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THE RELATION BETWEEN NEEDS SUPPORTIVE ENVIRONMENTS AND ACADEMIC PROCRASTINATION

by
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AN ABSTRACT OF THE THESIS OF

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Academic procrastination is a common problem in universities worldwide, with destructive effects on students' well-being and academic achievement. Self-Determination Theory (SDT), an empirically supported theory of human growth, presents a way to understand the link between academic procrastination and environmental factors. More specifically, SDT postulates that humans have three innate needs, the need for competence, autonomy and relatedness and that environments supporting these needs promote growth behaviors and decrease self-destructive behaviors. Extensive evidence has demonstrated a positive relation between certain needs supportive environments, specifically, needs supportive teaching, autonomy and relatedness supportive parenting and relatedness supportive peers, and manifestations of desirable academic outcomes. However, no known study has examined the relation between these needs supportive environments and academic procrastination. This study therefore examines the influence of students' reports of these needs supportive environments on their academic procrastination, using a cross-sectional design, in a sample of undergraduate students taking psychology courses at the American University of Beirut. Findings showed that perceived autonomy, structure, and relatedness supportive teaching, autonomy and relatedness supportive parenting, and relatedness supportive classmates, significantly negatively correlated with academic procrastination, but only autonomy supportive parenting and relatedness supportive peers significantly predicted academic procrastination after adjusting for possible confounders. It is concluded that increasing classmates' support of relatedness and parents' support of autonomy may protect against academic procrastination and should be the focus of future interventions for academic procrastination in colleges.

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CHAPTER 1:

ACADEMIC PROCRASTINATION

Definition

The word procrastination comes from the Latin word "procrastinatus" with "pro" meaning forward and "crastinatus" meaning "for tomorrow" (Klein, 1971; Schouwenberg, 2004). There is evidence of the word being used back in 500 B.C. in a Hinduism text in which Krishna associates the term "procrastinating" with other adjectives such as "lazy", and "undisciplined" (Gandhi, Strohmeier, & Nagler, 2000). However, the importance of time management and the prevalence of procrastination increased in modern industrial times as deadlines and punctuality became critical (Steel, 2007). The simplest way to define procrastination would be as a delay in a set course of action.

It is important to distinguish between trait procrastination and situational procrastination. As highlighted above, since the first documented use of the word "procrastination", it was tied with certain character flaws such as laziness and lack of discipline (Steel, 2007). This tendency to view procrastination as a character or personality deficiency carried over to the current literature with most studies focusing on trait procrastination. Trait procrastination is considered a personality trait and is defined as the mostly constant tendency to procrastinate across situations (Steel & Ferrari, 2013). On the other hand, situational procrastination is defined as the behavior of procrastinating in a specific situation, and as any other behavior, it can be triggered by predisposed tendency, situational factors, or an interplay of both (Ferrari, 2004; Lay,

1986). This distinction between trait and situational procrastination provides the important theoretical implication that not only the internal individual tendency towards procrastination can increase or decrease the behavior of procrastination, rather situational risk and protective factors can also have an influence over this problematic behavior.

In this thesis, the focus will be on academic procrastination which is one of the most outstanding manifestations of the behavior of procrastination (Can & Zeren, 2019). Thus, to understand the meaning of academic procrastination, first we should define situational procrastination. For the rest of the paper, situational procrastination will be called "procrastination". Procrastination literature makes it clear that not all dilatory behaviors can be considered procrastination, rather there are three components that should be considered. First, the delay should not simply be an avoidance of doing an action until the person does not need to do it anymore (e.g. avoiding doing the dishes knowing that eventually your mother will clean them). Thus, the first requirement of procrastination is for the delay to be for an action that the person intends to complete (Janssen, 2015; Steel, 2007, Özer, Demir, & Ferrari, 2009). Second, the delay must be avoidable to be considered as procrastination, meaning delaying a task because of reasons that can't be avoided (e.g. getting into an accident and going to the hospital) is not procrastinating (Janssen, 2015; McCown & Roberts, 1994; Steel, 2007). Third, sometimes the postponement to a later time may be functional, such as if the person would have more information later which is important for the optimal completion of the task (McCown & Roberts, 1994). Thus, scholars specify that an initial component of

procrastination is that it needs to be dysfunctional, or in other words, the task must be delayed past the optimal time for its successful completion (McCown & Roberts, 1994). Some authors add that the delay must result in a negative affect or subjective upset (Solomon & Rothblum, 1984; Özer et al., 2009). This leads us to the most used and accepted definition of procrastination and the one used in this paper: Procrastination is "to voluntarily delay an intended course of action despite expecting to be worse off for the delay" (Steel, 2007, p.66). This definition of procrastination excludes "positive procrastination" or "active procrastination" which is a new concept introduced in the literature and can be defined as the act of deliberately delaying a task to do more important tasks or because the output will be better when completed under pressure (Chu & Choi, 2005). There is much dispute whether such a behavior can even be considered procrastination, and the exploration of such a question exceeds the interest of this thesis. Finally, academic procrastination is to voluntarily delay academic tasks that the person intends to complete, such as studying for exams, weekly preparations for class or writing term papers, despite expecting to be worse off for the delay (Çavuşoğlu & Karataş, 2015).

Prevalence

Prevalence rates of trait procrastination in adults tend to range approximately between 11.5% and 20% (Ferrari, Diaz-Morales, O'Callaghan, Diaz, & Argumedo, 2007; Ferrari, O'Callaghan, & Newbegin, 2005; Harriott & Ferrari, 1996). Prevalence rates of academic procrastination in college are concerning, reaching rates as high as

75% to 95%. This means that most college students procrastinate on academic tasks (Ellis & Knaus, 1977; Potts, 1987). Even the newer studies that focus on frequent academic procrastinators in college report alarming prevalence rates ranging between 25% and 50% in different cultures from the United States of America to Canada, Turkey, and Iran (Bytamar et al., 2017; Day, Mensink, & O' Sullivan, 2000; Ebadi & Shakoorzadeh, 2015; Haycock, 1993; Klassen, Krawchuk, & Rajani, 2008; Orellana-Damacela, Tindale, & Suarez-Balcazar, 2000; Özer et al., 2009; Solomon & Rothblum, 1984). These rates of frequent academic procrastination are much higher than the rates of trait procrastination in adults that are college aged or older, and higher than the rates of academic procrastination in school (e.g. Janssen, 2015). This highlights the possibility that colleges include situational risk factors that trigger procrastination behaviors not only for those who have the internal tendency for it but rather for the vast majority college students.

College is generally a high-demanding environment where students are held to firm deadlines and evaluations that are challenging with difficult, complex and new tasks. In addition, college is usually a period of adjustment, including decreasing social and academic support as the person detaches from his/her school network of close friends; making new friends; leaving home and living away from parents; and adjusting to large classes and lecture halls in which teachers' attention and availability to each student may be compromised. Thus, it is particularly important to explore further the situational risk factors for academic procrastination in colleges to identify situational

protective factors against it, especially because there are a myriad of negative consequences of college academic procrastination.

Consequences

Academic procrastination in college is associated with a host of negative outcomes. For example, it was found to correlate with poorer GPA and grades on exams and term papers (Beswick, Rothblum, & Mann, 1988; Fritzsche, Young, & Hickson, 2003; Orpen, 1998; Tice & Baumeister, 1997). It also correlated with a greater likelihood of engaging in academic misconduct, such as fraudulent excuse making (Ferrari & Beck, 1998; Patrzek, Sattler, Van Veen, Grunschel, & Fries, 2014), cheating (Clariana, Gotzens, Mar Badia, & Cladellas, 2012; Patrzek et al., 2014; Roig & Detommaso, 1995), and plagiarism (Patrzek et al., 2014; Roig & Detommaso, 1995). Moreover, academic procrastination was found to correlate with lower life satisfaction (Özer & Saçkes, 2011). Finally, higher procrastination during an academic term predicted agitation and stress symptoms at the end of the term (Lay & Schouwenburg, 1993; Tice & Baumeister, 1997).

Individual Risk and Protective Factors

As highlighted previously, the focus of the literature is on procrastination as a trait. Thus, even when addressing a specific behavior of procrastination such as academic procrastination, studies focused on examining whether the internal individual risk and protective factors shown to correlate with and predict trait procrastination similarly correlate with academic procrastination. The individual factors most studied

are personality, affective, cognitive, and capacity characteristics. For example, many studies examined the relation between the Big Five traits and academic procrastination, consistently finding a negative correlation of academic procrastination with conscientiousness and a positive correlation with neuroticism (Beswick et al., 1988; Eerde, 2004; Schouwenburg, 2005; Steel, 2007). In addition, many studies examined other personality traits that positively correlated with trait procrastination, such as weak ego, low self-esteem, and low self-efficacy, to find that they similarly positively correlate and predict academic procrastination (Bandura, 1997; Batool, Khursheed, & Jahangir, 2017; Steel, 2007; Wolters, 2003). Such findings led scholars to examine self-sabotaging as an aspect of academic procrastination, meaning that students with low self-esteem use procrastination to blame academic failure on last minute work rather than their lack of capability or intelligence (Akça, 2012; Park & Sperling, 2012).

Many studies also showed that cognitive deficits that usually predict trait procrastination similarly predict and positively correlate with academic procrastination. These include irrational beliefs of inadequacy or irrational positive beliefs about procrastination ("I work better under pressure"); inability to make decisions; and defective future perspective (e.g. underestimation of the time needed to complete a task and ignoring long term consequences) (Bilde, Vansteenkiste, & Lens, 2011; Burka & Yuen, 1983; Flett, Stainton, Hewitt, Sherry, & Lay, 2012; Palmer & Gyllensten, 2008; Sadeghi, 2011; Spada, Hiou, & Nikcevic, 2006; Steel, 2007).

In addition, some affective and psychological problems were found to correlate with academic procrastination, especially shame, anxiety, depression, learning

disorders, substance abuse disorders, and attention deficit and hyperactivity disorder (Beswick et al., 1988; Day et al., 2000; Grunschel, Patrzek, & Fries, 2013; Jamrozinski, Kuda, & Mangholz, 2009; Stead, Shanahan, & Neufeld, 2011; Steel, Brothen, & Warmbach, 2001).

Finally, deficits in emotional and behavioral self-regulatory skills, which are a set of skills that facilitate the process of self-regulation, such as self-soothing, emotional containment, ignoring distractions, and planning complex tasks, positively predicted academic procrastination, while having good self-regulatory skills protected against academic procrastination (Park & Sperling, 2012; Steel, 2007).

Situational Risk and Protective Factors

Academic procrastination in college is associated with a host of negative outcomes. For example, it was found to correlate with poorer GPA and grades on exams and term papers (Beswick, Rothblum, & Mann, 1988; Fritzsche, Young, & Hickson, 2003; Orpen, 1998; Tice & Baumeister, 1997). It also correlated with a greater likelihood of engaging in academic misconduct, such as fraudulent excuse making (Ferrari & Beck, 1998; Patrzek, Sattler, Van Veen, Grunschel, & Fries, 2014), cheating (Clariana, Gotzens, Mar Badia, & Cladellas, 2012; Patrzek et al., 2014; Roig & Detommaso, 1995), and plagiarism (Patrzek et al., 2014; Roig & Detommaso, 1995). Moreover, academic procrastination was found to correlate with lower life satisfaction (Özer & Saçkes, 2011). Finally, higher procrastination during an academic term

predicted agitation and stress symptoms at the end of the term (Lay & Schouwenburg, 1993; Tice & Baumeister, 1997).

In addition to the focus of the literature on individual risk and protective factors of academic procrastination, some studies addressed the influence of task characteristics on academic procrastination. Specifically, it was found that boring, difficult, confusing, stressful, and high stakes tasks are the ones that trigger the most academic procrastination, while enjoyable, clear and manageable tasks trigger less procrastination (Howell & Watson, 2007; Milgrim, Marshevsky, & Sadeh, 1995; Pychyl, Lee, Thibodeau, & Blunt, 2000). For example, it was shown that students procrastinated the most on writing tasks, and the least on administrative tasks (Solomon & Rothblum, 1984).

However, little attention was given to possible situational characteristics, other than task characteristics, that might act as risk and protective factors to college academic procrastination. This is alarming, because the high rates of college academic procrastination compared to adult trait procrastination and school academic procrastination imply that there may be specific environmental risk factors surrounding college students that need to be explored along with the protective environmental factors that can buffer against them.

The qualitative studies on the risk and protective factors of procrastination shine light on the presence of several individual and situational factors that influence academic procrastination (Asri, Setyosari, Hitipeuw, & Chusniyah, 2017; Grunschel et al., 2013; Klingsieck, Grund, Schmid, and Fries, 2013; Patrzek, Grunschel, & Fries,

2012). These studies are not biased by the dominant interest in procrastination as a disposition rather than a behavior, instead they reflect the opinions of the participants regarding all their perceived reasons of procrastination. Two of the studies were done with students (Grunschel et al., 2013; Klingsieck et al., 2013), one was done with both teachers and students (Asri et al., 2017), and one was done with university counsellors (Patrzek et al., 2012), and they all used a semi structured interview process.

Even though the names and numbers of the categories of situational factors are different between studies, they can be roughly divided under two large headings: Task characteristics and relational context characteristics. The task-specific characteristics are similar to the ones presented above thus they do not require further elaboration. The relational context characteristics can be divided into four categories, each one reflecting a different relational context in the student's life. The first category is for the relation with parents, under which it was reported that parents' emotional support and attention could act as protective factors against academic procrastination (Asri et al., 2017). The second category is for the relations with peers, under which low social integration and low peer support (e.g. not having peers to talk with about studying problems) was reported as a risk factor for academic procrastination (Grunschel et al., 2013; Patrzek et al., 2012) while high cooperation (e.g. group work, interdependence in work) was reported as a protective factor (Klingsieck et al., 2013). The third category is the relational context with teachers, including teachers' disorganization, high demandingness, low sympathy towards students and poor academic support as major risk factors, while the opposite characteristics (teachers' organization and students'

perceptions of high support and sympathy from the teacher) as protective factors (Asri et al., 2017; Grunschel et al., 2013; Klingsieck et al., 2013; Patrzek et al., 2012). The final category relates to the institutional context, under which the university's or school's inefficient organization of study load (short exam period, lots of exams towards the end of semester…), lack of acknowledgement of students' achievements, and deficiency in its regulations, discipline, and structure (e.g. no consequences for absenteeism) are risk factors for procrastination (Asri et al., 2017; Grunschel et al., 2013; Klingsieck et al., 2013; Patrzek et al., 2012).

Thus, in short, the situational factors influencing procrastination are academic task characteristics, proximal relational contexts (relations with peers, parents, and teachers), and the distal relational context of the institution (school or college). It is not surprising that these relational contexts were reported as risk and protective factors for academic procrastination. In fact, they have been found to influence other academic outcomes (e.g. Furrer & Skinner, 2013; King, 2015). Moreover, as Nordby, Klingsieck, and Svartdal (2017) point out, being a student is primarily a social task and thus is likely to be influenced by the student's social environment. Surprisingly, the proximal relational context (with peers, parents, and teachers) has been studied less than the distal context (with the institution), although conceptually it is expected that the proximal context with which the student interacts daily would have more influence on his/her day to day academic behaviors. Thus, in this study the focus is on the association between proximal relational contexts and academic procrastination.

Very few quantitative studies examined the association and influence of the proximal environment/relational contexts of the students (with parents, peers, and teachers) on their academic procrastination.

Parenting Characteristics

Most of the studies addressing the influence of parenting on academic procrastination looked at the relation between parenting styles while growing up and current academic procrastination. These studies showed consistently that an authoritative parenting style, which allows for autonomy and provides support, while growing up correlated with better self-esteem and more self-directedness in the individual later (and thus less academic procrastination). However, authoritarian parenting that is controlling and highly demanding positively correlated with perfectionism and lower self-esteem (and thus with more academic procrastination) (e.g. Ferrari & Olivette, 1994; Mahasneh, Bataineh, & Al-Zoubi, 2016; Soysa & Weiss, 2014). Such findings are limited however because they study the parents' effect on academic procrastination through their influence on the child's traits rather than through their situational influence. Rather, what is relevant to this study is the literature that addresses the influence of the contemporary relational context between the child and the parent on academic procrastination. The focus of the procrastination literature on parenting dimensions while growing up rather than contemporary parenting dimensions reflects the general focus on internal/trait factors influencing procrastination rather than situational factors, and the prevalent belief that parents' influence on children is most

pertinent in early childhood (Bradley, Caldwell, & Rock, 1988) and decreases as the child grows. However, a longitudinal study comparing two models, one that explains academic procrastination at 10 years of age by the early childhood home environment while the other model explains academic procrastination at 10 years of age with the current (contemporary) home environment showed that the contemporary model was a significantly better fit for the data than the early environment model (Bradley et al., 1988). This study shows that when it comes to academic procrastination the current relational context with parents may be more important than the early childhood context (Bradley et al., 1988). The few studies that examined the influence of contemporary relational context between students and parents on academic procrastination found that academic procrastination correlated negatively with perceiving one's parents as compassionate and caring (Batool, 2019; Tang et al., 2014), and as supportive of one's autonomy (Won & Yu, 2018). Consistent with the previous finding, perceiving one's parents as controlling was shown to positively correlate with academic procrastination (Shih, 2019). It should be noted that these studies explored adolescents and college aged students thus contradicting the prevalent belief that the influence of parents on academic outcomes is negligible in older students.

Peers' Characteristics

When it comes to peers, research has shown both their positive and negative influence on academic procrastination. For the negative influence, it was shown that peer pressure positively predicts academic procrastination by increasing the cognitive

interference that arises from school-leisure conflict and thus increasing the possibility that the individual will choose leisure activities while delaying school work (Yee, 2019). For the positive influence, there are only two known studies. The first showed that having peers with lower procrastination levels predicted decreased procrastination in the students, which is thought to be due to modeling (Nordby et al., 2017). The second study showed that interaction with peers, affectionate bonding in peers, including trust, reliance, as well as sharing personal thoughts and emotions, or in short interaction and closeness with peers, correlated negatively with academic procrastination (Jin, Wang, & Lan, 2019).

Teaching Characteristics

The first characteristic of the teaching context that was revealed to protect against academic procrastination, by the few available studies, is the perceived organization and provision of an organized classroom structure by the teacher, which consists of providing clearly articulated course content, evaluation criteria, and expectations regarding assignments and deadlines (Corkin, 2012; Corkin, Yu, Wolters, & Wiesner, 2014; Khakpour & Abbasi, 2019). Second, perceived teacher's social support (taking personal interest in the students and interacting with them) and academic support (e.g. answering their questions), directly and indirectly predicted lower academic procrastination (Bun Ahmad, 2010; Kim & Kim, 2015). Finally, the perceived support from the teacher for the student's active participation in class work

and decision-making was shown to correlate negatively with academic procrastination (Kim & Kim, 2015).

Summary of Risk and Protective Factors

In short, there is extensive research on the individual and trait risk and protective factors for academic procrastination. Highly researched internal risk factors of academic procrastination range from trait characteristics such as neuroticism, perfectionism, low self-esteem and low self-efficacy to cognitive factors such as irrational cognitions, inability to make decisions, and deficient future perspective, to affective and psychological factors such as anxiety and depression, and to poor self-regulatory skills. Protective internal factors included conscientiousness, self-esteem, self-efficacy, and self-regulatory skills.

In addition, a decent portion of the literature was devoted to examining task characteristics as risk and protective factors of academic procrastination, consistently finding that aversive tasks correlate with higher procrastination.

Finally, a scant proportion of the procrastination literature focused on the relational factors in the parenting, peers, and teaching contexts that may influence academic procrastination. Based on qualitative studies that examined the perceived causes and protective factors of academic procrastination and based on studies regarding other academic outcomes, it is expected that these three relational contexts influence academic procrastination. Indeed, the few quantitative studies that examined these contexts separately, showed that perceiving one's relations with parents as strong and

caring, and supportive of one's autonomy were protective factors against academic procrastination, while perceiving one's parents as controlling correlated positively with academic procrastination. In addition, peer pressure was a risk factor for academic procrastination, while perceived interaction and closeness with peers seemed to protect against academic procrastination. Finally, perceptions that one's teachers ensured a clear and organized class structure, supported him/her, and allowed his/her autonomous and active participation in class work and decision making were possible protective factors against academic procrastination.

Gaps in the Literature on Situational Risk and Protective Factors

Clearly, the literature is scarce regarding the influence of parenting, peers, and teaching contexts on academic procrastination. It is important to enrich this literature as more findings on this topic can guide new procrastination interventions that focus on increasing the protective factors in these situational contexts and decreasing risk factors.

Another gap is that there are no common conceptual definitions of the protective and risk factors across the relational contexts. There seem to be common protective and risk factors in two or three of the contexts, but there is no way to ensure that they are the same factors, because the studies do not use a common conceptual definition for them. Having common conceptual definitions of the expected risk and protective factors in the three situational contexts can guide interventions to focus on the factors that show influence over procrastination in more than one context. In the current study, the definitions of the different parenting, peers', and teaching relational

factors expected to be influential on academic procrastination will be based on the Self-Determination Theory (SDT), introduced in the next section, thus there will be unified conceptual definitions of factors across contexts.

Finally, the findings in the literature do not allow for comparisons between the three relational contexts (parenting, teaching, and peers) regarding their influence on academic procrastination, because none of the studies included all three or even two of the three relational contexts in its examination. Studies examining all three relational contexts would clarify whether certain context(s) is/are more important than the other(s). Such insight can also guide interventions on whether to focus on only certain context(s) or to target all three contexts. In the current study, the influence of certain protective factors on academic procrastination will be examined across two or all three of the relational contexts, thus allowing for comparisons between them.

Next, Self-Determination Theory (SDT), which provided a conceptual framework for the study will be introduced.

CHAPTER II

SELF-DETERMINATION THEORY (SDT)

Introduction of SDT and Needs Supportive Environments

Self-Determination Theory (SDT) is an empirically derived theory about human growth that was first introduced around thirty five years ago by Edward Deci and Richard Ryan (Deci & Ryan, 1985). This theory holds a positive view regarding the human psyche and thus it fits under the umbrella of positive psychology. Deci and Ryan noted that the scientific literature documents many human behaviors such as free exploration and play that emerge without any external reinforcement or unsatisfied bodily drives and thus cannot be accounted for by drive or behavioral theories (Deci & Ryan, 2000). Therefore, they postulated that there is an innate tendency in humans towards behaviors that lead to growth and development (Deci & Ryan, 2000; Gagne & Deci, 2014). After much exploration, they concluded that humans have three universal psychological needs, the needs for competence, autonomy, and relatedness, and that human behaviors that are not purely externally or bodily driven, are driven by these needs (Deci & Ryan, 2000; Gagne & Deci, 2014; Ryan & Deci, 2000). The need for competence encompasses the need to feel successful and competent, thus it requires understanding how to succeed in desired challenging tasks and reach intrinsic and extrinsic goals (Deci, Vallerand, Pelletier, & Ryan, 1991). This need to feel competent drives individuals to seek challenging tasks instead of easier ones, to work hard to reach growth and success in the given context, and to avoid failure (Ryan & Deci, 2000; Deci

& Ryan, 2000). The need for autonomy is the need to feel self-determined in one's decisions and behaviors, which requires that the individual perceives that his/her behaviors and decisions are important and relevant to him/her and that s/he has a choice and a say in whether and how to do and make them (Deci & Ryan, 2000; Baard, Deci, & Ryan, 2004). This need drives individuals to be active, self-directed and internally cohesive (adopt behaviors and decisions that are valuable and relevant to them) and thus to avoid passivity, and internal conflicts between one's values and actions or decisions (Deci & Ryan, 2000). Finally, the need for relatedness is the need to build reliable relationships rich in care and involvement with one's environment and it requires that others in the environment want to build these relations with the individual (Deci & Ryan, 2000; Baumeister & Leary, 1995). This need drives individuals to adopt the values and goals of their environment as their own and thus behave in ways that fulfill these values and goals, while avoiding behaviors that go against them (Deci & Ryan, 2000).

Two points, from the previous paragraph, should be highlighted. First, behaviors driven to satisfy the three basic psychological needs not only promote growth (striving for success, being internally cohesive, and acting in an environmentally cohesive way), but they may also protect against self-sabotaging and problem behaviors (settling for easier tasks, being passive in one's behaviors, having internal conflict between actions and values, and acting in an antisocial way). Second, the fulfillment of the three needs has certain requirements. For example, the need for competence requires understanding how to succeed in desired challenging tasks.

Even though, based on SDT, the tendency to satisfy the three basic psychological needs is innate, SDT researchers found that this tendency does not automatically translate into action, rather it requires environments that allow ample opportunities for the satisfaction of such needs (Deci & Ryan, 2000). Deci and Ryan (1985) named these environments as needs supportive environments. For each need there is a corresponding need supportive environment.

For example, an individual is more likely to behave in ways that satisfy the need for competence, meaning to strive to succeed, pass challenges and avoid failure, in environments that support the need for competence, which are called structure supportive environments (Deci & Ryan, 2000). Structure supportive environments promote a clear structure which consists of clear rules, instructions, expectations, and consistent consequences for behaviors, thus allowing the individuals to understand how to reach desired behaviors (Baard et al., 2004; Stroet, Opdenakker, & Minnaert, 2013). Clear structure also consists of providing challenges that fit with the person's capacities and appropriate support for the individual to pass the challenges so that the person's chances of passing the challenges are optimized (Baard et al., 2004; Stroet, et al., 2013).

Similarly, an individual is more likely to behave in ways that satisfy the need for autonomy, i.e., one is more likely to be active, self-directed, and internally cohesive, in environments that support self-directedness and autonomy. These autonomy supportive environments provide the individual with choice, acknowledge the individual's opinions and feelings about the required behaviors/tasks, and provide a

rationale for the behaviors/tasks -which highlights their importance and relevance to the individual- (Deci & Ryan, 1985).

Finally, the person is more likely to behave in ways that satisfy the need for relatedness, i.e., one is more likely to behave in ways that follow and fulfill the values and goals of his/her environment while avoiding behaving against these values and goals, in environments that support the need for relatedness. Relatedness supportive environments are ones in which the individual perceives that s/he can build supportive reliable relations with others, because these 'others' care about him/her and are consistently present for him/her (Baumeister & Leary, 1995; Belmont, Skinner, Wellborn, & Connell, 1988).

There is extensive evidence for the connection between needs supportive environments and growth promoting environmentally desirable behaviors, and for the negative connection with self-handicapping and problem behaviors. For example, needs supportive environments were shown to predict, positively correlate with, and even increase growth promoting behaviors such as adherence to health behaviors, perseverance in a given task, and most importantly to this study, adopting desirable academic behaviors such as academic engagement (e.g. Black & Deci, 2000; Chan et al., 2015; Peng, Lin, Pfeiffer, & Winn, 2012; Silva et al., 2010; Vandereycken & Vansteenkiste, 2009). Similarly, needs supportive environments were shown to negatively correlate with and decrease undesirable self-handicapping behaviors across domains, such as resignation from work, school attrition, addiction, and most

importantly to this study, academic procrastination (Tang et al., 2014; Williams et al., 2014).

Link with the Study

As discussed above, needs supportive environments were shown not only to promote desirable growth promoting behaviors but also to protect against self-sabotaging undesirable behaviors, including academic procrastination. However, as will be shown later, the literature examining the association between needs supportive environments and academic procrastination is limited to only two studies, thus it is scarce, and has many gaps.

This study aims to add to the literature by examining the association between academic procrastination and perceived need support present in the student's proximal contexts that were shown to be most influential on academic outcomes including academic procrastination, and these are the parenting, peers, and teaching contexts. In other word, in this study, perceived needs support in the parenting, peers, and teaching contexts are examined as situational protective factors against academic procrastination. More specifically, the study examines whether perceived autonomy and relatedness supportive parenting, relatedness supportive peers, and structure, autonomy, and relatedness supportive teaching negatively predict academic procrastination. It should be noted that even though the definition of the needs support factors is similar across the different contexts their specific manifestation may be unique to the context, for example

relatedness support refers in all three contexts to being present and caring for the person, but the way that each context manifests this care and presence may differ.

CHAPTER III

NEEDS SUPPORTIVE ENVIRONMENTS AND ACADEMIC PROCRASTINATION

Autonomy and Relatedness Supportive Parenting

The literature has consistently shown that perceived autonomy-supportive parenting and perceived relatedness supportive parenting positively predict desirable academic behaviors and outcomes, and negatively predict undesirable ones (e.g. Chirkov & Ryan, 2001; Furrer & Skinner, 2003; Jiang, Yau, Bonner, & Chiang, 2011; King, 2015; Ratelle, Larose, Guay, & Senecal, 2005; Wong, 2008). Thus, in this study, these two contextual factors will be examined as possible protective factors against academic procrastination.

Only one known study examined the relation between autonomy supportive parenting and academic procrastination (Won & Yu, 2018). This study found a significant negative association between the self-reported parental autonomy support and academic procrastination in North American adolescents, and the relation was mediated by self-efficacy for self-regulated learning (Won & Yu, 2018). These findings imply that perceived autonomy supportive parenting might help children sense that they are efficacious enough to regulate their learning tasks which decreases the likelihood that they put off these tasks. Similarly, only one known study examined the relation between relatedness supportive parenting and academic procrastination (Tang et al., 2014). This study was administered on a sample of 460 students aged from 12-15 in a

middle school in China (Tang et al., 2014). The findings showed that perceived relatedness supportive parenting negatively predicted academic procrastination both directly and indirectly via self-efficacy (Tang et al., 2014).

Even though there is only one study that examined the association between each relevant needs supportive parenting (i.e. perceived autonomy supportive parenting and relatedness supportive parenting) and academic procrastination, there is extensive research on the relation between these two factors and other academic outcomes.

Perceived autonomy supportive parenting was shown to directly and positively predict academic motivation for students of different ages and from different nationalities, namely North American, Russian, Asian, and Latino students; these relations were of medium strength with standardized path coefficients ranging from 0.29 to 0.34 (Chirkov & Ryan, 2001; Jiang et al., 2011; Wong, 2008). It was also shown to indirectly positively predict academic engagement via self-esteem, (Jiang et al., 2011), and to directly positively predict objectively measured academic achievement (standardized path coefficient=0.29). In addition, perceived parental autonomy support regarding vocational choices during high school significantly and positively predicted persistence in college (standardized path coefficient=.20), competence in the chosen program (standardized path coefficient=.16) and autonomy in learning at college (standardized path coefficient= .18) (Ratelle, et al., 2005). Additionally, perceived parental autonomy support negatively predicted disruptive behaviors in the classroom (Wong, 2008).

Similar to autonomy supportive parenting, perceived relatedness supportive parenting has extensive evidence on its association with different academic outcomes and behaviors. For example, perceived relatedness supportive parenting was shown to directly positively predict both behavioral and emotional engagement in the classwork, with standardized Beta coefficients ranging from .11 to .31, while negatively predicting disengagement in the classroom (Standardized Beta coefficient= -.15) (Furrer & Skinner, 2003; King, 2015). In addition, it was shown to directly positively predict academic self-regulatory skills with a medium effect size (standardized path coefficient=.36) (Wong, 2008) and academic autonomy in college (standardized path coefficient=.22), and it indirectly positively correlated with academic achievement (Wong, 2008). Finally, an indirect negative relation was found between perceived parental support of relatedness and disruptive behaviors in the classroom (Wong, 2008). Thus, even though parents are not directly a part of the school context, the students' perceived relatedness with their parents positively predicts desirable academic outcomes and behaviors, especially engagement in the classroom. Scholars explained that perceived relatedness with parents might provide a safe base, especially during adjustment and difficult periods -such as passing from high school to college- thus motivating students to explore and engage in the academic context. Therefore, scholars look at relatedness with parents as a contemporary and dynamic version of attachment (King, 2015; Wong, 2008).

To summarize, two studies showed that autonomy and relatedness supportive parenting negatively predicts academic procrastination, and extensive studies showed

that they directly and indirectly positively correlate with desirable academic outcomes, namely behavioral and emotional engagement in the classroom, academic self-regulatory skills, autonomy, achievement, competence, and persistence. These have been shown to negatively correlate with academic procrastination (e.g. Abbasi, Pirani, Razmjoiy, & Bonyadi, 2015; Çapri, Gündüz, & Akbay, 2017; Steel, 2007). In addition, they were shown to indirectly negatively correlate with disruptive classroom behaviors, which also negatively correlate with academic procrastination (patrzek et al., 2014). These findings present solid grounds to hypothesize that perceived autonomy and relatedness supportive parenting negatively predict academic procrastination.

Even though perceived parental support of autonomy and perceived parental support of relatedness were shown to be positively correlated (e.g. Ratelle et al., 2005; Wong, 2008), they each have a unique effect on academic outcomes. For example, studies examining both parenting factors showed that even with the moderate to high correlation between them (ranges between Pearson's r= .36 and .52), they influenced different outcomes. Also, even when they influenced the same outcome such as academic autonomy, they did so independently of one another: when perceived parental autonomy support was controlled for, perceived academic relatedness support still predicted academic autonomy, and vice versa (Ratelle et al., 2005). Thus, it can be expected that each of the two parental factors will significantly negatively predict academic procrastination, even when they are simultaneously considered.

Relatedness Supportive Peers

Peers' support of relatedness was shown to promote and positively predict desirable academic outcomes in students (e.g. Furrer & Skinner; King, 2015), thus it was examined in this study as a protective factor against academic procrastination.

No studies explored the relation between peers' support of relatedness and academic procrastination. However, as already mentioned, there is substantial evidence linking perceived relatedness supportive peers and desirable academic outcomes and behaviors. The outcomes that seem to be influenced the most by perceiving peers' support of one's relatedness are behavioral and emotional engagement in the classroom, which are directly and positively predicted by perceived relatedness to peers in general, but especially to classmates, with standardized beta coefficients raging between 0.11 and 0.26 (Furrer & Skinner, 2003; King, 2015; Mikami, Ruzek, Hafen, Gregory, & Allen, 2017). One explanation for the prevalent influence of perceived classmates' support of relatedness on classroom engagement is that relatedness with classmates creates a safe classroom environment in which students are more likely to comfortably participate, take learning risks, and ask for help (Mikami et al., 2017). Such a relation can be also explained based on the SDT theory, since relatedness to classmates may drive the person to adopt the goals of the classroom, which generally are success and achievement, as his/her own, and thus to engage in the classroom to help him/herself and others reach this goal. Perceived peers' relatedness support was also shown to directly negatively predict disengagement in the classroom (Standardized beta coefficient= -.28) and to indirectly predict academic achievement via behavioral engagement (Mikami et al., 2017) and academic motivation via relatedness need

satisfaction (Cox, Duncheon, & McDavid, 2009). In short, perceived peers' support of relatedness was a direct positive predictor of desirable academic outcomes, namely emotional and behavioral classroom engagement and an indirect positive predictor of other outcomes such as academic motivation and achievement, that have all been shown to correlate negatively with academic procrastination (Abbasi et al., 2015; Çapri et al., 2017; Katz, Eilot, & Nevo, 2014; Klassen et al., 2008). Also, perceived peers' support of relatedness was shown to negatively predict classroom disengagement which has been shown to positively correlate with academic procrastination (Abbasi et al., 2015). Thus, it can be hypothesized that perceiving one's peers as relatedness supportive negatively predicts academic procrastination.

Autonomy, Structure, and Relatedness Supportive Teaching

The autonomy supportive teaching approach can be equated, in a sense, with the modern student centered and active learning approaches in education compared to the traditional teacher-centered approaches in which students passively receive the material without having choice or being involved in the learning process thus without feeling self-directed (Black & Deci, 2000). There are no studies that examine the relation between autonomy supportive teaching and academic procrastination, but one study explored the association between student reported autonomy supportive teaching and trait procrastination in undergraduate students, and it found a negative correlation between the two (Pearson's $r=-.11$, $p<0.01$) (Codina, Valenzuela, Pestana, & González-Conde, 2018).

Moreover, as will be shown next, studies from the educational literature showed causal relations and correlations between autonomy supportive teaching, as defined by SDT, and different academic outcomes that correlate with academic procrastination. For example, a randomly controlled trial in a physical education course, compared a control group of students who were receiving standard teaching with an intervention group in which the teachers were trained on autonomy supportive teaching (Chatzisarantis & Hagger, 2009). These teachers were trained to provide a rationale for physical activity, were instructed to acknowledge the students' own experiences with physical exercise, and to allow choice and self-directedness by using neutral language (e.g. we may do this exercise this way) rather than controlling language (e.g. this exercise should be done this way) (Chatzisarantis & Hagger, 2009). It was shown that autonomous motivation and persistence in physical activity increased significantly between baseline and post-intervention in the treatment group (eta squared= .18 and .20 respectively) but not in the control group (Chatzisarantis & Hagger, 2009). In another study, undergraduate college students in the U.S. enrolled in a physical activity course were given one class based on the SDT autonomy supportive teaching style (Beck & Diehr, 2017). This class was aimed at engaging the students in the course's objectives by encouraging them to find rationale for the course (asking them what benefits they personally perceive in physical activity), listening to their ideas and methods of exercising, and giving them the choice and freedom to create their own exercise routine (Beck & Diehr, 2017). In addition, correlational studies on high school students from different nationalities, Russian, American, and Iranian, showed that student-reported

and observer-reported autonomy supportive teaching correlated positively with autonomous motivation (r= .32), concentration (r= .34), persistence (r= .37), and directly positively predicted academic motivation, and academic engagement (Chirkov & Ryan, 2001; Jang, Reeve, & Deci, 2010; Vansteenkiste, Niemiec, & Soenens, 2010), which are all academic outcomes shown to negatively correlate with or predict academic procrastination (Abbasi et al., 2015; Çapri et al., 2017; Katz et al., 2014; Klassen et al., 2008; Rakes & Dunn, 2010). Student reported autonomy supportive parenting also negatively correlated with test anxiety (-.12), and school skipping (-.15), (Vansteenkiste et al., 2012), which are measures that positively correlate with academic procrastination (e.g. Custer, 2018; Steel, 2007). Thus, plenty of indirect evidence suggests an association between autonomy supportive teaching and academic procrastination.

Studies conducted on the association between structure supportive teaching and academic outcomes, showed that objective rater-observed structure supportive teaching significantly predicted rater-observed students' behavioral engagement (Jang et al., 2010), and student reported structure supportive teaching positively and significantly correlated with autonomous motivation (r=.23), concentration (r=.27), and persistence (r=.36), which are all outcomes that negatively correlate with academic procrastination (Abbasi et al., 2015; Çapri et al., 2017; Katz et al., 2014; Klassen et al., 2008; Rakes & Dunn, 2010). In addition, student reported structure supportive teaching significantly negatively correlated with school skipping (-.12) (Vansteenkiste et al., 2012), a behavior that positively correlates with academic procrastination (Steel, 2007).Thus, there are

some grounds to hypothesize that student reported structure supportive teaching might negatively correlate with and negatively predict academic procrastination.

There are no known studies examining the relation between relatedness supportive teaching and academic procrastination. However, some studies have examined the relation between student reported relatedness supportive teaching and different academic outcomes, in student samples from primary grades to high school. They found that perceived teacher's support of relatedness significantly and directly positively predicted academic behavioral engagement (standardized path coefficients ranging between .14 and .69), and emotional engagement (standardized path coefficients ranging between .17 and .46) (Furrer & Skinner, 2003; King, 2015; Patrick, Stockbridge, Roosa & Edelson, 2019; Shen, McCaughtry, Martin, Fahlmann, & Garn, 2012), and significantly positively correlated with academic motivation (r=.38), and enjoyment of academic work (r=.46) (Cox et al., 2009). All these variables negatively correlate with academic procrastination (Abbasi et al., 2015; Çapri et al., 2017; Katz et al., 2014; Klassen et al., 2008; Rakes & Dunn, 2010). Finally, student reported relatedness supportive teaching was also shown to significantly negatively predict disengagement (β =-.11) (King, 2015), and significantly negatively correlate with academic worry/anxiety (r=-.29) (Cox et al., 2009), which are two measures that positively correlate with academic procrastination (Abbasi et al., 2015). Thus, it can be hypothesized, from these findings, that student reported relatedness supportive teaching may negatively predict academic procrastination.

It should be noted that autonomy supportive teaching and structure supportive teaching are not incompatible. Autonomy supportive teaching does not refer to leaving the student on his/her own without guidance, it refers to encouraging the student to be more implicated, active, and self-directed in the learning process. Also, structure supportive teaching does not refer to imposing rules and demands, it refers to the provision of needed information and support to the student. A teacher can be both autonomy supportive and structure supportive. In fact, perceived autonomy supportive teaching and structure supportive teaching were shown to be significantly correlated, with correlation coefficients ranging between 0.5 and 0.6 (Jang et al., 2010; Vansteenkiste et al., 2012). However, this does not mean that the two factors overlap and measure the same thing, rather most studies examining the relation of both perceived autonomy supportive teaching and structure supportive teaching with academic outcomes, showed that each factor uniquely explains the academic outcomes (e.g. Jang et al., 2010; Vansteenkiste et al., 2012). For example, one study showed that the cluster of students who scored highly on both their teachers' autonomy support and relatedness support had better academic outcomes (academic motivation, concentration, persistence) compared to the group that scored high only on one of the two teaching factors. It should be noted that there were a few findings of an interaction effect between perceived autonomy supportive teaching and structure supportive teaching on academic outcomes. For example, one study showed that perceived structure supportive teaching was positively associated with academic motivation only for students with moderate or high scores on perceived autonomy supportive teaching (Sierens,

Vansteenkiste, Goossens, Soenens, & Dochy, 2009). An explanation of this latter finding could be that in the absence of autonomy support, the provision of structure by teachers may be viewed as an additional means for the teachers to control the students. However, findings are scarce to support this interactive relation between the two factors.

Studies that examined the influence of the three reported teaching factors (autonomy supportive, structure supportive, and relatedness supportive) on academic outcomes, have shown inconsistent findings. Some studies found that each factor explained the variance in a specific academic outcome over and above the other factors, or each factor uniquely predicted a different academic outcome (e.g. Taylor & Ntoumanis, 2007). Still other studies found that one or two factors were better predictors of academic outcomes, with the superior factors differing between studies (Baskerville, 2008; Hospel & Galand, 2016). Based on the SDT theory, each need supportive teaching factor should be necessary and essential for needs satisfaction and to boost the tendency towards desirable growth promoting behaviors. Therefore, based on the theory, it can be hypothesized that autonomy supportive teaching, structure supportive teaching, and relatedness supportive teaching will each independently explain the variance in academic procrastination.

Comparative Influence of the Three Contexts on Academic Outcomes

The current study will be comparing the influence of perceived needs supportive factors not only within the same context (parenting, teaching, peers) but also

between contexts, specifically perceived relatedness support is examined in all three contexts, and autonomy support is examined in two contexts (parenting, and teaching). Thus, it is important to consider the findings in the literature regarding the comparative influence of one factor (i.e. relatedness support, or autonomy support) between different contexts, on academic outcomes.

Regarding relatedness support, there is some inconsistency in the findings, but in general it was shown that, even when considered together, all three relational contexts (parents, peers, and teachers), significantly predicted the academic outcomes (e.g. Cox et al., 2009; Shen et al., 2012). It should be noted that most of these studies examining relatedness from the three contexts were done with school students rather than college students. However, they still present good grounds to hypothesize that relatedness from each context may uniquely predict academic procrastination in college students.

Little research was done on autonomy supportive teaching and autonomy supportive parenting simultaneously, and most of the studies were done with school students rather than college students. The findings showed that autonomy supportive teaching and autonomy supportive parenting positively predicted desirable academic outcomes independently of one another (Chirkov & Ryan, 2001; Feng, Xie, Gong, Gao, & Cao, 2019). Thus, I hypothesized that similarly to the other academic outcomes, academic procrastination will be independently predicted by autonomy supportive parenting and autonomy supportive teaching.

Summary

In summary, there are only two studies in the SDT literature that examined the influence of a need supportive environment on academic procrastination, specifically they showed that student reported autonomy supportive parenting and relatedness supportive parenting significantly predicted less academic procrastination (Tang et al., 2014; Won & Yu, 2018). There was also one study that showed a negative association between student-reported autonomy supportive teaching and trait procrastination (Codina et al., 2018). These are the only known studies that examined the relation between needs supportive environments and procrastination. However, many studies showed the association between the perceived needs supportive environments, examined in this study, and different academic outcomes that themselves correlate with academic procrastination (e.g. Cox et al., 2009; Furrer & Skinner, 2003; King, 2015). Thus, there are good grounds to hypothesize that the perceived needs supportive environments examined in this study may act as protective factors against academic procrastination and thus negatively predict it.

Even though no studies examined the comparative influence of different factors on academic procrastination, several studies examined their comparative influence on other academic outcomes thus showing that, in general, each factor in each context has an influence on academic outcomes even when the other factors and contexts are considered (e.g. Chirkov & Ryan, 2001; Jang et al., 2010; Ratelle et al., 2005; Taylor & Ntoumanis, 2007). Thus, it can be hypothesized that also for academic procrastination

each of the examined factors in this study will have an influence on academic procrastination even when all the other factors are controlled for.

Confounding Variables: Gender, Mental Illness, and ADHD diagnosis

In general, female students report less academic procrastination than their male peers (Senécal, Koestner, &Vallerand, 1995; Solomon & Rothblum, 1984). Females also report higher levels of relatedness with peers, parents, and teachers than their male peers (Bashir, 2019; Fischer, 2000; Floyd, 1996). Women may procrastinate less because they receive more relatedness support from their environment, or because they experience greater motivation and enjoyment in studying than males (Vallerand, Blais, Brière, & Pelletier, 1989). In short, gender may act as a confounding variable in the relation between academic procrastination and relatedness needs support.

As mentioned previously, some antecedents of academic procrastination include depression, anxiety, learning disorders, substance abuse disorders, and attention deficit and hyperactivity disorder (Grunschel et al., 2013; Jamrozinski, Kuda, & Mangholz, 2009; Stead et al., 2011). For example, one study showed that having depression or anxiety accounted for 14% of the variance in academic procrastination (Senécal et al., 1995). Thus, mental health diagnoses should be included as potential covariates in studies that examine academic procrastination.

Among the different psychological disorders, attention deficit and hyperactivity disorder (ADHD) seems to be an especially important predictor of academic procrastination (e.g. Altgassen, Scheres, & Edel, 2019; Niermann & Scheres,

2014). ADHD is characterized by executive functioning and self-regulation skills deficits (e.g. planning a complex task, ignoring distractions), which is an antecedent of academic procrastination (e.g. Altgassen et al., 2019). Students with ADHD reported lower scores of overall social support than student controls (Demaray & Elliott, 2001) and lower levels of social adjustment in college (Shaw-Zirt, Popali-Lehane, Chaplin, & Bergman, 2005). Students with ADHD are also more likely to struggle academically, especially in higher education. This may reduce their academic self-efficacy and increase procrastination (Fleming & McMahon, 2012; Lefler, Sacchetti, & Del Carlo, 2016).

In summary, gender, mental health diagnosis, and specifically ADHD diagnosis are the demographic variables that may act as confounding variables when examining the relation between needs supportive environments and academic procrastination.

CHAPTER IV

AIMS AND HYPOTHESES

Aims

The major aim of this study was to investigate whether undergraduate college students' perceptions of teachers' support of autonomy, competence and relatedness, parents' support of autonomy and relatedness and peers' support of relatedness could act as protective factors against academic procrastination. Based on past research, there is evidence that each of these needs supportive environments independently positively predicts or correlates with desirable academic outcomes that are negatively associated with academic procrastination. Thus, I hypothesized that each of the needs supportive environments would independently negatively predict academic procrastination. This study was the first to examine the relation between multiple needs supportive environments and academic procrastination.

Understanding more about the relation between procrastination and perceived needs supportive environments could inform possible interventions to address academic procrastination based on needs support trainings for parents, teachers and peers. There is growing evidence of the effectiveness of such trainings in decreasing dysfunctional behaviors (e.g. Fortier, Duda, Guerin, & Teixeira, 2012; Ryan, Patrick, Deci, & Williams, 2008) and this study could contribute to informing such interventions for procrastination.

Hypotheses

Null hypothesis: The needs supportive factors, namely student-reported autonomy supportive parenting, relatedness supportive parenting, relatedness supportive peers, autonomy supportive teaching, structure-supportive teaching, and relatedness supportive teaching, will not significantly negatively predict academic procrastination.

Alternative hypothesis: At least one of the needs supportive factors, namely student-reported autonomy supportive parenting, relatedness supportive parenting, relatedness supportive peers, autonomy supportive teaching, structure-supportive teaching, and relatedness supportive teaching, will significantly negatively predict academic procrastination.

CHAPTER V

METHOD

Participants

College students enrolled in different undergraduate psychology courses at the American University of Beirut were recruited. The final sample size consisted of 225 students, after the deletion of two cases missing more than 75% of their answers. This sample size exceeds the minimum number of cases required for multiple regression analysis according to Tabachnick and Fidell's formula (2007) of $N \geq 50 + 8m$, where m is the number of predictors. The students were from 11 different courses taught by 8 different teachers. Inclusion criteria consisted of students being 18 years old and above, so they could provide informed consent, and having at least one living legal parent/guardian, so they could fill the "Perceptions of parents' support" questionnaire.

In addition, the instructors of the undergraduate psychology courses from which the students were recruited, were themselves recruited to complete the teacher-reported measures. However, only three, out of the eight recruited teachers, completed the measure.

Procedure

The study used non-random convenience sampling in the recruitment of the students. Emails were sent to the 10 different teachers giving the undergraduate psychology courses (except for the introductory psychology course) in the 2019 summer

and fall semesters at the American University of Beirut, asking whether they accept to invite their students to participate in the study and to give them one credit point on the final course grade for the completion of the study.

Eight, out of the 10 teachers invited their students to the study. The teachers were sent the invitation flyer with the link to the survey to post on the course's Moodle page. Teachers were also sent the teacher's invitation email which explained the purpose of the teachers' survey (to control for any student perception bias) and had the links to the teachers' survey.

Each class had its own survey, with the content of the surveys similar across classes, but the course of interest differing between surveys. Students taking more than one course received a different invitation flyer and survey link for each course. Only one student answered two surveys, but this student's answers were removed from the analysis because they were missing a lot of data. None of the other students answered more than one survey. Similarly, teachers giving more than one course received one link for each course for the teacher's survey.

The surveys were anonymous and the data were stored under a random course name (e.g. class A) rather than under the actual class name. The raw data were deleted right after the closure of the surveys.

Both the teachers' surveys and students' surveys were hosted on LimeSurvey and required registration with an email. The surveys were opened a couple of weeks after the beginning of the semester, so students would have become familiarized with their teachers and peers. Surveys were closed before the reading period, so teachers

could appoint extra credit before they finalize the course's grade. Both surveys opened with a consent form. The students who accepted the consent form by clicking "Next" were directed to the subsequent page of the study that presented two mandatory closed ended questions on whether the student had at least one current living legal guardian, and whether the student was at least 18 years old (the eligibility criteria). When the answer was no on one or both questions, s/he was directed to a concluding page. When the answer was yes on both questions, the students were directed to subsequent pages to fill the demographic information and the study scales. All questions, except the eligibility criteria questions could be skipped. The students could only open the survey once. Therefore, they had to complete it in one sitting, which decreased the risk of students procrastinating in the completion of the survey once opened.

For the teachers' surveys, all questions could be skipped, and responses could be saved and completed in several sittings.

Students received one percentage extra point on the final course grade for completing the survey. After survey closure, the names of the students who completed the survey were sent to the teachers. Students' names could not be tied with their responses on the first survey. It was also clarified in the invitation flyer and consent form, that no student would be provided with more than 1% extra credit in total, no matter how many surveys s/he filled. The students were informed that if they filled more than one survey, they should email the student investigator with the name of the course on which they want the extra credit by the deadline of survey closure, after which the course would be randomly chosen for them.

The students who did not wish to participate in the study or were ineligible (under 18 or had no legal guardians) had the option of writing a brief report on an article from a psychological journal.

Measures

Demographic Measures of Students

This form asked about respondents' declared gender, nationality, age, and major. In addition, it asked whether they have ever received any diagnosis of a mental disorder in general and ADHD in particular.

Teacher and Student Reported Teaching Measures

Student-reported and teacher-reported autonomy, structure, and relatedness supportive teaching were measured using the Teacher as Social Context Questionnaire-Student Report and Teacher Report respectively (TASCQ; Belmont et al., 1988). Both versions of the questionnaire were developed based on the three needs model of SDT, and they are each composed of three eight-item subscales, one for each need. The items of the subscales are measured on a 4-point Likert scale ranging from 1 (not at all true) to 4 (very true). The negatively worded items are reverse coded, and the score of the subscale is computed by averaging the scores of all its items (Vansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009).

In this study, the student-reported autonomy supportive teaching subscale measured students' perceptions of their teacher's support of autonomy in the specific course by measuring to what extent students perceived that their teacher provided them with choice in the course work, acknowledged their opinions and ideas, explained to them the relevance of the course for their lives and careers, and allowed them to self-direct their course work. Student-reported structure supportive teaching measured the extent to which students perceived that their teacher in the specific course provided consistent consequences for behaviors, clarified their expectations, provided the needed support for the students to reach these expectations, and tailored the course speed to the ability of the students. Student-reported relatedness supportive teaching measured the extent to which students sensed relatedness to their teacher, i.e., the extent to which students perceived that their teacher, in the given course, liked them, understood them, made time for them, and was a reliable support for them, in general not only in academic matters and during class time.

Teacher-reported measures are similar to the student-reported measures, but they reflect the teachers' perceptions of their own teaching style.

The brief version for the TASCQ-student report, which consists of 24 items, was used to measure the student-reported teaching variables. The brief forms of the subscales have previously been reported to have acceptable to good internal reliability when used on students in secondary school, high-school, and after-school education (e.g. vocational specialization) with Cronbach's alpha for autonomy supportive teaching ranging between .75 and .83, for structure supportive teaching ranging between .72 and

.83, and for relatedness supportive teaching ranging between .70 and .86 (Lietaert, Roorda, Laevers, Verschueren, & Fraine, 2015; Sierens et al., 2009; Vansteenkiste et al., 2009; Vansteenkiste et al., 2012). For the TASCQ-teacher report, the longer version was used, since it showed high internal consistency (Cronbach's alpha =.81 for autonomy, 0.7 for structure and 0.88 for relatedness) in a sample of university lecturers (Kingma, Kamans, Heijne-Penninga, & Wolfensberger, 2016).

Student-Reported Parenting Measures

Child-reported autonomy supportive parenting and relatedness supportive parenting were measured using the Perception of Parents Scale -The College Student Scale (POPS; Robbins, 1994). This 21-item scale is split into the autonomy supportive parenting subscale with 9 items, and the relatedness supportive parenting subscale with 12 items (Niemiec et al., 2006). The subscales' items are measured on a 7-point Likert scale, ranging between 1(not at all true) and 7 (very true). Each subscale is scored by first reverse scoring the negatively worded items and then averaging the scores of all the items in the subscale.

The child-reported autonomy supportive parenting subscale measures the extent to which the participants perceive that their parents understand and acknowledge their feelings and opinions about different matters, provide them with choices and encourage them to be self-directed in life decisions and behaviors. The child-reported relatedness supportive parenting subscale measures the extent to which the participants

perceive that their parents have time and availability to support and spend quality time with them, and love, accept, and care about them.

The scale was first administered on elementary school children, and it was later adapted to older samples by Robbins (1994). The internal consistencies of the adapted subscales were high in a sample of high school students, with Cronbach αs ranging between .88 and .90 (Niemiec et al., 2006). Also, the construct validity of the adapted subscales was supported in high-school students in Turkey and Singapore, since child-reported autonomy supportive parenting was positively correlated with the child's autonomy need satisfaction, and child-reported relatedness supportive parenting was positively correlated with child-reported relatedness need satisfaction (Chew & Wang, 2008; Kocayörük, 2012).

Student Reported Relatedness Supportive Classmates

In this study, student-reports of relatedness supportive classmates were measured by the "Feeling of Relatedness Scale" which assesses the perception of relatedness support in a given relational context (Richer & Vallerand, 1998). The 10 items are measured on a 7-point Likert scale, ranging between 1 (do not agree) and 7 (very strongly agree). The total score gets computed by averaging all the items.

The scale was first constructed for relationships in the work-place domain (Richer & Vallerand, 1998). Later, the scale was adapted to the physical education (PE) domain, where it was used to either measure perceptions of relatedness support from peers in PE classes or from PE teachers (e.g. Cox et al., 2009). In the current study,

academic procrastination is measured in specific courses, and in theory, relatedness to classroom peers is likely to affect academic outcomes, including academic procrastination, in the given class, more robustly than relatedness with peers across college or with friends outside of college (Ryan & Patrick, 2001). Thus, in this study relatedness with classmates rather than relatedness with general peers is examined.

Studies using this scale to measure students' perceived relatedness support from their PE peers, in American and British samples, showed high internal consistency of the measure with Cronbach's alpha =.91, and construct and predictive validity with the measure positively correlating with students' needs satisfaction and self-determined motivation in the PE class, while negatively correlating with worry about PE activities (Cox et al., 2009; Standage, Duda, & Ntoumanis, 2003).

Student Reported Academic Procrastination

Student reported academic procrastination was measured using the Academic Procrastination State Inventory (APSI; Schouwenburg, 1995). The scale includes a fear of failure and a lack of motivation subscales in addition to the academic procrastination subscale (Littrell, 2016; Schouwenburg, 1995). Thus, it measures procrastination and two of the antecedents, namely fear of failure and lack of motivation. For this study, only the 13-item procrastination subscale was used. The subscale was previously found to have high internal reliability, and high construct and predictive validity (Schouwenburg, 1995).

The procrastination subscale of the APSI can be used to assess academic procrastination across courses/tasks or for a specific course/task (Littrell, 2016; Schouwenburg, 1995). The 13 items are scored on 5-point Likert scale ranging between 1(not) and 5 (always). Finally, the procrastination subscale asks about academic procrastination for the week of normal course work prior to the measurement day.

CHAPTER VI

RESULTS

Data Analysis

Data analysis was conducted using R software for statistical computing (R Core Team, 2014). The data were examined for missing values, and summary statistics were computed for all predictor and demographic variables. Also, the internal reliabilities of the scales and subscales used were assessed. Next, the relationship between the criterion (academic procrastination), and each of the six predictors was examined using bivariate scatterplots and by computing Pearson's correlation coefficient, r. To assess multicollinearity between predictors, all pairwise correlations and partial correlations between the predictors were computed.

Multiple regression was used to find the best-fitting linear model for academic procrastination. The initial model included all predictors and demographic variables previously identified as potential confounds (gender, mental illness, and ADHD diagnosis). This model used Type III sums of squares to determine the unique contribution of each predictor to the overall model. Non-significant predictors were dropped from the model leading to the final model that maximized Adjusted R^2 (an unbiased estimate of the proportion of variance accounted for by the model). The residuals of the model were inspected visually to verify the assumptions of normality, linearity, and homogeneity of variance. A Shapiro-Wilk test was used to test whether

the residuals were normally distributed, and the Breusch-Pagan test was used to verify homogeneity of variance.

The teachers' reported data was not analyzed, because only 3 teachers filled the teachers' survey, thus the sample size was too small to provide valuable or accurate results.

Results

Missing Values

Two surveys, submitted by the same student, were missing more than 75% of their answers, including the answers on the outcome variable. Thus, they were removed from the analysis. This decreased the sample size to 225 participants. There were 37 missing cells across the different questionnaires, with no question or case missing more than 2% of the data. Little's MCAR test of missingness at random was conducted separately for the teaching questionnaire, the parenting questionnaire, the peers' questionnaire, and the procrastination questionnaire. None of the tests were significant, showing that the data in each questionnaire were missing completely at random. Scores for each case with missing data were computed by averaging over the missing cells.

Descriptive Statistics

The sample largely comprised of female students (84.4%) of Lebanese nationality (85.3%) majoring in psychology (93.8%). Age ranged between 18 and 25

years. The percentage of the students who reported being diagnosed with a mental disorder was 31.5%; and 5.3% of the students reported that they received an ADHD diagnosis. The summary statistics for these variables are shown in Table 1. As most students were Lebanese, nationality was coded as “Lebanese” vs. “Non-Lebanese”. Most students were psychology majors, therefore major was coded as “Psychology” vs. “Other”.

The ranges, means, and standard deviations of students’ scores on the six predictor variables and the criterion variable (academic procrastination) can be found in Table 2. In this sample, 12.9% of the students reported procrastinating “most of the times” or “always” (i.e., a score of 4 or above) and thus could be considered as high procrastinators, but most students were moderate procrastinators, scoring around the half point (2.5 over 5). The procrastination averages for the different courses ranged between 2.57 and 3.10. A one-way ANOVA showed that there was no significant difference between the procrastination scores across courses ($F(10,214) = 0.9$, $p = 0.53$).

The internal consistencies of the different subscales and scales used in this thesis were acceptable. All Cronbach alphas exceeded 0.7: Autonomy supportive teaching subscale ($\alpha = 0.7$), structure supportive teaching subscale ($\alpha = 0.79$), relatedness supportive teaching ($\alpha = 0.79$), autonomy supportive parenting subscale ($\alpha = 0.89$), relatedness supportive parenting ($\alpha = 0.87$), relatedness supportive peers measure ($\alpha = 0.94$), and the academic procrastination measure ($\alpha = 0.91$).

Table 1

Descriptive Statistics of Demographic Variables

Variable	*N*	*%*
Gender		
Female	190	84.4%
Male	31	13.8%
N/A	4	1.8%
Nationality		
Lebanese	192	85.3%
Non-Lebanese	32	14.2%
N/A	1	0.5%
Major		
Psychology	211	93.8%
Other	14	6.2%
Mental Illness		
Yes	71	31.5%
No	153	68%
N/A	1	0.5%
ADHD Diagnosis		
Yes	13	5.8%
No	212	94.2%

Table 2

Descriptive Statistics of the Predictors and Criterion

Variable	*Range*	*M*	*SD*
AP	1-7	4.87	1.29
RP	1.58-7	5.12	1.2
RPE	1-7	3.39	1.36
AT	1.75-4	3.21	0.44
ST	1.5-4	3.36	0.46

RT	1.38-4	2.94	0.55
Procrastination	1.38-5	2.93	0.79

Note. AP = Autonomy supportive parenting. RP = Relatedness supportive parenting. RPE = Relatedness supportive peers. AT =Autonomy supportive teaching. ST = Structure supportive teaching. RT = Relatedness supportive teaching.

Correlations

Significant negative correlations were found between each of the student-reported needs supportive factors and academic procrastination. The correlation coefficients and significance levels for the correlations between academic procrastination and each of the predictors are shown in Table 3.

Significant positive correlations were found between several predictors, specifically, between the three teaching variables, the two parenting variables, and between teachers' relatedness support and peers' relatedness support (see Table 3 for statistics). These correlations indicate that not all predictors might be necessary for predicting the criterion variable (academic procrastination). The next section describes further analyses that were conducted to identify multicollinearity between predictors.

Table 3

Correlational Matrix

Variable	Procra-stination	AP	RP	RPe	AT	ST	RT
Procra-stination	1						
AP	-0.37***	1					

RP	-0.26***	0.72***	1				
RPe	-0.24***	0.19**	0.11	1			
AT	-0.23***	0.17*	0.19**	0.3***	1		
ST	-0.18**	0.16*	0.12	0.3***	0.74***	1	
RT	-0.17**	0.15*	0.06	0.48***	0.54***	0.62***	1

Note. AP = Autonomy supportive parenting. RP = Relatedness supportive parenting. RPE = Relatedness supportive peers. AT =Autonomy supportive teaching. ST = Structure supportive teaching. RT = Relatedness supportive teaching.

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

Multicollinearity

The *mctest* package in R, which provides overall and individual multicollinearity diagnostics, was used for these analyses. First, the matrix of predictor ratings was extracted from the dataset. This matrix was submitted for overall tests of multicollinearity, which include the determinant of the correlation matrix (1 = orthogonal predictors; 0 = perfectly correlated predictors or multicollinearity) and the Farrar-Glauber Chi-square test (Farrar & Glauber, 1967). The Determinant was found to be 0.09, confirming that the predictors were correlated. The F-G test was significant (Chi-square = 527.22), further confirming that the predictors were redundant. To determine the location of multicollinearity (i.e., to establish which variables were redundant with each other), the variance inflation factor (VIF) and Farrar-Glauber F test were computed for every predictor. The VIF ranged from 1.33 to 2.60, indicating moderate intercorrelations among the predictors. The F-G F test and Klein's rule

(Klein, 1962) identified collinearity for every predictor, i.e., every predictor was redundant with at least one other predictor. Finally, partial correlations were computed for every pair of predictors (Table 4). This analysis showed that five of 15 partial correlations were significant at an alpha of 0.05, namely the teaching-based support measures were mutually correlated, the parenting-based support measures were mutually correlated, and there were correlations across support sources (relatedness supportive teaching-relatedness supportive peers; autonomy supportive teaching-relatedness supportive parenting). These analyses confirm that only a subset of predictors would be essential for the final regression model.

Table 4

Matrix of Partial Correlations between Predictors

Variable	RT	ST	AT	AP	RP	RPe
RT	1					
ST	0.37***	1				
AT	0.13	0.6***	1			
AP	0.07	0.07	-0.08	1		
RP	-0.1	-0.06	0.17*	0.72***	1	
RPe	0.38***	-0.04	0.06	0.1	-0.01	1

Note. RT = Relatedness supportive teaching. ST = Structure supportive teaching. AT = Autonomy supportive teaching. AP = Autonomy supportive parenting. RP = Relatedness supportive parenting. RPE = Relatedness supportive peers.

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

Regression

Table 5 shows Type III sums of squares and significance tests from a multiple regression of academic procrastination on the six perceived needs support variables and the demographic variables of interest. The results in Table 5 show that autonomy supportive parenting and relatedness supportive peers were the only two significant predictors of academic procrastination out of the six perceived needs support variables. None of the teaching variables were significant. In addition, ADHD diagnosis was a significant predictor of procrastination. Based on the results of this analysis, a reduced model (Model 1) was defined, which included only the three significant predictors identified above (autonomy supportive parenting, relatedness supportive peers, and ADHD diagnosis). Adjusted R-squared for Model 1 was 0.193. In other words, Model 1 accounted for 19.3% of the variability in academic procrastination, $F(3, 221) = 18.86$ and $p = 6.28e^{-11}$.

Table 6 and Table 7 show adjusted R-squared and significance tests for Model 1 compared to a model that excluded ADHD from the predictors (Model 2). Adjusted R-squared for Model 2, which included only the two needs supportive predictors without ADHD, was 0.168. In other words, the two significant needs supportive predictors alone accounted for 16.8% of the variance in academic procrastination and ADHD accounted for approximately 2.5% of the variance in procrastination.

The unstandardized (*B*) and standardized coefficients (β) for the three variables in the final model (Model 1) are shown in Table 7. The coefficients for perceived parental autonomy ($B = -0.19$, $t(221) = -5.16$, $p = 5.48e^{-07}$; CI= [-0.27, -0.12], $\beta = -0.32$) and peers'

relatedness (*B*= -0.11, t (221) = -3.17, p= $0.02e^{-01}$; CI= [-0.18, -0.04], β= -0.19), were negative. This indicates that a greater degree of perceived parental autonomy and peers' relatedness reduced academic procrastination (consistent with the negative correlations reported earlier). While for ADHD (*B*= 0.65, t (221) = 3.16, p= $0.02e^{-01}$; CI= [0.24, 1.05], β= 0.19), the coefficients were positive indicating that an ADHD diagnosis predicted increased academic procrastination.

Table 5

Type III Sums of Squares and Significance Tests for Predictors in the Full Regression Model

Variable	*Df*	*Sum of Sq.*	*RSS*	*F-value*	*P-value*
Gender	2	0.69	108.94	0.68	0.51
Mental Illness	1	0.70	108.95	1.38	0.24
ADHD	1	4.91	113.16	9.62	$0.02e^{-01}$ **
RT	1	0.04	108.30	0.09	0.77
ST	1	0.00	108.25	0.01	0.93
AT	1	0.69	108.94	1.36	0.24
RP	1	0.07	108.33	0.15	0.70
AP	1	7.56	115.81	14.81	$0.01e^{-02}$ ***
RPE	1	3.64	111.89	7.12	0.0082 **

Note. RT = Relatedness supportive teaching. ST = Structure supportive teaching. AT = Autonomy supportive teaching. AP = Autonomy supportive parenting. RP = Relatedness supportive parenting. RPE = Relatedness supportive peers.

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

Table 6

Multiple Regression Model Summary

Model	R^2	*Adjusted* R^2	*F*	*df1*	*df2*	*p-value*
1	0.20	0.19	18.86	3	221	$6.28e^{-11}$
2	0.17	0.16	22.4	2	222	$1.38e^{-09}$

Note. Model 1: Yijk = β0 + β1*ADHD diagnosis + β2*autonomy supportive parenting + β3*relatedness supportive peers. Model 2: Yij = β0 + β1*autonomy supportive parenting + β2*relatedness supportive peers.

Table 7

Multiple Regression Parameters

Model	Unstandardized coefficients	Std.Error	t-value	p-value	Standardized coefficients
1					
Intercept	4.23	0.20	20.65	< 2e-16 ***	
ADHD	0.65	0.20	3.16	0.02^{e-01} **	0.19
AP	-0.19	0.04	-5.16	5.48e-07 ***	-0.32
RPE	-0.11	0.04	-3.17	0.02^{e-01} **	-0.19
2					
Intercept	4.29	0.20	20.63	< 2e-16 ***	
AP	-0.20	0.04	-5.42	1.51e-07 ***	-0.34
RPE	-0.10	0.04	-2.80	0.05^{e-01} **	-0.17

Note. AP = Autonomy supportive parenting. RPE = Relatedness supportive peers.

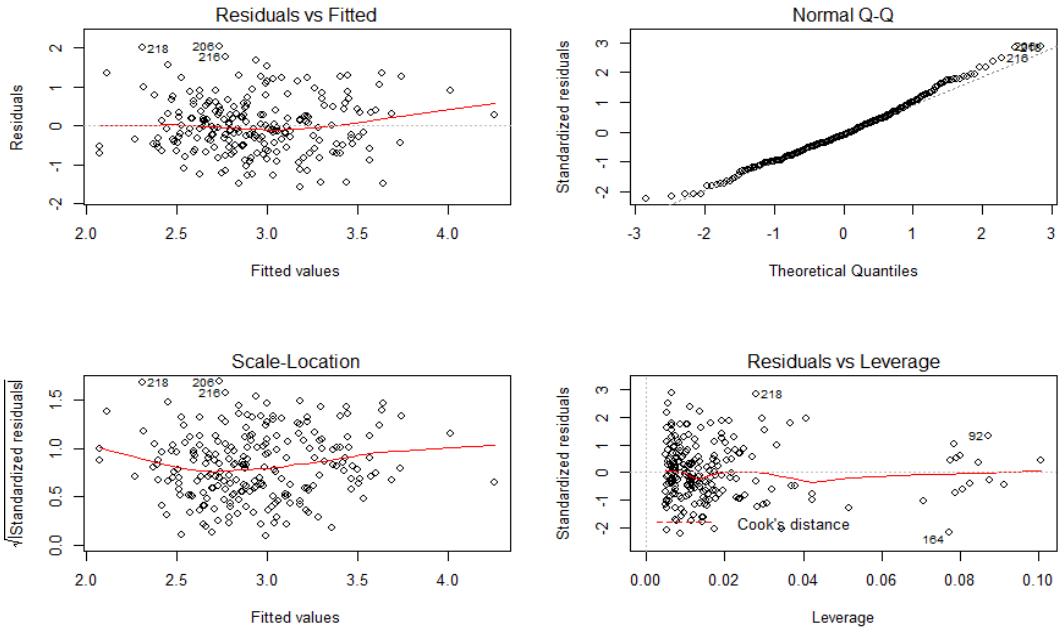
***$p < .001$. **$p < .01$.

The diagnostic plots of the residuals of the best fitting model (Model 1), showed that residuals were evenly distributed about the fitted values (Figure 1a), that

they adhered to the theoretical quantiles (QQ-plot; Figure 1b), and that no significant outliers were present. Therefore, the model met the assumptions of normality, homogeneity of variances, and linearity. A Shapiro-Wilk test on the model residuals was not significant (W=0.99, p=0.07), confirming that the assumption of normality was met. A Breusch-Pagan test on the model residuals was not significant (BP = 2.02, df = 3, p= 0.57), confirming that the assumption of homogeneous variances was met.

Figure 1

Diagnostic plots of the Residuals



Discussion

The aim of this study was to evaluate whether students' perceptions of teachers' support of autonomy, competence and relatedness, parents' support of autonomy and relatedness, and peers' support of relatedness could negatively predict academic procrastination. The results showed that each of these factors was negatively correlated with academic procrastination. However, only perceived parental autonomy and peers' relatedness were necessary to predict academic procrastination. Parental autonomy support and peers' support of relatedness significantly negatively predicted procrastination even after taking into consideration whether the students ever received an ADHD diagnosis (the only significant covariate of all additional variables measured). Perceived relatedness supportive peers and autonomy supportive parenting together explained 16.8% of the variance in academic procrastination, which is substantial considering the different individual and task characteristics that influence academic procrastination.

The finding that each of the needs supportive environments was independently negatively correlated with academic procrastination is consistent with the two previous studies on the topic (Tang et al., 2014; Won & Yu, 2018). This result also corresponds with previous findings in the SDT literature of a positive correlation between needs supportive parenting, peers, and teaching with desirable academic outcomes, and of a negative correlation of the same predictors with undesirable academic outcomes (e.g. King, 2015; Vansteenkiste et al., 2012).

The findings of positive correlations between different needs supportive factors corresponds with findings from previous studies (e.g. Jang et al., 2010; Ratelle et al.,

2005). A parent or teacher who attempts to support one psychological need would be likely to support the other need(s). In addition, it was found here that peers' support of relatedness largely positively correlated with teachers' support of relatedness, which also corresponds with previous work (e.g. Cox et al., 2009). One possible explanation for this correlation is that teachers who support the relatedness of their students create a comfortable and close-knit class environment in which students are more likely to connect. However, in the previous studies, the correlated factors nevertheless had independent influences on academic outcomes, while in this study, there seemed to be an overlap in the influence of the different factors on academic procrastination. There are no clear explanations for this inconsistency between the current results concerning academic procrastination and past results concerning other academic behaviors and outcomes. Further studies addressing the influence between needs supportive environments and academic procrastination will help show whether truly there is an overlap in the influence of the different supportive environmental factors on academic procrastination.

First predictor: Autonomy Supportive Parenting

Parents' support of autonomy significantly negatively predicted academic procrastination, thus showing that parents may have a continued influence on older students' academic behaviors. This result supports the finding of the only study on this topic which showed that autonomy supportive parenting negatively predicted academic procrastination through self-efficacy for self-regulated learning (Won & Yu, 2018). In

addition, previous studies showed that autonomy supportive parenting positively predicted different desirable academic outcomes such as academic engagement and academic achievement that negatively correlate with academic procrastination (Jiang et al., 2011; Ratelle et al., 2005), and it was associated with fewer disruptive behaviors in the classroom (Wong, 2008). Thus, this study supports the notion that parental autonomy support has a positive influence on academic outcomes and behaviors, including decreasing academic procrastination. During the transition from school to college, students are required to be more self-directed and active in their studying. Having parents that allow and support such an autonomy and self-directedness might not only increase the student's tendency to act in a self-directed way but also make the student sense that s/he is trusted to act in such a way and thus feel more competent in being self-directed. This is supported by Won and Yu (2018) who found that self-efficacy for self-regulated learning mediated the relation between autonomy supportive parenting and academic procrastination.

Second predictor: Relatedness Supportive Peers

Having relatedness supportive peers also significantly negatively predicted academic procrastination. This result is the first evidence of a predictive relation between academic procrastination and peers' relatedness, and is consistent with previous reports of a positive predictive relation between peer relatedness and desirable academic outcomes (e.g. Furrer & Skinner, 2003; King, 2015; Mikami et al., 2017).

Relatedness to peers may facilitate engagement in the classroom, thereby increasing the likelihood that students understand the material and the required tasks and decreasing the likelihood of procrastination. Relatedness with peers may also be an important emotional and academic resource outside of the classroom, where most procrastination behaviors take place. Relatedness with classmates or peers may also be an important factor in helping students adjust to the novel college environment. Studies confirm that peers can protect against loneliness and other negative psychological and academic outcomes, such as depression, anxiety, fear of failure, and low academic performance and motivation, that are antecedents of academic procrastination (Diamant & Windholz, 1981; Rahman, Bairagi, Kumar Dey, & Nahar, 2017; Wohn & LaRose, 2014; Steel, 2007).

Needs Supportive Teaching

None of the teaching factors significantly predicted academic procrastination. It should be noted that the scores on the teaching variables were very high, which may reflect a ceiling effect and thus not enough variability in the scores. However, it may be that needs supportive teaching truly does not significantly predict academic procrastination in the presence of the other needs supportive environments. Since no other known studies address the comparative influence of parents, peers, and teachers, on students' academic procrastination in college, there is no explanation in past literature as to why parents and peers may be more influential than teachers on this problem behavior. The most plausible explanation may be that in college there is more

work outside than inside the classroom, so home and peer contexts may have a greater influence on procrastination, especially that decisions about procrastination get updated constantly and thus are most influenced by the direct environment in which the behavior of procrastination is taking place (Steel & Ferrari 2013). This is not to say that the teacher-student relation is completely irrelevant to the students' academic procrastination behaviors outside of the classroom, rather it is likely that students maintain an internal representation of the teachers and think about the way the teacher will receive their task, which can influence their procrastination on it. However, the direct environments provided by peers and parents while working on tasks outside of the classrooms may surpass the influence of the internal representations and projections that the student maintains of the teachers.

The Findings in Light of the SDT Theory

The results of the study support the notion that environments which support the individual's psychological needs allow the person to achieve self-growth, in this case, by protecting against a self-sabotaging behavior (Deci & Ryan, 2000). In addition, the findings show that the support of each of the three needs (autonomy, competence, and relatedness) may protect against self-sabotaging behavior, since each needs supportive factor correlated negatively with academic procrastination. These correlations confirm the importance of supporting any of these three needs to prevent academic procrastination. However, while SDT theory deems that all three needs are equally essential for the promotion of self-growth and to protect against self-sabotaging

behavior (Deci & Ryan, 2000; Gagne & Deci, 2014), this study and previous studies suggest that for certain needs may be more important than others to sustain (or prevent) certain behaviors (e.g. Baskerville, 2008; Furrer & Skinner, 2003; Hospel & Galand, 2015). Here, for example, support of autonomy was more influential than the support of relatedness in the parenting relational context. Similarly, in a study by Furrer and Skinner (2003), it was shown that students who scored high on needs support for all three environmental sources (parents, peers, and teachers) did not significantly differ in academic behavioral engagement (participation in classroom) compared to students who perceived high needs support from two sources, but low support from the third source. Another study by Hospel and Galand (2015), showed that structure supportive teaching is sufficient to explain the variance in academic behavioral engagement, without the need for autonomy supportive teaching. More studies are needed to evaluate the comparative influence of the different needs and needs supportive environments for different outcome behaviors.

This study is one of the first to add academic procrastination to the many academic behaviors and outcomes influenced by needs supportive environments as defined by SDT (e.g. Beck & Diehr, 2017; Mikami et al., 2017; Sierens et al., 2009). Thus, this study highlights the importance of SDT in the understanding of the influence of the school and home environments on academic behaviors, and supports its potential in guiding interventions to improve the educational system and the students' academic experiences and outcomes. Finally, these results further support the relevance of this theory, which is a positive theory of human growth, in investigating and addressing the

opposite side of the coin, from self-sabotaging behaviors, to psychopathology, and possibly criminal behaviors.

Implications

The findings of this study provide evidence for a relationship between college students' academic procrastination and the extent of psychological needs support they receive from their parents and peers. This has implications for both classrooms and university functioning.

The findings indicate that attention should be provided to the student's relationships with classmates or peers, and how accepted and belonging s/he feels with them. Teachers could prioritize relatedness between classmates as one of the class's or course's goals, to try to reduce academic procrastination. This could be done by increasing group work, focusing on cooperative learning, creating common goals in the classroom, and focusing on the learning process rather than just the results, which might decrease competition and encourage more cooperation (Engstrom & Tinto, 2008; Van Ryzin & Roseth, 2018). In addition, teachers might promote peers' relatedness by supporting the students' need for relatedness (such as providing them time outside of class for discussions, and by showing that they care about them). These behaviors are not easy to implement, especially in colleges with large class sizes and heavy curriculums that have to be covered in a short time. However, this study suggests that investing time to create a better classroom environment will likely decrease some of the stress experienced by students and teachers due to procrastination. Although this study

focused on relatedness with classmates, it is likely that relatedness with peers in general, such as college friends and peers from the same major, may protect against academic procrastination. Thus, colleges could focus on creating environments that encourage relatedness between peers, from structuring smaller classrooms (around 20 students) that meet to discuss and work on the material delivered in the large lectures, to the encouragement of clubs, festivals, and other extracurricular activities (Engstrom & Tinto, 2008; Jorgenson, Farrell, Fudge, & Pritchard, 2018).

The findings also indicate the protective influence that parents' support of their children's autonomy has on children's academic procrastination during college, which counters the prevalent belief that parents' influence on academics decreases in older children (Bradley et al., 1988). Previous work has reported positive outcomes from individual and small group autonomy support training for parents conducted in schools (Froiland, 2011, 2015; Allen, Grolnick, & Córdova, 2019). The training in these studies included a psycho-education component on the concept of autonomy support, role-play and modeling exercises in expressing empathy towards children, and helping children find the intrinsic value and personal relevance of the school tasks especially the disliked ones (Froiland, 2011, 2015; Allen et al., 2019). Such training increased students' positive affect and passion towards school work, with generalized effects beyond school-related topics to goal setting in other contexts (Froiland, 2011, 2015). Our results imply that such autonomy supportive training may also be influential in protecting against academic procrastination in college students.

Strengths and Limitations

This study is one of the first to address the influence of needs supportive relations on academic procrastination, and it is the first to simultaneously include all three major relational contexts in a student's life, namely parents, peers, and teachers. The results shed light on new factors that should be considered in the conceptualization and intervention models of academic procrastination. In addition, they may provide an initial starting point for studies on new interventions for academic procrastination that are based on training the environmental actors in a students' life to be needs supportive. Finally, this study adds to the literature on situational academic procrastination, which is scant compared to the literature on trait factors of this problem behavior.

One limitation of this study is that it does not show a causal relation between needs supportive environments and academic procrastination. Rather than lower relatedness in the classroom causing more procrastination, it could be the other way around, with higher procrastination causing disengagement from the classroom and from classmates (Abbasi et al., 2015). Also, it could be that the more students procrastinate, the less their parents trust their ability for self-control and thus the more they enforce parental control.

Second, there was low variability in the students' scores on teachers' needs support, which were high across the different courses and students, thus possibly underestimating the influence of teachers' needs support on academic procrastination. This low variability might be due to the likelihood that most psychology teachers are highly conscious and supportive of their students' psychological needs.

Third, this study measured students' perceptions of needs support and academic procrastination, which may be biased, rather than using objective measures of these variables. This limitation is present in most studies addressing the relation between needs supportive environments and academic outcomes. While the subjective experience of needs support is valuable, for studies to guide procrastination interventions, they should show that the actual needs supportive behaviors from the examined contexts influence academic procrastination. Students' perceptions do not always accurately reflect these needs supportive behaviors. For example, it was shown that, within the same classroom, students who expected to receive a higher grade on the course and who had higher interest in it were more likely to report positive evaluations of the teachers (Boring, Ottoboni, & Stark, 2016; Marsch, 1984). In addition, the accuracy of students' perceptions of peer acceptance and relatedness was shown to vary, with some students having accurate perceptions while other students over-estimated or under-estimated their peers' acceptance (Dunkel, Kistner, & David-Ferdon, 2010; Kistner, David-Ferdon, Repper & Joiner, 2006; Putarek & Kerestes, 2015). In fact, students' perceptions of relatedness with and acceptance from peers is highly dependent on their self-esteem and self-perceptions, and thus can be biased and inaccurate (Dunkel et al., 2010). The most accurate method for studies to evaluate the relation between actual needs supportive behaviors and academic procrastination is through randomized controlled trials of trainings and interventions on needs support.

Fourth, in this study, we did not account for an exhaustive list of the individual characteristics and any of the task characteristics that might interact with the perceived

needs support to influence academic procrastination. To assess the unique effect of needs supportive factors on academic procrastination, the influence of individual characteristics and task characteristics should be controlled or accounted for. For the individual characteristics, the major ones that were not accounted for are the personality characteristics, such as conscientiousness, neuroticism, and self-esteem, and the self-regulatory skills, such as planning complex tasks, ignoring distractions, and emotional containment (e.g. Steel, 2007).The only relevant individual characteristics that were controlled for to an extent, in this study were gender, mental illness, and ADHD diagnosis. It should be noted though that mental illness and ADHD diagnosis, were not fully controlled, rather their measurement was too simplistic ignoring many relevant details such as whether the condition was ever treated in the past or being treated currently. For the task characteristics, the study should have accounted for the average difficulty, clarity, and appeal of the tasks in each given course (e.g. Howell & Watson, 2007).

Future Research

First, future studies should try to generalize this study's findings in different samples of students from different majors.

Second, they should examine the causal effects of needs supportive environments on academic procrastination, especially the effects of relatedness supportive peers and autonomy supportive parenting. This could be tested through intervention studies based on trainings on needs support. For example, studies could

apply a parental intervention that psycho-educates and trains parents on autonomy-supportive parenting, then compare the difference between students' baseline and post-intervention academic procrastination levels. The addition of a control group to such studies increases their robustness, so studies can compare the change in procrastination levels from baseline to post-intervention between the control and intervention groups. If it was found that procrastination levels decreased significantly from baseline to post-intervention in the experimental group but not in the control group, it would indicate that interventions that train parents on autonomy supportive parenting can decrease academic procrastination.

Third, studies should examine the interplay between needs supportive environments, individual factors, and task characteristics on academic procrastination. For example, it could be that needs supportive environments influence academic procrastination only in students with moderate trait procrastination but not those with high or low trait procrastination. It could also be that academic procrastination in certain types of students is most influenced by their parents, while for other types of students, peers or teachers are the most influential. For the task characteristics, it could be that needs supportive environments are not influential on procrastination in enjoyable and easy tasks, rather the more difficult the task is the more influential the needs supportive environments are.

Conclusion

The results of the study showed that each student-reported needs supportive factor (autonomy and relatedness supportive parenting, autonomy, structure, and relatedness supportive teaching, and relatedness supportive peers) negatively correlated with academic procrastination. Such a finding implies the relevance of needs supportive environments, and environmental factors, in general, to academic procrastination. The study also showed that when all the factors examined were simultaneously considered, autonomy supportive parenting and relatedness supportive peers negatively predicted academic procrastination. These two needs supportive factors explained 16.8% of the variance in academic procrastination. These results imply that schools and teachers may benefit from fostering an environment that promotes peers' relatedness, for example through collaborative group learning, small practice classes, providing club and extracurricular activities, and other. They also imply the need for educating parents on the importance of supporting their students' autonomy.

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Appendix A

Demographic questionnaire

Instructions: Please answer the following questions from the drop-down options.

1-What is your gender?

a. Female

b. Male

c. Other

2-What is your nationality?

3-How old are you?

4-In what year at AUB are you?

a. Sophomore

b. Junior

c. Senior

d. 1st year master's degree

e. 2nd year master's degree

f. 3rd year master's degree

g. 4th year master's degree

5-What is your major?

6-Have you ever been diagnosed with a mental disorder?

a. Yes

b. No

7-Have you ever been diagnosed with ADHD?

a. Yes

b. No

Appendix B

The Teacher as a Social Context Questionnaire (TASCQ) Student Report-Short Form

Instructions: How much each of the following statements applies to your (name of the course) teacher?

A) Not at all true B) Not very true C) Sort of true D) Very true

Teacher Involvement:

Affection

1. My teacher likes me.
2. My teacher really cares about me.

Attunement

3. My teacher knows me well.
4. My teacher just doesn't understand me.

Dedication of Resources

5. My teacher spends time with me.
6. My teacher talks with me.

Dependability

7. I can't depend on my teacher for important things.
8. I can't count on my teacher when I need him/her.

Teacher Provision of Structure:

Contingency

9. Every time I do something wrong, my teacher acts differently.

10. My teacher keeps changing how s/he acts towards me.

Expectations

11. My teacher doesn't make it clear what s/he expects of me in class.

12. My teacher doesn't tell me what s/he expects of me in the course.

Help/Support

13. My teacher shows me how to solve problems for myself.

14. If I can't solve a problem, teacher shows me different ways to try to.

Adjustment/Monitoring

15. My teacher makes sure I understand before s/he goes on.

16. My teacher checks to see if I'm ready before s/he starts a new topic.

Teacher Provision of Autonomy Support:

Choice

17. My teacher gives me a lot of choices about how I do my course work.

18. My teacher doesn't give me much choice about how I do my course work.

Control

19. My teacher is always getting on my case about course work.

20. It seems like my teacher is always telling me what to do.

Respect

21. My teacher listens to my ideas.

22. My teacher doesn't listen to my opinion.

Relevance

23. My teacher talks about how I can use, in life or in my college career, the things we learn in the course.

24. My teacher doesn't explain why the course is important to me.

Appendix C:

The Teacher as a Social Context Questionnaire
Teacher Report- Long Form

Instructions: How much each of the following statements applies to your perceptions of, feelings towards, and behaviors with the students in the (name of the course) course?

A) Not at all true B) Not very true C) Sort of true D) Very true

Involvement:

Affection

1. These students are easy to like.

2. I enjoy the time I spend with these students.

3. These students are difficult to like.

4. Teaching these students isn't very enjoyable for me.

Attunement

5. I mostly know a lot about what goes on for these students.

6. I mostly know these students well.

7. I don't understand these students very well.

8. I don't know very much about what goes on for these students outside of school.

Dedication of Resources

9. When needed, I spend time with these students even outside of course time and office hours.

10. When needed, I talk with these students even outside of course time and office hours.

Dependability (4 items)

11. When these students do not do as well as they can, I generally can make time to help them find ways to do better.

12. These students can count on me to be there for them.

13. Sometimes I feel like I can't be there for these students when they need me.

14. I can't always be available to these students.

Structure:

Contingency

15. When I discipline these students, I always explain why.

16. I let these students get away with things I normally wouldn't allow.

17. I find it hard to be consistent with these students.

18. I don't always have time to follow through with these students.

Expectations

19. I talk with these students about my expectations for them.

20. I try to be clear with these students about what I expect of them in class.

21. I change the rules about course work for these students.

22. Sometimes I feel I don't make my expectations clear to these students.

Monitoring - Adjustment

23. When these students don't comprehend the material, I take a different approach.

24. When these students don't understand something, I explain it in a lot of different ways.

25. I can't tell when these students are keeping up with me.

26. It's hard to know when these students are ready to go on to new material.

Help/Support

27. I show these students different ways to solve problems.

28. I find it difficult to tell when these student need help.

29. I find it hard to teach these students in a way they can understand.

Autonomy Support:

Choice

30. I try to give these students a lot of choices about classroom assignments.

31. My general approach with these students is to give them as few choices as possible.

32. It's better not to give too many choices to these students.

Autonomy

33. I have to lead these students through their course work step by step.

34. When it comes to assignments, I'm always having to tell these students what to do.

35. I find myself telling these students every step to make when it comes to course work.

36. I let these students make a lot of their own decisions regarding course work.

37. I can't let these students do things their own way.

38. I can't afford to let these students decide too many things about course work for themselves.

Relevance

39. I explain to these students why we learn certain things in this course.

40. I encourage these students to think about how course work can be useful to them.

41. It is difficult to explain to these students why what we do in this course is important.

Appendix D:

Perceptions of parents scale (POPS)
The College-Student Scale

Instructions: How much each of the following statements applies to your parent(s)? A parent is any legal guardian.

1 2 3 4 5 6 7

Not at all true somewhat true very true

1. My parent(s) seems to know how I feel about things.

2. My parent(s) tries to tell me how to run my life.

3. My parent(s) finds time to talk with me.

4. My parent(s) accepts me and likes me as I am.

5. My parent(s), whenever possible, allows me to choose what to do.

6. My parent(s) doesn't seem to think of me often.

7. My parent(s) clearly conveys his/her love for me.

8. My parent(s) listens to my opinion or perspective when I've got a problem.

9. My parent(s) spends a lot of time with me.

10. My parent(s) makes me feel very special.

11. My parent(s) allows me to decide things for myself.

12. My parent(s) often seems too busy to attend to me.

13. My parent(s) is often disapproving and unaccepting of me.

14. My parent(s) insists upon my doing things his/her way.

15. My parent(s) is not very involved with my concerns.

16. My parent(s) is typically happy to see me.

17. My parent(s) is usually willing to consider things from my point of view.

18. My parent(s) puts time and energy into helping me.

19. My parent(s) helps me to choose my own direction.

20. My parent(s) seems to be disappointed in me a lot.

21. My parent(s) isn't very sensitive to many of my needs.

Appendix E:

The Need for Relatedness Scale (NRS-10)

Instructions: In your relationship with your (name of the course) classmates, you feel…

1	2	3	4	5	6	7
Do not agree	Very Slightly agree	Slightly agree	Moderately agree	Agree	Strongly agree	Very Strongly agree

1. ... supported.
2. ... close to them.
3. ... understood.
4. ... attached to them.
5. ... listened to.
6. ... bonded to them.
7. ... valued.
8. ... close-knit.
9. ... safe.
10. ... as a friend.

Appendix F:

Academic Procrastination State Inventory

Instructions: How frequently, in the last week, did you engage in the following behaviors and thoughts while studying for the (name of the course) course?

1 = never; 2 = incidentally; 3 = sometimes; 4 = most of the time; 5 = always

1. Drifted off into daydreams while studying.
2. Studied what you had planned to study.
3. Had no energy to study.
4. Prepared to study at some point of time but did not get any further.
5. Gave up when studying was not going well.
6. Gave up studying early in order to do more pleasant things.
7. Put off the completion of the studying task.
8. Allowed yourself to be distracted from your studying.
9. Experienced concentration problems when studying.
10. Interrupted studying for a while in order to do other things.
11. Forgot to prepare things for studying.
12. Did so many other things that there was insufficient time left for studying.
13. Thought that you had enough time left, so that there was really no need to start studying.