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Academic procrastination and academic performance: Do learning disabilities matter?

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Abstract
The growing number of students with learning disabilities (LD) in higher education increases the need to understand and address the factors that affect their academic performance. One of these factors is academic procrastination, which affects over 70% of college students, including students with LD. The present study examined the relationship between academic procrastination and academic performance, and the moderating role of LD in this relationship. Findings showed a negative effect of academic procrastination on GPA, and more strongly for students with LD, indicating that a high-level of procrastination might be more harmful for these students' academic performance. These initial findings contribute to the body of knowledge concerning students with LD in higher education. They emphasize the need to support students with LD in a manner that will address the specific difficulties that may lead to higher rates of procrastination and subsequently lower academic achievement.

Keywords Learning disabilities · GPA · Academic procrastination

The reasons why people tend to procrastinate on their everyday tasks has been researched heavily in the last decades. Several different theoretical frameworks were suggested to explain this intention-action gap, including personality, motivational, clinical and situational aspects (Steel and Klingsieck 2016). Despite the conceptual diversity, most researchers agree that procrastination is associated with discomfort (e.g., anxiety, self-regulation failure, low self-efficacy), is a maladaptive behavior with a variety of negative outcomes, and should be addressed (Mann 2016). Procrastination was most often studied in young college students, indicating that academic procrastination has an overall negative effect on students' academic performance (Goroshit 2018; Steel 2007). However, findings have been inconsistent, suggesting that some psychological or contextual variables such as goal orientation (Stewart et al. 2016), time management (Häfner et al. 2014), time perspective (Sirois 2014a) and self-efficacy (Steel 2007) are playing a moderating role in this relationship (Kim and Seo 2015). The growing number of students with learning disabilities (LD) in higher education, their unique academic difficulties and the small number of studies on procrastination in students with LD (Andreassen et al. 2017; Hen 2018) was the basis for the present study. The aim of this study was to examine how academic procrastination affects academic performance in general and more specifically in students with LD.

Academic Procrastination

Academic procrastination is considered a specific type of behavioral procrastination. It refers to the tendency to voluntarily delay an intended course of study-related action despite the inevitable negative consequences of such a delay (Steel and Klingsieck 2016). This type of procrastination affects over 70% of college students and is reportedly associated with unsatisfactory academic performance and higher levels of stress and anxiety (Steel 2007; Kim and Seo 2015; Krause and Freund 2014a, b). It is often conceptualized as 1) a behavioral pattern to avoid difficult or anxiety-evoking tasks (Eckert et al. 2016), 2) a motivational issue that reflects individual differences in general values (Grund and Fries 2018), 3) a time management problem (Wolters et al. 2017) or 4) a metacognitive self-regulation failure (Fernie et al. 2017). This maladaptive behavior has been found to be associated with a range of personal characteristics such as perfectionism, fear of failure, low self-efficacy, low self-regulation and behavioral rigidity, as well as motivational aspects such as goal orientation and situational aspects such as class climate and task

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difficulty (Corkin et al. 2014; Dunn 2014; Glick et al. 2014; Grunschel et al. 2013; Katz et al. 2014; Malatincová 2015).

The consequences of procrastination often include negative affective, mental, and behavioral aspects such as unstable health, poor self-image, poor social impression, stress, and professional inconsistency (Klingsieck et al. 2012; Levy and Ramim 2012; Sirois 2014b). More precisely, for many students academic procrastination is strongly associated with dysfunctional learning outcomes such as low academic performance, low quality of academic work, lack of knowledge, time pressure, dropout and lengthened course of study (Ferrari 2010; Grunschel et al. 2013; Rice et al. 2012). Michinov et al. (2011), who studied academic procrastination in online environments, found that high-level academic procrastinators were less successful online learners than low-level procrastinators and that high-level procrastinators found it more difficult to (re)start studying online while not on-campus. Klassen et al. (2008b) found that high-level procrastinators reported lower GPAs, expected and received lower class grades, spent more hours procrastinating each day, took longer to begin important assignments, and expressed less confidence that they were capable of regulating their own learning. Although high-level procrastinators fared more poorly than low-level procrastinators, they did experience a degree of success in the university setting (Klassen et al. 2008a).

Findings of a recent meta-analysis that examined the effect of academic procrastination on academic achievement indicated that, in general, procrastination is associated with lower academic achievement. However, this relationship is inconsistent, and seems to be influenced by psychological moderators, or by students' characteristics (Kim and Seo 2015). For example Balkis et al. (2013) reported that time preference to study for exams mediated the relationship between academic procrastination and achievement, while Rabin et al. (2011) showed that high academic procrastinators with low executive functioning, are impulsive and display a low level of persistence, which predicts low academic performance. Furthermore, Visser et al. (2018) found in their interview study that average and high procrastinators had more difficulties than low procrastinators in getting started and engaging in study-related activities, and in reacting to failure; they also reported lower levels of academic achievement. Similarly, Balkis (2013) reported that the relationship between academic procrastination and academic performance was mediated and moderated by academic efficacy, suggesting that procrastinators with low academic efficacy were lower academic achievers. Other studies reported that test anxiety, statistics anxiety, low self-confidence, low academic strategies, low meta-cognitive strategies and fear of failure were also associated with both academic procrastination and academic performance (Kitsantas and Zimmerman 2009; Klassen et al. 2009; Odaci 2011; Onwuegbuzie 2004; Yerdelen et al. 2016).

Interestingly, although many of the above mentioned variables characterize the experience of students with learning disabilities (LD) in higher education (Baird et al. 2009), there has been a dearth of studies that examined academic procrastination in LD students (Hen and Goroshit 2014). Taking into consideration the growing number of students with LD in higher education and their unique experiences and difficulties, the aim of the present study was to contribute to the overall understanding of this problem.

Students with Learning Disabilities in Higher Education

LD is a developmental disorder that usually emerges during childhood and lasts into adulthood (Boardman et al. 2016). It is defined most accurately as "unexpected, significant difficulties in academic achievement and related areas of learning and behavior in individuals who have not responded to high-quality instruction, and for whom struggle cannot be attributed to medical, educational, environmental, or psychiatric causes" (Cortiella and Horowitz 2014, pp. 3). The precise reasons for this condition are still unclear; however, neurological differences in brain structure and function seem to affect a person's ability to receive, store, process, retrieve, and communicate information (Cortiella and Horowitz 2014). Some people never discover that learning disabilities are responsible for their lifelong learning difficulties, and others are not identified as having LD until they are adults (Sparks and Lovett 2014). Many individuals with LD suffer from low self-esteem, low self-efficacy, set low expectations for themselves, struggle with underachievement, and have few friends (Andreassen et al. 2017; Reed et al. 2009). Legislative changes and the increase of provisions and support have made post-secondary education more affordable and attractive for students with LD (Sparks and Lovett 2014).

In recent years, a growing number of students with LD have enrolled in institutions of higher education; however, the research concerning their unique academic needs and difficulties is still in its initial stages (Sparks and Lovett 2009, 2014). Often, students with LD in higher education are not prepared for the level of diligence, self-control, self-evaluation, decision-making, and goal-setting that is required to succeed in higher education, and they are overwhelmed by the academic demands (Klassen et al. 2013; Trainin and Swanson 2005). Recent studies indicate that students with LD experience high-levels of stress, anxiety, and loneliness, as well as low levels of self-regulation and self-efficacy. They also use more emotional coping strategies and fewer standard learning strategies than other students (Reed et al. 2009, 2011; Troiano et al. 2010). Research on academic procrastination in students with LD suggests that these students report significantly higher levels of academic procrastination coupled with lower levels of metacognitive self-regulation, self-efficacy for self-

regulation and emotional intelligence (Hen and Goroshit 2014; Klassen et al. 2008b, 2013).

While the literature suggests a generally negative association between academic procrastination and academic achievement, it is unclear how LD moderates this relationship. Consistent with the above literature, and the fact that students with LD suffer from a wide range of social and academic difficulties in higher education, we hypothesized that (1) academic procrastination would have a negative effect on GPA and (2) LD would strengthen this effect, meaning that LD students with higher levels of procrastination would present lower academic performance.

Methods

Participants

For this study, a sample of undergraduate students who studied social sciences at an academic college located in northern Israel, was recruited. The total sample and each sub-sample (students with and without LD) are based on the minimum criteria established by Rosenberg et al. (1992). There were 508 participants in this study: 175 students (34%) with LD and 333 students (66%) without LD. Approximately 86% of the sample were females, with ages ranging from 19 to 58 ($M = 25.44$, $SD = 4.19$), and GPAs ranging from 70 to 97 ($M = 88.29$, $SD = 4.19$). Within the LD-group, approximately 88% were females with ages ranging from 20 to 45 ($M = 25.11$, $SD = 2.91$) and GPAs ranging from 70 to 97 ($M = 86.61$, $SD = 5.86$). Within the non-LD group, approximately 86% were females with ages ranging from 19 to 58 ($M = 25.66$, $SD = 4.19$) and GPAs ranging from 78 to 97 ($M = 89.27$, $SD = 4.05$). For a detailed description of the total sample and of the sub-samples, as well as for the comparison between the two sub-samples regarding main demographic variables, please see Table 1.

Measures

Academic procrastination was measured by the Academic Procrastination Scale - Student Form (APS-SF; Milgram et al. 1998). This scale includes items related to three academic assignment categories: (a) homework (e.g., "I put off doing my homework until the last minute", (b) examination (e.g., "I daydream when I have to study for a test." and (c) papers (e.g., "When I have to sit and write a paper, I put it off again and again"). Each category consists of seven items measured on a 4-point scale (from 1, *hardly ever* to 4, *almost always*). This scale was previously used for middle school and high school students (Milgram and Amir 1998), as well as college students and their parents (Milgram et al. 1998). Recently, it was used for LD and non-LD college students (Hen and Goroshit 2014) and revealed high internal consistency ($\alpha \geq .90$) and good construct validity. Based on the authors previous study (Hen and Goroshit 2014) and according to the literature (Babakus and Mangold 1992) the questionnaire scale consisted a 5-point scale (from 1, *hardly ever* to 5, *almost always*) ($\alpha = .85$) and a composite score for all the items was created. The modification of the original scale from 4- to 5-points relied on current practice in which most of Likert-type rating scales contain either five or seven response categories (Bearden et al. 1993). The literature suggests that a five-point scale appears to be less confusing and to increase response rate (Babakus and Mangold 1992), is readily comprehensible to respondents and enables them to express their views (Marton-Williams 1986).

A measurement of GPA was based on a self-report question: "What was your grade point average last semester?" To evaluate the quality of a self-reported GPA, the mean GPAs from the current samples (between 87 and 88) were compared to the mean GPA of social work, education and psychology students provided by the college authorities ($M = 86$). The self-reported GPA is slightly higher than the official one, but the difference is small and insignificant, and it still allows consideration of the self-reported GPA as a reliable measure.

Learning disabilities were measured by self-report questions. Students were asked to report whether they have any confirmed learning disabilities, and whether they belong to the college LD support center. [Only students who are diagnosed with learning disabilities are eligible to receive support.] Therefore, students who replied "yes" on both questions were classified as LD students.

Demographic variables included in this study were gender, age, academic major, and year of study. To assess the vulnerability of the results to the possibility of spurious associations and in line with previous research on study behavior (e.g., Eggens et al. 2008; Nonis and Hudson 2006; Onji and Kikuchi 2011), they were entered into the analyses as control variables.

Procedure

An online questionnaire was designed using Qualtrics software (www.qualtrics.com). At the beginning of the second semester of an academic year 2014–2015 (spring semester), a web link to the survey was sent via e-mail to the students who were enrolled in one of our courses taught at the time of data collection. The participants were asked to sign a consent form prior to completing the questionnaires. The form included assurance that participation in the study was anonymous, that the data would be kept confidential, and that it would be used for the purpose of the current research only. It was also explained that they were allowed to discontinue their participation in the study at any stage. We offered no incentive for participation. After signing the consent form, the students received the questionnaire asking them about their academic performance in the first semester of academic year 2014–

Table 1 Descriptive statistics of participants in total sample and in sub-samples (students without learning disorders and students with learning disorders)

		Total		Students without LD		Students with LD		Difference between groups
		N	%	*N*	%	*N*	%	
		508	100	333	65.6	175	34.4	
Gender	Female	441	86.1	291	87.7	145	83.3	$\chi^2_{(1)} = 1.79$; $p = .18$
	Male	71	13.9	41	12.3	29	16.7	
Major	Education	223	43.4	134	40.2	86	49.1	$\chi^2_{(2)} = 17.77$; $p < .001$
	Social work	204	39.7	125	37.5	76	43.4	
	Psychology	87	16.9	74	22.2	13	7.4	
Year of study	First	196	38.1	122	36.6	72	41.1	$\chi^2_{(2)} = 1.81$; $p = .40$
	Second	199	38.7	128	38.4	68	38.9	
	Third	119	23.2	83	24.9	35	20.0	
		M	SD	M	SD	M	SD	
Age		25.44	4.19	25.66	4.73	25.11	2.91	$t_{(506)} = 1.42$; $p = .16$
GPA		88.29	4.19	89.27	4.05	86.61	5.86	$t_{(506)} = 5.64$; $p < .001$

2015 (autumn semester) and about their GPA in this particular semester. The study was approved by the IRB of Psychology department (IRB number 5A).

Results

In the first step of the analysis, Pearson correlations were calculated among the research variables (see Table 2). The results indicated that students with LD had lower GPA and higher academic procrastination scores compared to students without LD. Academic procrastination and GPA correlated negatively. Control variables are only weakly associated with the research variables.

In the second step of the analysis, a moderation analysis using SPSS Macro PROCESS was performed (Hayes 2013; Model 1). In this analysis, academic procrastination was an independent variable (*X*), LD was a moderator (*M*) and GPA was a dependent variable (*Y*). Testing of the moderation model revealed that adding an interaction term between learning disabilities and academic procrastination contributed 3% to the explained variance of GPA (see Table 3). This contribution was statistically significant. However, it is important to note that the significance of the interaction term indicates whether the slopes of the plotted lines differ significantly as a function of learning disabilities. The interaction term does not indicate whether the slopes of the lines differ significantly from each other.

To test the significance of the difference between the simple slopes, a simple slope for each category of the moderator was calculated (students with LD and students without LD) using the PROCESS (see Table 4). Afterwards, to test the difference between the slopes the following formula was used:

$$t = \frac{b_1 - b_2}{\sqrt{S_{b_1}^2 + S_{b_2}^2}}, df = n_1 + n_2 - 4$$

Here, *b1* and *b2* are the slopes of lines 1 and 2, *sb1* and *sb1* and *sb2* are the standard errors for lines 1 and 2, and *n1 and n2* are the sample sizes for lines 1 and 2. To gain a better

Table 2 Pearson correlations between the research variables ($N = 508$)

		1	2	3	4	5	6	7
1	Learning disorders (1 = students with LD)	–						
2	GPA	−.26***	–					
3	AP	.29***	−.39***	–				
4	gender	−.06	.03	−.07	–			
5	age	−.06	.08	.00	−.05	–		
6	year	−.06	−.01	.02	.13**	.18***	–	
7	Social work vs. Education	−.19**	.07	−.09	−.19**	−.14*	−.31***	–
8	Psychology vs. Education	.06	−.04	.07	−.10*	.02	−.14**	−.36***

AP academic procrastination

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

Table 3 Multiple linear regressions for the effect of AP, LD and the interaction between them on GPA

	Model 1 – Main effects[a]		Model 2 – Main effects + interaction between LD and AP[b]	
	Coeff. (SE)	*p*	*Coeff.(SE)*	*p*
AP (*X*)	−2.51 (0.31)	<.001	−2.39 (0.30)	<.001
LD (*M,* 1 = students with LD)	−1.64 (0.48)	<.01	−1.37 (0.47)	<.01
LD x AP			−2.74 (0.62)	<.001
Controls				
Gender	−0.12 (0.65)	.86	−0.09 (0.64)	.88
Age	0.05 (0.05)	.28	0.06 (0.05)	.21
Year of study	−0.27 (0.31)	.39	−0.40 (0.30)	.20
Social work vs. Education	−0.14 (0.75)	.85	−0.06 (0.74)	.94

AP academic procrastination

[a] $R^2 = .20$; $p < .001$

[b] $R^2 = .23$; $\Delta R^2 = .03$, $p(\Delta R^2) < .001$

understanding of the meaning of the interaction effects, the conditional effects of academic procrastination given LD were plotted (see Fig. 1). The analysis of simple slopes showed that at the lower levels of academic procrastination, there were no differences in GPA between students with LD and students without LD, while at the higher levels of academic procrastination, students with LD showed lower GPA scores.

Discussion

The growing number of students with LD in higher education, and the difficulties they encounter, increase the need to explore and address their unique learning processes (Klassen et al. 2013; Sparks and Lovett 2009). The present study was an initial attempt to learn more about the association between academic procrastination and academic achievement in LD students. It was hypothesized that procrastination would have a negative effect on students' academic achievements and that this effect would be stronger for students with LD.

Table 4 Conditional effects of AP on GPA for students with LD and students without LD

LD	*Coeff. (SE)*	*p*
Students with LD	−4.14 (0.47)	<.001
Students without LD	−1.40 (0.39)	<.001

In agreement with the literature (Kim and Seo 2015; Steel 2007), and as we had hypothesized, findings in the present study revealed that academic procrastination has a significant general negative effect on academic achievement, and that LD moderates this effect, so that the negative effect is stronger for LD students.

These effects may reflect the elevated stress and anxiety that LD students report in higher education (Reed et al. 2011), or perhaps the self- reported low academic self-efficacy (Hen and Goroshit 2014) and low academic self-regulation (Klassen et al. 2008a). It may also express the low-level meta-cognitive strategies and poor learning abilities that students with LD present in higher education (Andreassen et al. 2017) as well as the loneliness they reportedly experience (Baird et al. 2009).

Another explanation for this effect may be that while students without LD procrastinate for many different reasons, including strategic and adjustable reasons that do not necessarily affect their academic achievements (Ferrari 2010; Schraw et al. 2007), students with LD procrastinate mostly as a way to avoid academic difficulties and fears (Klassen et al. 2008b). Sirois and Pychyl (2013), suggested that some people tend to procrastinate as a mood-regulation strategy of the present self at the expense of the future self. For example, maybe the tendency of students with LD to procrastinate and avoid the difficulty of dealing or completing academic tasks further increases negative feelings, decreasing the future sense of self-efficacy and the ability to self-regulate negative feelings, in turn resulting in poorer academic performance (Klassen et al. 2013; Troiano et al. 2010).

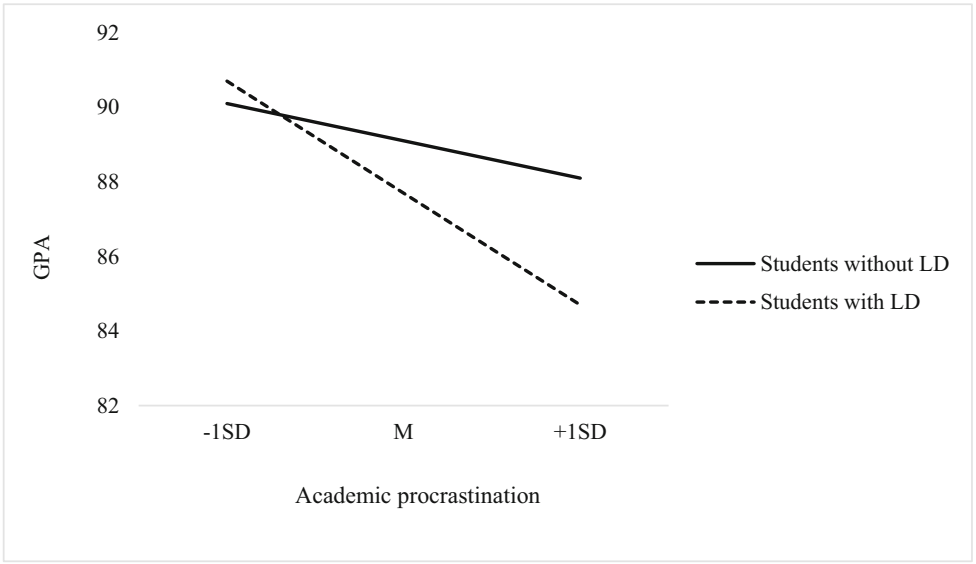

Fig. 1 Simple slopes of AP on GPA for students with LD and students without LD

Note: AP-academic procrastination

It may also be that students without LD procrastinate only on some assignments and are able to compensate their overall achievement by performing well on other assignments. Students with LD, on the other hand, tend to procrastinate and perform poorly on most academic tasks and find it difficult to compensate by doing well on other tasks (Klassen et al. 2013).

Overall while it seems that academic procrastination has an adverse effect for all students (Ferrari 2010), it is even more so for students with LD, as shown in our study. This may imply that students with LD who procrastinate are more at-risk to be underachievers and to perform poorly.

Finally, since this research is an initial study that examined the general picture of procrastination and academic performance in students with LD in Israel, further studies are needed to better interpret these results and understand how they can help us prevent high-levels of academic procrastination in LD students. In general Israeli society is embedded in the Western cultures; however, it may be important to note that college students in Israel are often older than their colleagues in other countries due to a mandatory army service of three years (18–21), and that the Israeli GPA system is more sensitive to variations because it ranges from 1 to 100 and not 1–4, as in many other countries. In addition, it might be that the Israeli LD diagnostic criteria is somewhat different, expressing the basic difference between the English and Hebrew languages, and this may somewhat affect the generalization of the results.

Limitations, Implications, and Future Research

Some limitations of the current research should be noted. First, the study design was cross-sectional, relying exclusively on self-reports. This type of study does not allow us to draw conclusions about causal relationships between variables. Second, the sample included primarily females in the social-science faculties, which might limit the ability to make inferences about the differences between students with LD and students without LD in the general student population. Third, students were classified as with or without LD by asking them if they were diagnosed with LD and if they had attended the support center for LD in the college. This may have limited our classification process, resulting in a very heterogeneous group of students who have the characteristics of LD, were recognized by the college support center, and are receiving emotional and academic support. Another limitation may be the sole reliance on self-reported GPA scores. Kim and Seo (2015) found that specific course achievements might be more affected by academic procrastination. However, we wanted to examine a general tendency, and therefore measured the general performance of students. Although participation in the research was anonymous, some degree of social desirability could have been involved and could have led to biased responses on the questionnaires.

The results of our study suggest that people who work with students with LD in higher education, especially in support centers for students with LD should be aware of the negative outcomes of academic procrastination for these students and explore effective ways to support them. While the literature does not identify specific ways to help students with LD reduce academic procrastination; it does indicate ways to help students to overcome or reduce these tendencies (Zacks and Hen 2018). Studies show that both setting academic environments that enhance academic self-regulation such as: time management, goal-setting, and implementation intentions (Goroshit 2018; Häfner et al. 2014; Krause and Freund 2014b; Owens et al. 2008) and referring students to emotional regulation interventions such as self-determination strategies

and self-forgiveness, maybe very useful and effective (Pychyl and Flett 2012). The combination of learning in accommodated academic environments and developing emotional self-regulation strategies may help students with LD to reduce academic procrastination and preserve their future selves (Sirois and Pychyl 2013). Further interview and longitudinal studies are needed in order to understand in depth the specific reasons for procrastination in students with LD in higher education, the dynamics that underlie their behavior, and intervention studies to explore academic as well as emotional ways to prevent and address procrastination in students with LD.

Compliance with Ethical Standards

Conflict of Interest All the authors declare that they have no conflict of interest in pursuing this publication.

Human and Animal Rights and Informed Consent This article does not contain any studies or experiments with animals.

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

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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