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Pilot study of a Web-based acceptance and commitment therapy intervention for university students to reduce academic procrastination

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ABSTRACT

Objective: This pilot study pursued two aims. The first was to investigate the feasibility and acceptability of a Web-based acceptance and commitment therapy (ACT) intervention to reduce academic procrastination among university students. The second aim was to test the effectiveness of the intervention on procrastination and committed actions.

Participants: The sample was comprised of Canadian university students ($n = 36$) that participated in the intervention between September 2016 and April 2017.

Methods: The study relied on a prepost research design.

Results: The intervention appears feasible, acceptable, and valuable to students. A significant reduction in procrastination and a significant improvement in committed actions were found between pre and postintervention. The effect sizes for these results were medium.

Conclusions: Results provide preliminary support for the feasibility and effectiveness of a Web-based ACT intervention for academic procrastination. Results also highlight some aspects that need to be improved for further development.

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Academic procrastination; acceptance and commitment therapy; committed action; prevention; Web-based intervention

Academic procrastination is defined as the voluntary delay of an intended course of study-related action despite expecting negative consequences that outweigh the positive consequences of the delay.^{1,2} Procrastination is seen as a regulation strategy where short-term mood repair takes priority over long-term goals,³ and is associated with greater impulsive behaviors.⁴ Prevalence of academic procrastination varies from 70% to 95%; with 50% of students admitting procrastinating consistently and problematically.⁵ Academic procrastination negatively affects students' academic achievement and their subjective well-being.² Moreover, procrastination has been shown to lead to lower grades,⁶ to health-related problems such as stress, sleep-related troubles, exhaustion and illness, and to affective consequences including anxiety, anger, shame, dissatisfaction, and feeling of guilt.^{4,7}

Given the ubiquity of academic procrastination and its detrimental effects on the performance, health, and quality of life of college and university students, effective and efficient interventions should be available to prevent and reduce academic procrastination within colleges and universities. However, few well-supported psychosocial interventions are accessible in

postsecondary institutions,⁸ and many students who would benefit from these interventions never seek help from a professional.⁵ Moreover, standard face-to-face intervention often involves large resource commitments both for the provider and the participant.⁹ Examples of resource commitments would be higher delivery costs, the need to hire and form staff to deliver the intervention, and the costs generated to travel to the intervention site. Hence, it is essential to find new and creative ways to reach out to students dealing with academic procrastination and help them engage more actively in their studies and ultimately attain their academic and professional goals.

Low-intensity intervention methods such as Web-based self-help interventions are a cost-effective way to deliver an intervention and have the potential to reach a greater number of people without the need for extra financial and human resources.⁹ Past research has found support for the effectiveness of Web-based interventions for several conditions including depression, social anxiety, panic disorder, and for different populations such as university students and the general population.¹⁰ Recently, Web-based interventions for procrastination using a traditional

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cognitive behavioral approach (CBT; eg, disputing thoughts, goal-setting, self-assertiveness) have been tested with results supporting their effectiveness to reduce procrastination in the general population up to 1 year after the treatment.^{8,11}

Acceptance and commitment therapy (ACT),¹² which is part of the family of cognitive and behavioral therapies, has recently emerged as a new and promising approach to the treatment and prevention of academic procrastination. ACT uses a combination of acceptance, mindfulness, value clarification, and traditional behavior change methods to enhance psychological flexibility. From an ACT perspective, psychological flexibility is defined as the ability to be in the present moment, to change, and to persist in behaviors consistent with one's values, even in the occurrence of unpleasant thoughts, feelings, and emotions.¹²

ACT offers a novel way of conceptualizing academic procrastination as the result of at least four explanatory factors: (1) a tendency to avoid uncomfortable emotions or states (eg, stress, performance anxiety, boredom) associated with study-related tasks; (2) a difficulty in identifying academic values and setting short- and long-term goals; (3) a presence of negative thoughts related to the task and a tendency to find excuses (reason-giving) to delay the work; and (4) a difficulty to focus on the present moment.^{13,14}

Past research has revealed that procrastination was related to higher levels of psychological inflexibility,¹⁵ and low levels of committed action.¹⁶ Moreover, committed action was found to add incremental variance in the prediction of academic procrastination over and above variables such as psychological distress and psychological inflexibility.¹⁶ Committed action is one of the core processes of ACT and psychological flexibility and is defined as flexible persistence in actions that are in harmony with one's values even in the presence of psychological obstacles.¹² Within the ACT framework, committed action is conceptualized as the opposite of impulsive behaviors.¹²

Research studying the effectiveness of ACT-based interventions for academic procrastination has shown that this type of intervention significantly reduces students' tendency to delay academic tasks and enhance their psychological flexibility.¹³ Furthermore, compared to a CBT intervention, at a 3-months follow-up ACT had a better long-term effect on the reduction of procrastinatory behaviors.¹⁷ These results support the effectiveness of the ACT framework in the study and treatment of academic procrastination.

Among college and university students, past research has shown that a Web-based ACT

intervention is feasible,¹⁸ can improve student academic performance,¹⁹ and prevent mental health problems.²⁰ Thus far, only one study has investigated the effectiveness of a Web-based ACT intervention for academic procrastination with results supporting its effectiveness to reduce procrastination at posttreatment.²¹

The purpose of this pilot study was to investigate the feasibility and acceptability of a Web-based ACT intervention to reduce academic procrastination among university students. This study also tests the potential value of the intervention to reduce academic procrastination and increase ACT-processes such as committed action. Specifically, it was hypothesized that: (1) The intervention would significantly reduce procrastination from pre to postintervention; and (2) The intervention would lead to greater committed actions from pre to postintervention.

Methods

Participants

A total of one hundred and thirty-three ($n = 133$) students completed the preintervention assessment. Ninety-seven ($n = 97$) participants did not complete the postintervention assessment, which resulted in an attrition rate of 73%. There were two eligibility criteria to participate in this study: (1) being at least 18 years of age; (2) studying at Université du Québec à Trois-Rivières (UQTR). There were no exclusion criteria.

Procedure

The intervention was offered twice during the academic year of 2016–2017; during the fall 2016 semester and during the winter 2017 semester. Participants were recruited over a 4-week period at the beginning of each semester (starting in September 2016 and January 2017, respectively) mainly through publicity posted on the UQTR campus located in Québec (Canada), advertisement in the school newspaper, presentation of the intervention in several classrooms, the university's mailing list, as well as publicity on Facebook. Participants were asked to read and sign an online informed consent before completing the preintervention assessment. After the intervention, participants were asked to complete the postintervention assessment. All the measurements were completed through a secure Website, and all the information was kept confidential. Participants that completed the first and second measurement waves were eligible to win three \$25 prepaid MasterCard® gift card certificate.

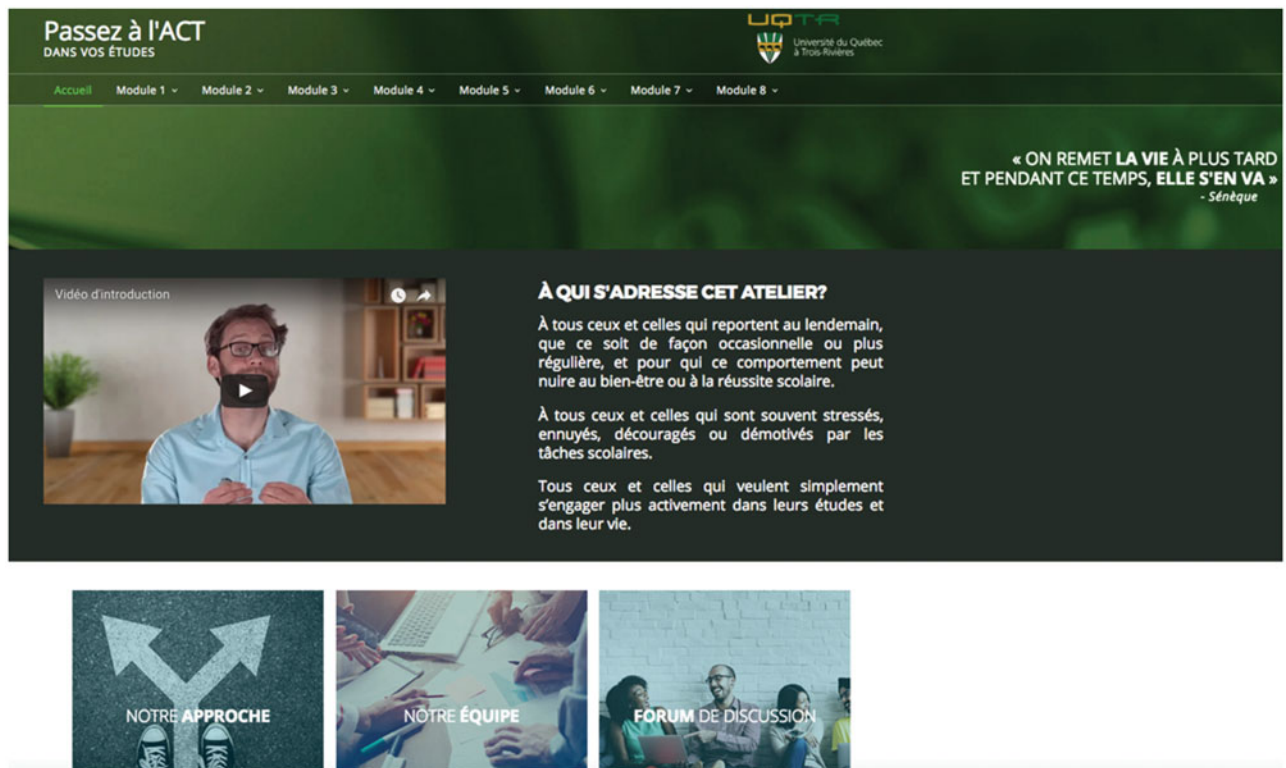


Figure 1. Screenshot from the home page of the intervention.

The Research Ethics and Integrity Committee of UQTR approved this study.

Intervention

The intervention was provided via a secure Website development program called Chopin, managed by the computer support service of UQTR (see [Figure 1](#)). The content of the intervention was developed by a psychologist trained in ACT and a doctoral student training in ACT. At this stage of the development process, the intervention is only available in French. The Web-based platform was created by a research assistant in close collaboration with the computer support service of UQTR. The intervention consisted of eight modules, each of which had to be completed in a “tunneled” format (each module had to be completed in a particular order). The intervention content was adapted from empirical research on ACT treatment and self-help protocols for mental health problems among college and university students. The intervention spans over 9 weeks with one module per week, and a break during the week of midterm exams. Each module focused on a specific ACT component (see [Table 1](#) for a short description of each module). In addition, each module contained exercises (ie, worksheets the participant could download) to

practice the skills targeted in the module. An example of an exercise that the participants were asked to complete was to answer three questions to clarify their academic values: (1) “What really matters to you in your studies? In other words, why are you studying?”; (2) “Where do you see yourself in five years?”; and (3) “What do you want to become?”. Then, students were asked to reflect on their answers and summarize their values. Finally, each module contained a section “Report of the week”, that synthesized the information introduced in the module, and further exercises. Modules were unlocked every Monday morning and participants were given access to the “Report of the week” only on Friday morning.

The content of each module was a mixture of text-based, multimedia (eg, images, videos for experiential exercises, Vox-pop), and interactive components (eg, worksheets). Despite the tunneled format of the intervention, participants could refer to previous modules.

Emails were sent as incentives twice a week for each week of the intervention. The first email was sent on Monday morning. This email contained information about the module for the upcoming week along with a URL link to the module’s Website page. The second email was sent on Friday morning. This email informed the participant that the “Report of the week” section was available for them to review.

Table 1. Title and objectives of each module in the intervention.

Title	Objectives
Module 1: <i>Be aware of ineffective behaviors</i>	Participants will better understand what is procrastination and will learn to be more aware of the ineffectiveness of procrastination.
Module 2: <i>Choosing a direction according to your values</i>	Participants will clarify their educational values and will also be asked to be more attentive to the choices of activities moment by moment.
Module 3: <i>Identify your excuses</i>	Participants will learn to identify the excuses (reason-giving) that contribute to their procrastination.
Module 4: <i>Take actions</i>	Participants will learn to act effectively and set goals in line with personal values.
Module 5: <i>Be willing to face discomforts</i>	Participants will learn to be aware of the discomforts they may encounter during school tasks.
Module 6: <i>Act on your environment</i>	Participants will be familiarized with the "Pomodoro" technique, framed as an exposure and acceptance technique. They will also have the opportunity to reduce the influence of distractions in their environment that interferes with school tasks.
Module 7: <i>Defuse from thoughts</i>	Participants will learn to defuse (observe and distance themselves) from negative thoughts.
Module 8: <i>Be perseverant in adversity</i>	Participants will learn to relate differently to internal barriers for the future and will learn to prevent relapse.

Measures

Sociodemographic information was taken at preintervention. Data on the feasibility and acceptability were taken at postintervention. Data for procrastination and committed action were taken at the pre and postintervention.

Feasibility and acceptability

The feasibility and acceptability of the intervention were assessed with questions created for this study targeting: (1) global satisfaction (eg, "Globally, I am satisfied with this intervention"); (2) feasibility of the intervention (eg, "The duration of the intervention was adequate?"); and (3) acceptability of the intervention (eg, "I won't recommend this intervention to anyone").

Procrastination

Procrastination was assessed using the French version of the pure procrastination scale (PPS,²² original version by²³). The PPS is an 11-item questionnaire that evaluates procrastination conceptualized as a dysfunctional delay. Sample items are: "I am continually saying I'll do it tomorrow" and "I delay making decisions until it's too late." Participants answered on a 5-point Likert scale ranging from 1 (*very seldom or not true of me*) to 5 (*very often true of true of me*). Responses were summed to create a score of general procrastination. Higher scores reflect a higher level of procrastination. Reliability for this scale was found to be good with Cronbach's alpha of .89, and test-retest reliability of .87.²² In this study, the alpha coefficients

were good ranging from .85 (preintervention) to .91 (postintervention).

Committed action

The extent to which an individual engages in persistent action linked with chosen values was assessed using the French version of the committed action questionnaire (CAQ-8,²⁴ original shorten version by²⁵). This 8-item questionnaire is composed of two subscales labeled *values persistence* and *nonreactive behavior*. Examples of items are: "When a goal is difficult to reach, I am able to take small steps to reach it" (*values persistence*) and "If I feel distressed or discouraged, I let my commitments slide" (*nonreactive behavior*). Responses are rated on a 7-point Likert-type scale ranging from 0 (*never true*) to 6 (*always true*). The scores of the nonreactive behavior subscale (item 5–8) are reversed and summed to the values persistence subscale to create a total score of committed action such as higher scores represent a higher level of committed action. The CAQ-8 showed good reliability in previous work with Cronbach's alpha of .87 for the total scale.²⁵ In this study, internal consistency analyses revealed that item five had poor reliability and had reversed correlations with the other items of the scale at both measurement occasions. Based on these results, we decided to remove item five when computing a total score for the CAQ-8. Alpha coefficients for the 7-item were acceptable ranging from .72 (preintervention) to .85 (postintervention).

Analysis

The analyses were conducted using the R software.²⁶ Descriptive statistics were calculated to examine

intervention feasibility and acceptability. To evaluate the impact of the intervention on the primary outcome (procrastination) and on the secondary outcome (commitment in value-based actions), we conducted paired sample *t*-tests.

To ensure maximum statistical power despite the high attrition, we adopted a multiple imputations approach to account for the few missing data in the final sample. The multiple imputations were conducted with the “mice” package²⁷ in R using the predictive mean matching algorithm. The level of significance was set at $p < .05$ prior to the analyses. Effect sizes (Cohen’s *d*) were calculated using the “effsize” package²⁸ in R to investigate the magnitude of the effect observed. The effect sizes were interpreted based on Cohen’s guidelines.

Before conducting the *t*-test, we removed from the final sample ($n = 36$) the participants that completed less than 60% of the intervention, which represents five out of eight modules. This resulted in a loss of three participants ($n = 33$). We then screened the data for the presence of outliers using Mahalanobis scores. Results revealed no outliers in the data. Normality of the scales was assessed by analyzing several metrics: skewness and kurtosis, a graphical representation of the distributions, and the Shapiro-Wilk test. Results showed that the assumption of normality of the distribution could not be rejected. Finally, the assumption of equal variances between pre and postintervention was analyzed with results indicating that for the PPS, the assumption of equal variances could not be rejected, whereas for the CAQ-8, the assumption of equal variances was rejected. Thus, for the CAQ-8, the Welch approximation to the degrees of freedom was used to estimate the variance.

Results

Sample characteristics

The final sample consisted of 36 participants (77.5% women). The age ranged from 20 to 54 years with a mean age of 27.80 ($SD = 9.11$). The participants were 57.5% undergraduate students and 40% graduate students; 77.5% of the participants were studying full-time. When asked if they have been diagnosed with a psychiatric condition, six participants reported having a diagnosis of anxiety and/or depression, six participants reported having a diagnosis of attention deficit hyperactivity disorder (ADHD), one participant reported having a diagnosis of dyspraxia, and one participant reported having a diagnosis myasthenia. Finally, the sample was 95% white, and 5% black.

Table 2. Descriptive statistics and results from *t*-test for each variable by time point.

	Group ($n = 33$)						
	Pre		Post		t-test		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i> _{df}	<i>p</i> value	Cohen <i>d</i> (95% CI)
PPS	36.94	6.41	30.94	8.50	5.01 ₂₂	< .001	.80 (.29, 1.31)
CAQ-8	23.52	4.82	26.67	7.83	-2.28 ₂₂	.015	-.49 (-.98, .01)

Note. *M*, mean, *SD*, standard deviation, CI, confidence intervals, PPS, pure procrastination scale, CAQ-8, committed action questionnaire.

Feasibility and acceptability

The frequency analyses regarding the feasibility and acceptability of the intervention were conducted on the sample of participants that responded to the post-intervention assessment ($n = 36$). A majority of participants (91.6%) completed at least five out of eight modules; while half of the participants (50%) completed at least seven out of eight modules. Regarding the global satisfaction, 83.3% *agreed* or *strongly agreed* to be satisfied with the intervention, and the majority (94.6%) would recommend the intervention to a friend dealing with academic procrastination. When asked if the duration of the intervention was adequate, 81.6% *agreed* or *strongly agreed*. For most of the participants (94.7%), the quantity of information contained in each module was appropriate and 86.8% of the sample appreciated that the intervention was given via an online platform. A quarter of the participants (25.7%) would have appreciated having support from a professional in addition to the online intervention. When asked if the intervention helped them engaged in study-related actions, 50% of the participants *agreed*, 18.4% *strongly agreed* while 26.3% responded being *neutral* on the subject. Finally, 65.8% *agreed* that the exercises were relevant in helping them improved study-related behaviors, while 23.7% *strongly agreed*. Overall, these results support the acceptability of the intervention among participants who completed the second wave of assessment.

Within-group analyses

Descriptive statistics on outcome variables by time point are shown in Table 2. *T*-tests were conducted to examine pre to postintervention changes on procrastination and committed action. Regarding procrastination, results showed a significant decrease in the mean score from pre to postintervention: $M_{DIFF} = 6.00$; $t_{32} = 5.01$; $p < .001$; $d = .80$, 95% CI [.29, 1.31]. Regarding committed action, results revealed a significant increase in the mean score from pre to postintervention: $M_{DIFF} = -3.15$; $t_{32} = -2.28$; $p = .015$; $d = -.49$, 95% CI [-.98, .01].

Comment

This pilot study sought to evaluate a Web-based ACT intervention to reduce academic procrastination among university students and followed two aims. The first aim was to evaluate the feasibility and acceptability of the intervention. The second aim was to evaluate the effectiveness of the intervention on procrastination and committed action. The intervention contains eight modules each targeting a specific process of the ACT model of psychological flexibility. This study was designed to be pilot in nature to determine whether the intervention could give promising results that would warrant further investigation and development.

Regarding the first aim, results suggest that among the participant that completed the postintervention assessment, the intervention appears to be acceptable and valuable to students dealing with academic procrastination. Moreover, participants reported that the amount of information in each module was adequate and that the exercises were useful in helping them consolidate their learning. Finally, a clear majority of participants enjoyed that the intervention was given through an online platform. These preliminary results highlight the potential suitability of Web-based ACT intervention for academic procrastination among university students. Furthermore, these results suggest that this type of intervention could be feasible in university contexts. The intervention is online, relatively automatic, requires minimal resources (eg, low-cost, minimal staffing), and has the potential to reach a large number of students across colleges and universities. These characteristics are interesting for universities dealing with continuously less funding for student services. However, the high attrition rate found in this study (73%) should be acknowledged when interpreting these results, notably because it has the potential to limit effectiveness and reduce the cost-effectiveness of Web-based interventions.

Regarding the second aim of this study, results revealed that the intervention may be effective in reducing academic procrastination with a medium effect size ($d = .80$). This result is in line with previous studies evaluating the effectiveness of ACT-based interventions that found medium-to-large effect sizes for primary outcomes (see²⁹ for a meta-analysis). A recent meta-analysis of Web-based ACT interventions reported small to medium effect sizes for primary outcomes as well.³⁰ Finally, the effect on procrastination found in this study is comparable to the effect sizes found in past research on different types of Web-based interventions

for procrastination (eg, Implementation intention,³¹ Time management,³² CBT³³).

We conducted post hoc tests using mixed-ANOVA to investigate if the treatment outcome for procrastination significantly differed for participants with a psychiatric diagnosis. Mixed-ANOVA simultaneously tests for the main effects of independent variables (ie, group: with and without a psychiatric diagnosis, and time: prepost intervention) and an interaction effect between the independent variables. Results revealed no significant interaction effect: $F_{1,31} = 1.35$; $p = .25$. When looking at the main effects, we found a significant main effect for change over time ($F_{1,31} = 25.90$; $p < .001$; $\eta_G^2 = .15$) whereas the main effect for group was not statistically significant ($F_{1,31} = .19$; $p = .66$). These findings suggest that the intervention could be effective at reducing procrastination among students with and without a psychiatric condition. While these results are of interest, they should be interpreted with caution particularly because of the small and unequal sample size for both groups and the presence of active symptoms of psychiatric disorders. Future studies should investigate this question more thoroughly. Notably, it would be interesting to study whether there are differences in treatment outcomes depending on the type of psychiatric diagnosis.

Regarding changes in ACT process, results showed that the intervention increased students' score on committed action and this result was associated with a small effect size ($d = -.49$). The effect of the intervention on committed action is in line with past studies that showed that ACT can improve task persistence,³⁴ and decreases impulsive decision-making.³⁵ These findings suggest that the intervention may successfully target ACT core process of committed action and further support ACT-based interventions to promote behavioral change and improved functioning.³⁶ Although significant changes in study outcomes were found, these results are preliminary and should be interpreted in light of the small sample size, the high attrition rate, and the absence of a control condition.

Limitations

This study contains several limitations that are worth noting. First, the lack of a comparison condition and randomization greatly limits the results found in this study. For example, it is not clear if the differences from pre to postintervention can be accounted for by the participation in the intervention or if the decrease in procrastination and increase in committed actions were due to normal fluctuations of behaviors happening

during the course of a semester (eg,³⁷). Future development should focus on implementing a passive or active comparison group (eg, Time management, CBT, or implementation intention).

Second, the high attrition rate found in this study is problematic notably because it undermines statistical power. High attrition rates are a ubiquitous problem and a general concern in Web-based interventions.³⁰ Results from past research has shown up to 25% in dropout every month for certain interventions.³⁸ The attrition found in this study is in range of what has been found in CBT interventions (attrition rate ranging from 2% to 83%),³⁹ but is above what has been found in a recent meta-analysis on Web-based ACT interventions (mean completion rates 68.4%).³⁰ Although the attrition rate is of concern, it is not surprising to witness such a high drop-out level among participants struggling with procrastinatory behaviors. Indeed, procrastinators are characterized by a higher level of impulsivity,⁴ self-regulatory failure,³ and lower task persistence.¹⁵ Moreover, it is possible to hypothesize that persisting in a task that has no immediate reward such as the intervention presented in this study is even harder for students dealing with a procrastination problem. The data regarding module completion partly support this hypothesis as only 50% of participants persevered and completed at least seven modules whereas 91.6% completed at least five modules. Third, at this stage of the development process, the Web-based platform was still a prototype and some important features of the Website were yet to be implemented. Notably, it was impossible to quantify the usage and the participant's engagement in the intervention due to the unavailability of metrics of usability such as the number of log-ins and average time spent on each module. Future developments of the platform will focus on adding a feature to gather data regarding the browsing history for each participant of the intervention. Specifically, it will be possible to quantify the number of modules visited and the time spent on each module for each participant. In future studies, methods to enhance engagement and adherence among participants should be implemented. Recent studies have suggested that the use of weekly SMS-support could be a potential avenue to keep participants engaged in the intervention.²⁰ Other methods such as direct contact with a professional, guidance throughout the intervention, or videoconference could also be potential alternatives; although a past study has found no differences between a guided and an unguided intervention in terms of attrition.⁸ Nevertheless, at the end of the

intervention, some participants reported that they would have appreciated a contact with a professional for a more individualized intervention and as a support in helping them understand and implement key concepts addressed in the intervention (eg, the value clarification exercise).

Fourth, data on the feasibility and acceptability of the intervention were obtained only from the participants that completed the postintervention assessment. It would have been valuable information to obtain feedbacks from participants who dropped out of the intervention as well.

Fifth, because the sample was predominantly women, the results of this study cannot be generalized to men. Thus, at this point, it is not possible to know if women and men respond differently to the intervention.

Finally, because this study was pilot in nature, and due to the small sample size, we specifically selected only two important outcome variables for the preliminary analyses on the efficacy of the intervention. In future studies, it will be of interest to include objective measures such as grade point average (GPA) and test the efficacy of the intervention to increase academic performance as assessed by GPA in the short-term.

Conclusion

This is the first study of Web-based ACT intervention for academic procrastination. Results from this pilot study support the feasibility and effectiveness of Web-based ACT as a standalone intervention to reduce academic procrastination and increase committed actions among university students. Results also highlight some key elements that need to be revised notably, further investigation is needed to develop an intervention that is more engaging for the student and to implement a randomization condition.

Disclosure statement

The authors declared no conflict of interest.

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