people to personal and academic maladjustment (Holmbeck & Wandrei, 1993; Paul & Brier, 2001; Taylor, Doane, & Eisenberg, 2014), resulting in stress-related problems (Besser & Zeigler-Hill, 2012; Ari & Shulman, 2012), especially in cases where individuals perceive themselves as vulnerable or inefficacious (Bandura, 1997; Galatzer-Levy, Burton, & Bonanno, 2012). Among the overall freshmen population, nursing students are generally considered an “at-risk” sub-group for their high stress exposure since the early phases of their academic career (Gibbons, 2010; Laschinger, Finegan, & Wilk, 2009; Duchscher, 2008; Edwards, Burnard, Bennett, & Hebden, 2010), mainly attributable to an high-demanding professional training that starts very early in their academic career (Killam, Mossey, Montgomery, & Timmermans, 2013), and facing this challenge can be somewhat perceived as difficult to deal and to cope with by nursing freshmen (Duchscher, 2008).

With this regard, self-efficacy (SE) beliefs may represent pivotal resources in coping with the life challenges mentioned above (Bandura, 1997, 2001), namely “people’s [domain-specific] judgments of their capabilities to organize and execute courses of action required to attain designated types of performances” (Bandura, 1986, p. 391). The interplay of different SE beliefs related to life functioning contribute substantially in determining psychosocial and academic adjustment (Maddux, 1995). Especially SE beliefs in mastering negative emotions (Caprara, Di Giunta, Pastorelli, & Eisenberg, 2013; Caprara, Vecchione, Barbaranelli, & Alessandri, 2013), in social functioning (Hermann & Betz, 2006; Gerdes & Mallinckrodt, 1994) and for academic regulation (Chemers, Hu, & Garcia, 2001; Zimmerman, Bonner, & Kovach, 1996) can make a difference in students’ adaptation to the academic context. However, as stated by Bandura’s (1986) “there has been little research on how people process multidimensional efficacy information” (p. 409), and little is known about such SE beliefs related to different life spheres of functioning are jointly configured in individuals.

Since adaptive functioning requires a number of personal skills and resources (Lazarus & Folkman, 1985; Arnett, 2006, 2007), viewing SE beliefs as complex structure where its components act in concert rather than relatively independent knowledge structures operating simultaneously may be more informative for several reasons. Firstly, even SE beliefs are conceived as relatively independent they are “governed by some common judgmental processes” (Bandura, 1986, p. 409). Thus, the individual can be conceived as the agentic actor governing such processes rather than investigating the impact of such predictors on adjustment in a stand-alone variable-centered framework (Bergman, Magnusson, & El-Khoury, 2003), because it’s plausible that different patterns of SE beliefs may correspond to different adjustment levels. Secondly, centering on a person-focused approach allows to identify sub-groups of individuals which can be particularly vulnerable in some specific adaptation processes (Magnusson, 1999) and, as a consequence, planning effective intervention in order to develop some specific skills tailored on the more vulnerable sub-groups. Thirdly, in our case, a person-oriented approach to the study of such personal resources would be really suitable to better understand the conjoint role of SE dimensions in promoting a fruitful adjustment of nursing students within their academic and training context.

## **2. SE Beliefs in Emerging Adulthood for Academic Adjustment**

A large amount of empirical findings showed that perceived individual capabilities substantially contribute to determine a positive academic adaptation since its very early phases (Aspinwall & Taylor, 1992; Gerdes & Mallinckrodt, 1994; Halamandaris & Power, 1999; Wei, Russell, & Zalaik, 2005; Ramos-Sánchez & Nichols, 2007; Pritchard, Wilson, & Yamnitz, 2007; Galatzer-Levy, Burton, & Bonanno, 2012).

As illustrated above, SE beliefs represent perceived competencies in facing a number of different challenges, rooted within a theory of human agency (Bandura, 2006a), and can be considered as the expression of self-regulatory skills in a variety of domains of individual functioning (Bandura, 1986; Bandura, 1977). Different individual judgments on one's own capacities to master negative emotions, social situations and academic tasks can make the difference between successful and problematic student's adaptation. The more the students perceive themselves as efficacious, the more their efforts will be directed to pursue their goals efficiently (Schunk & Meece, 2005) and, nevertheless, the more they will be able to cope with stressful events and to persevere when they encounter difficulties by adopting a constructive mindset (Chemers et al., 2001). Scholars, to date, emphasized the role of such domain-specific competencies in coping with determined challenges, personal threats and life problems, primarily relying on their role in promoting positive adjustment within context (Maddux, 1995). Among the spheres of human functioning in which self-efficacy mechanisms are involved, the mastery of negative affect (Caprara, Di Giunta, et al., 2013), the perceived self-confidence about social behaviors (Hermann & Betz, 2006) and the self-regulation in academic attainments (Zimmerman, 2000) represent pivotal keys to understand students' adaptation.

### **2.1. SE in Mastering Negative Emotions**

Self-efficacy beliefs and, more in general, self-regulation in mastering negative emotions represent fundamental ingredients for emerging adults that have to cope with life challenges (Arnett, 2001). As recently argued by Bandura (2012), "people's beliefs in their coping capabilities play a pivotal role in their self-regulation of emotional states. This affects the quality of their emotional life and their vulnerability to stress and depression" (p. 13). In other words, individuals who report a high degree of perceived competence in managing negative emotional states (e.g., anger and sadness) are more likely to cope proactively with

difficulties and life challenges, thereby hindering the emergence of stress-related problems (Lazarus, 1999; Jerusalem & Mittag, 1995; Bandura, 1991). Focusing on emerging adulthood, scholars found a number of positive effects of SE in mastering negative emotions with regard to emerging adults' adaptation (Bandura, Caprara, Barbaranelli, Gerbino, & Pastorelli, 2003; Caprara, Vecchione, et al., 2013; Caprara, Di Giunta, Eisenberg, Gerbino, Pastorelli, & Tramontano, 2008).

As recently evidenced by Caprara, Di Giunta, et al. (2013), SE beliefs in regulating negative affect can be represented by a hierarchical multidimensional structure: people adopt alternative but related mindsets to cope with different emotions, depending on the nature of the emotion itself. Despite a large body of research findings concerning self-regulation mechanisms in modulating the effects generated by the so called negative *basic emotions* (e.g. anger/irritation or sadness, Izard, 2007, 2011), little is known about the role of mastering the so called *self-conscious* negative emotions, such as shyness or embarrassment (see Tangney, Youman, & Stuewig, 2009; Tagney, 1999, for a review) and their functional role in promoting students' adjustment, even though evidence that negative consequences of such emotions increase the likelihood of maladjustment has been provided across a variety of life stages (Turner & Husman, 2008; Baldwin, Baldwin, & Ewald, 2006; Karevold, Ystrom, Coplan, Sanson, & Mathiesen, 2012).

## **2.2. SE in Social Relationships**

Social SE beliefs refer to perceived competencies in building adaptive relationships with other people and in developing self-confidence in interpersonal contexts, establishing friendship patterns with other individuals and self-promoting in social contact (Gecas, 1989). Generally, higher social SE beliefs in emerging adulthood are related to lower feelings of loneliness (Wei et al., 2005), to the adoption of active coping strategies (Di Giunta, Eisenberg, Kupfer, Steca, Tramontano, & Caprara, 2010), positive social adjustment

(Connolly, 1989) and low self-reported depressive symptoms (Hermann & Betz, 2006). Moreover, well developed social skills contribute to adequate individuals' self-promotion in shared academic activities (Riggio, Watring, & Throckmorton, 1993) and to functionally pursue academic attainments (Patrick, Hicks, & Ryan, 1997; Zajacova, Lynch, & Espenshade, 2005). Nevertheless, students' perceived social competencies help them to find external resources to cope with difficulties and stressful moments and to prevent stress related-problems (Chemers, et al., 2001; Legault, Green-Demers & Pelletier, 2006). Indeed, perceived self-competencies are involved both in help seeking (Ryan, Gheen, & Midgley, 1998) and help giving behaviors (Poortvliet & Darnon, 2014), which can be viewed as interdependent learning strategies coherent with academic goals (Karabenick & Newman, 2013; Smith & Betz, 2000).

### **2.3. SE in Self-Regulated Learning**

SE in self-regulated learning concern students' beliefs about their abilities to regulate learning processes and to actively orient courses of actions toward satisfying academic results consistent with self-standards (Zimmerman et al. 1996). Students with high SE beliefs in self-regulated learning are more able to plan, control, and direct their learning activities in order to master academic subjects and achieve their educational goals. Moreover, for these students difficulties are perceived as opportunities to improve competencies and to develop skills, and they are less prone to perceive deadlines, academic pressure and complex problems as threats or sources of stress (Schunk & Zimmerman, 1994). Indeed, students perceiving themselves as self-regulated learners in academic contexts tend to not procrastinate (Haycock, McCarthy, & Skay, 1998), to cope successfully with academic anxiety (Rouxel, 1999), to build effective strategies leading self-focusing growth in academic activities (Zimmerman & Martinez-Pons, 1990; Zimmerman, Bandura, & Martinez-Pons, 1992). In such scenario, where students face new and complex challenges

which require a number of skills to cope with them, scholars emphasized the role of SE beliefs in self-regulated learning as a pivotal leverage in fostering academic motivation (Zimmerman & Risemberg, 1997) and, in early phases of college life, as a protective agent from the high stress exposure (Chemers et al., 2001). Indeed, students who feel themselves as effective gatekeepers of their academic destiny show more developed skills in handling academic successes and failures (Zimmerman et al., 1996) and, especially in the second case, they deal proactively with it, incorporating such informations in socio-cognitive systems governing learning processes (Bandura, 1993). Finally, the central role of SE in self-regulated learning in predicting grade point average (GPA) and other academic performance ratings has been well documented in a variety of college settings (Pajares, 1996; Gore, 2006; Robbins, Lauver, Le, Davis, Langley, & Carlstrom, 2004; Zuffianò, Alessandri, Gerbino, Luengo Kanacri, Di Giunta, Milioni, & Caprara, 2013). From a social-cognitive point of view, SE beliefs in self-regulated learning allow students to proactively address efforts and persistence toward academic goals, building courses of actions consistent with their own motivations and personal standards (Bandura, 1989, 1997, 2006a).

### **3. SE Beliefs and Adjustment Indicators in Emerging Adulthood**

Adjustment can be conceived as a complex process where different components of social cognitive system act simultaneously in determining one's adaptation to a peculiar life phase. This process require a number of sub-skills related to a variety of spheres of human functioning because life problems generally necessitate an organized pattern of competences to deal with (Bandura, 1986). Indeed, "most common problems of adjustment can be viewed as consisting of difficulties in thinking, feeling, and doing" (Maddux & Lewis, 1995, p. 39). Arnett, Klopp, Hendry, & Tanney (2010) argued that personal well-being is a core aspect of the adjustment process in emerging adulthood. In such life stage, scholars stressed the role of

psychosocial (Bowman, 2010; Schulenberg & Zarrett, 2006) and physical outcomes (Kwan, Cairney, Faulkner, & Pullenayegum, 2012) as relevant indicators for one's optimal functioning. Among all the possible adjustment indicators, depressive symptoms (Dyson & Renk, 2006; Wells, Klerman, & Deykin, 1987), life satisfaction (Medley, 1980; Zullig, Huebner, Gilman, Patton, & Murray, 2005) and self-reported health and complaints (Mechanic & Hansell, 1987; Pilcher, Ginter, & Sadowski, 1997) have been widely studied in college settings among emerging adults.

### **3.1. SE Beliefs and Depression**

SE beliefs seem to play a fundamental protective role from depressive symptoms since the very early phases of human development (Bandura et al. 2003; Bandura, Pastorelli, Barbaranelli, & Caprara, 1999; Steca, Abela, Monzani, Greco, Hazel, & Hankin, 2014). With this regard, especially SE beliefs concerning self-competence in regulating negative affect play a crucial role in protecting by such undesirable conditions (Caprara, Gerbino, Paciello, Di Giunta, & Pastorelli, 2010; Caprara & Gerbino, 2010), and this competence seems to be modulated by gender (Ehrenberg, Cox, & Koopman, 1991). In college settings, longitudinal (Nightingale, Roberts, Tariq, Appleby, Barnes, Harris, Dacre-Pool, & Qualter, 2012) and clinical studies (Kanfer & Zeiss, 1983; Schwartz & Fish, 1989) underlined the role of different SE facets in hindering the emergence of depressing symptoms (Wei et al. 2005; Chemers et al. 2001; Blatt, D'Afflitti, & Quinlan, 1976; Hermann & Betz, 2006), while in nursing education settings Richard, Ratner, Richardson, Washburn, Sudmant, & Mirwaldt (2012) evidenced the role of SE beliefs in mastering stress to be a moderator of the relationship between adverse stress and depressing symptoms.

### **3.2. SE Beliefs and Life Satisfaction**

As well as reaching psychological well-being require different skills, life satisfaction in emerging adulthood is determined different facets of the self-organizing system (Judge, Bono, Erez, & Locke, 2005; DeWitz & Walsh, 2002).

Caprara & Steca (2005) found that regulatory emotional and social SE contribute in explaining individual differences in life satisfaction. Similar findings were presented in a study conducted with young adolescents (Vecchio, Gerbino, Pastorelli, Del Bove, & Caprara, 2007), whereas recently O'Sullivan (2011) found that academic SE beliefs increase the likelihood to be satisfied with life over an undergraduates' sample. Also in this case, an important role in determining a more positive adaptation seems to be attributable to SE beliefs in regulating negative affect (Lightsey, Maxwell, Nash, Rarey, & McKinney, 2011; Lightsey, McGhee, Ervin, Gharghani, Rarey, Daigle, Wright, Constantin, et al., 2013). Finally, the self-regulating system is deeply linked to the development of satisfactory life paths during one's psychosocial adaptive development (see Flammer, 1995, for a theoretical introduction rooted in a social cognitive framework).

### **3.3. SE Beliefs and Perceived Health Status**

SE beliefs produce effects on physical functioning and health-oriented behaviors (Leganger, Kraft, & Røysamb, 2000; Flett, Panico, & Hewitt, 2011). Kuijer & Ridder (2003) found protective effects of SE beliefs in goal orientation on physical perceived well-being in a chronically ill sample. Wiedenfeld, O'Leary, Bandura, Brown, Levine, & Raska, (1990) underlined in an experimental setting the role of perceived coping SE beliefs in enhancing positive immunological effects (see Bandura, 1997, for a review on this specific topic). As well documented by Clark & Dodge (1999) SE beliefs can be viewed as leverages to encourage people in adopting healthier behaviors (Bandura, 2004). Finally, SE beliefs are

linked to perceived physical fatigue both in chronically impaired (Motl, McAuley, Snook, & Gliottoni, 2009; Haas, 2011; Somers, Kurakula, Criscione-Schreiber, Keefe, & Clowse, 2012; Craig, Tran, Siddall, Wijesuriya, Lovas, Bartrop, & Middleton, 2013) and general samples (Maddux, 1995; Bandura, 1986, 1997; Strecher, DeVellis, Becker, & Rosenstock, 1986).

#### **4. Self-Efficacy in Nursing Education Settings**

The study of SE beliefs is currently developing among nursing sciences. To date, a number of evidences have been provided, especially with regard to the link between perceived self-competencies across different life spheres and the prevention of job-related undesirable outcomes generally growing under stressful conditions (Gibbons, Dempster, & Moutray, 2009, 2010). Recently, scholars highlighted that stress-related symptoms are not simply a matter of registered nurses. Indeed, the empirical evidence of these problems since the early phases of academic career and professional training is ongoing (Watson, Gardiner, Hogston, Gibson, Stimpson, Wrate, & Deary, 2009). Such problems can imprint negatively the academic and professional students' experience, especially if these symptoms are undertaken and unmanaged (McLaughlin, Moutray, & Muldoon, 2008). Moreover, as recently suggested by Rudman & Gustavsson (2011), initial levels of stress-related symptoms (e.g., burnout levels) are deeply linked with their development over time (Shirom, 2005), and such variability is highly predicted by the related former levels (Schaufeli & Enzmann, 1998). In other words, this means that students' who feel themselves as not competent in coping with academic and clinical difficulties at early stages of their academic career are more likely to experiment stress-related symptoms in their professional future, and a steeper increase in such symptoms could be expected (Rudman & Gustavsson, 2011). Additionally, nursing students have to cope simultaneously with academic challenges and

clinical practice (Jimenez, Navia-Osorio, & Diaz, 2010; Timmins, Corroon, Byrne, & Mooney, 2011), so they are called to manage challenges and potential self-threats referring to different sources of stress. As introduced above, adjustment as a complex process require more than one developed capability to optimally self-adapt to a complex context as such (Maddux, 1995).

Consistent with the scenario described above, SE beliefs in nursing education represent fundamental resources to cope with academic challenges and, in this case, with clinical training pressure (see Zulkosky, 2009, and Robb, 2012, for a review of the construct declined in nursing settings). Research in this field outlined a number of links between SE beliefs and a wide range of adjustment outcomes, such as stress-related symptoms (Lo, 2002; Gibbons et al., 2010; Gibbons, 2010; Sawatzky, Ratner, Richardson, Washburn, Sudmant, & Mirwaldt, 2012), educational process (Harvey & Murray, 1994), health promotion (Laschinger & Tresolini, 1999; Laschinger, 1996), epistemological beliefs (Orgun & Karaoz, 2014), academic performance (Andrew, 1998), selection and retention of nursing students (McLaughlin, Moutray, & Muldoon, 2008). Concerning nursing students' clinical training, researchers focused their attention on the role played by mastery experience (Bandura, 1986, 1997) as the principal source of SE beliefs in clinical training perceived effectiveness (Goldenberg, Iwasiw, & MacMaster, 1997). Indeed, many studies documented how improving directly clinical skills in professional training by using "direct" means as clinical simulations (Kuiper & Pesut, 2004; Shinnick & Woo, 2014; Townsend & Scanlan, 2011) yields effects on perceived practical competence.

In sum, SE beliefs appear to be important tools to improve nursing students' perceived competencies both in academic and in clinical environments (Leinz & Shortridge-Baggett, 2002).

## 5. The Present Study

Integrating an agentic perspective of human being (Bandura, 1986) with a person-centered framework (Bergman et al., 2003; Magnusson, 1999), the present study aims to identify distinct homogeneous sub-groups of nursing students with regard to their intra-individual pattern of SE beliefs in hindering negative consequences of primary and self-conscious emotions, social competence and self-regulated learning at the starting point of their academic career. To our knowledge, no study investigated the interplay of different SE dimensions under this paradigm, even if such approach has been largely used in other research domains (e.g., personality psychology, Asendorpf, 2015); thereby, no previous intra-individual structure of SE beliefs organization has been provided and, therefore, no hypothesis can be formulated about. However, with this regard, some expectations can be made. Relying on trait theory (e.g., Five Factor Model, for an overview see Digman, 1990) and the related gender differences (Costa, Terracciano, & McCrae, 2001), girls are generally depicted as less emotionally stable than boys, whereas the opposite difference has been documented for conscientiousness (Robins, Fraley, Roberts, & Trzesniewski, 2001). Thus, one might expect a proportional majority of boys in patterns connoted by higher levels of SE in managing negative and self-conscious emotions, while the opposite could be found in those configurations where SE in self-regulated learning is high. Moreover, consistent with social-cognitive theory (Bandura, 1986) and research findings in emerging adulthood (see Arnett, 2004, for a review), perceived competencies in different spheres of life functioning are likely to increase during this life stage; thus, we can expect that high-functioning patterns, where all the SE beliefs attest at high levels, are characterized by more aged students than others.

In line with previous results obtained in the broader field of college studies (Hokanson & Butler, 1992; Pastor, Barron, Miller, & Davis, 2007; Karabenick, 2003), it's hypothesizable that SE patterns explain inter-individual differences in adjustment indicators. More specifically, as introduced above, in the present study the adjustment indicators considered are depression, life satisfaction and self-reported physical complaints. With regard to these, high-functioning pattern(s) is(are) supposed to be associated with a more favorable adjustment (e.g., people in the high-functioning pattern are expected to be less depressed, more satisfied and having lower scores on physical complaints). These posited findings are supposed to emerge concurrently (measured simultaneously to SE beliefs) and longitudinally (after one year).

Finally, patterns are supposed to be ordered as a gradient in their differential impact over the adjustment process. As enlightened in other studies rooted in a person-centered approach with similar samples (Meeus, van de Schoot, Klimstra, & Branje, 2011), it is hypothesizable that "extreme" pattern(s) (e.g., high vs. low functioning) will be associated with higher or lower adjustment indicators' scores rather than "intermediate" sub-groups in SE beliefs; moreover, this hypothesis will be tested within a novel Bayesian analytical framework (i.e., *informative hypothesis testing*, Hoijtink, 2009; van de Schoot, Verhoeven, & Hoijtink, 2013; Kluytmans, van de Schoot, Mulder, & Hoijtink, 2012).

In sum, the present study aim to investigate intra-individual patterns of SE beliefs in nursing education, in order to determine their concurrent and longitudinal validity with regards to inter-individual differences in some relevant adjustment indicators and, finally, to highlight the between-pattern discriminative power through a direct (Bayesian) approach to hypothesis testing.

## 6. Method

### 6.1. Participants and Design

A two-cohort two-time point design was used for the present study. Participants were all students attending nursing programs of a big university in the center of Italy. They were recruited in the context of a broader research project about the study of personal and organizational determinants of well-being during nursing education. First time point of assessment correspond to their first year of undergraduate nursing program (T1), while follow-up took place one year later (T2).

Cohort1 started at the baseline (T1) in 2011 (870 participants, 66.3% females,  $M_{age}=21.84$ ,  $SD_{age}=4.65$ ), while Cohort 2 in 2012 (780 participants, 66.9% females,  $M_{age}=21.70$ ,  $SD_{age}=4.46$ ). After one year (T2), participation rate was the 57.6% of the total Cohort1 sample size (499 participants, 70.3% females,  $M_{age}=21.68$ ,  $SD_{age}=4.59$ ) and 60.4% for Cohort2 (471 participants, 69% females,  $M_{age}=21.46$ ,  $SD_{age}=4.11$ ). No cohort effects were detected about demographics.

### 6.2. Procedure

Students filled collectively a pencil-and-paper questionnaire after signing an informed consent developed in line with American Psychological Association recommendations (APA, 2010). Questionnaire contents and informed consent were previously approved by the university ethics review board. An explicit section of the informed consent was dedicated to explain the confidentiality and the general objectives of the entire research process, since questionnaires were non-anonymous in order to track students over time. A trained researcher was present at each time point to ensure setting control and to dissipate possible students' doubts. Students' participation was rewarded by a

brief tailored profile about the measured characteristics to be (voluntarily) discussed in a brief interview with a registered psychologist few weeks before the T2 assessment.

### 6.3. Measures

**6.3.1. SE Beliefs.** All the following SE items were introduced by the stem “How do you feel able to....”. In the present study, SE beliefs were measured exclusively at the baseline (T1), tapping four different areas of personal perceived competencies: 1) *SE beliefs in mastering negative emotions* (SE-MNE, Caprara & Gerbino, 2001; Caprara et al., 2008; 3 items, item sample “Control anxiety in facing a problem”, Cohort1  $\alpha=.75$ , Cohort2  $\alpha=.77$ ); 2) *SE beliefs in mastering self-conscious emotions* (SE-SCE, Caprara, Di Giunta, et al., 2013; 4 items, item sample “Contain shame for having made a poor figure in front of many people”, Cohort1  $\alpha=.80$ , Cohort2  $\alpha=.80$ ); 3) *Social SE beliefs* (SE-SOC, Bandura, 2006b; 3 items, item sample “Make sure to get help from teacher/tutor when needed”, Cohort1  $\alpha=.82$ , Cohort2  $\alpha=.83$ ); 4) *SE beliefs in self-regulated learning* (SE-SRL, Bandura, 2006b; 3 items, item sample “Focus on studies when there are other, more fun things to do”, Cohort1  $\alpha=.85$ , Cohort2  $\alpha=.84$ ). The answer format was on a 5-point Likert-type scale, ranging from 1 (“I am not able at all”) to 5 (“I am able at all”).

**6.3.2. Depression.** Depression was assessed both at T1 and T2 by using the Major Depression Inventory (MDI, Bech, Rasmussen, Olsen, Noerholm & Abildgaard, 2001), which encompasses 12 item tapping all the major depression symptoms outlined in DSM-V (American Psychiatric Association, 2013). In the present study, as well as in previous studies conducted in nursing education settings (e.g., Christensson, Vaez, Dickman & Runeson, 2011), items were measured with a 4-point scale (ranging from 1=not at all to 4=all the time, via 2=rarely and 3=most of the time). Participants were asked to indicate the occurrence of the symptoms during the two weeks before measure administration. Sample item is “During

the last two weeks, have you felt lacking in energy and strength?”. Cohort1 and Cohort2  $\alpha$ s for MDI were, respectively, .85 and .84 at T1, .87 and .86 at T2.

**6.3.3. Life satisfaction.** Life satisfaction was assessed both at T1 and at T2 by a shortened version of the Satisfaction with Life Scale (SWLS, Diener, Emmons, Larsen, & Griffin, 1985), scored on a 7-point scale (1 corresponded to “I totally disagree”, 7 to “I totally agree”). This scale is generally intended as a measure of subjective well-being, and people were asked to evaluate their agreement on 4 statements, e.g. “The conditions of my life are excellent”. Cohort1 and Cohort2  $\alpha$ s for SWLS were, respectively, .79 for both at T1, .82 and .83 at T2.

**6.3.4. Physical symptoms.** Four fatigue-related physical symptoms were selected from the Physical Symptoms Inventory (PSI, Spector & Jex, 1998) to evaluate such dimension asking participants to indicate the occurrence of some physical problems (e.g., tiredness or headache) during the month before questionnaire administration, by using a 4-point scale format ranging from 1 (never) to 4 (seldom). Cohort1 and Cohort2  $\alpha$ s PSI were, respectively, .73 and .74 for T1, .75 and .74 for T2.

## 6.4. Data Analysis

Firstly, since the drop-out at the follow-up was high for both cohorts, which is a common phenomenon in longitudinal projects rooted in nursing education settings, attrition and missing data mechanism(s) were analyzed in depth, adopting a multifaceted approach (Enders, 2010). Differences between attrited and non-attrited students in gender, age and demographics were investigated. Subsequently, the assumption that data were missing completely at random (MCAR) has been verified carrying out the classical Little’s (1988) MCAR test, along with the multiple testing procedure recently proposed by Raykov, Lichtenberg, & Paulson (2012), which is based on Benjamini & Hochberg (1995) statistical approach to the control of false discovery rates in hypotheses testing. Moreover, consistent

with Ender's recommendations (2010), MANOVA and the Box's M test were performed in order to detect differences in T1 variables' means and covariances between the attrited and the stayer parts of the sample. Finally, we conducted a logistic regression in order to detect possible direct effects of SE beliefs on attrition.

Construct validity of SE beliefs structure was assessed by using confirmatory factor analysis (CFA) positing a correlated four-factor model. To ascertain that same constructs were measured across cohorts, we tested a series of hierarchically nested model (e.g., configural, weak, strong and strict invariance models, Jöreskog, 1971; Meredith, 1993; Millsap, 2011). Since the posited model assume a multidimensional structure of SE beliefs, appropriate model-based consistency indices were preferred to common Cronbach's alpha (i.e., Model-Based Internal Consistency, MBIC, Bentler, 2009; Global Reliability Index, GRI, Raykov & Marcoulides, 2011; Raykov, 2012) to evaluate overall model reliability. Moreover, convergent and discriminant validity of the latent dimensions were assessed in both cohorts by the Maximum Shared Squared Variance (MSV) and the Average Shared Square Variance (ASV) (Hair, Black, Babin, & Anderson, 2010).

Construct validity and possible differential cohort functioning of depression, life satisfaction and physical symptoms scales were analyzed by using the hierarchical steps of between-cohorts invariance as above. Moreover, longitudinal invariance (Widaman, Ferrer, & Conger, 2008; Little, 2013) was established to ensure that adjustment indicators were measured in the same way and with the same characteristics over time; for this analysis, once between-cohorts strict invariance is ascertained for each construct at each time point, cohorts were merged and analyzed simultaneously. Since such constructs are all supposed to be unidimensional, reliability was assessed by the Composite Reliability (CR) and the Maximal Reliability (MR) (see Fornell & Larcker, 1981; Raykov & Marcoulides, 2011; for an application in a nursing research context, see Barbaranelli, Christopher, Lee, Vellone, & Riegel, 2014), which are less biased unidimensional reliability coefficients than others, e.g.

Cronbach's alpha (on this topic, see Sijtsma, 2009).

Adopting a multifaceted model fit assessment (see Kline, 2011), several goodness of fit indexes and criteria are taken into account: i) Chi-square significance (if Chi Square is not significant, it means that the model reached a perfect fit with the observed data); (ii) Comparative Fit Index (CFI), (Bentler, 1990); values  $\geq .95$  indicate a good fit); (iii) Root Mean Square Error of Approximation (RMSEA), (Steiger, 1990); values  $\leq .05$  or  $.08$  indicate a good fit, such as the non-statistical significance of its associated 90% confidence interval (Hu & Bentler, 1999); (iv) Tucker-Lewis Index or Non-Normed Fit Index (TLI or NNFI), (Tucker & Lewis, 1973); values  $\geq .95$  indicate a good fit. With regard to the invariance testing, since competing models are nested,  $\Delta\chi^2_{(\Delta df)}$  with  $p < .01$  (Scott-Lennix & Lennox, 1995) and  $\Delta CFI > |.01|$  (Cheung & Rensvold, 2002) were considered as indicative that imposed model restrictions do not hold.

SE beliefs patterns were derived by adopting a cluster analytic framework. Cluster analysis was conducted separately per each cohort. More specifically, we used a two-phase cluster analytic procedure, as recommended by Asendorpf, Borkenau, Ostendorf, & Van Aken (2001): firstly, we applied a hierarchical clustering procedure (i.e., Ward Method with squared Euclidean distance) extracting a three, four and five cluster solutions. Prior to apply the second phase of the clustering procedure suggested by Asendorpf et al. (2001), we determined the optimal number of cluster to retain using a bootstrap approach (Efron & Tibshirani 1993) as internal replication criterion: we computed 200 bootstrap draws from the original overall dataset maintaining the original sample size, carrying out over each bootstrapped dataset the same hierarchical clustering procedure described above and re-classifying subjects into new non-hierarchical partitions through the vector of centroids derived from the hierarchical clustering procedure (i.e., k-means procedure) applied to the original sample. Then, we compared the hierarchical solution calculated directly on the bootstrapped sample and this second partition obtained from the re-classification of subjects

into clusters by using the original dataset cluster centroids through Cohen's  $\kappa$  (Cohen, 1960; such index if  $>.60$  is generally considered as indicative of agreement between partitions, Asendorpf, 2001) and the Adjusted Rand Index (ARI, Hubert & Arabie, 1985, higher values indicate better solutions). The latter, in some cases, has been found to perform better than the former in determining the optimal number of cluster (see Herzberg & Roth, 2006). Sometimes, it was necessary re-order subjects into clusters to appropriately assess agreement between partitions (Asendorpf et al. 2001; Barbaranelli, 2002). Once the optimal cluster solution was determined per each cohort, the between-cohort invariance of the final cluster solution was assessed by Average Squared Euclidian Distance (ASED, Bergman et al., 2003): values approaching 0 indicate that the structure of the cluster is substantially the same across cohorts.

Concurrent and longitudinal validity of cluster solutions were evaluated by using a multi-group structural equation modeling (MG-SEM) approach, in order to detect mean differences at the latent level, after reaching the invariance steps discussed above. Standardized mean differences with their associated 99% confidence intervals to facilitate practical significance interpretation (Cummings, 2012) are provided.

Finally we compared different hypotheses about the between-clusters mean differences in adjustment indicators within the novel Bayesian framework of informative hypothesis testing (Hojtink, 2009; van de Schoot et al. 2013; Klugkist, van Wesel, & Bullens, 2011). Such approach is discussed later on the paper.

## 7. Results

### 7.1. Preliminary Results

**7.1.1. Attrition and Missing Data Analysis.** Cohort1 had more males attrited than expected ( $\chi^2_{[1]} = 5.6$ ,  $p=.02$ ), difference that didn't emerged for Cohort2. No differences in

age or other common demographics were detected. Where considering SE dimensions, concurrent and longitudinal adjustment indicators considered in the present study, Little's MCAR test (1988) was non-significant both for Cohort1 ( $\chi^2_{[93]} = 109.78, p=.11$ ) and Cohort2 ( $\chi^2_{[97]} = 94.48, p=.55$ ). However, even Box's M test for the homogeneity of covariance matrices were non-significant both for Cohort1 ( $F_{[28,2117984]} = 1.47, p=.05$ ) and Cohort2 ( $F_{[28,1314016]} = 1.24, p=.18$ ), multivariate analysis of variance (MANOVA) put in light some differences between attrited and non-attrited subjects in both cohorts (Cohort1  $F_{[7,840]} = 2.62, p=.011$ , and Cohort2  $F_{[7,734]} = 2.90, p=.005$ ). Moreover, only for Cohort1, two values of the p-probabilities vector derived from all probabilities to reject the null hypothesis associated to one way ANOVAs and homogeneity of variances of concurrent and longitudinal outcomes between subjects who dropped (or didn't) at T2 were higher than the corresponding ones calculated adopting the Benjamini-Hochberg testing procedure as indicated in Raykov et al. (2012). Specifically, according to this criterion, SE-SOC and SE-SRL were not missing at random at T2 for Cohort1. Finally, we regressed a binary outcome (0=non-attrited subject, 1= attrited subject) on both SE dimensions and T1 outcomes in the context of a binary logistic regression (Tabachnick & Fidell, 2007). While SE-SRL reduce the probability to be a missing subject at T2 both for Cohort1 ( $\beta = -.26, OR=.77, p<.01$ ) and Cohort2 ( $\beta = -.24, OR=.78, p<.01$ ), SE-SCE increase the probability to drop-out at the follow-up just for Cohort2 ( $\beta = .35, OR=1.4, p<.01$ ); however, in both cohorts missingness was only weakly explained by the posited logistic regression model (Cox & Snell  $R^2$  was .019 for Cohort1 and .025 for Cohort2). Overall, these analyses suggest a combination of MCAR and MAR mechanisms acting over the two sets of data. Thus, Full Information Maximum Likelihood (FIML, Arbuckle, 1996) is a suitable approach to handle with missing data for those analyses carried out in a latent variable context (Enders, 2010).

**7.1.2. Cohort Invariance of SE Four-Factor Model.** Table 1 shows the hierarchical steps of measurement invariance of SE dimensions between-cohorts. Each model was

analyzed using a maximum likelihood estimator. As can be noted, all the invariance levels are perfectly reached, and the model maintain a more than satisfying overall fit even after tested ancillary equality hypotheses (e.g., variances and covariances invariance, Millsap, 2011). Moreover, MBIC and GBI were  $\approx .88$  in both cohorts, suggesting a substantial multidimensional model-based consistency of the posited correlated four-factor structure. Finally, ASV and MSV were, respectively, .14 and .38 for Cohort1 and .13 and .40 for Cohort2, suggesting that every single SE dimension, even sharing common variance with other dimensions, maintain a certain degree of independence and discriminant validity (Hair et al., 2010).

**7.1.3. Cohort and Longitudinal Invariance of the Outcomes' Measures.** Table 2 shows the cohort invariance of outcomes' measurement models at each time point of assessment. Since depression items were slightly and positively skewed, related models were analyzed using a robust estimator (Robust Maximum Likelihood, MLR in Mplus, Muthén & Muthén, 1998-2013; Satorra & Bentler. 2001). As can be noted, strict invariance was reached for each construct at each time point, suggesting that latent mean comparisons across cohorts is meaningful at each time point. Thus, to investigate whether the same construct was measured in the same way over time (i.e., longitudinal measurement invariance, see Little, 2013), cohorts' data were merged in a single data file in order to ascertain longitudinal invariance.

Table 3 describes the longitudinal measurement models tested per each construct. With regard to depression, full weak, partial strong (4 intercepts didn't hold equally across waves), and full strict invariance were reached. Life satisfaction showed equal factor loadings and intercepts across time points, even one (of 4) residual variance was found to be non-invariant. Finally, equality constraints posited on physical symptoms measured across time points totally held, except one (of 4) intercept. Relying on these results, the measured

constructs can be meaningfully compared across waves at the latent level and, moreover, the constructs maintain the same structure and meaning over time in the considered sample.

**7.1.4. Descriptive Statistics, Correlations and Reliabilities.** Table 4 presents descriptive statistics, zero-order correlations and reliability coefficients separately for both cohorts. As can be noted, the magnitude of each correlation coefficient is very similar across cohorts, no fundamental discrepancies were detected between them. Reliability coefficients were all in line with literature proposed cut-offs (see Barbaranelli et al., 2014), except for the AVEs of depression in both cohorts and for each time point, which were lower than .50 (Fornell & Larcker, 1981). This is probably due to the elevated number of items loading on a single underlying latent dimension, since it is the denominator the AVE formula (Hair et al., 2010).

## 7.2. Cluster Analysis

As described above, 3-, 4-, and 5-cluster solutions were tested for each cohort and the best fitting solution was chosen in each cohort as described in the method section. For Cohort1, the bootstrapped 3-cluster solution agreement indices were  $M_K=.58$  ( $SD=.14$ ) and  $M_{ARI}=.39(.14)$ , the 4-cluster solution reached an  $M_K$  of  $.62$  ( $SD=.10$ ) and a  $M_{ARI}$  of  $.42$  ( $SD=.09$ ), and an  $M_K=.52$  ( $SD=.11$ ) and a  $M_{ARI}$  of  $.39(.08)$  were found for the 5-cluster solution. On the other hand, with regard Cohort2,  $M_K=.54$  ( $SD=.12$ ) and a  $M_{ARI}=.40(.11)$  for the 3-cluster solution,  $M_K=.65$  ( $SD=.09$ ) and  $M_{ARI}=.44(.07)$  for the 4-cluster solution, while  $M_K=.53$  ( $SD=.13$ ) and  $M_{ARI}=.39(.08)$  were the agreement indices for the 5-cluster solution. Both bootstrapped agreement indices indicate the 4-cluster solution as the best-fitting for both cohorts. Figure 1 presents the final non-hierarchical cluster solutions plotted for Cohort1 and Cohort2, where subjects were re-assigned to clusters on the basis of the centroids of the original hierarchical solution (Asendorpf et al., 2001) in order to increase within-cluster homogeneity. After this step, homogeneity coefficients per each cluster in

each cohort were lower than 1, suggesting a substantial intra-cluster similarity between subjects (Bergman et al., 2003)

Cluster 1 (labeled IF1) shows an overall intermediate functioning, with medium levels of SE-SOC and SE-SRL and lower levels in both emotional management dimensions (negative primary and self-conscious emotions). Cluster 2 (labeled IF2) shows a different pattern of intermediate functioning, where emotional management dimensions don't represent a potential source of vulnerability, while nursing students assigned to this cluster exhibit low levels of SE-SRL. Cluster 3 (labeled LF) present a pattern of overall low functioning. Students of this cluster can be considered the ore "at-risk" for maladaptive adjustment. Cluster 4 (labeled HF) represent the "high-functioning" sub-population, where all the SE dimensions are highly developed.

Males were underrepresented by IF1 ad overrepresented by IF2 and HF while, vice versa, females were underrepresented by IF2 and HF and overrepresented by IF1 both in Cohort1 ( $\chi^2_{[3]} = 65.22$ ,  $p < .001$ ) ad in Cohort2 ( $\chi^2_{[3]} = 102.11$ ,  $p < .001$ ). Thus, as hypothesized above, females were more likely to be clustered in more emotionally vulnerable patterns than males. Moreover, between-cluster differences in age were detected both for Cohort1 ( $F_{[3,861]} = 5.78$ ,  $p < .001$ ) and for Cohort2 ( $F_{[3,770]} = 9.24$ ,  $p < .001$ ). Tukey's post-hoc test revealed that HF group is significantly older than other three clusters ( $\approx 1.5$  years older than mean age of the remaining sample in both cohorts), supporting what hypothesized in previous sections, in line with SE beliefs development literature (Bandura, 1986).

Finally, as suggested by Bergman and colleagues (2001), the Average Squared Euclidean Distance (ASED) has been calculated between the same clusters across cohorts as an index of between-cohorts cluster solution invariance. To do it, SLEIPNER v. 2.1 has been used (module CENTROID, Bergman & El-Khoury, 2002). Results showed really low Euclidean distances, where ASED ranged from .005 (IF2 cluster invariance) to .043 (IF1

cluster invariance), and the mean ASED was .024 . Such results suggest that the 4-cluster solution is consistent across cohorts. Moreover, no pattern was associated with attrition processes.

### **7.3. MG-SEM for Latent Mean Differences between Cluster-Based Groups**

In order to assess concurrent and longitudinal validity of the final 4-cluster solution we used a multi-group structural equation modeling (MG-SEM) approach to compare latent means (for a detailed review on this approach see Little, 2013) across cluster-based groups derived from cluster membership. This approach take several advantages with respect to an observed variable framework to compare means (e.g., ANOVA). Firstly, before comparing latent means, different steps of measurement invariance have to be reached. Little (2013) suggests that at least weak and strong invariance have to hold prior to compare latent means, other authors (e.g., Wang & Wang, 2012) argued that a more stringent condition (i.e., strict invariance) represents a necessary preliminary condition before doing it. If latent means invariance is not tenable, this suggests differences between groups at the latent level. Secondly, such approach guarantee to detect group effects controlling for residual variances, namely to assess group differences at the “true construct” level partialled out from measurement error (Lord & Novick, 1968). Thirdly, standardized latent differences are easier to interpret than post-hoc tests, because of their standard metric.

Table 5 and 6 shows MG-CFA carried out over each cohort for both time points. With regard to depression, for both cohorts and at each time point, significant decrease in latent mean invariance model fit has been found with regard to previous model (i.e., strict invariance model), suggesting that groups significantly differ in latent scores. The same scenario was found in both cohorts with regard to life satisfaction at T1. Otherwise, full latent mean invariance was found for both cohorts at T2, suggesting no significant between

cluster-based groups differences at the latent level. Finally, looking at latent differences in physical symptoms, latent mean invariance doesn't hold for both cohorts at T1 and T2.

Table 7 describes the standardized mean differences in latent scores between the considered groups in each cohort, indicating the punctual estimate and, in brackets, its confidence interval at 99% level of probability. The latent mean of the reference group (i.e., the HF cluster-based group) was fixed to 0 for model identification purpose (more specifically, for the latent mean structure identification) and the differences of the other groups can be read as the standardized distance from the reference group in the considered latent variable. LF group is more or less one standard deviation higher in depression latent scores than HF group at T1 in both cohorts, and all of the other groups have higher latent scores both at T1 and T2. On the other hand, HF subjects were more satisfied of their lives than their colleagues clustered in the other groups at T1 for Cohort1 and Cohort2, especially with respect to LF group. Moreover, at T2 of Cohort1, IF1 group persist to have lower latent life satisfaction scores than HF (specifically,  $-.27$  SD lower). Finally, HF group showed lower latent scores on physical symptoms in both cohorts and for both the time points, especially with respect to LF group. At T1 of the first cohort, IF2 group wasn't found to be different in physical symptoms latent score from HF. To conclude, HF group performs better than others on all the adjustment indicator in both cohorts and for each time point of assessment, excepting the differences in latent life satisfaction scores at T2.

#### **7.4. Informative Hypotheses about the Adjustment Continuum**

Previous MG-SEM analyses highlighted the HF group as the more protected from depression and physical symptoms both concurrently and longitudinally. However, HF group resulted higher in satisfaction with life just at T1 assessment. On the contrary, LF appeared the less adjusted with respect to all the outcomes. Anyway, cluster-determined groups can be ordered as a continuum along the adjustment process? And if it's so, what's

the best gradient fitting the observed data? To answer these questions, it was implemented a Bayesian framework to test different inequality constrained hypotheses (Hojtink, 2009; Van de Schoot et al., 2013), where a set of hypotheses generated by imposing inequality (and/or equality) constraints among cluster-based group means in adjustment outcomes are compared to an unconstrained hypothesis (i.e., no relationship between groups mean, positing a model where they are just estimated) and the hypotheses specified by the researcher can be directly compared between them. Model evaluation was performed using two criteria: the Bayes Factor (BF, see Klugkist, Laudy, & Hoijtink, 2005, for computational and statistical details), which is the ratio between the tested model fit and complexity with respect to the unconstrained hypothesis, and the Posterior Model Probability (PMP), which quantifies the support in the data for each tested hypothesis, varying from 0 (no compatibility of the hypothesis with the observed data) to 1 (full compatibility), whereas the sum of PMPs of all the tested hypotheses (even the unconstrained one) is always 1. To implement this approach, the software BIEMS (Mulder, Hoijtink, & de Leeuw, 2012) has been used, selecting flat distributions for each outcome prior mean. Since BIEMS is rooted in an observed variable framework and doesn't allow the presence of missing data, we had a considerable fraction of missing information for each adjustment outcome mean at T2, and all the measurement models reached substantially the strict invariance across cohorts and time points, then the cohorts were merged in a single dataset that was subsequently imputed multiple times. More specifically, following Bodner's (2008) recommendations, we imputed 10.000 the merged dataset utilizing a Monte Carlo Markov Chains (MCMC) combined with a semi-parametric approach, namely Predictive Mean Matching (PMM) to avoid out-of-range imputed values. For multiple imputation (MI) purpose, adjustment indicators were used both as predictors and outcome variables in the MI process, while age, sex, SE dimensions and dummy-coded cluster membership were used as auxiliary variables (Enders, 2010). Finally, since BIEMS doesn't allow to analyze simultaneously imputed datasets and

pooling estimates, we averaged the 10.000 imputed datasets into a single data file, so that every final imputed data point was the average of thousand different imputed values. Even this approach is not good as pooling estimates from multiple datasets results (Enders, 2010), represent a good approximation of the missing data points.

Relying on precedent labels assigned to clusters, we specified and tested the following informative hypotheses on outcome means both concurrently (T1 means) and longitudinally (T2 means):

$$\begin{aligned}
 H_{\text{unc}}: & \mu_{\text{IF1}}, \mu_{\text{IF2}}, \mu_{\text{LF}}, \mu_{\text{HF}}; \\
 H_{\text{inf0}}: & \mu_{\text{IF1}} = \mu_{\text{IF2}} = \mu_{\text{LF}} = \mu_{\text{HF}}; \\
 H_{\text{inf1}}: & \mu_{\text{LF}} > \mu_{\text{IF1}} > \mu_{\text{IF2}} > \mu_{\text{HF}}; \\
 H_{\text{inf2}}: & \mu_{\text{LF}} > \mu_{\text{IF1}} > \mu_{\text{IF2}} = \mu_{\text{HF}}; \\
 H_{\text{inf3}}: & \mu_{\text{LF}} > \mu_{\text{IF1}} = \mu_{\text{IF2}} > \mu_{\text{HF}};
 \end{aligned} \tag{1}$$

$H_{\text{unc}}$  represents the unconstrained hypothesis for all the outcome: no directional relationship is hypothesized between cluster-based group means, they are only estimated in the model.  $H_{\text{inf0}}$  represent what is generally called “null hypothesis” in NHST framework (see Cohen, 1994) and it can be considered a special case of informative hypothesis (van de Schoot, Mulder, Hoijtink, van Aken, Dubas, de Castro, Meeus, & Romeijn, 2011) in Bayesian statistics: this is the case where no between-group mean differences are hypothesized.  $H_{\text{inf1}}$  posits that a full gradient exists between the considered cluster-based groups, e.g. LF have higher scores on depression than IF1 (low emotional-based SE beliefs) which, in turn, are higher in depression than IF2 (low SE-SRL) and so on. Of course, this and the following informative hypotheses were structured with opposite symbols for the ones regarding life satisfaction means (e.g.,  $H_{\text{inf1}}: \mu_{\text{LF}} < \mu_{\text{IF1}} < \mu_{\text{IF2}} < \mu_{\text{HF}}$  or  $H_{\text{inf3}}: \mu_{\text{LF}} < \mu_{\text{IF1}} = \mu_{\text{IF2}} < \mu_{\text{HF}}$ ).  $H_{\text{inf2}}$  posits a partial continuum in concurrent and longitudinal

assessment of adjustment process, where no differences are specified between IF2 and HF groups. Finally,  $H_{inf3}$  states no differences between SE intermediate functioning groups.

Table 8 reports the results of the analyses described above. In all cases (excepting for PHY differences at T2)  $H_{inf3}$  received the higher BF and PMP, suggesting that while “extreme” groups represent discriminant elements to understand students’ adaptation, it’s more likely that intermediate functioning groups do not differ in the adjustment process than they do. For instance,  $H_{inf3}$  received more than 61 times more support of  $H_{unc}$  after seeing the DEP T1 data. Interestingly, although in previous MG-SEM analysis we found no differences in latent scores of life satisfaction in both cohorts at T2, in this case data didn’t support  $H_{inf0}$  at all ( $BF_{H_{inf0}}$  and  $PMP_{H_{inf0}}=0$ ). Finally, the second hypothesis that received more support from the observed data in all outcomes and for all time points was the complete inequality hypothesis  $H_{inf1}$ , suggesting that intermediate functioning groups are discriminants for adjustment, with a more positive adjustment of the IF group characterized by “low” SE-SRL than IF group with “low” SE beliefs in emotional management. However, the relative BF ( $BF_{H_{inf3}}$  vs.  $BF_{H_{inf1}} = BF_{H_{inf3}}/BF_{H_{inf1}}$ ) is always  $>3$  (excepting for physical symptoms), suggesting that in almost all cases  $H_{inf3}$  obtained stronger evidence from the data than  $H_{inf1}$  (Kass & Raftery, 1995). To conclude, differential functioning in SE intra-individual patterns seems to underlie differences in the adjustment process of the considered sample, even the IF groups are only partially different, where students with more developed emotional competencies are more likely to approach positive adaptation.

## 8. Discussion.

The present study aimed to define intra-individual patterns of SE beliefs in different spheres of human functioning in order to highlight inter-individual characteristics in students’ adaptation to nursing programs. Using a combined approach, which on one hand

took into account intra-individual functioning at the baseline, on the other focused on concurrent and longitudinal differences in relevant adjustment outcomes, results showed firstly that a 4-pattern structure of the considered SE dimensions was consistent across two different nursing students' cohorts. Two "opposite" patterns evidenced that students may enter the nursing program with a non-ignorable gap in personal competencies' development: a student may be highly self-confident in his/her own skills, why others may be not. Otherwise, two "intermediate" clusters underlined a less prominent distinction between student types concerning the considered SE beliefs: on one hand, one sub-group evidenced low perceived competencies regarding the emotional management sphere (specifically, in SE-MNE and SE-SCE), while the other one resulted low-regulated in academic performance (i.e., low level of SE-SRL). As hypothesized, emotionally vulnerable and low-functioning patterns were characterized by more females than statistically expected, whereas students clustered in high-skilled group were older than the others clustered in the remaining three patterns. However, variable-oriented literature showed that, even in early adulthood they start from a lower level, females' increase in emotional regulation dimensions over time is steeper than males (Arnett, 2000) and after this developmental phase such dimensions tend to be stable across the life span (Lüdtke, Roberts, Trautwein, & Nagy, 2011).

With regard to adjustment process, the HF group performed better than others in all the considered outcomes, excluding in life satisfaction measured one year later the students' entrance in nursing program. This suggests that entering the nursing program with a high-developed pattern of SE skills may sustain students in approaching positively the adjustment process and in maintaining a successful adaptation over time, even MG-SEM analyses revealed that group differences slightly decrease over time, probably depending from the fact that SE dimensions are malleable over time (Bandura, 1986) so, from a person-centered point of view, some students may have switched into patterns that differ from the one in which they were clustered at the baseline.

Interestingly, results from Bayesian testing of alternative informative hypotheses disentangled the differential role of intra-individual patterns with regard to adjustment indicators. Data supported  $H_{inf3}$ , where LF was posited as less adjusted than IF groups which, in turn, were posited to be less adapted than HF group. Of importance, different intra-individual SE perceived skills in emotional management seems to play a role in explaining inter-individual adjustment differences. However, the latter was found to be less supported than the first informative hypothesis.

Overall, the present study presented an integrated research approach aimed to understand individual differences in adjustment outcomes by using a person-centered approach, which allowed to discriminate different patterns of SE beliefs and their interplay in determining alternative adjustment paths.

Nursing programs are generally considered high-demanding contexts and require a number of skills to succeed in different challenges. Adverse consequence of individual-adjustment misfit can emerge very early in nursing students' academic paths (Watson et al., 2009; Lo, 2002). Given the same structural context for a group of students, personal resources can make a difference in promoting students' functioning across academic and training activities. However, even empirical results highlighted the very early advent of stress-related problems in such populations (Rudman & Gustavsson, 2011), whereas others highlighted the role of personal resources focusing on individual differences (Deary, Watson, & Hogston, 2003; Edwards et al., 2010), limited efforts pointed to the study of intra-individual functioning and its development in order to explain inter-individual differences in adjustment during nursing programs. If challenges demanded by nursing context are many, multifaceted and different in nature, the variable-centered approach is not sufficient to capture a dynamic phenomenon as the adjustment process rooted in the early phases of academic life of nursing programs (Gibson et al., 2010). Moreover, if such

approach can be useful to identify predictors and moderators of perceived optimal adaptation, it says little about the link between overall human functioning and adjustment. From a more applied point of view, identifying possible “at-risk” patterns in early academic phase may be important for several reasons. First of all, identifying such nursing students’ sub-groups could help nursing program’s managers to plan intervention aimed at increasing personal skills development along the academic span both within learning and professional training environments. Since the increase in person-job misfit is highly related to its initial level (e.g., burnout, see Schaufeli & Enzmann, 1998), it’s important to promote and encourage the development of SE beliefs, especially by using mastery experience (Bandura, 1997) as a fundamental leverage of SE in different spheres of human functioning, such as the management of emotions. In the present study, a non-ignorable number of students were clustered into the LF pattern. Even SE beliefs are malleable over time and people could switch into a higher “rank-order”, these results should not be underestimated. About one quarter of both cohorts could be vulnerable to adjustment challenges and less prepared and skilled to face with new learning and training demands. When programming nursing academic courses and professional training activities, one should take into account potential intra-individual differences in individual functioning, guarantying shared learning and training moments where students can enhance their sense of efficacy in emotional, social and academic regulatory spheres. Moreover, peer exchange initiatives (e.g., peer education) and the promotion of social exchange could improve SE beliefs of nursing students by leveraging on vicarious experience (Bandura, 1986), contributing in filling the gap between LF and HF subjects. Finally, it’s important to create learning and training objects and goals which require a limited number of skills to be acquired or reached, avoiding (especially in early academic nursing students’ stages) too complex assignments or heavy-demanding work tasks in terms of competences involved in. In other words, it would be important working on the

development of perceived competencies one by one and only then on their conjoint functioning, rather than the contrary.

The present study had several limitations. Even we handled missing data with FIML approach and this fact was highly taken into account, the follow-up registered an important decrease in sample size (more than 40% of the entire sample in each cohort dropped out), and this partially reduce the strength and the generalizability of the findings. Moreover, for Bayesian informative hypothesis testing, we did not use a full multiple imputation method to analyze our data. We used self-report data, which are generally affected by common method biases phenomena (Podsakoff, MacKenzie, & Podsakoff, 2012), problem that should be partially handled by further analyze data in a latent variable framework. To derive SE patterns, we used cluster analysis, an empirical technique that doesn't distinguish between true and error variance. In other words, cluster structure in each cohort could be affected by sources of variance not linked with SE scores. Anyway, findings showed that the 4-cluster solution was invariant across cohorts. Finally, the considered SE dimensions were four among many other possible and a single specific cultural context was investigated.

## **9. Conclusion and Future Research**

The present study presented a novel approach to the study of adjustment process in nursing students through the integration between variable- and person-centered approaches in order to determine how intra-individual patterns of SE perceived competences are linked to some relevant indicators of optimal adaptation. Findings showed that LF group performed worse than others in all the considered adjustment outcomes. Bayesian analysis revealed the existence of an ordered continuum in concurrent and longitudinal differences in adjustment, where IF clusters discriminate only partially individual differences in psychosocial adaptation.

Further research efforts in this direction have to point to replicate these findings across cultural contexts and, furthermore, across academic contexts. Moreover, longitudinal invariance of the patterns could be an interesting target of investigation by using a SEM approach (e.g., latent transition analysis, e.g., Lanza, Bray, & Collins, 2013) along with its longitudinal validity considering time-varying outcomes (e.g., the slope of depression) or controlling for their previous levels. Finally, profiling techniques alternative to cluster analysis could be improved within this research approach (e.g., latent profile analysis or latent class cluster analysis, Hagenaars & McCutcheon, 2002), even in a longitudinal perspective (e.g., latent growth class analysis, see Jung & Wickrama, 2008).

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Table 1.

Cohort Invariance of SE Four-Factor Model.

MODEL	INVARIANCE	$\chi^2$	df	MC	$\Delta\chi^2$	$\Delta$ df	<i>p</i> $\Delta\chi^2$	RMSEA (CI 90%)	CFI	TLI	$\Delta$ CFI
Ma	COHORT 1	210.28	59	–	–	–	–	.054 (.049 – .062)	.96	.947	–
Mb	COHORT 2	243.35	59	–	–	–	–	.063 (.055 – .072)	.948	.932	–
M1	CONFIGURAL	453.63	118	–	–	–	–	.059 (.053 – .064)	.955	.945	–
M2	WEAK	460.03	127	M2 Vs. M1	6.40	9	.70	.056 (.051 – .062)	.955	.945	0
M3	STRONG	464.48	136	M3 Vs. M2	4.45	9	.88	.054 (.049 – .060)	.955	.949	0
M4	STRICT	480.97	149	M4 Vs. M3	16.49	13	.23	.052 (.047 – .057)	.955	.953	0
M5	VAR & COVA	486.71	159	M5 Vs. M4	5.74	10	.84	.052 (.047 – .057)	.956	.956	-.001
M6	LATENT MEANS	491.35	163	M6 Vs. M5	4.64	4	.33	.049 (.044 – .054)	.956	.957	.001

*Note.* COHORT1 & COHORT2 = Model tested on the single cohort; CONFIGURAL = Model estimated simultaneously on both cohorts without imposing equality constraints; WEAK = Factor loadings invariance; STRONG = Observed intercepts invariance; STRICT = Residual variances invariance; VAR & COVA=Invariance of variances and covariances of latent factors; LATENT MEANS = Invariance of latent means; MC = Model comparison; *df* = degrees of freedom. Models were estimated by using Maximum Likelihood (ML).

Table 2.

Cohort Invariance of Adjustment Dimensions at each Time Point.

DEPRESSION												
T1												
MODEL	INVARIANCE	ROBUST $\chi^2$	df	MC	Scaled $\Delta\chi^2$	$\Delta$ df	<i>p</i>	RMSEA	CFI	TLI	$\Delta$ CFI	
								Scaled $\Delta\chi^2$	(CI 90%)			
Ma	COHORT 1	132.6	54	–	–	–	–	.041	(.032 – .050)	.963	.955	-
Mb	COHORT 2	156.04	54	–	–	–	–	.050	(.041 – .059)	.941	.928	-
M1	CONFIGURAL	288.23	108	–	–	–	–	.045	(.039 – .052)	.953	.943	-
M2	WEAK	294.24	119	M2 Vs. M1	6.01	11	.87	.043	(.037 – .049)	.955	.95	-.002
M3	STRONG	304.21	130	M3 Vs. M2	4.11	11	.97	.041	(.035 – .046)	.955	.955	0
M4	STRICT	305.97	142	M4 Vs. M3	8.26	12	.76	.038	(.032 – .044)	.958	.961	-.003
M5	VAR & COVA	307.99	143	M5 Vs. M4	2.02	1	.15	.038	(.032 – .044)	.957	.961	.001
M6	MEANS	308.56	144	M6 Vs. M5	.57	1	.45	.038	(.032 – .043)	.957	.961	0
T2												
Ma	COHORT 1	126.87	54	–	–	–	–	.054	(.041 – .066)	.942	.930	-
Mb	COHORT 2	108.61	54	–	–	–	–	.045	(.033 – .057)	.957	.947	-
M1	CONFIGURAL	235.11	108	–	–	–	–	.049	(.041 – .058)	.950	.939	-
M2	WEAK	255.83	119	M2 Vs. M1	2.46	11	.04	.049	(.040 – .057)	.946	.940	.004
M3	STRONG	273.03	130	M3 Vs. M2	15.05	11	.18	.048	(.040 – .056)	.942	.943	.004
M4	STRICT	308.19	142	M4 Vs. M3	32.73	12	.00	.049	(.042 – .057)	.934	.939	.008
M5	VAR & COVA	308.80	143	M5 Vs. M4	.60	1	.44	.049	(.041 – .056)	.934	.939	0
M6	MEANS	311.39	144	M6 Vs. M5	3.89	1	.05	.049	(.042 – .056)	.934	.939	0
LIFE SATISFACTION												

<b>T1</b>											
<b>MODEL</b>	<b>INVARIANCE</b>	$\chi^2$	<b>df</b>	<b>MC</b>	$\Delta\chi^2$	$\Delta$ df	<i>p</i> $\Delta\chi^2$	<b>RMSEA (CI 90%)</b>	<b>CFI</b>	<b>TLI</b>	$\Delta$ CFI
Ma	COHORT 1	9.86	2	–	–	–	–	.068 (.030 – .112)	.992	.977	-
Mb	COHORT 2	32.92	2	–	–	–	–	.14 (.100 – .188)	.968	.911	-
M1	CONFIGURAL	42.79	4	–	–	–	–	.11 (.081 – .140)	.98	.942	-
M2	WEAK	43.87	7	M2 Vs. M1	1.08	3	.78	.08 (.059 – .115)	.982	.969	-.002
M3	STRONG	44.87	10	M3 Vs. M2	1	3	.80	.066 (.047 – .086)	.983	.979	-.001
M4	STRICT	47.89	14	M4 Vs. M3	3.02	4	.55	.055(.038 – .072)	.983	.986	0
M5	VAR & COVA	47.93	15	M5 Vs. M4	.04	1	.84	.052(.036 – .069)	.984	.987	-.001
M6	MEANS	47.97	16	M6 Vs. M5	.04	1	.84	.050(.034 – .0666)	.984	.988	0
<b>T2</b>											
Ma	COHORT 1	22.56	2	–	–	–	–	.144 (.094 – .200)	.973	.919	-
Mb	COHORT 2	9.18	2	–	–	–	–	.088 (.036 – .149)	.99	.971	-
M1	CONFIGURAL	31.74	4	–	–	–	–	.12 (.083 – .161)	.981	.944	-
M2	WEAK	33.88	7	M2 Vs. M1	2.14	3	.54	.089 (.061 – .121)	.982	.969	-.001
M3	STRONG	36.42	10	M3 Vs. M2	2.54	3	.47	.074 (.049 – .101)	.982	.979	0
M4	STRICT	4.4	14	M4 Vs. M3	3.98	4	.41	.063(.041 – .086)	.982	.985	0
M5	VAR & COVA	4.41	15	M5 Vs. M4	.01	1	.92	.059(.038 – .082)	.983	.986	-.001
M6	MEANS	41.13	16	M6 Vs. M5	.72	1	.40	.057(.037 – .069)	.983	.987	0
<b>PHYSICAL SYMPTOMS</b>											
<b>T1</b>											
<b>MODEL</b>	<b>INVARIANCE</b>	$\chi^2$	<b>df</b>	<b>MC</b>	$\Delta\chi^2$	$\Delta$ df	<i>p</i> $\Delta\chi^2$	<b>RMSEA (CI 90%)</b>	<b>CFI</b>	<b>TLI</b>	$\Delta$ CFI
Ma	COHORT 1	9.25	2	–	–	–	–	.065 (.027 – .109)	.990	.969	-
Mb	COHORT 2	.01	2	–	–	–	–	.000 (.000 – .000)	1.000	1.010	-
M1	CONFIGURAL	9.26	4	–	–	–	–	.040 (.000 – .075)	.996	.988	-
M2	WEAK	12.23	7	M2 Vs. M1	2.97	3	.40	.030 (.000 – .058)	.996	.993	0
M3	STRONG	18.12	10	M3 Vs. M2	5.89	3	.12	.032 (.000 – .055)	.994	.993	.002

M4	STRICT	2.44	14	M4 Vs. M3	2.32	4	.68	.024 (.000 – .045)	.995	.996	-.001
M5	VAR & COVA	2.50	15	M5 Vs. M4	.06	1	.81	.021 (.000 – .042)	.996	.997	-.001
M6	MEANS	2.83	16	M6 Vs. M5	.33	1	.57	.019 (.000 – .040)	.996	.997	0
<b>T2</b>											
Ma	COHORT 1	4.29	2	–	–	–	–	.048 (.000 – .112)	.995	.984	-
Mb	COHORT 2	2.34	2	–	–	–	–	.019 (.000 – .096)	.999	.997	-
M1	CONFIGURAL	6.63	4	–	–	–	–	.037 (.000 – .085)	.997	.991	-
M2	WEAK	6.68	7	M2 Vs. M1	.05	3	1.00	.000 (.000 – .054)	1.000	1.000	-.003
M3	STRONG	7.64	10	M3 Vs. M2	.96	3	.81	.000 (.000 – .040)	1.000	1.000	0
M4	STRICT	9.61	14	M4 Vs. M3	1.97	4	.74	.000 (.000 – .029)	1.000	1.000	0
M5	VAR & COVA	9.63	15	M5 Vs. M4	.02	1	.89	.000 (.000 – .025)	1.000	1.000	0
M6	MEANS	9.9	16	M6 Vs. M5	.27	1	.60	.000 (.000 – .022)	1.000	1.000	0

*Note.* COHORT1 & COHORT2 = Model tested on the single cohort; CONFIGURAL = Model estimated simultaneously on both cohorts without imposing equality constraints; WEAK = Factor loadings invariance; STRONG = Observed intercepts invariance; STRICT = Residual variances invariance; VAR & COVA=Invariance of variances and covariances of latent factors; MEANS = Invariance of latent means; MC = Model comparison; *df* = degrees of freedom. Models for life satisfaction and physical symptoms were estimated by using Maximum Likelihood (ML). ROBUST  $\chi^2$  = Chi-square estimated with Robust Maximum Likelihood (MLR, Satorra & Bentler. 2001).

Table 3.

Longitudinal Invariance of Adjustment Dimensions.

DEPRESSION												
MODEL	INVARIANCE	ROBUST $\chi^2$	df	MC	Scaled $\Delta\chi^2$	$\Delta$ df	<i>p</i>	Scaled $\Delta\chi^2$	RMSEA (CI 90%)	CFI	TLI	$\Delta$ CFI
M1	CONFIGURAL	634.89	239	–	–	–	–	–	.032(.029 – .035)	.947	.938	-
M2	WEAK	649.62	251	M2 Vs. M1	14.44	12	.27		.031(.028 – .034)	.946	.941	.001
M3	STRONG	824.399	263	M3 Vs. M2	207.97	12	<.01		.036(.033 – .0349)	.924	.921	.018
M3a	STRONG <sub>partial</sub>	663.77	258	M3a Vs. M2	13.22	7	.06		.031(.028 – .034)	.945	.941	.001
M4	STRICT	669.91	270	M4 Vs. M3a	11.86	12	.45		.030(.027 – .033)	.946	.945	-.001
LIFE SATISFACTION												
MODEL	INVARIANCE	$\chi^2$	df	MC	$\Delta\chi^2$	$\Delta$ df	<i>p</i>	$\Delta\chi^2$	RMSEA (CI 90%)	CFI	TLI	$\Delta$ CFI
M1	CONFIGURAL	79.17	15	–	–	–	–	–	.051(.040 – .063)	.958	.97	-
M2	WEAK	9.63	19	M2 Vs. M1	11.46	4	.021		.048(.038 – .058)	.958	.97	0
M3	STRONG	93.47	22	M3 Vs. M2	2.84	3	.41		.045(.036 – .054)	.982	.977	-.024
M4	STRICT	109.28	26	M4 Vs. M3	15.81	4	.00		.044(.036 – .053)	.979	.978	.003
M4a	STRICT <sub>partial</sub>	101.639	25	M4a Vs. M3	8.16	3	.04		.043(.035 – .052)	.981	.979	-.002

PHYSICAL SYMPTOMS											
MODEL	INVARIANCE	$\chi^2$	df	MC	$\Delta\chi^2$	$\Delta$ df	<i>p</i> $\Delta\chi^2$	RMSEA (CI 90%)	CFI	TLI	$\Delta$ CFI
M1	CONFIGURAL	27.37	15	–	–	–	–	.022(.008 – .036)	.995	.991	-
M2	WEAK	33.77	19	M2 Vs. M1	6.4	4	.17	.022(.009 – .034)	.994	.992	.001
M3	STRONG	52.62	22	M3 Vs. M2	18.85	3	<.01	.029(.019 – .039)	.988	.985	.006
M3a	STRONG <sub>partial</sub>	34.83	21	M3a Vs. M2	1.06	2	.58	.020(.006 – .032)	.995	.993	-.001
M4	STRICT	35.33	25	M4 Vs. M3a	.5	4	.97	.016(.000 – .027)	.996	.996	-.001

*Note.* COHORT1 & COHORT2=Model tested on the single cohort; CONFIGURAL=Model estimated simultaneously on both cohorts without imposing equality constraints; WEAK=Factor loadings invariance; STRONG=Observed intercepts invariance; STRICT=Residual variances invariance; MC=Model comparison; df=degrees of freedom; ROBUST  $\chi^2$ = Chi-square estimated with Robust Maximum Likelihood (MLR, Satorra & Bentler, 2001).

Table 4.

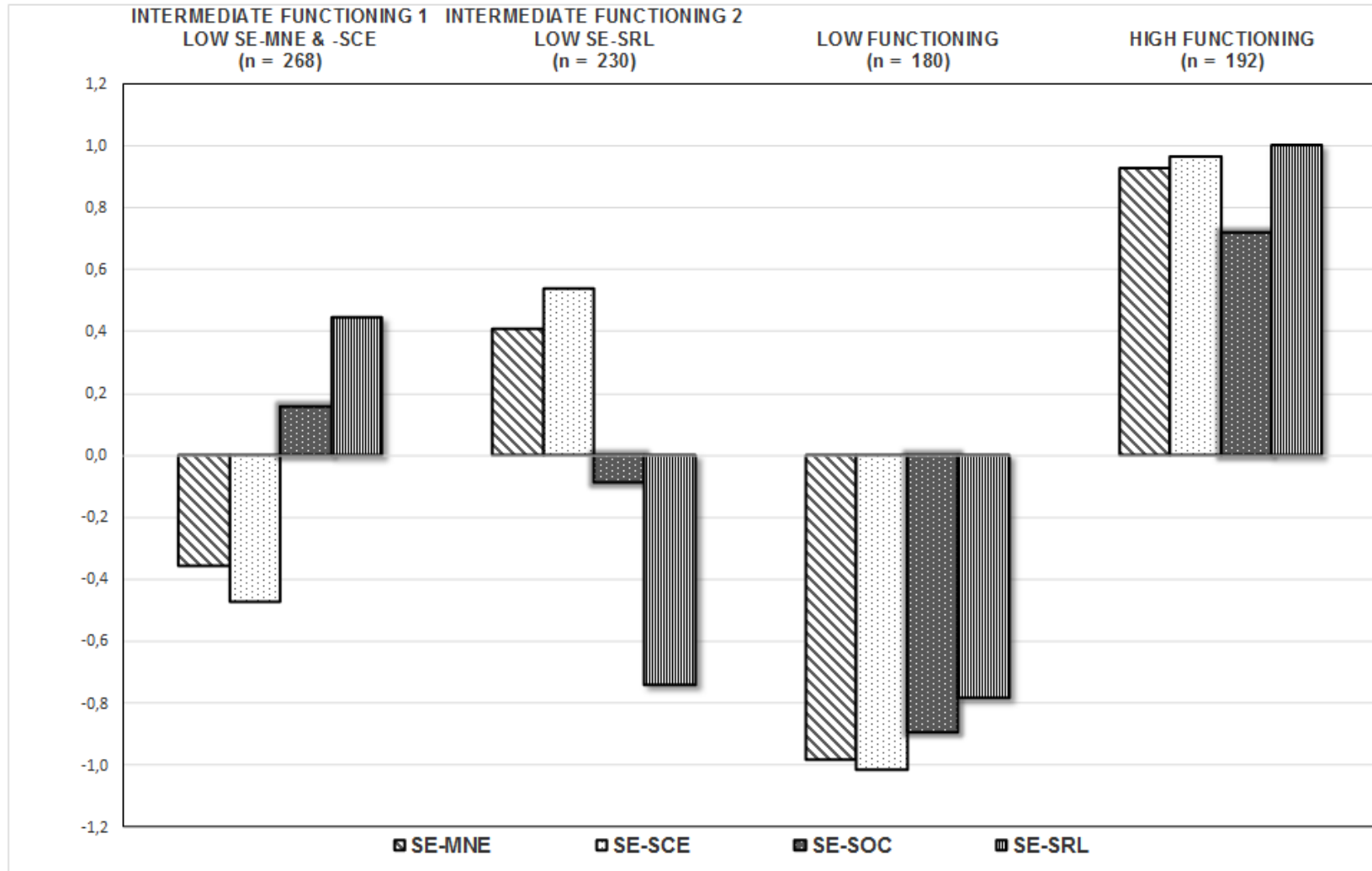
Descriptive Analyses, Zero-Order Correlations and Reliability Coefficients for both Cohorts.

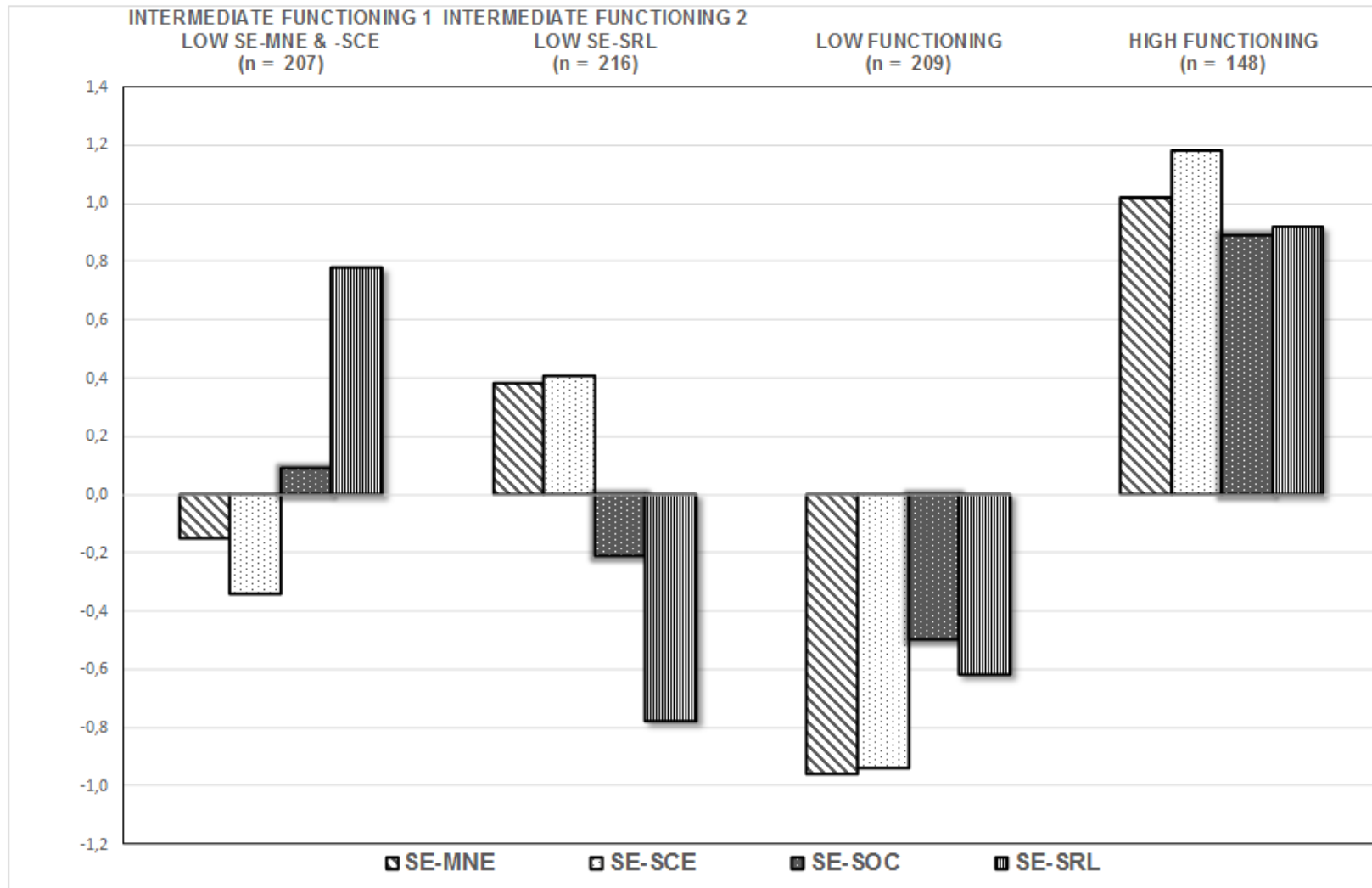
		COHORT1 (T1=2011; T2=2012)																
		M	SD	SKEW	KURT	MR	CR	AVE	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1.	SE-MNE T1	3.11	.79	.00	-.06	-	-	-	1									
2.	SE-SCE T1	3.06	.83	.00	-.20	-	-	-	.52**	1								
3.	SE-SOC T1	3.66	.69	-.22	.04	-	-	-	.19**	.28**								
4.	SE-SRL T1	3.34	.84	-.11	-.06	-	-	-	.25**	.17**	.30**	1						
5.	D T1	1.74	.47	.86	.97	.86	.85	.32	-.34**	-.27**	-.18**	-.22**	1					
6.	D T2	1.78	.49	.74	.46	.89	.86	.35	-.26**	-.14**	-.09	-.18**	.52**	1				
7.	LS T1	4.91	1.25	-.50	-.29	.81	.80	.51	.20**	.23**	.20**	.23**	-.39**	-.31**	1			
8.	LS T2	4.72	1.27	-.45	-.26	.80	.77	.58	.17**	.15**	.10*	.22**	-.32**	-.40**	.59**	1		
9.	PHY T1	2.38	.71	.10	-.70	.75	.74	.42	-.28**	-.19**	-.10**	-.14**	.51**	.32**	-.22**	-.17**	1	
10.	PHY T2	2.43	.72	.00	-.76	.77	.75	.44	-.24**	-.18**	-.11*	-.08	.33**	.42**	-.14**	-.19**	.48**	1

		COHORT2 (T1=2012; T2=2013)																
		M	SD	SKEW	KURT	MR	CR	AVE	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1.	SE-MNE T1	3.14	.80	-.10	.00	-	-	-	1									
2.	SE-SCE T1	3.06	.81	.11	-.28	-	-	-	.55**	1								
3.	SE-SOC T1	3.69	.67	-.14	.06	-	-	-	.21**	.25**	1							
4.	SE-SRL T1	3.41	.84	-.09	-.31	-	-	-	.23**	.21**	.30**	1						
5.	D T1	1.73	.45	.68	.35	.88	.86	.34	-.36**	-.29**	-.21**	-.26**	1					
6.	D T2	1.73	.46	.90	.92	.88	.87	.36	-.26**	-.27**	-.16**	-.15**	.50**	1				
7.	LS T1	4.93	1.25	-.52	-.30	.84	.85	.57	.22**	.25**	.21**	.19**	-.38**	-.25**	1			
8.	LS T2	4.79	1.28	-.44	-.23	.85	.81	.59	.20**	.20**	.26**	.19**	-.27**	-.43**	.52**	1		
9.	PHY T1	2.36	.71	.13	-.66	.74	.74	.42	-.36**	-.31**	-.14**	-.18**	.55**	.32**	-.26**	-.19**	1	
10.	PHY T2	2.41	.73	-.06	-.68	.76	.74	.43	-.31**	-.28**	-.10*	-.10*	.39**	.50**	-.22**	-.31**	.54**	1

*Note.* SE=Self-efficacy in managing negative emotions; SE=Self-efficacy in mastering self-conscious emotions; SE-SOC=Social Self-efficacy; SE-SRL=Self-efficacy in self-regulated learning; D=Depression; LS=Life satisfaction; PHY=Physical symptoms; M=mean; SD=Standard deviation; SKEW=Skewness; KURT=Kurtosis; MR=Maximal reliability; CR=Composite reliability; AVE=Average variance extracted. Reliability coefficients for D T1 & D T2 are based on MLR (Robust Maximum Likelihood) estimates. \* $p < .05$ , \*\* $p < .001$

Figure 1. Final 4-Cluster Solution for Cohort1 (Upper Panel) and Cohort 2 (Lower Panel).





*Note.* Plotted cluster centroids were previously standardized. SE-MNE=Self-efficacy in managing negative emotions; SE-SCE=Self-efficacy in mastering self-conscious emotions; SE-SOC=Social Self-efficacy; SE-SRL=Self-efficacy in self-regulated learning.

Table 5.

MG-CFA for Latent Mean Differences between Clusters in Cohort1.

DEPRESSION											
T1											
MODEL	INVARIANCE	ROBUST $\chi^2$	df	MC	Scaled $\Delta\chi^2$	$\Delta$ df	<i>p</i> Scaled $\Delta\chi^2$	RMSEA (CI 90%)	CFI	TLI	$\Delta$ CFI
M1	CONFIGURAL	357.57	216	–	–	–	–	.050(.039 – .061)	.942	.929	–
M2	WEAK	383.46	249	M2 Vs. M1	5.02	33	.03	.050(.040 – .060)	.933	.929	.009
M3	STRONG	466.54	282	M3 Vs. M2	9.05	33	<.01	.055(.046 – .064)	.909	.914	.021
M3a	STRONG <sub>partial</sub>	424.7	275	M3a Vs. M2	41.5	26	.03	.051(.042 – .060)	.926	.929	.007
M4	STRICT	495.33	311	M4 Vs. M3a	66.25	36	<.01	.053(.044 – .061)	.909	.923	.017
M4a	STRICT <sub>partial</sub>	475.24	310	M4a Vs. M3a	51.51	35	.036	.050(.041 – .059)	.918	.923	.008
M5	LATENT MEANS	557.98	313	M5 Vs. M4a	75.97	3	<.01	.060(.053 – .069)	.879	.898	.028
T2											
M1	CONFIGURAL	299.34	216	–	–	–	–	.056(.040 – .071)	.936	.921	–
M2	WEAK	315.8	249	M2 Vs. M1	19.01	33	.95	.047(.029 – .061)	.948	.945	-.012
M3	STRONG	354.06	282	M3 Vs. M2	41.85	33	.14	.045(.028 – .060)	.944	.948	.004
M4	STRICT	372.73	318	M4 Vs. M3	23.87	36	.94	.037(.017 – .052)	.958	.965	-.012
M5	LATENT MEANS	389.72	321	M5 Vs. M4	18.78	3	<.01	.042(.024 – .056)	.947	.956	.011
LIFE SATISFACTION											
T1											
MODEL	INVARIANCE	$\chi^2$	df	MC	$\Delta\chi^2$	$\Delta$ df	<i>p</i> $\Delta\chi^2$	RMSEA (CI 90%)	CFI	TLI	$\Delta$ CFI
M1	CONFIGURAL	19.73	8	–	–	–	–	.082(.037 – .129)	.99	.97	–
M2	WEAK	36.21	17	M2 Vs. M1	16.48	9	.05	.072(.039 – .105)	.984	.977	.006
M3	STRONG	62.1	26	M3 Vs. M2	25.89	9	<.01	.080(.055 – .106)	.969	.972	.015
M3a	STRONG <sub>partial</sub>	48.49	24	M3a Vs. M2	12.28	7	.09	.069(.040 – .096)	.979	.979	.005
M4	STRICT	81.49	36	M4 Vs. M3a	33	12	<.01	.076(.054 – .098)	.961	.974	.018

MODEL	INVARIANCE	$\chi^2$	df	MC	$\Delta\chi^2$	$\Delta$ df	<i>p</i>	$\Delta\chi^2$	RMSEA (CI 90%)	CFI	TLI	$\Delta$ CFI
M4a	STRICT <sub>partial</sub>	66.83	35	M4a Vs. M3a	18.34	11	.07	.065(.041 –.088)	.973	.981	.006	
M5	LATENT MEANS	109.17	38	M5 Vs. M4a	42.34	3	<.01	.093(.073 –.133)	.939	.962	.034	
<b>T2</b>												
M1	CONFIGURAL	47.28	8	–	–	–	–	.15(.111 –.193)	.992	.975	-	
M2	WEAK	64.1	17	M2 Vs. M1	16.82	9	.05	.113(.084 –.143)	.99	.986	.002	
M3	STRONG	76.75	26	M3 Vs. M2	12.65	9	.17	.095(.071 –.120)	.989	.99	.001	
M4	STRICT	144.24	38	M4 Vs. M3	67.49	12	<.01	.113(.094 –.133)	.979	.986	.010	
M4a	STRICT <sub>partial</sub>	91.6	34	M4a Vs. M3	14.85	8	.06	.088(.067 –.110)	.988	.991	.001	
M5	LATENT MEANS	95.26	37	M5 Vs. M4a	3.66	3	.30	.085(.064 –.106)	.988	.992	0	
<b>PHYSICAL SYMPTOMS</b>												
<b>T1</b>												
MODEL	INVARIANCE	$\chi^2$	df	MC	$\Delta\chi^2$	$\Delta$ df	<i>p</i>	$\Delta\chi^2$	RMSEA (CI 90%)	CFI	TLI	$\Delta$ CFI
M1	CONFIGURAL	16.7	8	-	-	-	-	.071(.019 –.119)	.987	.961	-	
M2	WEAK	27.27	17	M2 Vs. M1	1.57	9	.30	.053(.000 –.088)	.985	.978	.002	
M3	STRONG	4.11	26	M3 Vs. M2	12.84	9	.16	.052(.012 –.079)	.979	.981	.006	
M4	STRICT	64.05	38	M4 Vs. M3	23.94	12	.02	.056(.031 –.080)	.961	.975	.018	
M5	LATENT MEANS	107.89	41	M5 Vs. M4a	43.84	3	<.01	.087(.067 –.107)	.9	.941	.061	
<b>T2</b>												
M1	CONFIGURAL	12.94	8	-	-	-	-	.071(.000 –.138)	.989	.966	-	
M2	WEAK	24.18	17	M2 Vs. M1	11.24	9	.25	.058(.000 –.107)	.983	.977	.006	
M3	STRONG	36.51	26	M3 Vs. M2	12.33	9	.19	.057(.000 –.097)	.976	.978	.007	
M4	STRICT	46.81	38	M4 Vs. M3	1.3	12	.58	.043(.000 –.080)	.98	.987	-.004	
M5	LATENT MEANS	66.78	41	M5 Vs. M4a	19.97	3	<.01	.071(.038 –.101)	.94	.965	.04	

*Note.* COHORT1 & COHORT2=Model tested on the single cohort; CONFIGURAL=Model estimated simultaneously on both cohorts without imposing equality constraints; WEAK=Factor loadings invariance; STRONG=Observed intercepts invariance; STRICT=Residual variances invariance; LATENT MEANS=latent means invariance; MC=Model comparison; df=degrees of freedom; ROBUST  $\chi^2$ = Chi-square estimated with Robust Maximum Likelihood (MLR, Satorra & Bentler. 2001).

Table 6.

MG-CFA for Latent Mean Differences between Clusters in Cohort2.

DEPRESSION												
T1												
MODEL	INVARIANCE	ROBUST	df	MC	Scaled	$\Delta df$	<i>p</i>	Scaled	RMSEA (CI 90%)	CFI	TLI	$\Delta CFI$
		$\chi^2$			$\Delta\chi^2$			$\Delta\chi^2$				
M1	CONFIGURAL	388.33	216	–	–	–	–	–	.065(.054 – .075)	.893	.870	-
M2	WEAK	406.82	249	M2 Vs. M1	33.01	33	0.47		.058(.048 – .068)	.902	.897	.009
M3	STRONG	491.47	282	M3 Vs. M2	90.06	33	<.01		.063(.053 – .072)	.871	.879	.021
M3a	STRONG <sub>partial</sub>	465.12	277	M3a Vs. M2	45.63	28	.02		.058(.048 – .067)	.892	.897	.01
M4	STRICT	529.94	313	M4 Vs. M3a	71.77	36	<.01		.061(.052 – .069)	.866	.887	.026
M4a	STRICT <sub>partial</sub>	499.38	311	M4a Vs. M3a	49.61	34	.04		.057(.047 – .066)	.884	.901	.008
M5	LATENT MEANS	562.20	314	M5 Vs. M4a	68.82	3	<.01		.065(.056 – .073)	.847	.871	.037
T2												
M1	CONFIGURAL	319.69	216	–	–	–	–	–	.064(.048 – .078)	.924	.907	-
M2	WEAK	343.26	249	M2 Vs. M1	26.22	33	.79		.057(.041 – .071)	.931	.926	-.007
M3	STRONG	393.07	282	M3 Vs. M2	50.39	33	.02		.058(.043 – .071)	.918	.923	.013
M4	STRICT	463.41	318	M4 Vs. M3	65.26	36	<.01		.062(.050 – .074)	.893	.911	.025
M4a	STRICT <sub>partial</sub>	445.02	317	M4a Vs. M3	51.13	35	.03		.059(.045 – .071)	.906	.922	.012
M5	LATENT MEANS	474.96	320	M5 Vs. M4a	29.71	3	<.01		.064(.052 – .076)	.886	.906	.02

LIFE SATISFACTION											
T1											
MODEL	INVARIANCE	$\chi^2$	df	MC	$\Delta\chi^2$	$\Delta df$	$p \Delta\chi^2$	RMSEA (CI 90%)	CFI	TLI	$\Delta CFI$
M1	CONFIGURAL	50.11	8	–	–	–	–	.164(.122 – .209)	.968	.905	-
M2	WEAK	56.81	17	M2 Vs. M1	6.7	9	.66	.110(.079 – .149)	.97	.958	-.002
M3	STRONG	68.26	26	M3 Vs. M2	11.45	9	.24	.091(.065 – .118)	.968	.971	.002
M4	STRICT	102.18	38	M4 Vs. M3	33.92	12	<.01	.093(.072 – .115)	.952	.969	.016
M4a	STRICT <sub>partial</sub>	89.25	35	M4a Vs. M3	20.99	9	.01	.089(.066 – .112)	.959	.972	.009
M5	LATENT MEANS	138.65	38	M5 Vs. M4a	49.4	3	<.01	.117(.096 – .138)	.924	.952	.025
T2											
M1	CONFIGURAL	35.33	8	–	–	–	–	.132(.09 – .178)	.993	.98	-
M2	WEAK	41.94	17	M2 Vs. M1	6.61	9	.67	.087(.054 – .120)	.994	.991	-.001
M3	STRONG	49.31	26	M3 Vs. M2	7.37	9	.59	.068(.038 – .096)	.994	.995	0
M4	STRICT	93.5	38	M4 Vs. M3	44.19	12	<.01	.087(.065 – .109)	.987	.991	.007
M4a	STRICT <sub>partial</sub>	66.22	36	M4a Vs. M3	16.91	10	.07	.066(.040 – .090)	.993	.995	.001
M5	LATENT MEANS	73.61	39	M5 Vs. M4a	7.39	3	0.06	.067(.043 – .091)	.992	.995	.001
PHYSICAL SYMPTOMS											
T1											
MODEL	INVARIANCE	$\chi^2$	df	MC	$\Delta\chi^2$	$\Delta df$	$p \Delta\chi^2$	RMSEA (CI 90%)	CFI	TLI	$\Delta CFI$
M1	CONFIGURAL	7.65	8	–	–	–	–	.000(.00 – .083)	1.00	1.00	-
M2	WEAK	25.44	17	M2 Vs. M1	17.79	9	.03	.051(.00 – .090)	.983	.975	.017
M3	STRONG	33.82	26	M3 Vs. M2	8.38	9	.41	.040(.00 – .074)	.984	.985	-.001
M4	STRICT	48.5	38	M4 Vs. M3	14.68	12	.25	.038(.00 – .067)	.978	.986	.006
M5	LATENT MEANS	144.49	41	M5 Vs. M4	95.99	3	<.01	.115(.095 – .136)	.786	.875	.192
T2											
M1	CONFIGURAL	7.65	8	–	–	–	–	.000(.00 – .083)	1.00	1.00	-

SELF-EFFICACY & ADJUSTMENT

M2	WEAK	25.44	17	M2 Vs. M1	17.79	9	.03	.051(.00 – .090)	.983	.975	.017
M3	STRONG	33.82	26	M3 Vs. M2	8.38	9	.49	.040(.00 – .074)	.984	.985	-.001
M4	STRICT	48.5	38	M4 Vs. M3	14.68	12	.25	.038(.00 – .067)	.978	.986	.006
M5	LATENT MEANS	144.49	41	M5 Vs. M4	95.99	3	<.01	.115(.095 – .136)	.786	.875	.192

*Note.* COHORT1 & COHORT2=Model tested on the single cohort; CONFIGURAL=Model estimated simultaneously on both cohorts without imposing equality constraints; WEAK=Factor loadings invariance; STRONG=Observed intercepts invariance; STRICT=Residual variances invariance; LATENT MEANS=latent means invariance; MC=Model comparison; df=degrees of freedom; ROBUST  $\chi^2$ = Chi-square estimated with Robust Maximum Likelihood (MLR, Satorra & Bentler. 2001).

Table 7.

Latent Mean Differences between Cluster Analysis-Based Groups for Cohort1 and Cohort2.

	COHORT1				COHORT2			
	IF1	IF2	LF	HF	IF1	IF2	LF	HF
DEP T1	.86 [.60 – 1.17]	.50 [.26 – .74]	1.12 [.84 – 1.33]	@0	.52 [.19 – .84]	.64 [.33 – .94]	1.06 (.76 – 1.35]	@0
DEP T2	.37 [.04 – .69]	.36 [.01 – .71]	.67 [.30 – 1.04]	@0	.52 [.20 – .84]	.56 [.20 – .92]	.77 [.46 – 1.08]	@0
LS T1	-.30 [-.39 – -.01]	-.33 [-.60 – -.06]	-.67 [-.95 – -.39]	@0	-.53 [-.84 – -.23]	-.51 [-.79 – -.22]	-.80 [-1.13 – -.49]	@0
LS T2	-.27 [-.35 – -.11]	.04 [-.19 – .28]	.06 [-.31 – .19]	@0	-.22 [-.48 – .04]	.01 [-.26 – .24]	-.16 [-.41 – .09]	@0
PHY T1	.55 [.23 – .88]	.46 [.13 – .78]	.86 [.49 – 1.12]	@0	.89 [.52 – 1.26]	.92 [.53 – 1.31]	1.44 [1.00 – 1.87]	@0
PHY T2	.47 [.10 – .84]	.29 [-.10 – .69]	.70 [.24 – 1.16]	@0	.82 [.40 – 1.25]	.59 [.16 – 1.01]	1.23 [.68 – 1.79]	@0

*Note.* HF has been chosen as the reference group, fixing its latent mean to 0 in each MG-SEM. Differences are presented in a completely standardized metric [99% confidence interval]. DEP=depression; LS=life satisfaction; PHY=physical symptoms; IF1=intermediate functioning cluster – type 1 (low SE-MNE & -SCE); IF2=intermediate functioning cluster – type 2 (low SE-SRL); LF=low functioning cluster; HF=high functioning cluster.

Table 8.

Model Evaluation of the tested Informative Hypotheses.

	MODEL U ( $H_{unc}$ )	MODEL 0 ( $H_{inf0}$ )	MODEL 1 ( $H_{inf1}$ )	MODEL 2 ( $H_{inf2}$ )	MODEL 3 ( $H_{inf3}$ )
DEP T1	– (.01)	0 (0)	11.51 (.16)	0 (0)	61.28 (.83)
DEP T2	– (.01)	0 (0)	12.24 (.17)	0 (0)	59.15 (0.82)
LS T1	– (.03)	0 (0)	2.04 (.07)	0 (0)	27.01 (.90)
LS T2	– (.02)	0 (0)	3.51 (.09)	0 (0)	35.79 (.89)
PHY T1	– (.01)	0 (0)	20.27 (.29)	0 (0)	48.43 (.69)
PHY T2	– (.04)	0 (0)	23.30 (.96)	0 (0)	.02 (0)

*Note.* Model U=Unconstrained Hypothesis Model. MODEL 0=Null Hypothesis model. In each cell it's reported the Bayes factor (BF) associated to the tested model against Model U. In circular brackets, it's indicated the Posterior Model Probability (PMP).

**SELF-EFFICACY IN MASTERING NEGATIVE EMOTIONS AND DEPRESSION:  
AN INTEGRATED LONGITUDINAL INVESTIGATION  
ON A NURSING STUDENTS' COHORT**

**Abstract:**

Self-Efficacy beliefs in Mastering Negative Emotions (SE-MNE) represent paramount cognitive perceived skills in hindering the undesirable consequences of negative affect. The present study investigated a cohort of nursing students by using a three-time points of assessment implemented in a longitudinal design. Adopting an integrated social cognitive perspective both on personality and gender development, the aim of present study was threefold: a) investigating gender differences in SE-MNE growth; b) identifying unobserved intra-individual trajectories of SE-MNE; and c) evaluating the impact of alternative paths of SE-MNE trajectories on depression. Findings showed that males entered the nursing program with a higher level of SE-MNE than females, whereas girls showed a significant higher increase in SE-MNE during the overall assessment span. Moreover, 4 patterns were found to represent unobserved sub-groups in SE-MNE development: the higher was the probability to be clustered in a high-stable or mean-high increasing trajectory, the lower the probability to be depressed at the last point of assessment, after controlling for its previous levels. Finally, by using a Bayesian approach in testing a set of informative hypotheses, the 4 different patterns were found to be associated to 4 different levels of depression. Research implications of these findings are discussed.

*Keywords:* Self-Efficacy, Depression, Latent Growth Modeling, Developmental Trajectories, Nursing Students.

## 1. Introduction

Emerging adulthood is a critical life stage, ranging about from 18 to 25 years old (Arnett, 2004). This life span has been previously labeled in several different ways (Arnett, 2004, 2007), and generally researchers conceptualized it as a sub-phase of a broader developmental process (on this topic, see Arnett, Kloep, Hendry, & Tanner, 2010). Despite a number of studies addressing young people personality development (Arnett, 2012), only recently emerging adulthood has been recognized by scholars as a peculiar developmental step having own distinctive specificities and characteristics. In particular, emerging adulthood can be considered “the most heterogeneous period of the life course because it is the least structured” (Arnett, 2007, p. 69). Within this age range, people feel themselves “in-between”, experiencing a number of challenges and facing stressful situations (Arnett, 1999). Despite a number of evidences acknowledging the increase of psychosocial well-being and low risks for mental health during this life span (Galambos, Barker, & Krahn, 2006; Schulenberg & Zarrett, 2006), a less equipped sub-group of boys and girls is more prone to encounter difficulties (such as the development of depressive symptoms, Tanner. Reinherz. Beardslee, Eitzmaurice, Leis, & Berger, 2007; Soto, John, Gosling, & Potter, 2011; Dyson & Renk, 2006) because they generally feel inadequate to face life challenges in different human spheres of functioning along with a low personal agency (Bandura, 1986, 1997; Schwartz, Côté, & Arnett, 2005). Moreover, this stage generally encompasses a number of transitions: after high school, boys and girls switch into the labor market (Hamilton & Hamilton, 2006) or they enter college (Holmbeck & Wandrei, 1993; Fromme, Corbin, & Kruse, 2008; Lee, Dickson, Conley, & Holmbeck, 2014). With regard to the latter case, the adjustment process can be difficult because individuals change substantively their role in society because they are invested of different social expectations (Arnett, 2004) and, on the other hand, life

challenges become more pressing, pacing and demanding (Roisman, Masten, Coatsworth, & Tellegen, 2004; Salmela-Aro, Aunola, & Nurmi, 2007). Among the overall freshmen population, nursing students are early exposed to both academic career challenges and professional training demands (e.g., Timmins, Corroon, Byrne, & Mooney, 2011), which can lead to undesirable outcomes linked to stressful conditions (Deary, Watson, & Hogston, 2003). These stressful conditions along with the pressing demands of academic career make them potentially vulnerable to undesirable outcomes, such as depression (Dzurec, Allchin, & Engler, 2007; Haack, 1988).

In such scenario, perceived self-competencies may be the key to overrule stress-related problems and to hinder negative academic adjustment paths (Maddux, 1995; Maddux & Meier, 1995). Although a number of personal skills are generally required to cope with complex challenges (Bandura, 1997), perceived self-efficacy in mastering negative emotions (SE-MNE) can be considered a core competence in dealing with this specific transitional period (Bandura, 1997), since the knowledge and cognitive structures underlying SE beliefs and agency mechanisms are related both to stress management (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986; Lazarus, 1999; Folkman & Lazarus, 1985; Folkman, Moskowitz, & Tedlie, 2000) and they represent a fundamental ingredient in building mindsets protecting from depression (Hankin & Abela, 2005; Hankin & Abramson, 2001, 2002). In this sense, a large body of empirical findings suggest that emotional development is widely modulated by gender differences (Nolen-Hoeksema, 2012), and this generally yields the adoption of different cognitive strategies of emotion regulation (Nolen-Hoeksema & Aldao, 2011), corresponding to different levels of cognitive vulnerability to psychopathology (Hankin & Abramson, 2001, 1999; Hankin & Abela, 2005; Nolen-Hoeksema, 1990). However, despite a consistent amount of studies about the inter-individual differences in regulating negative affect stemming from a social-cognitive perspective (see Alessandri, Vecchione, & Caprara, 2014) both in college students and emerging adults

(Caprara, Di Giunta, Eisenberg, Gerbino, Pastorelli, & Tramontano, 2008), no studies investigated the role of intra-individual differences in shaping different SE-MNE longitudinal trajectories by using a person-centered approach (von Eye & Bergman, 2009). Moreover, to our knowledge, albeit the detrimental effects of emotion regulation on depressive onset and symptoms have been largely documented (see Berking, Wirtz, Svaldi, & Hofmann, 2014), even highlighting gender differences (Garnefski, Teerds, Kraaij, Legerstee, & van den Kommer, 2004), there is a lack of evidences about how intra-individual growth patterns of emotional regulation skills account for inter-individual differences in depression.

Consistent with these premises, adopting a social-cognitive view both of human agency (Bandura, 1986) and gender differences (Bussey & Bandura, 1999), the aim of the present study is threefold: a) investigating the role of gender in SE-MNE growth over time; b) individuating longitudinal intra-individual patterns of SE-MNE and c) disentangling the role of gender with regard to SE-MNE intra-individual growth in protecting from depression.

## **2. SE-MNE Development and Gender Differences**

Gender differences in emotion regulation are well documented in literature (Eckes & Trautner, 2000). Such differences are the adoption of cognitive strategies in handling negative affect (Gross, 2007), personality traits (Feingold, 1994; Lucas & Donnellan, 2011), social expectations about gender role (Gilligan, 1982; Clemans, DeRose, Graber, & Brooks-Gunn, 2010), physiological responses (Kemp, Silberstein, Armstrong, & Nathan, 2004), biological characteristics (Shaffer, 2009) and some aspects of brain functioning (McRae, Ochsner, Mauss, Gabrieli, & Gross, 2008; Domes, Shulze, Böttger, Grossmann, Hauenstein, Wirtz, Heinrichs, et al. 2010). Among these differential gender features, cognitive

management of emotion regulation represents a core competence (Ochsner & Gross, 2008; Zlomke & Hahn, 2010).

In this broader research field, SE-MNE beliefs can be considered pivotal individual resources that contribute in overruling negative affect, referring to knowledge structures affecting both appraisal and behavioral processes in hindering emotional maladjustment (Bandura, 1997; Maddux, 1995). From a gender point of view, some studies documented that during emerging men score higher than women in SE-MNE self-report measures (see Alessandri et al., 2014, for a review), highlighting the higher vulnerability of women to the undesirable consequences of negative emotions (Alessandri, Caprara, Eisenberg, & Steca, 2009). However, less is known about differences in SE-MNE growth rates across gender. For example, Caprara, Vecchione, Barbaranelli, & Alessandri (2013) found an overall negative nonlinear trajectory in SE-MNE beliefs from 14 to 21 years old. Similar results were reported in Caprara, Alessandri, Barbaranelli, & Vecchione (2013), considering a different life span (ranging from 16 to 25 years).

However, these studies rely on a broader developmental interval, focusing on the transition from late adolescence to early adulthood. As argued by Arnett (2004), emerging adulthood is often confused or equaled to “late adolescence”, “transition to adulthood”, “young adulthood”, and other similarly labeled life stages. Centering on this specific developmental stage, emotional stability seems to increase over time (Roberts, Walton, & Viechtbauer, 2006) and, as stated by Caspi (1998) during this life stage “people become less emotionally liable, more responsible, and more cautious” (p. 347). Moreover, linking SE-MNE development to gender differences, Caprara et al. (2008) noted that “men appeared to enter adulthood with a more robust sense of personal efficacy in dealing with negative affect than did women, but at older ages, they exhibited a weaker sense of personal efficacy in dealing with them. On the other hand, women’s sense of personal efficacy in dealing with negative affect improved from early adulthood to elderly age” (p. 228), suggesting a steeper

increase in women's SE-MNE than males over time, stemming from the early phases of emerging adulthood. In light of these premises, one might expect initial lower levels for females and a slightly accelerated increase in SE-MNE beliefs during the college years (Caprara & Steca, 2005; Caprara, Caprara, & Steca, 2003).

### 3. SE-MNE, Gender Differences and Depression

Gender differences in depression emerge since childhood after 10 years old (see Hyde, Mezulis, & Abramson, 2008 for a review), this gap increases during adolescence (Galambos, Leadbeater, & Barker, 2004; Nolen-Hoeksema & Girgus, 1994; Nolen-Hoeksema, 1987, 2001; Ge, Lorenz, Conger, Elder, & Simons, 1994), peaking in mid-adolescence (Poulin, Hand, Boudreau, & Santor, 2005; Hankin, Abramson, Moffitt, Silva, McGee, & Angell, 1998; Compas, Malcarne, & Fondacaro, 1988). Among the possible explanations of such phenomenon, scholars emphasized the differential impact of cognitive vulnerability in males and females in hindering negative affect consequences and individual threats (Hakin & Abramson, 2001, 2002), along with the tendency to conform to gender stereotypes or social expectations (Hakin & Abramson, 1999) and to react more negatively to stressors (Hankin, Mermelstein, & Roesch, 2007).

However, findings about such differences in early adulthood are scarce and somewhat inconsistent. Some theoretical perspectives (e.g., *gender intensification hypothesis*, Hill & Lynch, 1983) stressed the influence of social pressure to conform to adult gender roles in building a self-concept consistent with these. On the contrary, Brody & Hall (2010) endorsed the line of reasoning suggesting that "both men and women feel pressure to maintain control over the specific emotions stereotyped as inappropriate for them to express" (p. 432). Moreover, as argued by Galambos et al. (2006) "the average trajectory in depressive symptoms from ages 18-25 will be one of decline" (p. 351). Costello, Swendsen,

Rose, & Dierker (2008) noted that this gap “may be moderated by age” (p. 180). Finally, Mahmoud, Staten, Hall, & Lennie (2012) found a significant decrease in self-reported depressive symptoms among nursing students without detecting gender effects. In sum, gender differences in depression onset, symptoms, maintenance and growth during emerging adulthood seems to be not yet unraveled. To date, although many studies converge in depicting adolescent females as more prone to depression and less equipped in facing life challenges (see Nolen-Hoeksema & Girgus, 1994), little is known about the existence and the magnitude of this gap during emerging adulthood.

In such scenario, higher SE-MNE beliefs are associated with lower levels of depression during adolescence (Bandura, Caprara, Barbaranelli, Gerbino, & Pastorelli, 2003; Caprara, Gerbino, Paciello, Di Giunta, & Pastorelli, 2010). As contextually developed personal skills, SE-MNE beliefs are crucial in fostering emerging adults to cope with difficulties and specific life threats (Caprara, Di Giunta, Pastorelli, & Eisenberg, 2013) and, moreover, such individual resources are highly involved in the broader emotion regulation process along the entire life span (John & Gross, 2004; Zimmerman & Iwanski, 2014). Thus, SE-MNE can be viewed as a complex systems of beliefs aroused by negative emotions in managing their negative consequences (Bandura, 1997), with the scope of promoting a fruitful adjustment over the life course (Arnett, 2007).

However, to our knowledge, there is a lack of studies investigating the role of SE-MNE development in protecting from depression by using a gender perspective, especially considering the emerging adulthood life span. Moreover, no study so far has taken into account the role of different SE-MNE intra-individual patterns of development in hindering the course of depression.

#### 4. Aims of the Present Study

The present study is aimed to investigate the role of SE-MNE beliefs development and its impact on depression in a nursing student cohort.

Firstly, developmental trajectories of SM-MNE will be investigated in an inter-individual differences perspective. Relying on previous findings both on the development of emotion regulation skills (Roberts et al., 2006) and self-efficacy beliefs in regulating negative affect on early adults samples (Caprara et al., 2003), we expect that: a) males enter the college with higher scores of SE-MNE and b) both males and females increase slightly their sense of efficacy in mastering negative emotions. With this regard, we expect that the rate of change will be significantly higher for females than males.

Secondly, by adopting a longitudinal person-centered approach (Nagin, 1999; Nagin & Odgers, 2012; Bergman, Magnusson, & El-Khoury, 2003) to intra-individual developmental processes, we investigated the existence of unobserved sub-groups underlining alternative patterns of growth in SE-MNE over time. With this regard, we expect that males will be more likely to be clustered in high-favorable patterns, stemming from a higher level of SE-MNE at the initial time point of assessment.

Thirdly, we expect that higher probabilities to be classified into such intra-individual developmental trends are associated with a negative impact on depression scores at the last time point of assessment, controlling for its previous levels.

Finally, we hypothesize that different intra-individual growth patterns of SE-MNE can be informative in order to understand inter-individual differences in depression scores at the end of measurement process.

## 5. Method

### 5.1. Participants and Design

A three-time point design rooted in a prospective framework (Little, 2013) was implemented. A cohort of nursing students represented the longitudinal sample of the present study. Participants were enrolled by a medical university of central Italy in the context of a broader study aimed at investigating the individual and organizational determinants of well-being during their academic career.

At the baseline (T1, 2011) 865 students (67.5% females,  $M_{\text{age}}=21.85$ ,  $SD_{\text{age}}=4.65$ ) represented the target initial sample. At T2 (one year later the T1, 2012) 501 students (70.5% females,  $M_{\text{age}}=22.7$ ,  $SD_{\text{age}}=4.43$ , 57.9% of the initial sample) participated to the second research step, while T3 sample (one year later the T2, 2013) was made of 462 students (72.7% females,  $M_{\text{age}}=23.4$ ,  $SD_{\text{age}}=4.3$ , 53.4% of the initial sample). A small part of the sample exceed the early adulthood phase (i.e., about 8% of the initial sample was >25 years old), not differing in gender from the counterpart of the sample.

### 5.2. Procedure

After signing an informed consent developed in line with American Psychological Association recommendations (APA, 2010) previously accepted by the university ethics committee, students filled collectively a non-anonymous questionnaire. Questionnaires were administered in a single day in place of a lecture in the early weeks of the first semester. Baseline (T1) time point of assessment was scheduled after some weeks students entered the nursing program.

A researcher was always present during the administration time to support students and encourage them to ask questions if something was unclear. Participants were rewarded

with a brief personality profile along with the opportunity to discuss their results with a registered psychologist.

### 5.3 Measures

**5.3.1. Self-Efficacy Beliefs in Mastering Negative Emotions.** SE-MNE was assessed by 3 items introduced by the stem “How do you feel able to....”, which were markers of SE-MNE in previous studies (Caprara & Gerbino, 2001; Caprara et al. 2008). Students endorsed the items by using a 5-point Likert-type scale, ranging from 1 (“not able at all”) to 5 (“able at all”). Cronbach’s  $\alpha$ s were .75 (T1), .76 (T2) and .77 (T3).

**5.3.2. Depression.** Depression was assessed by using the Major Depression Inventory (MDI, Bech, Rasmussen, Raabaek Olsen, Noerholm, & Abildgaard, 2001), which is a 12 items measure encompassing the principal symptoms of MD outlined by the DSM-V (American Psychiatric Association, 2013). Students were asked to indicate the frequency of each symptom during the two weeks prior to the day of questionnaire administration. Response format was a 4 Likert-type scale, ranging from 1=“not at all” to 4=“all the time”. Participants were asked to indicate the occurrence of the MDI symptoms during the two weeks prior to the measure administration. Cronbach’s  $\alpha$ s for MDI were, respectively, .85 at T1, .87 at T2 and T3.

### 5.4. Data Analysis and Modeling Strategy

A series of multivariate analyses of variance (MANOVAs), Box’s M and the Little’s (1988) test for MCAR (null hypothesis is that data were missing completely at random) were carried out in order to ascertain the unselective attrition between adjacent time points of assessment.

Since the constructs target of the study are supposed to be unidimensional, Composite Reliability (CR), Maximal Reliability (MR) and Average Extracted Variance

(AVE) (see Fornell & Larcker, 1981; Raykov & Marcoulides, 2011) were used as reliability coefficients of the measurement instruments used for the present study.

Measurement gender invariance (i.e., configural, weak, strong and strict invariance, Meredith, 1993) of the measures was investigated in order to legitimate meaningful latent mean comparisons across gender. Configural invariance consist in a Confirmatory Factor Analysis (CFA) performed simultaneously over two (or more) groups, without imposing any equality restriction on parameters across groups. Weak invariance posits a model were factor loadings are constrained to be equal across males and females. Strong invariance requires, additionally to weak invariance, the equality of observed intercept across gender. Finally, strict invariance add to previous models equality constraints on residual variances. In case of partial invariance (i.e., some equality constraint does not hold across groups, Byrne, Shavelson, & Muthén, 1988), between-group comparison can still be meaningful if the number of non-invariant parameters is trivial (van de Schoot, Lugtig, & Hox, 2013). In order to assess model fit, we used a multifaceted approach (Kline, 2011), relying on Hu & Bentler (1999) recommendations.

Moreover, longitudinal measurement invariance models (see Little, 2013) were tested separately for males and females in order to verify that constructs were measured in a similar way over time. For both cross-sectional (across gender) and longitudinal (across time points within each gender) invariance,  $\Delta CFI > .01$  (Cheung & Rensvold, 2002) has been adopted as a non-invariance criterion between nested competitive models.

Latent Growth Modeling (LGM, Meredith & Tisak, 1990) was implemented to assess mean-level growth in SE-MNE separately for females and males. This approach was initially carried out in a second-order framework (Hancock, Kuo, & Lawrence, 2001) in order to take into account the longitudinal invariance of measurement model components and allowing both trait and state variance estimation (Geiser, Keller, & Lockhart, 2013). Different growth functions were specified and then compared both for males and females (Stoolmiller, 1994).

Subsequently, first-order multi-group LGMs (MG-LGM) were conducted (Bollen & Curran, 2006) in order to further investigate gender invariance of growth parameters.

To detect unobserved intra-individual growth patterns in SE-MNE, a Latent Growth Class Analysis (LGCA, Nagin, 1999, Nagin & Odgers, 2010) was performed, adding sex and age as covariates of the categorical latent variable (Wang & Wang, 2012), choosing the optimal number of longitudinal SE-MNE patterns relying on the multifaceted criteria described in Enders & Tofighi (2008). LGCA is a special case of Growth Mixture Modeling (GMM, see Jung & Wickrama, 2008) assuming no within-class variance of intercept and slope factors. Sex and age impact on each class membership was expressed by multinomial logit coefficients (see Muthén, 2004). Finally, average latent class probabilities and class entropy around .70 were considered indicative of clear between-group distinction (Nagin, 1999; Muthén, 2001).

The impact of SM-MNE growth on depression was investigated by regressing T3 depression on LCGA posterior membership probabilities, after controlling for its previous levels. Furthermore, the discriminant power of the LGCA-based patterns with regard to depression was tested by adopting the Bayesian framework of the informative hypothesis testing (see van de Schoot, Verhoeven, & Hoijsink, 2013, for a review).

## 6. Results

### 6.1. Preliminary Results

**6.1.1. Attrition and Missing Data Analysis.** As described above, more than 40% of the initial sample was attrited at T2, while this proportion is significantly lower looking at the drop out from T2 to T3. This was mainly due to a high percentage of students absent the day of administration. Considering all the variables under study, Little's MCAR test was non-significant ( $\chi^2_{[33]} = 33.21, p=.83$ ), and the same has been found when selecting only

variables at adjacent time points (from T1 to T2  $\chi^2_{(17)} = 9.35, p=.93$  and from T2 to T3  $\chi^2_{(12)} = 11.82, p=.46$ ), suggesting that attrition was unrelated to the variables under consideration. Moreover, MANOVAs and Box's  $m$  tests did not reveal any significant effect, corroborating this hypothesis. Finally, more males than expected dropped out at T2 ( $\chi^2_{(1)} = 4.65, p<.05$ ) and at T3 ( $\chi^2_{(1)} = 7.36, p<.01$ ), and the participants attrited from T2 to T3 were slightly older than their non-attrited counterpart ( $F(1,498) = 10.39, p = .001, \text{partial } \eta^2 = .02$ ).

In sum, a combination of MCAR and MAR (related to demographic characteristics) missing data mechanisms seem to act over the data under study. Thus, for all of the further analyses rooted in the SEM framework, a Full Information Maximum Likelihood (FIML, Arbuckle, 1996) to deal with missing data will be used, while data will be imputed for analyses not allowing FIML (Enders, 2010).

**6.1.2. Descriptive Statistics, Correlations and Reliabilities.** Table 1 presents some preliminary results. As can be noted, in magnitude, the association between SE-MNE and depression seems to be stronger for female at all measurement occasions. Skewness and kurtosis for depression support a slight departure from univariate normality (Tabachnick & Fidell, 2007) at T1 for males, while the average extracted variance (AVE) is under the cut-off generally adopted (.50, Fornell & Larcker, 1981) and this can be attributed to the fact that MDI latent single factor was loaded by many items.

**6.1.3. Gender Invariance of SM-MNE and MDI scales.** Table 2 and Table 3 present the gender invariance results for SE-MNE and MDI scales at each time point of assessment. Results reveal that full strict invariance was reached for the former at T1, T2 and T3, while the latter showed two non-invariant intercepts at all occasions. Moreover, one factor loading was found to be non-invariant at T3. However, latent mean comparisons are still meaningful in such cases, since the number of non-invariant parameters is trivial.

SM-MNE latent means significantly differ across gender at each time point (i.e., males were higher), and latent Cohen's  $d$  were .60, .66 and .50 respectively at T1, T2 and

T3. On the other hand, MDI latent means were different at T1 and T3, .34 and .35 were the effect sizes.

**6.1.4. Longitudinal Invariance of SM-MNE and MDI scales.** Table 4 presents the longitudinal invariance analyses of the scales conducted separately for males and females. With regard to SE-MNE scale, males group reached the full longitudinal strict invariance, whereas females showed only one non-invariant residual variance. Reversely, MDI was found to be full and strictly invariant for females, whereas three residual variances equality constraints were released for males. We can assume that constructs under study are measured similarly in all measurement occasions within each gender sub-group.

## 6.2. Latent Growth Curve Modeling

As explained above, LGMs models of SE-MNE beliefs were firstly carried out in a second order framework. Figure 1 showed the competing LGM tested models. Model 1 (*Strict Stability*) posits no growth in SE-MNE, allowing subjects to differ in its level at the baseline (only intercept variance and mean are estimated). Model 2 (*Parallel Stability*) posits a linear mean change, where subjects increase (or decrease) over time in the same way (no variability around the average trajectory is posited, variance of the slope factor is fixed to zero). Model 3 (*No-Mean Growth*) assumes that, at the mean level, no change in SE-MNE occur, although subjects may vary around the mean of the slope (slope mean is fixed to zero). Model 4 (*Linear Growth*) posits a linear trend over time and systematic variability around the average trajectory. Model 5 (*Non Linear Growth*) posits an average nonlinear increase (or decrease) over time, with individual trajectories free to fluctuate around the average one. The specification of parameters and basis coefficient is depicted in Figure 1.

Parameterization of these models was definite as follows: full strict invariance was specified, with one first-order loading fixed to one in order to assign the standard metric to the first-order latent means, first indicator intercept fixed to 0 to identify the second-order

latent mean structure, first-order latent means fixed to 0, second-order disturbances constrained to equality. Moreover, since the second indicator was less general than others, (i.e., SE beliefs about the control of anxiety during examinations), a method factor was specified. This factor was uncorrelated with all the other latent variables and all its loadings were constrained to equality within the factor.

Table 6 (upper panels) shows the results of competing tested models. For both males and females the parallel stability model was found to be the more appropriate to describe growth processes. Figure 2 presents the plotted model-implied latent means. Apparently, both males and females show a slightly increasing trend over time, whereas males enter higher at the baseline.

Lower panels of Table 6 show that the growth function was found to be the best fitting among the first-order LGMs (in this case, first-order disturbances were set to be equal across time points to facilitate identification, see Bollen & Curran, 2006). Males showed a significant variance around the intercept latent mean (.29,  $t = 6.61$ ,  $p < .001$ ) and they increased significantly over time (slope latent mean was .064,  $t = 2.01$ ,  $p < .05$ ), suggesting that they varied in SE-MNE scores at the baseline and they had a similar increase over time. The same was found for females, where a significant latent variance around the average latent mean scores (.34,  $t = 6.61$ ,  $p < .001$ ) and a significant average increase over time (.08,  $t = 4.65$ ,  $p < .001$ ) were detected.

Thus, we can conclude that both males and females show an average increasing trajectory over the three time points of assessment, and the change process is approximately the same for each individual within the specific gender-based sub-sample. Moreover, both males and females vary around the mean latent score at the baseline.

**6.2.1. Gender Invariance of Latent Growth Parameters.** To test whether the initial SE-MNE level and the growth rate was the same for males and females, a multiple approach was carried out in order to evaluate the invariance of intercept variance and intercept and

slope factors' means. This model fitted poorly the data ( $\chi^2_{(14)} = 78.33$ ,  $p < .01$ , RMSEA = .10 [90% CI .08 – .13], CFI = .84), suggesting the non-invariance of one (or more) parameter(s). Following the information conveyed by modification indexes (Millsap & Kwok, 2004), we found intercept and slope means to be non-invariant ( $\Delta\chi^2_{(2)} = 57.91$ ,  $p < .001$ ) across gender. After releasing these two parameters, the model reached a satisfying fit ( $\chi^2_{(12)} = 20.42$ ,  $p > .05$ , RMSEA = .04 [90% CI .00 – .07], CFI = .98). Thus, as expected, we can conclude that males enter the nursing program with higher scores on SE-MNE, whereas the rate of acceleration is significantly higher for females than males across the considered span.

### 6.3. Latent Class Growth Analysis of SE-MNE Intra-Individual Trajectories

LGCA results are presented in Table 7. Most of the selected criteria converge in electing the 4-class solution as the best fitting. Growth parameters for each class are presented in Table 8, while average model-implied trajectories are depicted in Figure 3.

Trajectory 1 showed a high stable pattern over time, encompassing about the 4% of the total sample and its members were prevalently males, who represented the 78% of students clustered in the present pattern. Slope mean was non-significant, so we can conclude that this can be considered the stable “high-functioning” students’ sub-group with regard to SE-MNE perceived beliefs, which entered the nursing program with high perceived skills in mastering negative affect and remain stable over time. The posterior average probability of this pattern was .78. This group was chosen as the reference one to estimate the impact of gender and age within the categorical latent variable regression framework.

Trajectory 2 showed a medium-high pattern slightly increasing over time. Across the three points of assessment taken into account for the present study, students clustered in this pattern showed a small amount of acceleration in their perceived skills in mastering negative emotions during the period under consideration. Compared to Trajectory 1, females were more likely to be member of this pattern ( $\beta = 2.86$ ,  $t = 3.9$ ,  $p < .001$ ), whereas age didn't exert

any effect on trajectory membership. This pattern absorbed about the 40% of the total sample. The posterior average probability of this pattern was .80.

Trajectory 3 showed a medium-low pattern slightly accelerating over time. With regard to Trajectory 2, this pattern showed a similar increasing trend, although students clustered in this intra-individual longitudinal configuration entered the nursing program with a lower perceived level of SE-MNE, and this difference remained more or less constant at each time point. Also in this case, to be a female increase the probability to be clustered in this pattern ( $\beta=1.21$ ,  $t=2.17$ ,  $p<.05$ ). This trajectory can be considered the “normative” one, since half of the total sample was represented by this pattern. The posterior average probability of this pattern was .81.

Finally, Trajectory 4 showed a low stable pattern of SE-MNE beliefs over time. A group of students (about 8% of the sample) entered the academic career with low perceived levels of SE-MNE and showed a flat trajectory over the three waves during the academic span under study. Even in this case, with respect to Trajectory 1, females were more likely to be classified in this pattern ( $\beta=2.13$ ,  $t=4.01$ ,  $p<.001$ ). The posterior average probability of this pattern was .85.

In conclusion, 4 trajectories represented the best fitting LCGA solution to explain intra-individual development in SE-MNE beliefs of the nursing students' cohort under investigation. Two trajectories were found to be stable: the first had the highest score at the baseline, while the second showed the lowest mean scores at the beginning of the longitudinal project. Otherwise, two patterns showed a significant increasing trend, even in both cases it was weak in magnitude: the first trajectory showed a medium-high level of SE-MNE at the entrance of the nursing program, whereas the second a medium-low level. Such differences between the two patterns were constant at the other two time points.

#### **6.4. Effect of Pattern Membership on Depression**

To evaluate the impact of SE-MNE growth on depression a hierarchical regression was carried out. Before doing this, due to the relevant amount of attrited students (especially from T1 to T2), data were multiply imputed following the more recent recommendations (Enders, 2010). Monte Carlo Markov Chains (MCMC) combined with a semi-parametric approach, namely Predictive Mean Matching (PMM) were used. One hundred datasets were created specifying one hundred MCMC iterations, imputing depression mean scores at each time point, using as regressors of the imputation model the following variables: age, sex, SE-MNE mean scores at each time point, previous levels of depression and individual posterior probabilities of group membership related to each longitudinal pattern. Inspection of trace plots representing the iteration process showed no evident spikes (Enders, 2010). Missing data-points were then substituted by merging the imputed datasets. Even this approach is not performing as analyzing multiple imputed datasets and pooling estimates, it can be considered superior to single imputations techniques, because final average values are corrected for chance by merging them across datasets.

Since the individual posterior probabilities are strongly correlated, we decided to not considering the probability to be a member of the normative group (Trajectory 3) as an additional predictor, in order to avoid perfect multicollinearity (see Kline, 2011). Results from the hierarchical regression are presented in Table 9. As can be noted, after controlling for previous levels of depression, an higher probability to be clustered into the high stable or the medium-high increasing pattern produce a significant decrement in depression mean scores after controlling for its T1 and T2 previous levels. Otherwise, a higher probability to be clustered into the low stable trajectory produce an increment in depression scores.

### 6.5. Informative Hypotheses about SE-MNE Longitudinal Patterns and Depression

Since preliminary analyses showed that the best fitting trajectory to describe depression course over time was represented by the strict stability model (Stoolmiller, 1994), namely no growth (or decrease) over time, only depression measured at T3 was considered the dependent variable of the tested informative hypotheses (Hojitink, 2009) rather than longitudinal inter-individual differences in growth parameters.

To test the following hypotheses about group mean differences, software BIEMS (Mulder, Hoijtink, & de Leeuw, 2012) was used, specifying uninformative priors for depression mean scores. Since this software doesn't allow the presence of missing data in the data-file, we used the imputed dataset previously analyzed for hierarchical regression (see the above paragraph). We tested competing models specified as follows, separately for males and females:

$$\begin{aligned}
 H_{\text{Unc}}: & \mu_{\text{traj1}}, \mu_{\text{traj2}}, \mu_{\text{traj3}}, \mu_{\text{traj4}} \\
 H_{\text{inf0}}: & \mu_{\text{traj1}} = \mu_{\text{traj2}} = \mu_{\text{traj3}} = \mu_{\text{traj4}} \\
 H_{\text{inf1}}: & \mu_{\text{traj1}} < \mu_{\text{traj2}} < \mu_{\text{traj3}} < \mu_{\text{traj4}} \\
 H_{\text{inf2}}: & \mu_{\text{traj1}} < \mu_{\text{traj2}} = \mu_{\text{traj3}} < \mu_{\text{traj4}} \\
 H_{\text{inf3}}: & \mu_{\text{traj1}} < \mu_{\text{traj2}} = \mu_{\text{traj3}} = \mu_{\text{traj4}} \\
 H_{\text{inf4}}: & \mu_{\text{traj1}} = \mu_{\text{traj2}} = \mu_{\text{traj3}} < \mu_{\text{traj4}}
 \end{aligned} \tag{1}$$

$H_{\text{Unc}}$  represents the unconstrained hypothesis (Van de Schoot et al., 2013), positing no relationship among the depression group means. Bayes factor of this hypothesis represents the denominator of all other computed Bayes factor (Van de Schoot, Mulder, Hoijtink, Van Aken, Dubas, De Castro, et. al., 2011).  $H_{\text{inf0}}$  corresponds to the null hypothesis of the Null Hypothesis Significance Testing framework (NHST, Cohen, 1994; Kline, 2004).  $H_{\text{inf1}}$  posits a full gradient of differences in depression mean scores: students clustered in the

high-stable pattern are posited to be significantly less depressed than the ones of the mean-high increasing trajectory, which in turn are less depressed than people grouped in the medium-low increasing pattern, whereas the more depressed students were in the low stable longitudinal trajectory.  $H_{inf2}$  posits no differences between the students showing a mean-high or a mean-low increasing intra-individual trajectory of SE-MNE during the considered academic span.  $H_{inf3}$  represents the model where high-stable students in SE-MNE development are the less depressed, while no differences are posited among the other groups. Finally,  $H_{inf4}$  highlight the potential role of the low-stable trajectory as the higher depressed category, whereas no differences are posited between other sub-groups.

As can be noted in Table 10,  $H_{inf1}$  received about 23 times more support than  $H_{Unc}$  and the higher posterior model probability both for males and females. Adopting BF interpretation criterion proposed by Jeffreys (1961), there is strong evidence that SE-MNE intra-individual trajectory membership is highly discriminant for depression mean scores at the last time point of assessment. In conclusion, SE-MNE intra-individual development seems to predict inter-individual differences of T3 self-reported depressive symptoms in the considered sample.

## 7. Discussion

The present study investigated some aspects of SE-MNE beliefs development of a nursing students' cohort across a two-year (three time points of assessment) span of their academic career, by adopting a social-cognitive perspective of intra-individual development (Cervone, 2005) and of gender differences (Bussey & Bandura, 2004). First of all, as hypothesized, males entered the nursing program with high perceived SE-MNE skills than females. This finding is consistent with previous longitudinal studies (Caprara, Vecchione, et al. 2013). Scholars emphasized the gender intensification hypothesis as a possible

framework to understand such differences (Hill & Lynch, 1983), where both males and females tend to conform to their gender role, showing patterns of thought and behavior consistent with social expectations. Generally, masculine and feminine roles are quite distinct in society (see Galambos, Almeida, & Petersen, 1990, for a review) in terms of attitudes, personality characteristics and mood (Else-Quest, Hyde, Goldsmith, & Van Hulle, 2006), and these aspects tend to increase the likelihood to conform with gender expected standards. Expanding this conception, Bussey & Bandura (1999) proposed a social cognitive theory of gender differentiation, emphasizing the role of psychological and social factors shaping different roles in society. In their view, gender differences are the product of distinct self-development patterns rather than determined by biological endowments. Of importance, authors stressed the role of social cognitive factors in defining gender differences, such as motivational, affective and environmental features underpinning gender development. Relying on this perspective, our findings showed a more or less constant distance of SE-MNE between gender-based groups at each time point of assessment, and this is probably due to the stereotypic expectation about gender roles in mastering negative emotions, which depict males as more skilled in hindering negative affect consequences than females (Gilligan, 1982). However, we think that further evidences are required, because times are changing. Nowadays, males and females share a number of developmental phases together rather than in the past, and gender normative social norms are slightly but constantly changing (Arnett, 2007). If gender roles are markedly distinct in childhood (Archer, 1992) and over the course of adolescence (Basow & Rubin, 1999), we have reasons to believe that early adulthood processes are involved in attenuating gender differences, since males and females are more likely to share experiences and contexts than in previous developmental phases (Arnett, 2004). Moreover, given the fact that gender stereotypes are socially constructed and modeled by social cognitive factors, sharing experiences and contexts could foster stereotypes' attenuation (Hewstone & Brown, 1986), leading to weaker differences in

those characteristics (e.g., SE-MNE and depression). Along with this, both males and females showed a significant SE-MNE mean-level of increase, even females showed an average trajectory slightly steeper than males. Moreover, no significant variability was found around the average trajectory both for males and females, suggesting that students increased their SE-MNE in the same way within each gender sub-group. This finding corroborate the above explanations, supporting that gender differences in SE-MNE begin to slowly attenuate (Caprara et al. 2003; Caprara et al. 2008). Since nursing programs require constant social exchanges among students both in academic and professional training contexts, such difference across average gender trajectories could be related to the attenuation of gender stereotypes produced by a common shared life span. If this can be assumed, males and females shared common challenges and goals (Bandura, 1986), therefore demanding females more efforts than males in hindering negative affect consequences that could have produced a steeper increase in SE-MNE perceived competencies during the relatively small considered academic span. Of importance, both males and females showed a parallel stability in the SE-MNE increase. This is consistent with the above discussion, and it can be attributed to the shared reality (Echterhoff, Higgins, & Levine, 2009) that students perceive. Common contexts, locations, inner states, and life threats can be experienced similarly across individuals, especially among students having the same gender. In this case, social exchange and modeling may have a paramount role (Bandura, 1974): students may influence (and be influenced) by social cognitive models of emotion management, and this can yield, as we found, a homogenous increase in some SE facets. In other words, gender can have the in-group function to foster the sense of efficacy in mastering negative affect similarly for each individual, since students are “nested” in gender. In fact, males and females entered the nursing program with different levels of SE-MNE but their increase seems to be similar for all of the students within gender. However, further research efforts should point to deepen topic, considering different samples of emerging adults, with different measures in different

cultures. Moreover, the role of social contexts has to be unraveled, using for example multilevel research designs (Hox, 2010) and more time points of assessment are required to assess the permanence of this within-gender homogeneity in SE-MNE average rate of growth.

In the second part of the present study, we investigated the role of intra-individual differences in determining alternative patterns of SE-MNE development over the three time points of assessment. A 4-class solution was found to be the best fitting, highlighting a high-stable pattern mainly represented by males (however, only less than 4% of the total sample was clustered in this pattern). Two longitudinal trajectories were found to slightly increase over time: students grouped into the first entered the nursing program with a medium-high level of SE-MNE, while those belonging to the second one start their academic career with a medium-low level (together, these groups represented more than 90% of the total sample). Finally, a low-stable trajectory was found and, with respect to the high-stable pattern, females were more likely to be clustered in this group. Hierarchical regression results showed that the individual posterior probability to be clustered into the high-stable and the medium-high trajectory reduce the probability to feel depressed at the last point of assessment, after controlling for its previous levels. Conversely, a higher probability to be classified into the low-stable pattern increase the likelihood to be depressed. With respect to the above mentioned “positive” effects on depression, this detrimental influence seems to be stronger in magnitude.

Overall, of importance, we found significant effects of SE-MNE intra-individual trajectories on depression. Findings suggest that “higher” patterns of SE-MNE act hindering depressive symptoms in the considered sample, suggesting that promoting psychosocial intervention aimed at increasing students’ perceived sense of efficacy during nursing programs could be a fruitful strategy to avoid negative consequences of dysfunctional emotional management on adjustment outcomes (Bandura, 1997). However, more waves

have to be collected in order to better understand associations between SE-MNE development and depression. Moreover, replicating the structure of the 4-class solution by using different measurement instruments over different samples would corroborate our findings.

Multi-group analyses revealed that the strict stability (no-growth or no-decrease) of depression was the LGM best fitting model for all of the four patterns, suggesting the stability of the depression trajectories within each group. Thus, we assessed the discriminant power of the 4 longitudinal SE-MNE patterns hypothesizing alternative ordered gradients regarding inter-individual differences in T3 depression. By adopting a Bayesian framework (Van de Schoot et al., 2013), the hypothesis positing a fully discriminative gradient resulted the best fitting both for males and females, in which all groups were different from each other. These findings support the practical utility of the 4-class solution in discriminating between different levels of perceived depression. However, as argued above, more research efforts should point to replicate these results, considering different college samples and, for instance, groups of emerging adults involved in the labor market.

Finally, the present study had some limitation. Although we used appropriate techniques of analysis taking into account the combination of MCAR and MAR found in our dataset (see Enders, 2010), attrition (especially between T1 at T2) was quite large. We tried to overcome this problem by adopting FIML (Arbuckle, 1996) in the context of SEM analyses, and to multiply impute data when using other analytical frameworks (e.g., Bayesian informative hypothesis testing). However, our analyses out of FIML approach were not based on pooled estimates, since multiple imputation served to generate several values for missing data points that we further averaged.

Moreover, a small part of non-emerging adults was part of the present sample (i.e., older students that entered the nursing program). However, no gender effects were detected and the percentage of people overcoming the early adulthood period was markedly lower

than in other longitudinal studies on similar cohorts in other countries (e.g., Rudman, Omne-Ponten, Wallin, & Gustavsson, 2010). Thus, generalization of findings over the target population could be misleading. Self-report measures were used for the present study, and no other informant was enrolled for it. Finally, a specific cohort of college students (i.e., nursing students) was the target of the study, rooted in a nursing program of a specific cultural context (i.e., central Italy). A cross-cultural approach would be suitable for further investigations. Again, generalizability of these findings on emerging adult population is not suggested.

## 8. Conclusions

Despite some limitations, the present study highlighted the role of SE-MNE among nursing students over a specific span of their academic career. Males entered nursing program with a higher sense of efficacy in mastering negative emotions, while females increase slightly steeper across the three time points of assessment we considered, suggesting that gender gap in SE-MNE become to partially attenuate since emerging adulthood. Moreover, a person-centered approach was used to identify longitudinal unobserved patterns of SE-MNE over time. Findings showed that higher probability to be clustered in more favorable trajectories (i.e., high-stable and medium-high increasing SE-MNE trajectories) significantly produce a decrement in the likelihood to experience depressive symptoms. Finally, the 4-class solution provided a discriminative gradient of inter-individual differences in depression mean scores both for males and females.

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Table 1.

Descriptive Analyses, Zero-Order Correlations and Reliability Coefficients.

	M	SD	SKEW	KURT	MR	CR	AVE	1	2	3	4	5	6
1 SE-MNE T1	3.36 (2.99)	.80 (.75)	-.17 (.04)	-.14 (.13)	.77 (.75)	.76 (.74)	.52 (.49)	–	-.35**	.58**	-.30**	.56**	-.28**
2 DEPR T1	1.66 (1.77)	.46 (.46)	1.09 (.77)	1.86 (.77)	.88 (.88)	.86 (.85)	.35 (.34)	-.28**	–	-.32**	.50**	-.31**	.47**
3 SE-MNE T2	3.49 (3.05)	.77 (.78)	-.10 (-.16)	-.11 (-.20)	.78 (.77)	.74 (.76)	.49 (.52)	.45**	-.30**	–	-.31**	.61**	-.38**
4 DEPR T2	1.74 (1.79)	.53 (.47)	.72 (.72)	.66 (.36)	.89 (.88)	.88 (.86)	.38 (.36)	-.17*	.54**	-.26**	–	-.35**	.53**
5 SE-MNE T3	3.49 (3.17)	.69 (.74)	.18 (.01)	.20 (-.15)	.73 (.78)	.72 (.77)	.47 (.53)	.41**	-.14	.44**	-.22*	–	-.40**
6 DEPR T3	1.71 (1.77)	.52 (.46)	.59 (.51)	-.18 (.02)	.91 (.88)	.90 (.86)	.45 (.35)	-.19*	.41**	-.25*	.51**	-.15	–

Note. SE-MNE = Self-Efficacy in Managing Negative Emotions; DEPR = Depression; M = Mean; SD = Standard Deviation; SKEW = Skewness; KURT = Kurtosis; MR = Maximal Reliability; CR = Composite Reliability; AVE = Average Variance Extracted. Reliability coefficients for DEPR are based on MLR (Robust Maximum Likelihood) estimates at each time point. Values in parenthesis and correlations above the diagonal refer to females.

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

Table 2.

Gender Invariance of SE-MNE Scale.

MODEL	INVARIANCE	$\chi^2$	<i>df</i>	MC	RMSEA (CI 90%)	CFI	TLI	$\Delta$ CFI
<b>T1</b>								
<b>M1</b>	WEAK	.299	2	–	.00 (.00 – .05)	1.00	1.01	–
<b>M2</b>	STRONG	7.26	4	M2 vs. M1	.04 (.00 – .09)	.994	.992	.006
<b>M3</b>	STRICT	1.24	7	M3 vs. M2	.03 (.00 – .07)	.994	.995	0
<b>T2</b>								
<b>M1</b>	WEAK	4.94	2	–	.08 (.00 – .16)	.992	.975	–
<b>M2</b>	STRONG	6.29	4	M2 vs. M1	.05 (.00 – .11)	.994	.99	-.002
<b>M3</b>	STRICT	1.03	7	M3 vs. M2	.04 (.00 – .09)	.991	.993	.003
<b>T3</b>								
<b>M1</b>	WEAK	.1	2	–	.00 (.00 – .00)	1.00	1.02	–
<b>M2</b>	STRONG	1.02	4	M2 vs. M1	.00 (.00 – .04)	1.00	1.01	0
<b>M3</b>	STRICT	2.18	7	M3 vs. M2	.00 (.00 – .00)	1.00	1.01	0

*Note.* WEAK = Factor loadings invariance; STRONG = Observed intercepts invariance; STRICT = Residual variances invariance; MC = Model Comparison; *df* = degrees of freedom; RMSEA = Root Mean Square Error of Approximation; 90% CI = 90% Confidence Interval; CFI = Comparative Fit Index; TLI = Tucker-Lewis or Non-Normed Fit Index.

Table 3.

Gender Invariance of MDI Scale.

MODEL	INVARIANCE	ROBUST $\chi^2$	df	MC	RMSEA (CI 90%)	CFI	TLI	$\Delta$ CFI
<b>T1</b>								
<b>M1</b>	CONFIGURAL	173.16	108	–	.04 (.03 – .05)	.969	.962	–
<b>M2</b>	WEAK	185.88	119	M2 vs. M1	.04 (.03 – .05)	.968	.965	.001
<b>M3</b>	STRONG	232.12	130	M3 vs. M2	.04 (.03 – .05)	.951	.950	.017
<b>M3a</b>	STRONG <sub>partial</sub>	203.76	128	M3a vs. M2	.04 (.03 – .05)	.964	.963	.004
<b>M4</b>	STRICT	216.93	140	M4 vs. M3	.04 (.03 – .05)	.963	.965	.001
<b>T2</b>								
<b>M1</b>	CONFIGURAL	159.4	108	–	.04 (.03 – .06)	.960	.951	–
<b>M2</b>	WEAK	173.97	119	M2 vs. M1	.04 (.03 – .06)	.957	.953	.003
<b>M3</b>	STRONG	217.24	130	M3 vs. M2	.05 (.04 – .06)	.932	.931	.025
<b>M3a</b>	STRONG <sub>partial</sub>	192.76	128	M3a vs. M2	.04 (.03 – .06)	.950	.948	.007
<b>M4</b>	STRICT	216.33	140	M4 vs. M3	.05 (.03 – .06)	.941	.944	.009
<b>T3</b>								
<b>M1</b>	CONFIGURAL	228.9	108	–	.07 (.06 – .08)	.915	.896	–
<b>M2</b>	WEAK	255.93	119	M2 vs. M1	.07 (.06 – .08)	.904	.894	.011
<b>M2a</b>	WEAK <sub>partial</sub>	247.18	118	M2a vs. M1	.07 (.06 – .08)	.909	.899	.006
<b>M3</b>	STRONG	290.1	129	M3 vs. M2a	.07 (.06 – .08)	.887	.884	.022
<b>M3a</b>	STRONG <sub>partial</sub>	269.73	127	M3a vs. M2a	.07 (.06 – .08)	.900	.896	.009
<b>M4</b>	STRICT	295.82	139	M4 vs. M3	.07 (.06 – .08)	.890	.896	.01

*Note.* WEAK = Factor loadings invariance; STRONG = Observed intercepts invariance; STRICT = Residual variances invariance; MC = Model Comparison; ROBUST  $\chi^2$  = Chi-square estimated with Robust Maximum Likelihood (MLR, Satorra & Bentler, 2001); *df* = degrees of freedom; RMSEA = Root Mean Square Error of Approximation; 90% CI = 90% Confidence Interval; CFI = Comparative Fit Index; TLI = Tucker-Lewis or Non-Normed Fit Index.

Table 4.

Longitudinal Invariance of SE-MNE Scale.

MODEL	INVARIANCE	$\chi^2$	<i>df</i>	MC	RMSEA (CI 90%)	CFI	TLI	$\Delta$ CFI
<b>MALES</b>								
<b>M1</b>	CONFIGURAL	24.80	15	–	.05 (.03 – .08)	.98	.952	–
<b>M2</b>	WEAK	33.076	19	M2 vs. M1	.05 (.02 – .08)	.972	.946	.008
<b>M3</b>	STRONG	37.33	23	M3 vs. M2	.05 (.01 – .07)	.971	.955	.001
<b>M4</b>	STRICT	46.16	29	M4 vs. M3	.05 (.02 – .07)	.965	.957	.006
<b>FEMALES</b>								
<b>M1</b>	CONFIGURAL	18.61	15	–	.02 (.00 – .05)	.997	.994	–
<b>M2</b>	WEAK	25.02	19	M2 vs. M1	.02 (.00 – .05)	.996	.992	.001
<b>M3</b>	STRONG	33.40	23	M3 vs. M2	.03 (.00 – .05)	.992	.988	.004
<b>M4</b>	STRICT	54.38	29	M4 vs. M3	.04 (.02 – .05)	.981	.977	.011
<b>M4a</b>	STRICT partial	41.12	28	M4a vs. M3	.03 (.00 – .05)	.990	.987	.002

*Note.* WEAK = Factor loadings invariance; STRONG = Observed intercepts invariance; STRICT = Residual variances invariance; MC = Model Comparison; *df* = degrees of freedom; RMSEA = Root Mean Square Error of Approximation; 90% CI = 90% Confidence Interval; CFI = Comparative Fit Index; TLI = Tucker-Lewis or Non-Normed Fit Index.

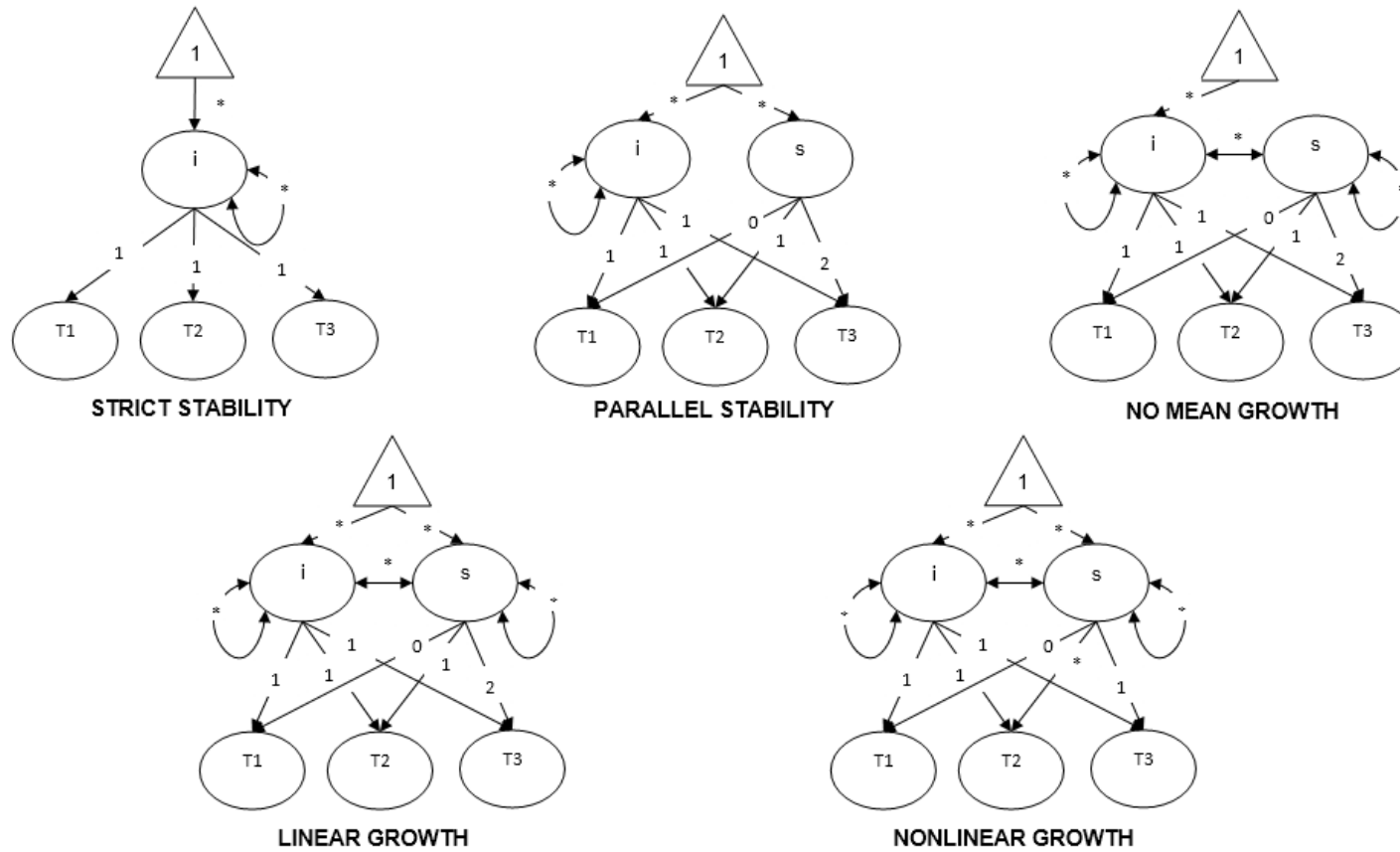
Table 5.

Longitudinal Invariance of MDI Scale.

MODEL	INVARIANCE	$\chi^2$	<i>df</i>	MC	RMSEA (CI 90%)	CFI	TLI	$\Delta$ CFI
<b>MALES</b>								
<b>M1</b>	CONFIGURAL	788.54	555	–	.04 (.03 – .04)	.89	.88	–
<b>M2</b>	WEAK	813.05	579	M2 vs. M1	.04 (.03 – .04)	.89	.881	.000
<b>M3</b>	STRONG	840.08	601	M3 vs. M2	.04 (.03 – .04)	.888	.882	.002
<b>M4</b>	STRICT	894.38	625	M4 vs. M3	.04 (.03 – .04)	.874	.873	.014
<b>M4a</b>	STRICT partial	871.26	622	M4a vs. M3	.04 (.03 – .04)	.883	.882	.005
<b>FEMALES</b>								
<b>M1</b>	CONFIGURAL	848.51	555	–	.03 (.026 – .034)	.932	.923	–
<b>M2</b>	WEAK	879.96	579	M2 vs. M1	.03 (.026 – .034)	.930	.924	.002
<b>M3</b>	STRONG	912.57	601	M3 vs. M2	.03 (.026 – .034)	.928	.924	.002
<b>M4</b>	STRICT	941.23	625	M4 vs. M3	.03 (.026 – .033)	.927	.926	.001

*Note.* WEAK = Factor loadings invariance; STRONG = Observed intercepts invariance; STRICT = Residual variances invariance; MC = Model Comparison; ROBUST  $\chi^2$  = Chi-square estimated with Robust Maximum Likelihood (MLR, Satorra & Bentler, 2001); *df* = degrees of freedom; RMSEA = Root Mean Square Error of Approximation; 90% CI = 90% Confidence Interval; CFI = Comparative Fit Index; TLI = Tucker-Lewis or Non-Normed Fit Index.

Figure 1. Parameterization of Second-Order LGM models.



Note. *i* = Intercept Factor; *s* = Slope Factor; \* = Free Parameter; 1 = Latent Mean Structure; 0, 1, 2 = Basis Coefficients. To avoid clutter, first-order part of the model was not depicted.

Table 6.

Second- and First-Order LGC Models of SE-MNE.

GROWTH FUNCTION		$\chi^2$	<i>df</i>	<i>p</i>	RMSEA (90% CI)	CFI	TLI	AIC	BIC	ABIC
<b>MALES (second-order)</b>										
M1	Strict Stability	99.39	43	<.001	.07 (.05 – .09)	.886	.905	4104	4144	4109
<b>M2</b>	<b>Parallel Stability</b>	<b>95.39</b>	<b>42</b>	<b>&lt;.001</b>	<b>.07 (.05 – .08)</b>	<b>.892</b>	<b>.91</b>	<b>4102</b>	<b>4145</b>	<b>4107</b>
M3	No-Mean Growth	98.07	41	<.001	.07 (.05 – .09)	.89	.90	4106	4154	4112
M4	Linear Growth <sup>a</sup>	92.55	39	<.001	.07 (.05 – .09)	.89	.90	4105	4159	4112
M5	Nonlinear Growth	93.83	39	<.001	.07 (.05 – .09)	.89	.90	4106	4161	4113
<b>FEMALES (Second-Order)</b>										
M1	Strict Stability	151.84	43	<.001	.07 (.05 – .08)	.919	.932	8968	9016	8981
<b>M2</b>	<b>Parallel Stability</b>	<b>127.68</b>	<b>42</b>	<b>&lt;.001</b>	<b>.06 (.05 – .07)</b>	<b>.936</b>	<b>.945</b>	<b>8946</b>	<b>8998</b>	<b>8960</b>
M3	No-Mean Growth	150.87	41	<.001	.07 (.06 – .08)	.918	.928	8971	9028	8987
M4	Linear Growth	127.49	40	<.001	.06 (.05 – .07)	.935	.941	8950	9011	8966
M5	Nonlinear Growth <sup>b</sup>	125.43	40	<.001	.06 (.05 – .07)	.936	.943	8948	9009	8964

		<b>MALES (First-Order)</b>								
M1	Strict Stability	9.98	6	.12	.05 (.00 – .10)	.939	.97	1228	1239	1230
<b>M2</b>	<b>Parallel Stability</b>	<b>5.967</b>	<b>5</b>	<b>.31</b>	<b>.03 (.00 – .09)</b>	<b>.985</b>	<b>.99</b>	<b>1226</b>	<b>1241</b>	<b>1228</b>
M3	No-Mean Growth	7.002	4	.14	.05 (.00 – .11)	.95	.97	1229	1247	1232
M4	Linear Growth	2.704	3	.43	.05 (.00 – .10)	1.00	1.04	1227	1249	1230
M5	Nonlinear Growth <sup>c</sup>	2.67	2	.26	.03 (.00 – .13)	.99	.99	1229	1254	1232
		<b>FEMALES (First-Order)</b>								
M1	Strict Stability	27.36	6	<.001	.08 (.05 – .11)	.935	.967	2596	2609	2600
<b>M2</b>	<b>Parallel Stability</b>	<b>5.92</b>	<b>5</b>	<b>.86</b>	<b>.02 (.00 – .06)</b>	<b>.997</b>	<b>1.00</b>	<b>2577</b>	<b>2594</b>	<b>2582</b>
M3	No-Mean Growth	26.91	4	<.001	.10 (.07 – .14)	.930	.95	2600	2622	2606
M4	Linear Growth <sup>c</sup>	5.896	3	.12	.04 (.00 – .09)	.991	.99	2581	2607	2588
M5	Nonlinear Growth	3.87	2	.14	.04 (.00 – .10)	.994	.99	2581	2589	2589

*Note.* AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; ABIC = Sample Size Adjusted BIC; CFI = Comparative Fit Index; TLI = Tucker-Lewis or Non-Normed Fit Index. Best fitting models are in bold.

<sup>a</sup> To let this model converge one second-order latent disturbance was released from equality.

<sup>b</sup> Since slope variance obtained a non-significant negative estimates, this value was fixed to a small value (.0001) in order to reach model convergence (Bollen & Curran, 2006).

<sup>c</sup> In these models,  $\Psi$  matrix was not positive definite, suggesting the inappropriateness of such growth functions to fit the data (Bollen & Curran, 2006).

Figure 2. Model-Implied Latent Means for the Second-Order Best Fitting LGC for Males and Females.

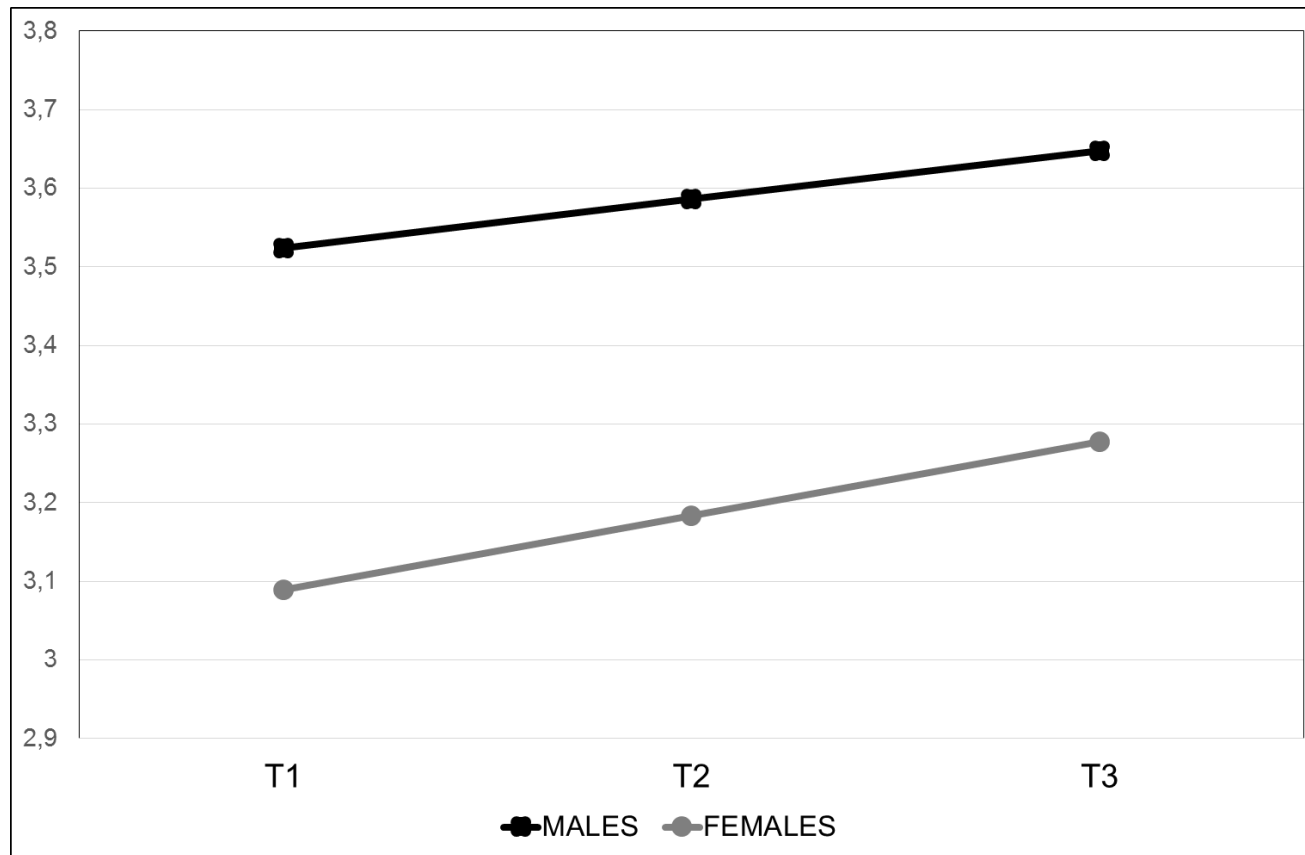


Table 7.

Latent Growth Class Analysis (LCGA) of SE-MNE.

Model	AIC	BIC	ABIC	Entropy	LMR LR test <i>p value</i>	ALMR LR test <i>p vale</i>	BLRT test <i>p value</i>
2-class LGCA	3916	3968	3933	.59	<.001	<.001	<.001
3-class LGCA	3814	3890	3840	.65	<.001	<.001	<.001
<b>4-class LGCA</b>	<b>3790</b>	<b>3890</b>	<b>3824</b>	<b>.67</b>	<b>&lt;.05</b>	<b>&lt;.05</b>	<b>&lt;.001</b>
5-class LGCA	3785	3909	3827	.59	.82	.82	.08
6-class LGCA	3777	3925	3827	.75	.24	.24	.11

*Note.* AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; ABIC = Sample Size Adjusted BIC; LMR LR test = Lo-Mendell-Rubin likelihood ratio test; ALMR LR test = Adjusted Lo-Mendell-Rubin likelihood ratio test; BLRT test = Bootstrap likelihood ratio test. Best fitting solution is in bold.

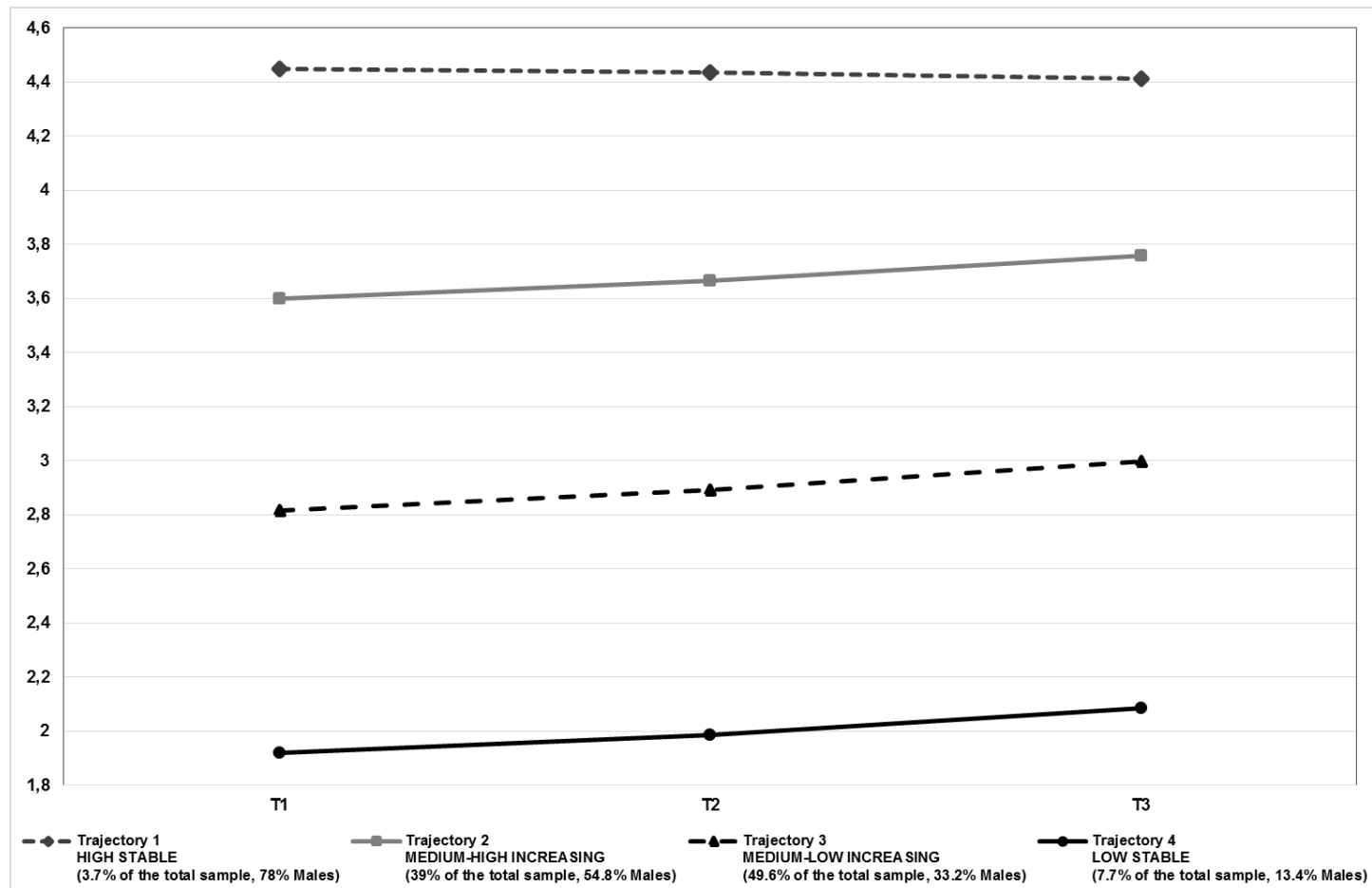
Table 8.

LCGA Model Parameters.

Model	I $\mu$	<i>t</i>	S $\mu$	<i>t</i>
Trajectory 1 ( <i>High-Stable</i> )	4.45	37.29**	-.04	-.17 <sup>ns</sup>
Trajectory 2 ( <i>Medium-High increasing</i> )	3.6	45.78**	.16	2.17*
Trajectory 3 ( <i>Medium-Low increasing</i> )	2.83	41.88**	.18	3.79**
Trajectory 4 ( <i>Low-Stable</i> )	1.92	15.4**	.16	.88 <sup>ns</sup>

Note. I $\mu$  = Intercept Mean; S $\mu$  = Slope Mean; *t* = t-value, <sup>ns</sup> = non-significant, \*  $p < .01$ , \*\*  $p < .01$ .

Figure 3. Estimated Means for LCGA trajectories.



Note. To avoid clutter, observed means were not represented.

Table 9.

Hierarchical Regression of Depression at T3.

	Variable	$\beta$	$t$	$sr^2$	R	$R^2$	$\Delta R^2$
Step 1					.54	.293	–
	Depression T1	.54	18.91***	.54			
Step 2					.67	.446	.154***
	Depression T1	.23	7.57***	.19			
	Depression T2	.48	15.5***	.39			
Step 3					.68	.463	.019***
	Depression T1	.23	7.09***	.16			
	Depression T2	.48	14.86***	.35			
	Prob. Trajectory 1 ( <i>High Stable</i> )	-.05	-2.15*	-.05			
	Prob. Trajectory 2 ( <i>Medium-High increasing</i> )	-.06	-2.18*	-.05			
	Prob. Trajectory 4 ( <i>Low Stable</i> )	.10	3.51***	.09			

Note. Dependent variable = Depression T3; N = 865;  $\beta$  = Standardized Regression Coefficient;  $sr^2$  = Squared Semi-partial Correlation Coefficient; R = Multiple Correlation Coefficient;  $R^2$  = Squared Multiple Correlation Coefficient. <sup>ns</sup> = non-significant, \* $p < .01$ , \*\*\*  $p < .001$ .

*Table 10.*

Model Evaluation of the Informative Hypotheses about Depression Mean Differences between Longitudinal Pattern-Based Groups.

	Males		Females	
	BF	PMP	BF	PMP
MODEL Unc ( $H_{Unc}$ )	–	.04	–	.04
MODEL 0 ( $H_{inf0}$ )	0	0	0	0
MODEL 1 ( $H_{inf1}$ )	23.51	.93	23.49	.96
MODEL 2 ( $H_{inf2}$ )	.64	.03	0	0
MODEL 3 ( $H_{inf3}$ )	0	0	0	0
MODEL 4 ( $H_{inf4}$ )	0	.01	0	0

*Note.* Model Unc=Unconstrained Hypothesis Model. MODEL 0=Null Hypothesis model. BF= Bayes factor associated to the tested model against Model Unc; PMP=Posterior Model Probability.

**AN INTRA-INDIVIDUAL PERSPECTIVE  
ON SELF-EFFICACY BELIEFS DEVELOPMENT:  
IMPACT ON BURNOUT AND WORK ENGAGEMENT**

**Abstract:**

Principal aim of the present paper is to link intra-individual conjoint development in Self-Efficacy (SE) facets to inter-individual differences in burnout and work engagement within a cohort of nursing students. By adopting a longitudinal design with three time points of assessment, Multi-Process Latent Class Growth Analysis (MP-LCGA) has been used in order to identify longitudinal integrated pattern of SE beliefs in emotional, social and academic spheres of personal functioning. Results provided a 4-class solution, evidencing an overall high-functioning pattern, two intermediate functioning configuration (the first with a less favorable trend of academic regulatory efficacy, the second by low stable trajectories of SE dimensions in managing negative affect), and an overall low-functioning longitudinal structure of SE beliefs development. These patterns were found to be discriminant for burnout and work engagement at the last point of assessment, where the high-functioning pattern showed to be the better adjusted. Moreover, results from Bayesian evaluation of informative hypotheses suggest that academic regulatory efficacy played a key role along the adaptation continuum, rather than SE beliefs in mastering negative consequences of affect. Findings and practical implication are discussed, along with some suggestions to move forward in this direction.

*Keywords:* Self-efficacy, Burnout, Engagement, Multi-Process Latent Growth Class Analysis, Informative Hypotheses.

## 1. Introduction

Helping others is not a simple matter: it involves a number of skills, such as emotional, social and behavioral competencies (Brammer & MacDonald, 2003). Yet, if helping others constitutes one's work, this scenario makes things even more complex (Compton, Galaway, & Cournoyer, 2004). Among the wide range of professionals that are involved in jobs aimed at improving others' well-being, nurses represent an important population for several reasons. Firstly, they are involved in highly demanding processes, representing paramount human resources in managing and improving some relevant aspects of health care facilities (Irvine, Sidani, & Hall, 1997). Secondly, they represent a category of health care workers continuously involved in social contacts with patients, within a complex network of human relations with superiors and subordinates (Fagin, 1992). Thirdly, in such scenario, nurses are required to balance their feelings with their professional activities (Theodosius, 2008). Modern theories of nursing education argue that emotional, social and behavioral outcomes of nursing profession are ongoingly increasing their relevance in contemporary practice, representing fundamental elements of the overall evaluation of job performance (Bastable, 2003; Gorman & Sultan, 2007). In other words, along with technical skills, nurses are called to manage their feelings at work, to engage social relations, and to act patterns of behavior in line with context's requirements (Gorman & Sultan, 2007).

These premises show that nurses are involved in a complex adjustment process that encompasses a number of specific activities, such as working in team, managing emergencies, taking fast decisions, satisfying patients' needs at their best. A variety of research findings showed that outcomes of the adjustment process are not the same for all nurses. Among all the possible consequences that adjustment (or maladjustment) process can bring with, scholars focused their attention to disentangle dynamics, onset and etiology of

long-term dysfunctional schemes of reaction to work-related stress (i.e., burnout syndrome). Otherwise, a large body of literature on nursing adjustment to working settings acknowledged the role of proactive involvement in job processes (i.e., work engagement) in determining better performances and yielding fruitful health care outcomes.

More specifically, burnout can be defined as a “prolonged response to chronic emotional and interpersonal stressors on the job, and is defined by the three dimensions of exhaustion, cynicism, and inefficacy” (Maslach, Schaufeli, & Leiter, 2001, p. 2001). As can be noted, three are generally considered the components of the broader construct of burnout: “(1) exhaustion (i.e., the depletion or draining of mental resources); (2) cynicism (i.e., indifference or a distant attitude towards one’s job); and (3) lack of professional efficacy (i.e., the tendency to evaluate one’s work performance negatively)” (Schaufeli, Taris, & van Renen, 2008, p. 175). From the bright side of nursing adjustment, work engagement can be defined as “positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption” (Bakker & Demerouti, 2008, p. 209). Again, this construct reflects three specific components: “Vigor is characterized by high levels of energy and mental resilience while working. Dedication refers to being strongly involved in one’s work and experiencing a sense of significance, enthusiasm, and challenge. Absorption is characterized by being fully concentrated and happily engrossed in one’s work” (*Ibid.*, p. 209-210). Apparently, burnout and work engagement could represent two poles of a common gradient, even if the theoretical relationship among the two constructs is still object of debate. For example, Maslach, Jackson, & Leiter (1997) argued that burnout and work engagement are specular points of a single continuum, while other scholars advanced the hypothesis of antithetic and independent constructs (Bakker & Demerouti, 2007; Demerouti, Mostert, & Bakker, 2010), especially with regards to their sub-dimensions that, according with their line of reasoning, does not represent antipodes.

Nurses have been repeatedly the target population of such investigations. What is known so far is that both job demands and job resources are highly involved in processes leading both to burnout and work engagement (Bakker, Demerouti, & Sanz-Vergel, 2014). With this regard, Job-Demands Resources Model (JD-R model, Bakker & Demerouti, 2007, 2008b) provide a theoretical framework to understand the processes involved in determining such outcomes. In particular, personal resources (e.g., self-efficacy beliefs) can be pivotal in hindering maladjustment and fostering optimal functioning at work (Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2007; 2009b). Moreover, as well as their more experienced colleagues, nursing students are involved in a similar adaptation process during the years of their academic education. Specifically, they have to deal since the first year with both academic activities and clinical training (Jimenez, Navia-Osorio, & Diaz, 2010). Although they generally enter nursing program in life a stage of increasing well-being and with a good sense of efficacy in mastering life challenges (i.e., *emerging adulthood*, Arnett, 2004), some individuals experience a sense of low efficacy and they feel unable to face challenges, failing a number of personal goals. In this sense, recent studies provided the evidence that unmanaged stress can lead to stress-related symptoms since the very early phases of nursing academic career (Watson, Deary, Thompson, & Li, 2008; Rudman & Gustavsson, 2011, 2012; Deary, Watson, & Hogston, 2003).

In such scenario, perceived efficacy in managing negative affect, in building constructive social relations and in self-regulating academic activities are paramount to overcome stressful conditions (Bandura, 1997). For instance, self-efficacy beliefs in mastering basic negative emotions (SE-MNE) represent a pivotal key in overruling stress-related negative consequences in nursing education settings (Gloude-mans, Schalk, Reynaert, & Braeken, 2013). Since SE-MNE beliefs are highly involved in the broader process of emotion self-regulation (John & Gross, 2004; Judge & Bono, 2001), they substantially contribute in determining a competent mindset oriented to manage job threats in nursing

settings (Townsend & Scanlan, 2011; Zulkosky, 2009). Moreover, recently Caprara, Di Giunta, Pastorelli, & Eisenberg (2013) highlighted the role of self-efficacy beliefs in mastering self-conscious emotions (SE-SCE), such as shame and embarrassment, in promoting optimal functioning among emerging adults by hindering the negative consequences of others' judgments. Since such perceived competencies are crucial in work settings (e.g., Kramer, 1999), we have reasons to believe that they are involved in the broader adjustment process of nursing students, especially in clinical training contexts.

Building proactively social relationships could improve psychosocial functioning (Caprara, 2002). Generally, a higher sense of social self-efficacy (SE-SOC) in academic contexts is related to fruitful academic paths (Zajacova, Lynch, & Espenshade, 2005), to lower levels of perceived stress (Wei, Russel, & Zakalik, 2005) and to better career development (see Anderson & Betz, 2001). Moreover, specific facets of SE-SOC (e.g., self-efficacy beliefs in help giving and seeking) can be viewed, under certain circumstances, as effective learning and working strategies (Smith & Betz, 2000; Karabenick & Newman, 2013). These competences can be part of a broader intra-individual self-regulatory system in hindering negative consequences of job burnout and, on the other hand, promoting successful adaptation to learning and training contexts.

Finally, self-efficacy beliefs for self-regulated learning (SE-SRL) enhance not only academic performance (Zimmerman, Bonner, & Kovach, 1996; Caprara, Fida, Vecchione, Del Bove, Vecchio, Barbaranelli, & Bandura, 2008) and proactive academic strategies (Wäschle, Allgaier, Lachner, Fink, & Nückles, 2014), but they contribute to personal well-being across the academic span, since the first steps into academic career (Chemers, Hu, & Garcia, 2001). Moreover, SE-SRL can improve newcomers' adjustment in working and training settings (Saks, 1995; Sitzmann & Ely, 2011; Kozlowski, Gully, Brown, Salas, Smith, & Nason, 2001).

Overall, we believe that such SE dimensions can be all related to nursing students' adaptation to academic contexts and clinical training. As a consequence, we think that the higher students score and grow on these SE beliefs, the lower the risk to be burned out and, vice versa, the higher the likelihood to have stronger work engagement. However, to date, it is unclear how such beliefs are configured within individuals, and how they grow (or decrease) conjointly over the nursing program span. The present study is aimed to unravel the link between self-efficacy beliefs development to clinical training adjustment outcomes of nursing students.

### **1.1. Burnout and Personal Resources in Nursing Contexts**

Burnout represents the precipitate of job characteristics (both demands and resources, e.g. Demerouti, Bakker, Nachreiner, & Schaufeli, 2001) that are unsuccessfully managed by personal resources (Bakker & Costa, 2014). Within nursing context, especially in emergency situations (Adriaenssens, De Gucht, & Maes, 2015; Browning, Ryan, Thomas, Greenberg, & Rolniak, 2007) such individuals' state can yield a substantial negative impact on patients' safety outcomes (see Laschinger & Leiter, 2006).

Even if integrated interventions (targeted both at the individual and organizational level) would be one of the most effective strategies in preventing burnout (Maslach et al., 2001), we believe that changing job characteristics is a hard work, since health care organizational settings are generally pervaded by a strongly institutionalized culture (Davies, Nutley, & Mannion, 2000; Scott, Mannion, Davies, & Marshall, 2003), and this makes it difficult to introduce relevant changes from a managerial point of view, even because nursing practices and procedures are highly standardized across facilities. Otherwise, personal resources can buffer the impact of stressful working conditions on both performance and adjustment process (see Laschinger & Fida, 2014). In this sense, a plethora

of research findings documented the protective effects of personal resources on burnout (see Maslach et al. 2001, for a review).

Among all the individual differences in dealing with burnout, the sense of personal efficacy is generally stressed as a core competence (Leiter, Bakker, & Maslach, 2014; Cherniss, 1993). However, in nursing settings, only few studies addressed the role of SE beliefs in hindering burnout onset and maintenance over time (Laschinger & Shamian, 1994; Leiter, 1992). This is probably consistent with the fact that inefficacy is mostly viewed as a component of burnout rather than a possible determinant (Maslach et al., 2001). Recently, Consiglio, Borgogni, Alessandri, & Schaufeli (2013) found that work self-efficacy decrease the likelihood to be burned out both at the individual- and team-level in a large Italian company. Salanova, Peiró, & Schaufeli (2002) found a specific self-efficacy dimension (i.e., computer self-efficacy) to be moderating job demands-burnout link in an information technology job setting, whereas a number of findings showed that teacher self-efficacy protect from such syndrome (see Aloe, Amo, & Shanahan, 2014, for a review).

With regards to nursing education settings, recent findings showed increasing trajectories of burnout across the years, with a very early onset (Watson et al., 2008; Deary et al. 2003; Rudman & Gustavsson, 2011, 2012), and a protective role of self-efficacy in contrasting the emerge of such outcome during nursing education (see Gibbons, 2010). Moreover, recently Rudman, Gustavsson, & Hultell (2014) found that burnout levels during nursing education predict the intention to leave the profession during their first five years of practice. Moreover, findings from longitudinal studies across different samples put in light that burnout growth rate is highly related to its initial levels (Bakker, Schaufeli, Sixma, Bosveld, & Van Dierendonck, 2000; Hakanen, Bakker, & Jokisaari, 2011; Schaufeli, Maassen, Bakker, & Sixma, 2011), making the onset and maintenance of burnout during nursing education a non-ignorable problem. In other words, the more a nursing student show

high levels of burnout during his/her academic period, the more is the likelihood to be burned out also in the future.

These findings highlight the nursing program as a critical academic context. As documented, early onset of burnout can have problematic consequences on nursing performance and, moreover, on personal well-being. We believe that self-efficacy beliefs represent paramount competencies in hindering such phenomenon along the entire span of nursing learning and training education, allowing students to cope proactively with a variety of challenges and demands. However, little is known about the role of intra-individual patterned self-efficacy structures to deal with the negative consequences of maladjustment on nursing students.

## **1.2. Work Engagement and Personal Resources in Nursing Contexts**

Simpson (2009) highlighted in a literature review that a variety of antecedents are related to work engagement in nursing settings, both at the individual and organizational level. Moreover, common findings converge in attesting the positive impact of work engagement on job performance and the detrimental effects on maladjustment outcomes (e.g., turnover and absenteeism). Work engagement can be viewed as the output of a fruitful process of adjustment to the working context, and it is positively associated with job satisfaction, happiness, positive mood, well-being and good health (Bakker, Schaufeli, Leiter, & Taris, 2008; Taris, Cox, & Tisserand, 2008). Again, personal resources play a key role in promoting and directing working efforts on performance (Demerouti & Bakker, 2006). Interestingly, work engagement seems to be unrelated to workaholism (Schaufeli, Bakker, & Salanova, 2006).

According to Bakker & Demerouti (2007), personal resources boost directly work engagement and, from a theoretical point of view, they are in turn affected by the loop feedback of performance. Among these, self-efficacy represents a key aspect of personal

functioning directly linked to it. Despite a number of conceptual contributions about the impact of self-efficacy beliefs on work engagement, research findings are relatively scarce. Xanthopoulou, Bakker, Demerouti, & Schaufeli (2009a) found in a diary study that both general and day-level self-efficacy produced an increase in day-level work engagement. Xanthopoulou et al. (2007) tested a model in which a general factor measuring personal resources (loaded by self-efficacy, optimism and organizational-based self-esteem) exerted a positive impact on work engagement. Similar results were found in Xanthopoulou et al. (2009b). Salanova, Lorente, Chambel, & Martínez (2011) found a strong impact of self-efficacy on work engagement in a nursing setting. Caesens & Stinglhamber (2014) enlightened the same link, finding a similar effect in terms of magnitude. Finally, Simbula, Guglielmi, & Schaufeli (2011) found a cross-lagged path between self-efficacy beliefs and work engagement over three time points of assessment, and Guglielmi, Simbula, Schaufeli, & Depolo (2012) results suggest, as they found, that impact of self-efficacy on work engagement could be partially mediated by job resources.

With regards to nursing professional contexts, Bargagliotti (2011) proposed in her review a “contagious” perspective of work engagement, in which nurses are mutually influenced by their superiors and colleagues in performing nursing activities with vigor, dedication and absorption. This perspective can be extended also to educational settings (Crookes, Crookes, & Walsh, 2013). Yet, findings support the positive influence exerted by work engagement on different facets of nursing performance, both for professionals (Laschinger, Wilk, Cho, & Greco, 2009; Jenaro, Flores, Begoña, 2011; Kalish, Curley, & Stefanov, 2007; White, Wells, & Butterworth, 2014; Van Bogaert, Clarke, Willems, & Mondelaers, 2012; Salanova et al., 2011) and students in clinical training contexts (Pfaff, Baxter, Jack, & Ploeg, 2014; Ullom, Hayes, Fluharty, & Hacker, 2014; Pollard, 2009). Overall, these findings suggest the importance of work engagement in determining an outstanding job performance and an optimal functioning within (and outside) working

contexts. Moreover, self-efficacy seem to be crucial to activate virtuous personal job paths leading to work engagement.

However, to date, it's unclear how self-efficacy beliefs in different spheres of life functioning (i.e., emotional, social and academic regulatory) shape differences in work engagement within clinical settings. Moreover, the lack of studies investigating self-efficacy and work engagement link in a prospective framework does not allow to infer causality about this relationship. Finally, to date, no study and theoretical contributions pointed to unravel how intra-individual differences in personal resources may produce inter-individual differences in work engagement.

### **1.3. The Present Study**

Adopting a social cognitive view of personal resources (Bandura, 1986, 1997) the present study is aimed to unravel the link between the conjoint intra-individual development of self-efficacy beliefs (henceforth, also SE) in different life spheres and clinical training adjustment in a cohort of nursing students. By using a longitudinal research design, we firstly investigate intra-individual differences in longitudinal integrated patterns of SE beliefs in emotional, social and academic functioning. With this regard, relying on previous studies on emerging adults (see Alessandri, Vecchione, & Caprara, 2014), we hypothesize that male students will be more likely to be clustered in longitudinal patterns characterized by higher levels of SE in mastering the negative consequences of emotions. Otherwise, according with an agentic perspective of human being (Bandura, 2006a), we expect that older students will be classified in high functioning patterns (i.e., more favorable trajectories in all SE dimensions). Finally, we expect such longitudinal patterns of SE beliefs to produce individual differences in burnout and work engagement at the final time point. With these regard, we expect pattern(s) showing more favorable within-class trajectories to be better adjusted.

## 2. Method

### 2.1. Participants and Procedures

Participants were nursing students enrolled in a broader research project of a central Italian medical university. After signing an informed consent previously endorsed by the ethics committee board in line with APA's recommendation (2010), they filled a non-anonymous questionnaire at the beginning of the first semester of each academic year (T1, 2011; T2, 2012; T3, 2013).

874 students (67.3% females,  $M_{age}=21.83$ ,  $SD_{age}=4.6$ ) represented the target initial sample. At T2 (one year later, 2012) 503 students (70.4% females,  $M_{age}=22.7$ ,  $SD_{age}=4.43$ , 57.5% of the initial sample size) participated to the second research step, while T3 sample (one year later the T2, 2013) was made of 464 students (72.4% females,  $M_{age}=23.4$ ,  $SD_{age}=4.3$ , 53% of the initial sample size). As a reward for their participation, students enjoyed (voluntarily) the opportunity to discuss the results of a brief personality profile with a registered psychologist few weeks before the new wave.

### 2.2. Measures

**2.2.1. SE beliefs.** SE beliefs were measured tapping four different areas of personal perceived competencies and items were introduced by the general stem "How do you feel able to....": 1) *SE beliefs in mastering negative emotions* (SE-MNE, Caprara & Gerbino, 2001; 3 items, item sample "Control anxiety in facing a problem"); 2) *SE beliefs in mastering self-conscious emotions* (SE-SCE, Caprara, Di Giunta, et al, 2013; Caprara, Di Giunta, Esisenberg, Gerbino, Pastorelli, & Tramontano, 2008; 4 items, item sample "Contain shame for having made a poor figure in front of many people"); 3) *Social SE beliefs* (SE-SOC, Bandura, 2006b; 3 items, item sample "Make sure to get help from teacher/tutor when

needed”); 4) *SE beliefs in self-regulated learning* (SE-SRL, Bandura, 2006b; 3 items, item sample “Focus on studies when there are other, more fun things to do”). The answer format was for all the items on a 5-point Likert-type scale, ranging from 1 (“not able at all”) to 5 (“able at all”). SE dimensions were measured at T1, T2 and T3.

**2.2.2. Burnout and Work Engagement.** Burnout and work engagement were measure by using a reduced version of the Scale of Work Engagement and Burnout (SWEBO, Hultell & Gustavsson, 2010a and 2010b). Specifically, participants were asked to indicate the occurrence of some feelings towards clinical training and academic experience with respect to a two weeks span prior to the administration of questionnaires. Burnout was assessed considering three sub-dimensions: Exhaustion (3 items, sample item is “I felt lethargic”,  $\alpha = .79$ ), Cynism (4 items, sample item is “I felt indifferent”,  $\alpha = .84$ ) and Inattentiveness (4 items, sample item is “I felt unfocused”,  $\alpha = .82$ ). Work engagement was assessed by considering tree sub-dimensions too: Vigor (3 items, sample item is “I felt determined”,  $\alpha = .91$ ), Dediton (3 items, sample item is “I felt inspired”,  $\alpha = .86$ ) and Attention (4 items, sample item is “I felt fully concentrated”,  $\alpha = .80$ ). For the present study, both burnout and work engagement were considered only at the last wave (T3). Items were endorsed on a 4-point Likert scale, ranging from 1 (“never”) to 4 (“all the time”).

### 2.3. Plan of Analysis and Modeling Strategies

Adopting a multifaceted approach (Enders, 2010), missing data mechanisms were controlled carrying out the Little’s MCAR test (1988), and performing a series of cross-tabulations with demographics. Moreover, in order to understand in depth if attrition was partially selective, a series of MANOVAs considering attrition between adjacent time points of assessment and from T1 to T3 were performed, by creating a dummy variable (0=non-attrited Vs. 1=attrited participant) as between-subjects factor. The homogeneity of multivariate covariance matrices was also ascertained by Box’s M tests (Tabachnick &

Fidell, 2007). Construct validity of SE scales was assessed by longitudinal factor analysis (LCFA) positing a correlated four-factor model, imposing restrictions on model's parameters by hierarchical steps, in order to ascertain that SE dimensions were measured similarly across time points. With this scope, firstly (Meredith, 1993; Little, 2013) a CFA model was estimated simultaneously considering all items without imposing constraints on any parameter (i.e., *configural invariance*), secondly constraining factor loadings to be equal across waves (i.e., *weak invariance*), thirdly constraining observed intercepts equal across time points (i.e., *strong invariance*) and finally the same restrictions were applied on residual variances (i.e., *strict invariance*). To compare these nested models,  $\Delta\text{CFI} > .01$  (i.e., difference in Comparative Fit Index, Cheung & Rensvold, 2002) was considered as indicative of model fit worsening, meaning that invariance restrictions do not hold.

Construct validity of SWEBO scales was assessed also by carrying out a CFA, positing a two correlated second-order factors. In this case, first-order dimensions were supposed to load into their consistent second-order factor (i.e., burnout and work engagement).

To assess the model overall reliability of SE cross-sectional models and of SWEBO second-order structure, an appropriate coefficient was used (Model-Based Internal Consistency, MBIC, Bentler, 2009), overcoming the well-known limitations of Cronbach's alpha (on this topic, see Sijtsma, 2009). With this regard, burnout and work engagement second-order models were estimated separately.

Finally, adopting a multifaceted model fit assessment (see Kline, 2011), several goodness of fit indexes and criteria are taken into account for SEM tested models' evaluation: i) Chi-square significance (if Chi Square is not significant, it means that the model reached a perfect fit with the observed data); (ii) Comparative Fit Index (CFI) (Bentler, 1990); values  $\geq .95$  indicate a good fit); (iii) Root Mean Square Error of Approximation (RMSEA) (Steiger, 1990); values  $\leq .05$  or  $.08$  indicate a good fit, as well as

the non-statistical significance of its associated 90% confidence interval (Hu & Bentler, 1999); (iv) Tucker-Lewis Index or Non-Normed Fit Index (TLI or NNFI) (Tucker & Lewis, 1973); values  $\geq .95$  indicate a good fit).

In order to identify integrated longitudinal patterns of SE dimensions, a Multi-Process Latent Growth Class Analysis (MP-LCGA, see McLachlan & Peel, 2004, for an overview on finite mixture models). In such models, latent intercept and slope variances are fixed to 0, since no within-class variability in intercept and slope factors is assumed, while intercept and slope means are allowed to vary. This analytic technique allows to identify unobserved homogeneous sub-groups with alternative patterns of growth in emotional, social and academic SE beliefs estimated conjointly within each sub-group. T2 basis coefficient of slope was free, while the first and the third were fixed, respectively, to 0 and 1 within all classes. Since we found a large number of attrited subjects from T1 to T2 and imputing multiple datasets for the present analysis would be extremely time consuming, latent categorical variable was conditioned for sex and age, used as auxiliary variables (Graham, 2009). In order to decide about the number of longitudinal integrated patterns to retain, a multifaceted approach was adopted (Enders & Tofighi, 2008). Specifically, AIC (Akaike Information Criterion), BIC (Bayesian Information Criterion), ABIC (Sample Size Adjusted BIC), LMR LR test (Lo-Mendell-Rubin likelihood ratio test) and ALMR LR test (Adjusted Lo-Mendell-Rubin likelihood ratio test) were used as fitting criteria. Lower AIC, BIC and ABIC are associated with better models, whereas  $p < .05$  associated to LMR LR and ALMR LR tests support the tested solution to be more fitting the observed data than one positing  $k - 1$  longitudinal patterns. Finally, average latent class probabilities and class entropy around .70 were considered indicative of clear between-group distinction (Nagin & Odgers, 2010; Muthén, 2001). Solutions ranging from 1 up to 6 classes were tested.

Longitudinal validity of integrated patterns was investigated by a Second-Order Multiple-Group Confirmatory Factor Analysis (SO-MG-CFA) separately for burnout and

work engagement. Group membership, in this case, is determined from the posterior pattern membership derived from the MP-LCGA best fitting solution (i.e., the higher probability among the ones related to the retained classes correspond to the group membership of a determined individual). This approach allows to compare burnout and work engagement means between pattern-based groups at the latent level, partialling out measurement error component and after testing hierarchical the steps of second-order factor models (for an overview on invariance of second-order factor models, see Chen, Sousa, & West, 2005).

Finally, a series of informative hypotheses were tested (for an overview on this topic, see Van de Schoot, Verhoeven, & Hoijsink, 2013), rooted in a Bayesian framework of analysis and interpretation. Since these hypotheses pertain to the between-pattern differences in observed burnout and work engagement observed means, a number of datasets were imputed and missing values were replaced by average values across datasets. Details are discussed later on this paper.

### 3. Results

#### 3.1. Descriptive Analyses

Table 1 shows some preliminary results. As can be noted, burnout is significantly and negatively correlated with all SE dimensions at each of the three measurement occasions, excepting SE-SCE at T1 and T2. On the other side, work engagement shows positive and significant correlations with all SE dimensions across waves, whereas it is negatively correlated with burnout. Moreover, burnout composite resulted slightly skewed.

#### 3.2. Attrition and Missing Data Analysis

Considering all the variables under study, Little's MCAR test was non-significant ( $\chi^2_{[65]} = 78.87, p=.15$ ), while was significant for  $p<.05$  when selecting only variables at T1 and

T2 ( $\chi^2_{[8]} = 17.02, p=.03$ ). Moreover, data were missing completely at random from T2 to T3 ( $\chi^2_{[27]} = 34.05, p=.16$ ) and from T1 to T3.

MANOVA considering T2 attrition as between-subjects factor and T1 SE dimensions as dependent variable was significant ( $F(4,868) = 3.94, p = .004, \text{partial } \eta^2 = .018$ ), revealing a main effect of dummy-coded attrition for SE-MNE ( $F(1,868) = 5.03, p = .025$ ) and for SE-SRL ( $F(1,868) = 11.97, p = .025$ ). Subjects attrited from T1 to T3 differed in T1 variables ( $F(1,868) = 5.03, p = .025, \text{partial } \eta^2 = .023$ ), and the only detected main effect was for SE-SRL ( $F(1,868) = 5.85, p = .004$ ). All Box's M tests were non-significant, suggesting that homogeneity of covariance matrices between attrited and non-attrited subjects holds in each analysis.

A higher proportion of males was attrited from T1 to T2 rather than females ( $\chi^2_{[1]} = 6.74, p=.01$ ), from T2 to T3 ( $\chi^2_{[1]} = 13.12, p<.001$ ) and from T1 to T3 ( $\chi^2_{[1]} = 6.02, p=.02$ ), while students that left the sample from T1 to T2 were almost one year older than students that did not ( $F(1,867) = 11.34, p = .001, \text{partial } \eta^2 = .011$ ).

These results suggest a combination of MCAR and MAR acting over the dataset across waves. Thus, a Full Information Maximum Likelihood (FIML, Arbuckle, 1996) will be used to handle missing data within analyses conducted in SEM framework.

### 3.3. Longitudinal Invariance of SE Dimensions and Model-Based Consistency

Table 2 shows results from longitudinal confirmatory factor analysis. Full strict invariance was reached, suggesting that SE dimensions were measured similarly across waves. Even reported, CFI and TLI fit indexes are low, and this depend from the fact that null model RMSEA is rather small (.158, 90 % CI 126 – .130), introducing biases in their computation (see Kenny, 2014); accordingly, we will not consider them as far as the evaluation of model fit is concerned. MBIC for the cross-sectional models were .88 (T1), .89

(T2) and .87 (T3), supporting a satisfying overall model reliability for each time point of assessment.

### 3.4. Construct Validity of SWEBO and Model-Based Consistency

Since some items of both burnout and work engagement were slightly skewed and they were endorsed by using four categories, a robust estimator was used to estimate measurement model's parameters (Robust Maximum Likelihood, MLR, Satorra & Bentler, 2001). Model fit was more than satisfying ( $\text{MLR}\chi^2_{[145, N=492]} = 295.02, p < .001, \text{RMSEA} = .046 [90\% \text{ CI } .038 - .053], \text{CFI} = .955, \text{TLI} = .947$ ). Figure 1 shows the estimated parameters for the completely standardized solution. As can be noted, first- and second-order factor loadings are very high, and the latent correlation between burnout and work engagement was  $-.59$ .

### 3.5. Multi-Process Latent Class Growth Analysis

Table 3 show results from MP-LCGA. Given that LMR LR and ALMR LR tests are significant, entropy value is satisfying and information criteria are lower than ones associated with  $k - n$  classes, the 4-pattern solution has been considered the best fitting. Figure 2 shows the longitudinal integrated patterns. Since 9 subjects had missing data on one auxiliary variable (i.e., sex and age), they were not classified in any longitudinal configuration.

Pattern 1, which represents about the 15% of the total sample, was characterized by a medium stable trajectory level of SE-SOC, a medium-low stable trend of SE-SRL and low and stable courses of SE dimensions pertaining to emotion management. Despite a significant increase of SE-MNE from T2 to T3, the average trajectory was found not to be growing significantly, as well as slopes pertaining to other SE dimensions (i.e., mean of the

slopes was non-significant for all the within-pattern trajectories). The average latent class probability for this pattern was .84 .

Pattern 2 showed medium stable longitudinal trends for SE-MNE, SE-SCE and SE-SOC, while showed a lower stable trajectory for SE-SRL. Even in this case, no average within-class trajectory was found to significantly increase over time. 31.7% of the total sample was clustered here, with a prevalence of males (58%). The average latent class probability, for this pattern, was .82 .

Pattern 3 represents the “high-functioning” integrated configuration, composed by the 23.1% of the entire initial sample. This pattern shows stable high trends for all the SE dimension. All SE within-class trajectories didn’t increase significantly across the three measurement occasions and they stem from similar values at the first time point of assessment. The average latent class probability for this pattern was .87 .

Pattern 4 was almost entirely made of females (about 98% of this within-class subgroup) and it showed a medium-high stable trajectories for SE-SOC and SE-SRL, while a medium-low stable trajectory for SE-MNE. The within-class average trend for SE-SCE was the only, across the considered patterns, to significantly increase across the three waves (unstandardized slope mean was .205,  $p < .001$ ). This pattern classified about one third of the total initial sample. The average latent class probability for this pattern was .82 .

Table 4 shows the impact of sex and age on pattern membership, proposing different multinomial parameterization by turning the reference group. With respect to pattern 4, females were more likely to be clustered in pattern 1, why males have higher probabilities to be classified in pattern 2 or three. Age increase the likelihood to be a member of high functioning pattern. Moreover, results reveal that females are clustered more frequently in patterns characterized by less favorable trends in SE dimensions related to emotion management (i.e., pattern1 and pattern 4).

Taken together, these results put in light an unobserved sub-group showing some low stable trends in emotion management SE dimensions (pattern 1), a class showing mean-stable trajectories with a less favorable trajectory of SE-SRL (pattern 2), an high functioning integrated longitudinal sub-group (pattern 3), a class connoted by medium-high stable trends of SE-SOC and SE-SRL, with a less favorable course of SE-MNE and SE-SCE over the three waves, with the latter slightly and significantly increasing.

### **3.6. MG-CFAs for Burnout and Work Engagement for Comparison of Group Means at the Latent Level**

Pattern membership was used to define a grouping variable in order to perform two MG-CFA with the scope to assess the utility of MP-LCGA results in explaining inter-individual differences in burnout and work engagement. Table 5 and 6 show results from the two separate MG-CFA performed respectively on burnout and work engagement. As can be noted, after tested all previous hierarchical constrained models to assess that both constructs were assessed similarly across the 4 pattern-based groups (both at the first- and second-order), equivalence of second-order latent means does not hold ( $\Delta CFI > .01$ ) both for burnout and work engagement, suggesting that pattern membership produce substantial inter-individual differences in both constructs measured at the final measurement occasion (T3). Table 7 present results from second-order latent mean comparisons from the completely standardized solution. As can be noted, pattern 3 (the “high-functioning” one) was set as the reference group. Other groups’ latent means statistically differ from pattern 3, having higher latent mean scores in burnout (e.g., pattern 1 was found to be almost one standard deviation higher than pattern 3), and lower in work engagement (e.g., pattern 1 was almost one SD and a half less engaged than pattern 3). As can be noted, all of the other patterns highlighted higher leveln of burnout and lower level of work engagement at the latent level, suggesting that the group with the high-functioning pattern was the most protected from burnout

symptoms and more engaged in professional and academic settings than the other groups identified by MP–LCGA analysis. These preliminary results suggest the utility of longitudinal conjoint patterns of SE beliefs in explaining inter-individual variability of burnout and work engagement. Even there are some differences among group latent mean differences and results from MG–SEM provided evidences that pattern 3 students were the better adjusted of the sample, these results put in light little about the mutual differences between the others groups along the adjustment continuum. Further analyses showed in the next paragraph, rooted in a Bayesian framework of analysis and interpretation, will help to investigate more in-depth this possibility.

### **3.7. Informative Hypotheses**

Informative hypotheses about burnout and work engagement mean differences were tested by adopting a Bayesian strategy, using the software BIEMS (Mulder, Hoijtink, & de Leeuw, 2012). Since this software does not allow the presence of missing data and the hypotheses are formulated on group differences about observed means, data were previously imputed by adopting the following strategy: one hundred datasets were created by replacing missing data point using Fully Conditional Specification (FCS) in combination with the semi-parametric approach of Predictive Mean Matching (PMM), in order to avoid out-of-range imputed values (Enders, 2010), specifying one hundred iterations. Subsequently, datasets were averaged, and missing data points were replaced by average values across datasets into a single data file. Even this approach is not good as multiple imputation followed by pooled estimates (Rubin, 1987) because information about between-imputation variability is not taken into account, it can be regarded as a good balance between costs and benefits for informative hypotheses evaluation purpose. Variables used as predictor of data missingness were age, sex, SE dimensions at each time point and burnout and work

engagement sub-dimensions. Of course, only burnout and work engagement values were imputed one hundred times.

Informative hypotheses about mean differences were formulated imposing different sets of logical constraints between pattern-based groups (van de Schoot, Mulder, Hoijtink, Van Aken, Dubas, de Castro, Meeus, & Romeijn, 2011). Moreover, they were formulated on the basis of longitudinal patterns' configuration. Specifically, with regards to burnout (1) and work engagement (2), such hypotheses were specified as follows:

$$\begin{aligned}
 & H_{\text{unc}}: \mu_{\text{pattern1}}, \mu_{\text{pattern2}}, \mu_{\text{pattern3}}, \mu_{\text{pattern4}} \\
 & H_{i0}: \mu_{\text{pattern1}} = \mu_{\text{pattern2}} = \mu_{\text{pattern3}} = \mu_{\text{pattern4}} \\
 & H_{i1}: \mu_{\text{pattern3}} < \mu_{\text{pattern2}} < \mu_{\text{pattern4}} < \mu_{\text{pattern1}} \\
 & H_{i2}: \mu_{\text{pattern3}} < \mu_{\text{pattern4}} < \mu_{\text{pattern2}} < \mu_{\text{pattern1}} \quad (1) \\
 & H_{i3}: \mu_{\text{pattern3}} < \mu_{\text{pattern4}} = \mu_{\text{pattern2}} = \mu_{\text{pattern1}} \\
 & H_{i4}: \mu_{\text{pattern3}} < \mu_{\text{pattern4}} = \mu_{\text{pattern2}} < \mu_{\text{pattern1}} \\
 & H_{i5}: \mu_{\text{pattern3}} = \mu_{\text{pattern4}} = \mu_{\text{pattern2}} < \mu_{\text{pattern1}}
 \end{aligned}$$

$$\begin{aligned}
 & H_{\text{unc}}: \mu_{\text{pattern1}}, \mu_{\text{pattern2}}, \mu_{\text{pattern3}}, \mu_{\text{pattern4}} \\
 & H_0: \mu_{\text{pattern1}} = \mu_{\text{pattern2}} = \mu_{\text{pattern3}} = \mu_{\text{pattern4}} \\
 & H_{i1}: \mu_{\text{pattern3}} > \mu_{\text{pattern2}} > \mu_{\text{pattern4}} > \mu_{\text{pattern1}} \\
 & H_{i2}: \mu_{\text{pattern3}} > \mu_{\text{pattern4}} > \mu_{\text{pattern2}} > \mu_{\text{pattern1}} \quad (2) \\
 & H_{i3}: \mu_{\text{pattern3}} > \mu_{\text{pattern4}} = \mu_{\text{pattern2}} = \mu_{\text{pattern1}} \\
 & H_{i4}: \mu_{\text{pattern3}} > \mu_{\text{pattern4}} = \mu_{\text{pattern2}} > \mu_{\text{pattern1}} \\
 & H_{i5}: \mu_{\text{pattern3}} = \mu_{\text{pattern4}} = \mu_{\text{pattern2}} > \mu_{\text{pattern1}}
 \end{aligned}$$

$H_{\text{unc}}$  represents the so-called uninformative hypothesis (Hoijtink, Klugkist, & Boelen, 2008), and it posits no relationship about group means.  $H_{i0}$  is the null hypothesis, representing the starting point of the Null Hypothesis Significance Testing framework (NHST, Cohen, 1994), indicating no differences between patterns' means.  $H_{i1}$  is the first

“true” inequality constrained hypotheses, positing a full gradient of differences between adjacent patterns; in this case, the high-functioning group is supposed to be the better adjusted (i.e., lower scores on burnout and higher in work engagement), followed by pattern 2 (connoted by medium-high stable trajectories of SE-SOC, SE-MNE and SE-SCE and medium-stable SE-SRL trend), pattern 4 (medium-high stable trends of SE-SOC and SE-SRL) and pattern 1 (low-functioning configuration).  $H_{i2}$  was formulated similarly, exchanging the position of pattern 4 with pattern 2 on the ordered continuum, supposing that more favorable trends of SE-SOC and SE-SRL could improve adjustment more than SE beliefs trend in mastering both negative and self-conscious emotions.  $H_{i3}$  posits the high-functioning pattern as the more adjusted and no differences between the others.  $H_{i4}$  posits a continuum where no differences are supposed to exist between “intermediate” functioning patterns (e.g., patterns 2 and 4). Finally,  $H_{i5}$  posits no differences between pattern 1, 2 and 3 that are supposed to be better adjusted than the “low-functioning” sub-group. To estimate these models in BIEMS, flat prior mean were specified.

Table 8 show results from models’ Bayesian evaluation. With regards to both burnout and work engagement,  $H_{i2}$  was found to be about twenty times more likely to fit the data than  $H_{unc}$ , suggesting a full gradient of differences between pattern-based groups, where the high-functioning group is followed by pattern 4 along the adjustment continuum. Of importance, results supported the evidence of a key role in students’ adjustment towards academic and clinical setting played by SE-SRL development rather than medium-high stable trends of SE beliefs in mastering negative consequences of affect, which are the substantial differences between the configuration of pattern 2 and pattern 4. Moreover, pattern 4 was the only showing a significant average within-class increasing trend of one SE dimension (i.e., SE-SCE trajectories). In line with Jeffreys (1961) and his recommendations about Bayes Factor evaluation, data support strongly  $H_{i2}$ . Moreover, comparing Bayes

Factors of inequality constrained hypotheses (e.g.,  $BF_{H_{i2} \text{ vs. } H_{i4}} = BF_{H_{i2}}/BF_{H_{i4}}$ ), resulting ratios support again strong evidence in favor of  $H_{i2}$ .

#### 4. Discussion

Self-efficacy beliefs in different spheres of personal functioning are paramount resources to deal with one's life challenges (Bandura, 1997). During nursing education, such beliefs were found in different studies to protect students from a variety of undesirable adjustment outcomes and to foster optimal adaptation (Robb, 2012). However, most of research findings were carried out and interpreted by adopting only a variable-centered perspective, namely the inter-individual differences framework. In other words, scholars focused their attention on how SE beliefs help students in overruling negative consequences of academic and training related pressure (Zulkosky, 2009). With regard to this point, social cognitive theorists proposed self-efficacy beliefs as intra-individual dynamical constructs, shaped by the interaction between cognitive structures and social contexts (Cervone, 2004a, 2004b, 2005; Cervone, Shadel, Smith, & Fiori, 2006). Unfortunately, we believe that this framework of investigation has been largely unaddressed, because self-efficacy beliefs are still continuing to be investigated through the exclusive lens of inter-individual perspective, adopting epistemological and methodological points of view consistent with this (Cervone, 2005).

The present study was aimed at investigating the longitudinal integrated intra-individual variability of different SE facets rooted in emotional, social and academic development of a nursing students' cohort. Moreover, such patterns were used to explain inter-individual differences in burnout and work engagement. Firstly, we found four different patterns to be the best descriptors of the conjoint SE facets development over the period under assessment.

A first pattern (pattern 1) showed stable low trajectories in SE dimensions related to emotional management, even if SE-MNE increased significantly from T2 to T3. A stable trajectory stemming from a medium level was found for SE-SOC within this pattern. Consistent with our expectations, based on previous studies on emerging adulthood arguing that females are less equipped to master the negative consequences of affect (see Alessandri et al., 2014, for a brief review), being female increased significantly the likelihood to be classified within this pattern. With regards to the high-functioning pattern, older students had lower probabilities to undertake such developmental path along the considered waves. A second pattern (pattern 2) showed a medium-high stable trajectories for SE-MNE, SE-SCE, SE-SOC and a less favorable course of SE-SRL (i.e., a stable trajectory that started from a lower level). Males were significantly less likely to be clustered in such pattern comparing to other configurations, excepting when considering the high-functioning one as the reference group. Overall, this pattern of students showed to be less regulated in academic activities than the last two ones. The third pattern (pattern 3) represented the “high-functioning” longitudinal configuration, where all SE dimensions stemming from a high level remained stable over time. Interestingly, females had lower probabilities to be classified in this configuration, when pattern 1 and pattern 4 were considered reference groups. Vice versa, to be older was associated with being a member of such pattern in all cases. Finally, pattern 4 showed to have medium-high stable trajectories of SE-SOC and SE-SRL, while exhibited more difficulties than patterns 2 and 3 in managing negative consequences of emotions along the considered span, since students clustered into entered the nursing program with a lower sense of efficacy in dealing with such dynamics. However, SE-SCE trajectory of this pattern was the only to exert a slight significant increase over time, suggesting that students in this configuration boosted their sense of efficacy in managing self-conscious emotions (e.g., embarrassment) during the period under study. Males were overall more likely than females to be classified in this pattern, whereas age produced a decrease in the same probability only

when considering the high-functioning longitudinal as the reference group for this comparison.

The utility of this pattern was tested in order to explain inter-individual differences in burnout and work engagement, firstly by adopting a MG-CFA approach and, secondly, formulating some inequality constrained hypotheses on the basis of patterns' structure. Findings from the first approach suggest that high-functioning pattern was the more adjusted, since all the other sub-groups showed higher scores on burnout and, vice versa, lower scores when considering work engagement. This differential functioning of longitudinal configuration along the adjustment continuum seemed to be stronger in the case of work engagement, where pattern 1 and pattern 2 showed to be one (or more) standard deviation lower at the latent level. At a first sight, these results offer insights about a possible supremacy of social and academic self-regulatory competencies over the emotional ones in concurring to hinder burnout onset and, on the other hand, to foster a higher work engagement. These findings were corroborated by Bayesian informative constrained hypotheses we tested, where  $H_{i2}$  received most of support from observed data. Specifically, we found that means pertaining to patterns can be ordered as a continuum where the high-functioning pattern is the more adjusted, followed by pattern 4 (i.e., stable medium trajectories for SE-SOC and SE-SRL, medium-low stable trajectory for SE-MNE and a slightly increasing average trend in SE-SCE that started at the same latitude of SE-MNE at T1). In this continuum, pattern 4 was followed by pattern 2, showing a medium stable trend in SE-MNE, SE-SOC and SE-SRL, while SE-SRL trajectory, started from a lower level at the baseline, had a less favorable trend. Finally, the low-functioning longitudinal sub-group was found to be the less adjusted, showing higher scores on burnout and lower in work engagement. Interestingly, pattern 4 received evidences to be more adjusted than pattern 2. Scrutinizing the patterns' configuration, it can be noted that similar trajectories of SE-SOC were reached across the two patterns, while pattern 2 had higher stable trends of SE

dimensions in management of negative affect and, vice versa, pattern 4 showed a higher stable trend of SE-SRL than pattern 4. Finally, pattern 4 showed a slight increasing trend of SE-SCE along the considered academic span.

Taken together, findings from the present study point to assign an important role to SE-SRL development in protecting from burnout and in promoting work engagement. In other words, SE-SRL seems to enrich students' mindset in hindering burnout and boosting work engagement more than SE-MNE and SE-SCE do. Findings are consistent with social cognitive theory, where self-regulation in learning and training activities contribute substantially in directing one's effort toward his/goal (Bandura, 1997) and higher beliefs related to one's efficacy in mastering academic and learning activities are related with a more favorable adjustment (see Chemers et al. 2001). Moreover, the overlapping trends of SE-SOC and SE-SRL in pattern 4 could be interpreted as the conjoint development of such skills in this longitudinal configuration. This fact can determine that SE-SOC and SE-SRL serve to build integrated patterns of behavior consistent with one's adjustment (i.e., help-seeking and help-giving in working contexts, Grodal, Nelson, & Siino, 2014), and such virtuous arrangement of personal competencies could improve the role of SE in boosting the relationship between training, academic activities and adjustment (see Saks, 1995). However, the acknowledged role of emotion regulation in burnout-work engagement continuum (see Maslach & Leiter, 1997) seems to be less crucial than SE-SRL. These findings should be replicated, using different measures and samples in other culture, to disentangle the differential role of intra-individual SE facets development in determining adjustment among nursing students.

This study presented some limitations. Firstly, we used a single cohort design in a specific nursing setting, and this limits the generalization of our findings (Little, 2013). Secondly, we used specific facets of SE dimensions among all the possible, using specific self-reported indicators and we did not used other informants (i.e., no other-report measure

or “objective” data have been used for the present study) and sub-dimensions of burnout and work engagement were slightly different from the ones generally considered across studies (i.e., one sub-dimension per construct was different from other measures generally utilized in research settings, see Leiter & Maslach, 2000). To this point, following Nesselroade (2007) “indicators [in our case, first-order constructs] are our worldly window into latent spaces“ (p. 252), so we are confident that the same second-order constructs have been measured.

Thirdly, for the Bayesian analyses, data were multiply imputed following an approach not trustable as multiple imputation with pooled estimates (Enders, 2010). Anyway, the strength of Bayes Factor in enlightening  $H_{i2}$  as the best one give us some confidence about the fact that such approach did not distort final interpretation of findings. Finally, Bayesian analyses were conducted in an observed variable framework, so differences about group means were partially inflated by the incorporation of measurement error. To conclude, three time points of assessment represent a limited life span to understand SE development over time (indeed, almost all within-class slope means were found to be non-significant).

Finally, we think that further research efforts might be directed towards the study on links between intra-individual development and inter-individual differences in adjustment outcomes among nursing students. Given the strict stability of burnout course over time that seems to be highly dependent from the levels of its onset within individuals (Bakker et al, 2000; Hakanen et al., 2011; Schaufeli et al. 2011), it’s important to understand very early the link between individual functioning and adjustment in nursing education settings. On the other hand, work engagement seems to maintain an important stable component over time (see Seppälä, Hakanen, Mauno, Perhoniemi, Tolvanen, & Schaufeli, 2014) and fluctuations around the average stability could be attributed partially to changes in personal resources (Bakker, 2014). For this reasons, it’s important to implement interventions since the very early phases of nursing education aimed at increasing students’ likelihood to be well-adjusted along the educational span. Interventions focused on SE beliefs showed, in this

sense, promising results (Leiter, 1992; Bresó, Schaufeli, & Salanova, 2011; Leiter & Maslach, 2000, 2005).

We are persuaded that studying and linking SE development and adjustment processes could represent an important leverage to build constructive mindsets among nursing students. Further efforts should be implemented in this direction to organize effective interventions aimed at hindering burnout onset and maintenance and, simultaneously, promoting work engagement by using informations unraveled by intra-individual processes and their development over time.

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Table 1.

Descriptive Analyses, Zero-Order Correlations and Reliability Coefficients.

	M	SD	SKEW	KURT	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
<b>1. SE-MNE T1</b>	3.11	.79	.01	-.06	.75													
<b>2. SE-SCE T1</b>	3.06	.83	.01	-.20	.52**	.80												
<b>3. SE-SOC T1</b>	3.6	.69	-.22	.04	.19**	.28**	.70											
<b>4. SE-SRL T1</b>	3.34	.84	-.11	-.06	.25**	.17**	.30**	.82										
<b>5. SE-MNE T2</b>	3.18	.81	-.12	-.14	.57**	.34**	.12**	.20**	.77									
<b>6. SE-SCE T2</b>	3.14	.89	-.27	-.19	.47**	.53**	.20**	.17**	.53**	.86								
<b>7. SE-SOC T2</b>	3.68	.74	-.49	.69	.07 <sup>ns</sup>	.10*	.26**	.17**	.19**	.21**	.68							
<b>8. SE-SRL T2</b>	3.35	.88	-.12	-.21	.19**	.11*	.11*	.56**	.25**	.28**	.37**	.82						
<b>9. SE-MNE T3</b>	3.25	.74	.02	-.03	.54**	.31**	.11*	.15**	.59**	.36**	.06 <sup>ns</sup>	.19**	.77					
<b>10. SE-SCE T3</b>	3.17	.76	-.04	.11	.34**	.51**	.15**	.15**	.34**	.55**	.08 <sup>ns</sup>	.21**	.51**	.83				
<b>11. SE-SOC T3</b>	3.59	.66	-.16	-.06	.11*	.15**	.30**	.14**	.15**	.14**	.40**	.24**	.31**	.28**	.60			
<b>12. SE-SRL T3</b>	3.44	.82	-.01	-.28	.15**	.12*	.12*	.45**	.21**	.14*	.13*	.54**	.33**	.29**	.42**	.85		
<b>13. BURN T3</b>	1.7	.53	.89	.45	-.14**	-.08 <sup>ns</sup>	.03 <sup>ns</sup>	-.12**	-.14**	-.03 <sup>ns</sup>	-.11*	-.14**	-.23**	-.13**	-.18**	-.29**	.88	
<b>14. ENG T3</b>	2.86	.60	-.22	-.11	.15**	.13**	.18**	.24**	.16**	.12*	.17**	.36**	.22**	.24**	.23**	.40**	-.31**	.91

Note. SE-MNE = Self-Efficacy in Managing Negative Emotions; SE-SCE = Self-Efficacy in Mastering Self-Conscious Emotions; SE-SOC = Social Self-Efficacy; SE-SRL = Self-Efficacy for Self-Regulated Learning; M = Mean; SD = Standard Deviation; SKEW = Skewness; KURT = Kurtosis. Cronbach's alphas are on diagonal. <sup>ns</sup> = non-significant, \* $p < .05$ , \*\* $p < .01$ .

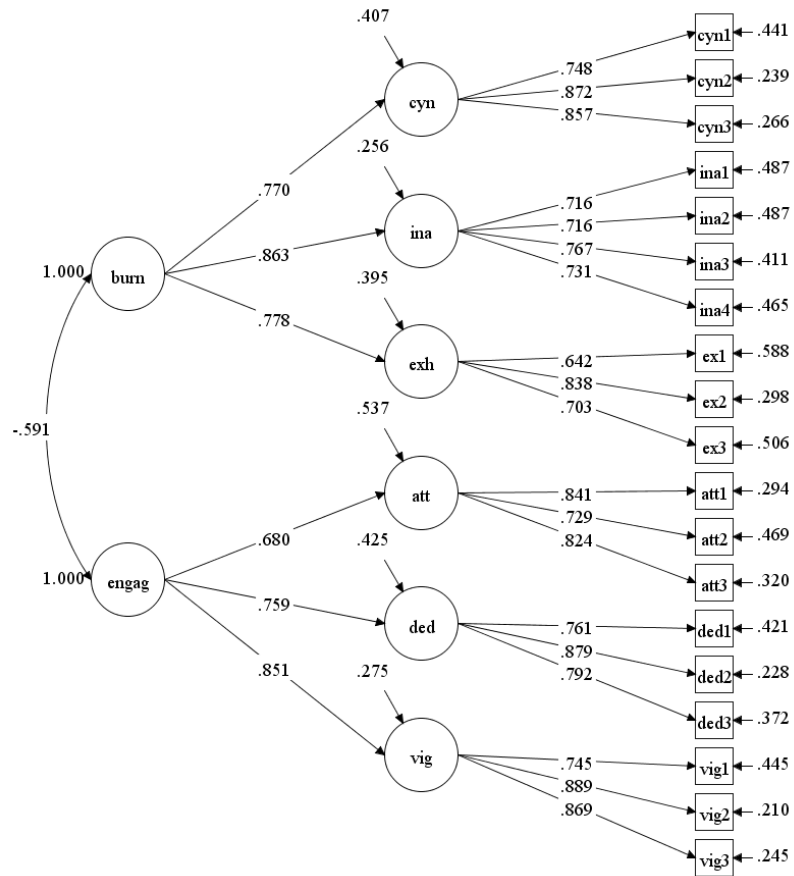
Table 2.

Longitudinal Invariance of Self-Efficacy Dimensions.

MODEL	INVARIANCE	$\chi^2$	df	MC	RMSEA (CI 90%)	CFI	TLI	$\Delta$ CFI
a	T1	210.28	59	–	.054 (.046 – .062)	.96	.95	–
b	T2	281.61	59	–	.087 (.077 – .097)	.92	.90	–
c	T3	225.61	59	–	.078 (.067 – .089)	.93	.91	–
M1	CONFIGURAL	2163.57	655	–	.051 (.049 – .054)	.858	.839	–
M2	WEAK	2237.75	681	M2 Vs. M1	.048 (.038 – .058)	.853	.84	.005
M3	STRONG	2259.75	699	M3 Vs. M2	.051 (.048 – .053)	.853	.844	0
M4	STRICT	2390.15	717	M4 Vs. M3	.052 (.036 – .053)	.844	.837	.009

*Note.* T1, T2, T3 = Model tested on a single time point; WEAK = Factor loadings invariance; STRONG = Observed intercepts invariance; STRICT = Residual variances invariance; MC = Model Comparison; *df* = degrees of freedom; RMSEA = Root Mean Square Error of Approximation; 90% CI = 90% Confidence Interval; CFI = Comparative Fit Index; TLI = Tucker-Lewis or Non-Normed Fit Index.

Figure 2. Estimated parameters from SWEBO Second-Order Cfa.



Note. Results are presented in a completely standardized metric and they are based on Robust Maximum Likelihood estimation (MLR, Satorra & Bentler, 2001). Burn = Burnout; Engag = Engagement; Cyn = Cynism; Ina = Inattentiveness; Exh = Exhaustion; Att = Attention; Ded = Dediton; Vig = Vigor.

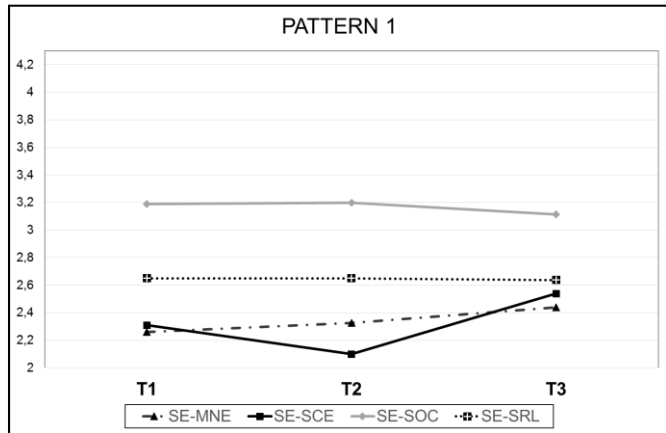
Table 3.

Fit indices of the Multi-Process Latent Growth Class Analysis (MP-LCGA) of SE dimensions.

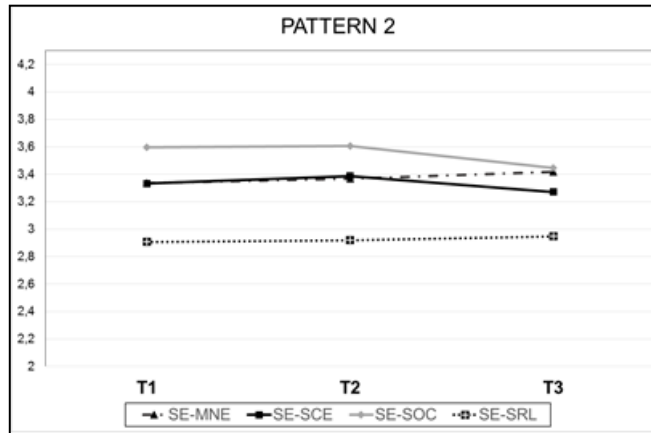
Model	Log Likelihood	AIC	BIC	ABIC	Entropy	LMR LR test <i>p value</i>	ALMR LR test <i>p vale</i>
1-class	-11745	23545	23674	23588	–	–	–
2-class	-8013	16095	16261	16150	.73	<.001	<.001
3-class	-7882	15855	16074	15928	.70	.18	.18
<b>4-class</b>	<b>-7752</b>	<b>15618</b>	<b>15889</b>	<b>15708</b>	<b>.70</b>	<b>&lt;.05</b>	<b>&lt;.05</b>
5-class	-7700	15535	15859	15643	.69	.21	.21
6-class	-7655	15468	15844	15593	.69	.53	.54

*Note.* AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; ABIC = Sample Size Adjusted BIC; LMR LR test = Lo-Mendell-Rubin likelihood ratio test; ALMR LR test = Adjusted Lo-Mendell-Rubin likelihood ratio test; BLRT test. Best fitting solution is in bold.

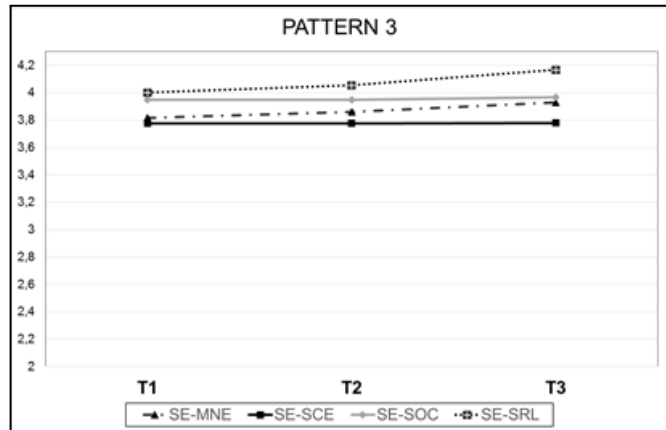
Figure 2. Estimated Means for MP-LCGA Patterns.



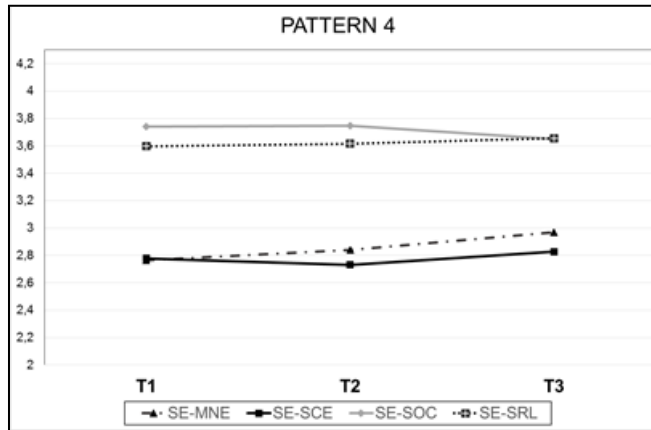
24.8% Males,  $M_{age}=20.9$ , 15.4% of the total sample size



58% Males,  $M_{age}=21.8$ , 31.7% of the total sample size



43% Males,  $M_{age}=23.9$ , 23.1% of the total sample size



1.9% Males,  $M_{age}=20.7$ , 29.8% of the total sample size

Note. SE-MNE=Self-Efficacy in Managing Negative Emotions; SE-SCE=Self-Efficacy in Mastering Self-Conscious Emotions; SE-SOC=Social Self-Efficacy; SE-SRL=Self-Efficacy for Self-Regulated Learning. To avoid clutter, only model-implied means were represented.

Table 4.

Multinomial Logit Coefficients of Sex and Age on Categorical Latent Variable.

	Pattern 1	Pattern 2	Pattern 3	Pattern 4
Sex (1=Male, 2=Female)	1.89**	-3.18***	-2.65***	–
Age	-.02 <sup>ns</sup>	.70 <sup>ns</sup>	.14**	–
Sex (1=Male, 2=Female)	–	-1.3***	-.78*	1.88**
Age	–	.04 <sup>ns</sup>	.11**	-.02 <sup>ns</sup>
Sex (1=Male, 2=Female)	1.3***	–	.52 <sup>ns</sup>	3.18**
Age	-.04 <sup>ns</sup>	–	.07*	-.07 <sup>ns</sup>
Sex (1=Male, 2=Female)	.78*	-.52 <sup>ns</sup>	–	2.65***
Age	-.11**	-.07*	–	-.14**

Note. Patterns are, in turn, the reference group. <sup>ns</sup>=non-significant; \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .01$

Table 5.

MG-CFA for Burnout.

MODEL	INVARIANCE	ROBUST $\chi^2$	df	MC	RMSEA (CI 90%)	CFI	TLI	$\Delta$ CFI
<b>M1</b>	CONFIGURAL	192.81	128	–	.067 (.046 – .085)	.953	.934	–
<b>M2</b>	WEAK (1st Order)	220.16	149	M2 vs. M1	.065 (.046 – .082)	.948	.938	.005
<b>M3</b>	WEAK (2nd Order)	224.87	155	M3 vs. M2	.063 (.044 – .080)	.949	.941	-.001
<b>M4</b>	STRONG (1st Order)	258.68	182	M4 vs. M3	.061 (.043 – .077)	.944	.945	.005
<b>M5</b>	STRICT (1st Order)	299.26	212	M5 vs. M4	.060 (.043 – .075)	.937	.946	.007
<b>M6</b>	STRICT (2nd Order)	312.44	221	M6 vs. M5	.060 (.044 – .075)	.934	.946	.003
<b>M7</b>	LATENT MEANS (2nd Order)	336	224	M7 vs. M6	.066 (.051 – .080)	.919	.935	.015

*Note.* CONFIGURAL = Model estimated simultaneously on the 4 groups without imposing equality constraints; WEAK (1st Order) = Invariance of first-order factor loadings; WEAK (2nd Order) = Invariance of second-order factor loadings; STRONG (1st Order) = Invariance of intercepts of measured variables; STRICT (1st Order) = Invariance of first-order residual variances; STRICT (2nd Order) = Invariance of second-order residual variances; LATENT MEAN (2nd Order) = Invariance of second-order latent means. MC = Model Comparison; ROBUST  $\chi^2$  = Chi-square estimated with Robust Maximum Likelihood (MLR, Satorra & Bentler, 2001); df = degrees of freedom; RMSEA = Root Mean Square Error of Approximation; 90% CI = 90% Confidence Interval; CFI = Comparative Fit Index; TLI = Tucker-Lewis or Non-Normed Fit Index.

Table 6.

MG-CFA for Engagement.

MODEL	INVARIANCE	ROBUST $\chi^2$	df	MC	RMSEA (CI 90%)	CFI	TLI	$\Delta$ CFI
M1	CONFIGURAL	144.11	96	–	.066 (.042 – .088)	.97	.96	–
M2	WEAK (1st Order)	161.1	114	M2 vs. M1	.060 (.037 – .081)	.971	.963	-.001
M3	WEAK (2nd Order)	165.39	120	M3 vs. M2	.057 (.037 – .078)	.972	.967	-.001
M4	STRONG (1st Order)	186.47	144	M4 vs. M3	.051 (.026 – .070)	.974	.974	-.002
M5	STRICT (1st Order)	209.78	171	M5 vs. M4	.045 (.018 – .064)	.976	.98	-.002
M6	STRICT (2nd Order)	227.66	180	M6 vs. M5	.048 (.025 – .066)	.971	.977	.005
M7	LATENT MEANS (2nd Order)	272.78	183	M7 vs. M6	.065 (.049 – .081)	.945	.957	.026

*Note.* CONFIGURAL = Model estimated simultaneously on the 4 groups without imposing equality constraints; WEAK (1st Order) = Invariance of first-order factor loadings; WEAK (2nd Order) = Invariance of second-order factor loadings; STRONG (1st Order) = Invariance of intercepts of measured variables; STRICT (1st Order) = Invariance of first-order residual variances; STRICT (2nd Order) = Invariance of second-order residual variances; LATENT MEAN (2nd Order) = Invariance of second-order latent means. MC = Model Comparison; ROBUST  $\chi^2$  = Chi-square estimated with Robust Maximum Likelihood (MLR, Satorra & Bentler, 2001); df = degrees of freedom; RMSEA = Root Mean Square Error of Approximation; 90% CI = 90% Confidence Interval; CFI = Comparative Fit Index; TLI = Tucker-Lewis or Non-Normed Fit Index

*Table 7.*

Standardized Latent Mean Differences.

	Pattern 1	Pattern 2	Pattern 3	Pattern 4
Burnout	.85 [.45 – 1.26]	.65 [.32 – .98]	–	.52 [.13 – .91]
Engagement	-1.36 [-2.02 – -1.26]	-1.01 [-1.5 – -.58]	–	-.71 [-1.12 – -.31]

*Note.* Pattern 3 was chosen as the reference group, in which latent mean was fixed to 0 to allow for latent means comparison. Differences are presented in a completely standardized metric [99% Confidence Interval].

*Table 8.*

Bayesian Model Evaluation of Informative Hypotheses about Burnout and Engagement Mean Differences.

	BURNOUT	ENGAGEMENT
MODEL U ( $H_{unc}$ )	– (.03)	– (.04)
MODEL 0 ( $H_{i0}$ )	0 (0)	.01 (0)
MODEL 1 ( $H_{i1}$ )	.13 (.01)	.01 (0)
MODEL 2 ( $H_{i2}$ )	19.95 (.87)	24.41 (.96)
MODEL 3 ( $H_{i3}$ )	.36 (.02)	0 (0)
MODEL 4 ( $H_{i4}$ )	1.55 (.07)	.11 (0)
MODEL 5 ( $H_{i5}$ )	0 (0)	0 (0)

*Note.* Model U=Unconstrained Hypothesis Model. MODEL 0 = Null Hypothesis Model. In each cell it is reported the Bayes factor (BF) associated to the tested model against Model U. In circular brackets, it is indicated the Posterior Model Probability (PMP).

## 1. General Discussion

This contribution has tried to offer some insights about the link between intra-individual patterned development of SE beliefs and adjustment process among nursing students. Specifically, an integrated framework made of person-centered and variable-centered approaches has been carried out throughout this dissertation, in order to understand how (and if) students changed over the time span we have taken into account, and how this changes and patterned differences shape alternative outcomes along the continuum of the complex adjustment process. As argued in studies described above, the basic idea underlining this dissertation is that intra-individual patterns of development in SE beliefs related to different life spheres can offer insights on both personal and working (in our case, clinical training) adaptation.

Study 1 stressed the role of SE cross-sectional patterns at the moment of students' entrance to the nursing program in explaining individual differences about some personal adjustment indicators (i.e., depression, life satisfaction, physical symptoms), both concurrently and longitudinally. Specifically, by using a person-centered technique of data analysis (i.e., a two-phased cluster analysis), we found four different configurations of SE beliefs in emotional, social and academic spheres of life: a low- and a high-functioning pattern, showing low or high levels of all SE dimensions taken into account, and two intermediate-functioning patterns, one connoted by medium levels of the three SE facets and low scores on academic regulatory efficacy, whereas the other intermediate group showed some difficulties in emotion management. Results attested the importance of SE perceived competencies in hindering effects of stress and promoting optimal functioning, enlightening the role of patterned differences in SE by understanding students' peculiar configurations rather than effects exerted by single SE sub-dimensions over the adjustment process.

Informative hypotheses we tested deepened these findings, representing intermediate-functioning as an overall pattern along the adjustment continuum (i.e., intermediate-patterns were not discriminable with regards to inter-individual differences in adjustment), suggesting that no specific SE dimensions was diriment for intermediate-functioning groups in their relationship with adaptation process. Findings were corroborated by adopting a two-cohort research design.

Study 2 focused on the development of self-efficacy beliefs in mastering negative emotions (SE-MNE) and their link to depression along a three occasions of measurement span (i.e., two years). Centering on a social cognitive perspective of human being and gender development, we found a parallel stability in SE-MNE growth both for males and females, whereas males entered the nursing program with a higher sense of efficacy in managing negative emotions. Interestingly, we found females' growth rate to be higher than males. In a second phase of the same investigation, we identified patterns of growth in this SE facet, controlling for age and gender used as auxiliary variables controlling for selective attrition. Four mixture trajectories have been found to explain intra-individual differences in SE-MNE development, two stable trajectories (high vs. low) and two increasing ones (one stemming from a medium-high level at the baseline, one from a medium-low starting point). Moreover, probabilities to be clustered into specific trajectories (e.g., high-stable, medium-high increasing or low stable) predicted depression scores at the last time point of assessment, controlling for its previous levels. Finally, informative hypotheses we tested revealed that membership in growth mixture trajectories is highly discriminant for depression scores at the final stage of measurement process. In fact, the four sub-groups are related to as many different levels along the depressive continuum.

Study 3 has tried to enlighten the intra-individual conjoint development of emotional, social and academic SE beliefs linking these longitudinal patterned differences to academic and clinical adjustment among a cohort of nursing students. Adopting a longitudinal

perspective of intra-individual differences, four structured patterns of SE beliefs growth have been found: a high-functioning pattern, a low functioning pattern (with social competencies showing a medium-stable trend), and high functioning pattern, a medium-stable pattern of trajectories (with academic regulatory efficacy stemming from a lower level and then remaining stable over time), finally a pattern with medium-high stable trend in social and academic regulatory efficacy, and lower stable trajectories in SE for emotion management dimensions. These patterns showed to be fully discriminant for burnout and work engagement measured at the final time point, and in this sense academic regulatory efficacy seemed to be a key ingredient for students' adaptation to academic and clinical training contexts.

Summarizing results from the present dissertation, SE beliefs represent pivotal individual resources in hindering stress-related consequences and in promoting an optimal adaptation to the nursing program contexts. Moreover, we strongly believe that more than one skill is required to face efficiently the challenges of such academic path, given the complexity of activities that students are called to manage. As demonstrated, intra-individually patterned differences effectively explain inter-individual differences across a variety of adjustment indicators, both from an individual and organizational adjustment perspective.

### **1.1. Practical Implications**

The integrated approach adopted by the present dissertation is suitable to program and implement interventions in order to foster students' sense of efficacy in different life spheres, with the scope to prevent undesirable outcomes reverberant their consequences in future professional careers. As largely documented, a negative adjustment to nursing context has found to be ongoing since the earliest phases of academic career, and this may yield undesirable consequences both for nurses' individual well-being and patients' safety. For

these reasons, it is important to intervene immediately in order to decrease the students' likelihood to be burned out or stressed once they will be in the labor market.

As posited by JD-R model, both job and personal resources represent key ingredients of the positive individual functioning within working contexts. However, as argued in Study 3, changing the structural features of nursing profession is not a simple matter, because health care organizational cultures are strictly institutionalized. We think that a more effective approach would be implementing interventions aimed at fostering and integrating different SE facets, along with a constant longitudinal monitoring of students' perceived competencies. Moreover, we think it would be important to put efforts in integrating different competencies, rather than focusing on single SE dimensions, because as this dissertation highlighted optimal adjustment require a number of integrated skills acting in concert.

### **1.1. Conclusions**

Integrated patterns of SE beliefs are related to adjustment process among nursing students. Future research on SE beliefs development should incorporate the intra-individual perspective in the broader framework adopted to investigate such phenomena. It would be interesting adding more time points to our studies, considering the effects of educational and training contexts in shaping intra-individual differences adopting multilevel designs, replicating these findings across cultures and college contexts by adopting different measurement instruments and considering SE beliefs in additional spheres of life. Our understanding from the findings we presented is that more than one ingredient is required to prepare an outstanding meal and, moreover, everything must be well mixed.