Procrastination as Self-Regulatory Failure

Habitual Avoidance and Inhibitory Control Moderate the Intention-Behaviour

Relation for Unpleasant Tasks

by

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Abstract

Recent conceptualizations of procrastination suggest that procrastination is akin to self-regulatory failure wherein the effect of good intentions is attenuated for individuals who tend to procrastinate. Some researchers speculate that this effect is due to subtle neurological deficits that make it more difficult for procrastinators to follow through with completing tasks. The present work examines this claim while also investigating two factors that should theoretically weaken the effect of intentions for engaging unpleasant, but important, tasks – namely habitual avoidance and the executive function of inhibition.

Study 1 investigated the question of whether chronic avoidance patterns may become so entrenched that they take on the qualities of a habit. This is important because habits are known to be less reliant on intentions because they are triggered in a relatively automatic fashion. Habit indices were created which assessed the degree to which the experience of avoiding particular tasks was automatic and self-descriptive in nature (Verplanken & Orbell, 2003). The results confirmed the expectation that more frequent avoidance patterns are experienced as occurring relatively automatically. Habit-like avoidance can be measured reliably and is related to other constructs in expected ways. For example, habit-level predicts reduced task quality and lower rates of task completion above-and-beyond motivational variables (e.g. intentions). Finally, habit-like avoidance patterns were more often associated with stable features identified by participants as being present in the environment.

Using a prospective design, Study 2 assessed the degree to which existing habitual-avoidance patterns weakened the effect of good intentions to carry out unpleasant tasks over the course of a week. Several computer tasks at Time 1 were also

used to assess inhibitory control or the degree to which participants could inhibit

prepotent responses. In addition to personality traits which purportedly moderate the

intention-behaviour relation (e.g. trait procrastination), the moderating effects of habitual

avoidance and inhibitory control were also tested. Trait-level procrastination did not

weaken the effect of one's intentions to carry out unpleasant tasks. However, habitual

avoidance and inhibitory control jointly moderated the effect of intentions on behaviour

such that poor inhibitors had difficulty overcoming previous avoidance habits in order to

complete unpleasant tasks during the week. In contrast, good inhibitors were able to

behave according to their intentions irrespective of habit-like avoidance patterns. These

findings point to the importance of recognizing the joint influence of avoidance patterns

and regulatory capacities involved in self-control when understanding procrastination

behaviour.

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Literature Review

Procrastination Defined

Many psychological terms are part of our everyday vernacular. The term *procrastinate* is no exception.   Intuitively speaking, we may associate procrastination with purposefully avoiding tasks that, at some level, we are simultaneously motivated to work on or complete. These conflicting forces are evident in modern conceptualizations of the term. For example, contemporary definitions indicates that to procrastinate is, "to put off intentionally the doing of something that should be done" (Merrian-Webster Dictionary, 2008). However, the study of procrastination has produced a variety of construct definitions. These include the notion that procrastination is not intentional, but is rather a failure to carry out our *previous* intentions to complete a task. Some commentators have noted that the definitions that have been put forward in the psychological research are almost as numerous as the authors proposing them (e.g., see Ferrari, Johnson & McCown, 1995). Some authors have endorsed relatively strict definitions of what it means to procrastinate. For example, Milgram (1991) described how, to be considered 'procrastination,' a behaviour must meet several criteria including that it be postponed to some degree, result in substandard performance, and that the task be important enough that delaying it produces the experience of emotional upset. By comparison, more liberal definitions suggest that procrastination may manifest itself in a number of different ways including postponing the initiation of the behaviour, postponing the intended time of the behavioural performance, the presence of an intention-behaviour discrepancy, or doing activities other than the behaviour of interest (e.g., Schouwenburg, 1995).

Although there is no general consensus in the literature, it is clear that the delaying, postponing or putting off of tasks is a central feature of procrastination. Further, what is clear from the literature is that procrastination often involves the counter-intentional delay of actions whose execution were considered at some point in time (Ferrari, 1993a; Lay & Silverman, 1996; Milgram,

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1991; Silver & Sabini, 1981). As pointed out by Steel (2007) in a recent review, it is important to distinguish intentional from non-intentional task delay given that it is difficult to think about the myriad of tasks that one is not doing at any given time. Defining procrastination as the delay of *previously* intended tasks also allows for a distinction to be made between procrastination behaviour and decisional avoidance (i.e., intentionally delaying the performance of a task; Anderson, 2003). This is similar to the definition provided by van Eerde (2003; p. 1402) who has commented that, "procrastination pertains to intentions that do not result in actions." Owens, Bowan, and Dill (2008), believe that procrastination may best be understood as two separate processes which are involved in behavioural enactment. Following Gollwitzer (1999), these authors understand behavioural processes as distinct phases that consist of motivational and volitional components. Whereas the first phase involves the selection of a behaviour that will (ideally) lead to certain goals, the second phase involves the actual execution of the selected action. Owens et al. (2008) described how both of these processes are likely involved in procrastination. The volitional process of behavioural enactment will be emphasized in the present work. Therefore, procrastination is defined here as the delay of executing important tasks that one had previously intended to perform. In other words, procrastination is defined here as the failure to carry out, "the implementation of an intention" (van Eerde, 2000; p. 372).

As will be reviewed below, procrastination often involves a failure to perform important tasks that serve long-term goals because of more immediate contingencies in the short-term. For example, procrastination behaviour increases when tasks are not implemented because they are boring, difficult or unpleasant to perform. Despite previous intentions, the aversive quality of tasks can ultimately hinder task execution. Some have suggested (e.g., Steel, 2007) that the inability to overcome immediate contingences for longer-term goals represents a failure of self-regulation.

In addition to defining what it means to procrastinate on intended tasks, it is also important to outline what is not considered procrastination behaviour. Since the present definition of procrastination involves the absence of an intended behaviour it is necessary to outline factors that may lead to the absence of intended behaviour which do not involve procrastination per se. As mentioned above, behaviour that is never seriously intended should not be considered procrastination since there is no potential for motivational conflict (e.g., short- vs. long-term goals) or an intention-behaviour discrepancy. Finally, not included in the present definition of procrastination is a failure to complete intended tasks due to poor planning. This is an especially important consideration for the present work since there is some evidence that high trait-procrastinators tend to underestimate the time it will take to complete tasks (e.g., time to read a brief passage) whereas non-procrastinators actually overestimate time for task completion (e.g., Aitken, 1982).

Prevalence

Avoiding the completion of important tasks or "procrastinating" is a relatively common phenomenon. Nearly everyone has been guilty of "dilly dallying" with unpleasant tasks. However, for some individuals the act of putting off aversive tasks becomes a hazardous pastime. This may be especially true for students pursuing post-secondary education. Much of the research investigating procrastination has involved academic procrastination in which college students put off the completion of a number of academic-related tasks. Estimated prevalence rates in student populations have ranged anywhere from 50% to 95% (e.g., Day, Mensink, & O'Sullivan, 2000; Pychyl, Lee, Thibodeau, & Blunt, 2000; Aitken, 1982; Ellis & Knaus, 1977). Astonishingly, almost half of college students spend half their day procrastinating (Hill, Hill, Chabot, & Barrall, 1976), and nearly 50% of students report consistently putting off tasks in such a way that it causes difficulties (Day, et al., 2000; Solomon & Rothblum, 1984). In absolute terms, the average student spends over one-third of his or her daily activities avoiding academic tasks by engaging in other activities such as playing

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or watching television (Pychyl, Lee, Thibodeau, & Blunt, 2000). Although specific estimates of the negative impact of procrastination vary greatly, what has become clear is that these effects are both common and debilitating.

However, to assume that the tendency to procrastinate is confined to the college campus would be a mistake. For example, some estimates indicate that somewhere between 15-25% of adults procrastinate chronically (e.g., Harriott & Ferrari, 1996; McCown & Johnson, 1989). A recent international study has provided further evidence that procrastination is also problematic for non-student, adult populations. Using two established measures of procrastination, Ferrari, Díaz-Morales, O'Callaghan, Díaz, and Argumendo (2007) surveyed individuals from six countries (Spain, Peru, Venezuala, the United Kingdom, Australia, and the United States) about their tendency to put off tasks. The results were consistent with the existing student data indicating that the tendency towards delaying tasks was a common feature for adults in all six countries.

Consequences

Whereas evading important tasks can appeal to our short-term experience of side-stepping the unpleasant (e.g. bring temporary relief), the act of putting off tasks is not without consequence. In a recent review of the psychological literature on procrastination, Steel (2007) reported a small negative correlation (average r = -.19; K = 41)[1] between trait procrastination and academic success. Overall GPA, course GPA, final exam scores and assignment grades are generally worse when one tends to procrastinate. It is important to highlight the fact that negative outcomes are not restricted to tasks that are germane only to student populations. For example, Sirosis' (2007) examination of trait-procrastination and health behaviours using a large adult population demonstrated that procrastination is associated with the practice of fewer self-care behaviours and a lower frequency of both dental and medical check-ups. Nevertheless, since most of the evidence originates from studies

using student samples, our knowledge about how procrastination affects non-student populations is limited in scope.

In addition to readily observable outcomes, procrastination may also have a number of psychological consequences. For example, Pychyl (1995) observed a moderate relation between procrastinating on personal projects (e.g., academic manuscripts) and feelings of guilt (r = .46). Currently there is some debate about whether procrastination is strongly associated with other mood-related variables. Whereas one meta-analytic review of the literature reported moderate correlations between procrastination and state anxiety (r = .22) and depression (r = .30; van Eerde, 2003), a more recent review of the same body of work commented on how the evidence supporting the relation between procrastination and mood is less than definitive (Steel, 2007). One speculation is that transient variables (e.g. mood) tend to fluctuate over time making their presence difficult to detect (Steel, 2007).

Some carefully considered attempts to capture the affective experience of procrastinators have been made. Using an experience-sampling method, Pychyl et al. (2000) examined the relation between procrastination and positive and negative affect. Participants in this study were given electronic pagers that signalled them randomly eight times per day for five consecutive days. For each signal they completed a number of items about the task they were performing, tasks they would rather be performing, and rated a number of adjectives that represented their positive and negative affect at the time of the signal. Despite the fact that participants reported engaging in procrastination over one-third (36.2%) of the time, the data provided no evidence that either overall positive or negative affect were related to procrastination. Consistent with the findings of Pychyl (1995), however, the level of procrastination was positively correlated with guilt (r = .42) experienced at the time of the signal.

Notably, the impact of procrastinating can depend on objective criteria like deadlines. In a seminal study, Tice and Baumeister (1997) demonstrated that the act of procrastinating may bring temporary relief at the cost of longer-term outcomes. Using a longitudinal approach over the course of an academic semester, these researchers observed the relation between procrastination (measured by self-report and behaviour) and a number of outcome variables including paper and exam grades, subjective stress, and physical complaints. Unsurprisingly, the results indicated that high trait-procrastinators submitted assignments later and received lower grades than low trait-procrastinators. Interestingly, early in the semester high procrastinators reported experiencing less stress, fewer physical ailments and fewer visits to a health-center than low procrastinators. As deadlines loomed late in the semester, however, this pattern reversed and high procrastinators reported more stress and health-related complaints than those low in trait-procrastination. This led the authors to conclude that despite, "its short-term benefits, procrastination cannot be regarded as either adaptive or innocuous. Procrastinators end up suffering more and performing worse than other people" (Tice & Baumeister, 1997; p. 458).

Finally, there is some evidence that trait-like worry and depression are moderately related to trait procrastination. For example, Flett, Blankstein and Martin (1995) describe that depression and worrying in a number of domains correlate significantly with a number of procrastination measures. These correlations with procrastination range from .30 to .40 for depression and from .28 to .47 for worry. However, as van Eerde (2003) points out, there is no evidence to verify the causal direction of these relations. Thus, it is difficult to know whether procrastination behaviour is the result of depression and/or anxiety or whether the act of procrastinating plays a role in producing these conditions. Nevertheless, it is important to note that avoidance behaviour is a central component in conceptualizing and treating depression and anxiety disorders. For example, a main goal of the Behavioural Activation Model of depression (Jacobson, Martell, & Dimidjian, 2001) is the removal

of maladaptive task-avoidance in order for clients to more fully engage in and positively affect their environment. Similarly, the gradual removal of avoidance behaviour is essential for the effective use of exposure strategies in the treatment of anxiety disorders (e.g., Barlow, 2002). Furthermore, the fact that avoidance plays a large role in both depression and anxiety has suggested to some that avoidance may be a common factor that accounts for the observed comorbidity between the two types of condition (e.g., Mazer & Cloninger, 1990; Ottenbreit & Dobson, 2004).

Two Types of Trait Procrastination

There is some reason to believe that trait-like tendencies to procrastinate may differ depending on the motivating forces behind the task avoidance (e.g., see Burka & Yuen, 1983; Ellis & Knaus, 1977; Solomon & Rothblum, 1984). Two forms of trait-procrastination that appear frequently in the literature have motivational roots in arousal and avoidance.

Ferrari (1992a) suggested that people who are high on *arousal procrastination* are thrill-seekers who like to perform tasks at the last minute in order to ward off boredom. These individuals delay tasks in order to experience the "rush" of working against a deadline – effectively adding a form of excitement to their lives. Not only is this type of procrastination correlated with sensation-seeking (Ferrari, 1992a), but there is evidence that these procrastinators demonstrate poorer performance when arousal caused by task deadlines is heightened by environmental situations that may cause an overload of arousal (Ferrari, 2001). The General Behavioural Procrastination (GPS) Scale developed by Lay (1986) is a reliable and valid measure of arousal procrastination (Ferrari et al., 1995).

Whereas some procrastinate to generate sufficient arousal for task performance, *avoidant procrastination* appears to be driven by the tendency to delay tasks in order to avoid the unpleasant nature of a task and/or the risk of failure. This is supported by the observation that this type of procrastination is related to both low self-esteem and low self-confidence (Ferrari, 1992b). For these

individuals the act of delaying tasks may reflect an inclination to prevent perceived inadequacies from being revealed. The Adult Inventory of Procrastination (AIP; McCown & Johnson, 1989; items found in Ferrari et al., 1995) has been identified as a good measure of avoidant procrastination (Ferrari et al., 1995).

Despite how both forms of trait procrastination predict behaviour (e.g., the time to return completed inventories; Ferrari, 1992a), there is conflicting evidence that these conceptualizations of procrastination are distinct. Across a series of samples of both traditionally and non-traditionally-aged college students, Ferrari (1992a) found no significant correlations between the two constructs using the GPS scale and AIP as indicators of arousal and avoidant procrastination, respectively. However, in a more recent international study of procrastination using the same measures, Ferrari, et al. (2007) found considerable overlap between these two forms of procrastination ($r = .72$) in a large ($N = 1347$) adult population. Unfortunately, Ferrari et al. (2007) did not provide any speculations that may explain these discrepant findings. More recent evidence from Simpson and Pychyl (2009; cf. Steel, 2010) has examined whether the GPS measures procrastination motivated by arousal. These authors administered the GPS along with several indices of arousal-based personality. The results demonstrated no relation between sensation seeking and the GPS. Further, although participants often believe they procrastinate for arousal-based reasons, there was little evidence that individuals scoring high on the GPS have an increased need for heightened arousal. Taken together, evidence from the literature suggests that arousal and avoidant motivations may be similar constructs and may not represent distinctive subtypes of procrastination.

Measurement of Procrastination

Attempts have been made to measure procrastination in different ways. There is clear evidence that procrastination is stable across both time and situations (see Steel, 2007 for a brief review). For example, the ten-year test-retest correlation of an adult inventory of procrastination in

one study demonstrated considerably stability (r = .77) over that period of time (Elliot, 2002 as cited in Steel, 2007). Given the observed stability of the construct, procrastination is most often measured as a personality style or trait. The most common method of assessing procrastination in this manner is by self-report. Self-reported procrastination has been investigated across a number of domains. For example, academic procrastination has been gauged using instruments like the Aitken Procrastination Inventory (API; Aitken, 1982) which is a scale designed to differentiate between high and low procrastination in undergraduate students (sample items include, "When I have a test scheduled soon, I often find myself working on other jobs when a deadline is near"). More generalized scales of procrastination have also been developed. For example the General Procrastination Scale (GPS; Lay, 1986) measures the tendency to put off tasks in a number of non-academic domains (participants rate their agreement to statements such as, "A letter may sit for days after I write it before I mail it.").

In addition to the measurement of retrospective, self-reported task avoidance, behavioural manifestations of procrastination have also been measured. The validity of many of the self-report scales, for example, has been tested against whether or not the scale could predict real-world task avoidance. Here there are many instances in which trait-procrastination has been found to be related to a number of task-delay behaviours, including the time to complete self-paced quizzes (Solomon & Rothblum, 1984), to turn in assignments (e.g., Beswick, Rothblum, & Mann, 1988), to return questionnaires (e.g., Lay, 1986), to redeem gift certificates or begin shopping for the holidays (Ferrari, 1993a).

As mentioned above, a more recent study by Pychyl et al. (2000) used an experience-sampling method to explore the immediate affective experience of procrastinating at random time-points during the day. Since participants reported on their experience *during* the task avoidance itself, these authors could safely rule out retrospective biases in recall as an alternative explanation of

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their results. The methods used in two studies reported by Ferrari and Scher (Ferrari & Scher, 2000;

Scher & Ferrari, 2000) are perhaps most germane to the present conceptualization of procrastination

as a failure to follow through with previous intentions. Participants in this sample ($N = 37$) reported

on daily tasks and activities. These data were then submitted to a task-level analysis. On five

consecutive days, participants reported on tasks that they intended to complete in the next day (i.e.,

24 hours) as well as the percentage of each task they intended to achieve. On each of the following

days, they then reported on each of the previous day's tasks indicating, among other things, what

percentage of their original intention they accomplished for each task. Task procrastination was then

defined as not completing at least 80% of the task-intention from the previous day. Among other

findings, the results of the Ferrari and Scher (2000) study replicated the work of others in the

demonstration that college students procrastinate on both academic (e.g., daily homework) and non-

academic (e.g., household chores) tasks at a fairly high rate. As the authors mention, however, this

work extends previous findings because it used an idiosyncratic approach to task avoidance in that

the tasks measured were selected by each participant for each day. Of course, this allows for higher

ecological validity in studying the nature of real-world procrastination. Further, the fact that

intentions and task-execution were measured at separate time-points (i.e., intentions were measured

before task performance) eliminates the need for participants to recall their original level of intention

for each task.

Nomological Network of Procrastination

The examination of the constructs associated with chronic task avoidance is an important first

step toward understanding the factors that negatively impact whether one follows through with the

intention to complete unpleasant tasks. To this aim, the nomological network of constructs associated

with procrastination is reviewed at both the task and individual difference level. The focus of this

review is to identify characteristics of both the task and the person that would create difficulties in

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overcoming the immediate contingencies of unpleasant tasks in the service of intentions that represent longer-term goals. The following review consists mainly of findings reported by Steel (2007) and van Eerde (2003) in recent meta-analyses on procrastination.

Task Characteristics

There is little doubt that task avoidance is associated with the type of task to be performed. One consistent finding is that aversive tasks produce task delay or avoidance. More aversive tasks produce higher levels of procrastination behaviour (average $r = .40$, $K = 8$; Steel, 2007). This includes more task avoidance for unpleasant, boring or uninteresting tasks. The majority of this research stems from self-reported reasons for procrastinating (e.g., Solomon & Rothblum, 1984; Anderson, 2001). However, in their daily logs study, Ferrari and Scher (2000) also demonstrated that early in the semester, the more effortful and/or anxiety provoking a task was perceived to be, the less often the task was completed. This is also consistent with the event-sampling data collected by Pychyl et al. (2000). In this study, when participants were procrastinating they rated the task they *should be* doing as more unpleasant than their current task (e.g., watching television).

Individual Differences

A number of individual-difference variables have demonstrated empirical associations with procrastination. As reviewed by Steel (2007) and van Eerde (2003), some of these variables (e.g., neuroticism) show only a small association with task-avoidance tendencies. However, there are a number of individual-difference variables that are strongly predictive of the tendency to procrastinate. For example, individuals with low self-efficacy, high impulsivity, and who are less conscientious tend to procrastinate more than those with high self-efficacy, low impulsivity and who are more conscientious. These relations are outlined below.

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Neuroticism

From the general finding that aversive tasks tend to be avoided, it follows that the disposition to experience events as negative (e.g., as stressful or as a threat) may increase the avoidance of unpleasant tasks. However, the correlational evidence suggests that neuroticism is only weakly associated with procrastination (average r = .24, K = 59; Steel, 2007; average r = .26; K = 10; van Eerde, 2003), and that this association is driven largely by the fact that the construct of neuroticism often contains items that tap *impulsiveness*. Steel (2007) pointed out that the relation between procrastination and neuroticism that does *not* contain items about impulsivity is less than half (average r = .16, K = 10) of that observed when impulsivity is considered part of neuroticism (average r = .33, K = 10). The observed relation between procrastination and impulsivity is further described below.

Rebelliousness

Some clinical writers have proposed that a tendency to rebel against external control may create the impetus for procrastination behaviour (e.g., Burka & Yuen, 1983; Knaus, 1979). From this framework, rebellious individuals likely avoid the completion of tasks that are imposed by others because these tasks impede one's autonomy and are therefore experienced as aversive. However, the observed correlation between procrastination and agreeableness (i.e., the tendency to be pleasant and socially accommodating) is very small (average r = -.12, K = 24; Steel, 2007).

Self-efficacy

One variable that has demonstrated strong associations with procrastination across a number of tasks is self-efficacy, or the belief in one's capabilities to control important events that affect one's life (average r = -.38, K = 39; Steel, 2007; average r = -.44, K = 11; van Eerde, 2003). Individuals tend to procrastinate when they have little confidence that they can effectively perform the tasks before them. This large negative relation may indicate that procrastination causes poor performance,

which then lowers one's beliefs about efficacy. However, the direction of this relation is questionable, as it seems equally plausible that beliefs about task failure may increase the aversive nature of tasks. From this perspective, increased task aversion may increase the tendency to procrastinate.

Impulsiveness

From a review of the literature, it is clear that a tendency to be impulsive is predictive of procrastination behaviour (average $r = .41$, $K = 22$; Steel, 2007). One speculation about why this relation is present is based on the observation that chronic procrastinators also tend to be low *stimulus screeners* (Lay, 1987). Whereas high stimulus screeners are able to disregard distracting and irrelevant cues, low stimulus screeners are likely overwhelmed in situations that involve higher levels of information, suggesting that the degree to which attention can be controlled may affect how we guide our own behaviour. Moreover, there is evidence that low screeners are also more sensitive to whether a task is pleasant or not (Mehrabian & West, 1977), which may produce impulsive behaviour. This is consistent with Lay's (1986) observation that chronic procrastinators worked on tasks longer if the tasks were pleasant, despite the fact that task pleasantness had no effect on individuals low in procrastination. In combination, these findings suggest that procrastinators may impulsively favour more immediately gratifying tasks over previous goals or intentions. This account resonates with part of Costa and McCrae's (1992) definition of impulsiveness as an inability to resist urges or temptations – in this case selecting pleasant over aversive tasks. Results of a study examining procrastination and self-control (Ferrari & Emmons, 1995) are consistent with this interpretation. In this sample of college students, procrastination levels were negatively related to self-control tendencies. The authors attribute this relation to an inability on the part of the procrastinator to inhibit the desire to perform tasks that are more pleasurable in the short-term. An alternative interpretation of the relation between procrastination and impulsiveness has been put

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forward by Ferrari (1993b). He suggests that dysfunctional impulsivity is a consequence of procrastination behaviour. According to this account, individuals that tend to delay tasks are often required to speed up the when they eventually get around to completing tasks (i.e., work more impulsively), which may explain the observed relation between the two constructs.

Conscientiousness

Conscientiousness has been defined as a tendency for high self-control, including a tendency to enact active processes of, "planning, organizing, and carrying out tasks" (Costa & McCrae, 1992; p. 16). Given this definition, it should be unsurprising that both Steel (average r = -.62, K = 20; 2007) and van Eerde (average r = -.63, K = 10; 2003) reported large negative correlations between procrastination and the personality trait of conscientiousness.

Also unsurprising is that the facet of conscientiousness that has demonstrated the largest association with procrastination is *self-discipline* (average r = -.58, K = 21; Steel, 2007). Costa and McCrae (1992) define self-discipline as, "the ability to begin tasks and carry them through to completion despite boredom and other distractions" (p. 18). These authors also emphasize that there is an empirical distinction between high impulsivity and low self-discipline. Both of these constructs are associated with one's level of self-control over behaviour. Yet, whereas the impulsive individual has difficulty resisting unintended tasks, the individual lacking self-discipline has difficulty compelling him- or herself to carry out intended tasks (Costa & McCrae, 1992).

Steel (2007) also reported that other components of conscientiousness were related to procrastination including the facets of *distractibility* (i.e., poor management of distracting cues; average r = .45, K = 13), *organization* (i.e., planning and structuring one's life; average r = -.36, K = 25), and *achievement motivation* (i.e., level of work ethic towards goals; average r = -.35, K = 34).

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Gender

Given the results demonstrating gender differences in self-control, Steel (2007) predicted that males may procrastinate slightly more than females. In his review of the procrastination literature there was a small correlation across studies (r = .08). This is consistent with the small correlation between procrastination and gender observed by vanEerde (2003; r = .05) indicating that men procrastinate slightly more than women.

The Present Research

Many procrastination researchers consider task avoidance to be a failure to implement previous intentions (e.g., van Eerde, 2000; Silver & Sabini, 1981). Therefore, one imperative of future research should be to investigate variables that moderate the intention-behaviour relation with respect to task completion. Although formidable, this is a worthwhile endeavour for further investigation because of the fundamental nature of the problem:

"Given this consistency of opinion, stretching thousands of years, procrastination must be considered an almost archetypal human failing. Therefore it is rather surprising and ironic that science did not address procrastination sooner" (Steel, 2007; p. 67).

An interesting question that arises from this line of thinking surrounds factors that may impede one's ability to behave in a way that is consistent with previous intentions. Procrastination has been discussed as a variable that weakens the effect of intentions. The present work is an investigation of two factors that may moderate the intention-behaviour relation for completing unpleasant tasks. Both factors will be outlined in detail after exploring potential theories for explaining the intention-behaviour gap observed in procrastinators.

Explaining Procrastination

Under a framework that understands procrastination to be a failure to complete previous intentions, theories that speak to the relation between intentions and behaviour may be best suited to understanding procrastination. In addition, because both impulsivity and conscientiousness demonstrate strong correlations with procrastination, theories involving the construct of self-control may most appropriately capture the phenomenon of interest.

Theory of Planned Behavior. The Theory of Planned Behaviour (TPB; Ajzen & Madden, 1986) and its predecessor the Theory of Reasoned Action (TRA; Fishbein & Ajzen, 1975) are among the most popular theories for explaining planned behaviour. Both theories consider behavioural decisions to be based on subjectively-made expected utilities for each choice option. Germane to the present work, the single best predictor of behaviour, according to the TPB, is one's intention to behave – a construct that is itself determined by attitudes about the behaviour, beliefs about whether that behaviour will bring social pressure from significant others, and perceptions about how much the individual can control outcomes associated with that behaviour. Although perceived behavioural control can directly affect behaviour, according to TPB, intentions are the most important determinant of behaviour. In a meta-analysis of ten correlational meta-analyses, Sheeran (2002) reported that intentions have a large effect on actual behaviour (average r = .53). However, since much of these data are based on correlational studies using cross-sectional designs, it is difficult to determine whether this is an accurate estimate of the relation between intention and behaviour. As pointed out by Webb and Sheeran (2006), it is difficult to infer whether or not intentions cause behaviour from this type of data because of (1) self-report biases that may inflate the observed relation and (2) the possibility that behaviour is reported as intentional simply because it has already been performed (i.e., the level of intention is inferred by the action taken). Further, in their meta-analysis of the experimental data on the intention-behaviour relation, Webb and Sheeran (2006) reviewed how manipulated changes in intention of a medium-to-large magnitude produced only small-to-medium changes in actual behaviour. These authors have also indicated that the intention-behaviour relation is often moderated by other variables. In addition to having perceived control, the relation is stronger when (1) one's social context is conducive to the original intention and (2) when the environment does not evoke habitual control of behaviour. As an aside, the latter is especially relevant to the present work involving task avoidance. There is evidence that behaviours performed

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frequently in stable environmental-contexts promote the formation of habit-like behaviour (see Neal, Wood, & Quinn, 2006 for a review). Further, when behaviour becomes habitual, the behaviour is often prompted by environmental cues irrespective of one's original intentions. Therefore, particular tasks that are often avoided may continue to be avoided despite one's intentions to begin the task. More about this issue below. In summary, despite the early promise of TPB, there is reason to believe that intentions alone are not sufficient for predicting future behaviour.

In addition, given that the main predictor of behaviour of the TPB is intention to act, it is doubtful that this theory will provide a solid ground on which to build an understanding of procrastination behaviour. By definition, procrastination is the failure to complete previous intentions – a statement that is antithetical to a theory whose most proximal predictor is intention proper. Empirical work has also demonstrated that work intentions are uncorrelated with procrastination (average $r = -.03$, $K = 8$; Steel, 2007), suggesting that procrastinators' intentions to complete tasks are as strong as those held by non-procrastinators. Additionally, it is clear from reviewing the literature that chronic task avoidance also involves a relative inability to self-regulate – that is to control one's behaviour at the time of task execution – despite previous intentions. It is less than clear how this observation would fit in the framework proposed by the TPB. Further, the TPB neglects the temporal dimensions that appear to be important. For example, Steel, Brothen and Wambach (2001) observed that at the beginning of an academic course, procrastinators tended to do less work than they intended. However, nearing the end of the course the pattern reversed, and procrastinators tended to do *more* work than they indicated by their intentions. Taken together, task avoidance may optimally be modeled using a theory that accounts for procrastination as a failure to overcome the negative impact of immediate contingencies of performing a task in the service of goal-oriented intentions.

Temporal Self-Regulation Theory. The main focus of Temporal Self-Regulation Theory

(TST; Hall & Fong, 2007) is the explanation of how we engage in behaviour that serves long-term

goals in spite of the fact that, on average, humans are hypersensitive to the immediate contingencies

in our environment (e.g., Loewenstein, Read, & Baumeister, 2003). According to the TST

framework, time-sensitive behaviour stems from a number of distinct factors that are biological,

cognitive and social in nature. The first consideration is that individuals have varying levels of *self-*

regulatory capacity that is partially determined by their neuro-biological make-up. Inherent in this

construct is one's executive functioning abilities and the physiological energy required to exert these

abilities. Second, two social-cognitive variables are primarily involved in determining one's intention

to act. These include whether one believes that current behaviour will lead to predicted outcomes

(i.e., *connectedness beliefs*) and the values one assigns to short- versus long-term outcomes for each

behavioural option (i.e., *temporal valuations*). Consistent with the TPB (Ajzen & Madden, 1986),

intentions are then posited to have direct effects on behaviour. The third factor identified in this

model is *behavioural prepotency*, which is a behaviour-level variable that represents relatively

reflexive behaviour that may be triggered by past behaviour or environmental cues to action. Figure 1

is a pictorial representation of the model describing the TST.
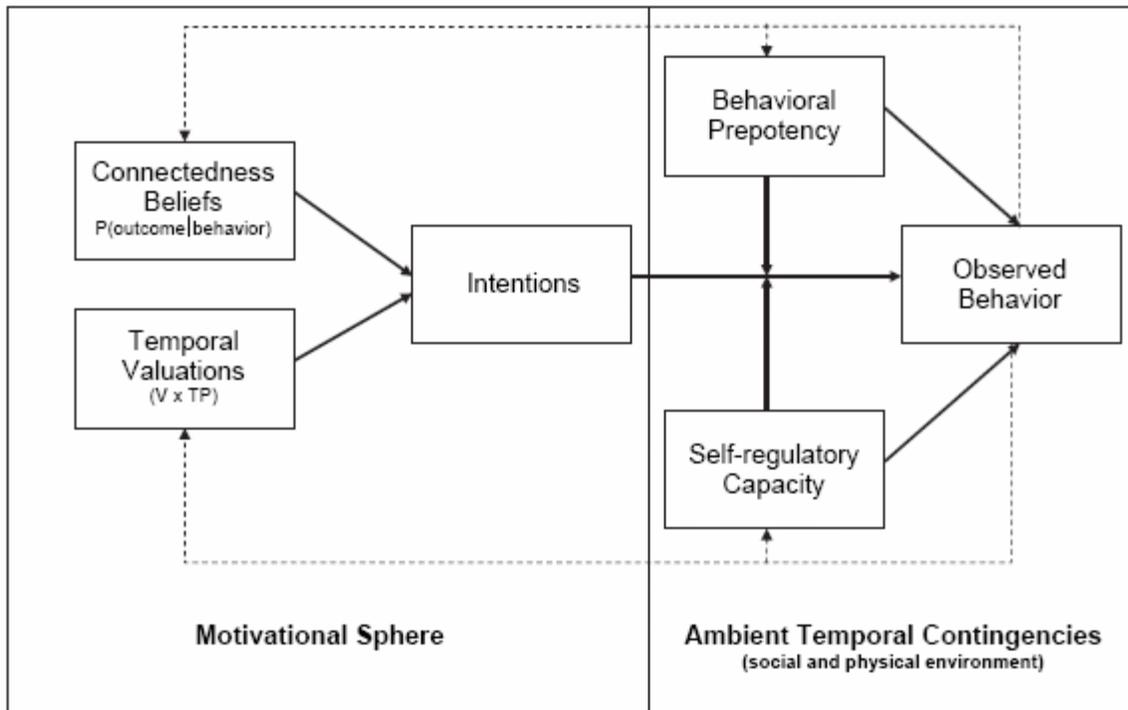
Figure 1: A Schematic Representation of TST as Described by Hall and Fong (2007).

One aspect of TST that makes it particularly well suited to understanding procrastination is that moderators of the intention-behaviour relation are explicitly incorporated into the model. As depicted in Figure 1, behavioural prepotency and self-regulatory capacity both moderate the strength of the relation between intention and action. Hall and Fong (2007) describe how a prepotent response, or reflexive behaviour, may be largely determined by biological drives, salient environmental cues, or past behaviour. According to the theory, the more a response is prepotent in its nature, the less effect previous intentions should exert on behaviour. Further, many future-oriented behaviours require that we inhibit responses that are more immediately reinforcing. From this framework, the model predicts that individuals with greater self-regulatory capacity are better equipped to inhibit those responses. This includes brain operations like executive functioning which are responsible for exerting top-down control over behaviour (Norman & Shallice, 1986). Therefore, stronger executive functioning abilities should predict strong intention-behaviour relations, whereas

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weak executive abilities should predict weak intention-behaviour relations. Thus, the TST model

presents two classes of moderators that may affect the intention-behaviour relation with respect to

procrastination or task avoidance: (1) behaviour-level prepotent responding and (2) person-level

executive functioning abilities. Therefore, the main goal of the present work is to investigate one

potential variable from each of the respective classes: (1) at the behaviour-level, habitual avoidance

as a form of prepotent responding and (2) at the person-level, one's ability to inhibit prepotent

responding as one operationalization of executive functioning abilities. Each of these potentially-

moderating variables is further specified below. However, before this exposition, one last theoretical

model of procrastination is considered.

Temporal Motivation Theory. The Temporal Motivational Theory (TMT) proposed by Steel

(Steel & König, 2006; Steel, 2007; see Figure 2) is another good candidate for explaining

procrastination behaviour. Similar to the TST, this account is founded on expected utility theory. In

addition, TMT also incorporates the fact that we often discount long-term consequences in favour of

more immediate contingencies. Based on principles of hyperbolic discounting, or discounting more

distal consequences over more proximal ones (e.g., Ainslie, 2001), TMT posits that procrastination

behaviour is governed by the following basic mathematical formulation:

$$\text{Utility} = \frac{E \times V}{\Gamma D}$$

Figure 2: The Simplest Formulation of TMT as Described by Steel (2007).

This description of behaviour posits that the behaviour that *currently* has the highest utility is

enacted. As described by other utility theories, expectancy (E) is defined as the belief that an

outcome is contingent on the current behaviour, and value (V) is the worth assigned to the expected

outcome. Factors that are affected by the timing of contingencies are in the denominator of the

formula. Here delay (D), represents the actual time between behaviour and consequence, whereas Γ

represents a person's sensitivity to the specified delay. Whereas behaviours that are associated with

immediately realizable rewards (e.g., watching television) produce a constant utility over time,

immediately-unrewarding tasks are believed to take on a hyperbolic function. Tasks like school

assignments that have a deadline far into the future have very low current utility according to TMT,

especially compared to more immediately rewarding activities. However, as time passes and a

deadline approaches, the utility of the unrewarding task grows in a hyperbolic manner until it reaches

a level that surpasses other activities. This *preference reversal* is believed to describe the process of

procrastination. Namely, despite original intentions to work, procrastinators often "change their

minds and fail to act on their plans" (Steel & König, 2006; p. 899). The Γ variable in the formula is

largely affected by differences among individuals. Individuals who are highly sensitive to delay will

have lower utilities for aversive tasks early on. These individuals will put off or excessively delay

starting tasks until the deadline is very near. However, as the deadline approaches, the value

associated with the unpleasant task will grow at an accelerated rate, indicating that task completion is

extremely valued – but only for the short period of time directly before the deadline. Presumably,

this will result in frantic behaviour often observed when procrastinators feverishly work towards a

goal at the last minute.

Steel (2007) described how each of the four variables outlined by TMT are empirically

related to procrastination. For example, equating self-efficacy with expectancy (i.e., E), he notes the

strong negative correlation between efficacy and procrastination in the literature. He also suggests

that the observed correlations between procrastination and variables like task-aversion and boredom-

proneness represent how procrastination is more likely if a task is not highly valued at the present

time (i.e., low V). Further, there is evidence that procrastination often involves tasks that are delayed

in nature (D) and that personality variables associated with procrastination (e.g., distractibility,

impulsiveness, and lack of self-control) lend evidence to the idea that procrastinators are very

sensitive to the task delays (i.e., high Γ).

A more general and complete version of TMT was originally put forward by Steel and König

(2006). From this perspective, behaviour is driven by current utilities which are analogous to the

intensity of needs of the organism. In addition to our primary biological needs (e.g. for food), these

authors suggest that behaviour is largely driven by one's psychogenic needs for (1) achievement, (2)

affiliation, and (3) power, which can be thought of as preferences for how to behave (Winter, 1996).

Once a need has become salient, the utilities of behaviours that could satisfy that need increase (e.g.,

because the potential outcome associated with that particular action becomes more valued). Similar

to the simplified form of this account (see Figure 2), the full version of TMT purports that we carry

out the course of action that holds the highest level of current utility based on the following formula:

$$\text{Utility} = \sum_{i=1}^{k} \frac{E_{CPT}^{+} \times V_{CPT}^{+}}{Z + \Gamma^{+}(T - t)} + \sum_{i=k+1}^{n} \frac{E_{CPT}^{-} \times V_{CPT}^{-}}{Z + \Gamma^{-}(T - t)}$$

Figure 3: A Complete Representation of the TMT model as Described by Steel & König (2006).

Figure 3 depicts the utility associated with a single behaviour based on all possible (i.e., n) outcomes

for that action. Notably, the utility for each action is separated into outcomes associated with gains

and losses. All of the possible outcomes for each respective category are summed into two main

terms. The first term represents the positive expected-value associated with k gains taking into

account both delay (*T*) and the individual's sensitivity to gains (i.e., Γ^{+}). The second term represents

the negative expected-value associated with n – k losses where Γ^{-} indexes the individual's sensitivity

to losses. The Z is a constant which prevents the denominator of either term from reaching zero

when task delay reaches zero. Both expectancy terms represent mathematically transformed values

(see Kahneman, 1992) which reflect how we tend to overestimate low-probability events and underestimate high-probability events. Similarly, both value terms are transformations which reflect how we tend to undervalue future events (e.g., Ainslie, 2001).

One clear advantage of TMT over basic expectancy models (e.g., the TPB) is that TMT explicitly considers the timing of consequences on procrastination behaviour. This concept is central because the definition of procrastination is temporally related in that it is often defined as the avoidance of unpleasant tasks that were *previously* intended. Another benefit of using TMT to understand procrastination is that self-regulation has also been incorporated into the theory, albeit indirectly. Sensitivity to delay is related to personality constructs such as impulsivity, self-control and distractibility, all tendencies which are presumably related to the capacity to act according to one's own intentions.

Temporal Self-Regulation Theory, Temporal Motivation Theory and Procrastination

Steel and König (2006) point out that any theory of procrastination should simultaneously account for three main correlates of procrastination, including variables related to expectancy, value, and one's sensitivity to delay. Both the TST and TMT models accomplish this, albeit in different ways with respect to how procrastination is defined here. A consideration of expected-values provides the foundation of both approaches. The two models are also similar in that both take the temporal nature of gains and losses into account (e.g., considering the hyperbolic discounting of distal rewards).

Despite their similarity, however, the models differ in some respects. The main focus here is on failing to complete previously intended tasks. Whereas TST is clear about how behaviour can ultimately be counter-intentional in this respect (e.g., one can intend to exercise, but not follow through because of poor executive-functioning abilities), procrastination in TMT is clearly framed in terms of a preference reversal wherein people are always doing what they intend. In other words,

whereas procrastination may be understood as counter-intentional self-regulation failure in TST, TMT describes procrastinators as avoiding previously intended tasks because they "change their minds" about engaging in the previously intended behaviour (Steel & König, 2006; p. 899). However this difference appears to be largely semantic. Whereas Hall and colleagues (e.g., Hall & Fong, 2007) define self-regulatory failure as previous intentions that do not translate into behaviour, Steel (e.g., Steel 2007) considers intentions for completing aversive tasks (i.e., utilities) to be weak (but present) initially. From this perspective, there is always some intention for task completion, but the task is not seriously considered in the face of more immediately-reinforcing alternatives (i.e., until the deadline draws near). The most salient difference between the two models is that the TMT does not allow for the consideration of prepotent responding. The relevance of this omission becomes apparent as the potential moderators of the intention-behaviour relation in procrastination are reviewed below.

<div align="center">Potential Moderators of the Intention-Behaviour Relation</div>

As mentioned previously, TST provides two classes of variables that suggest potential moderators for the intention-behaviour failures often seen when an individual procrastinates. The first class involves *behavioural prepotency*, which reflects, "frequency or past performance and/or the presence of cues to action in the environment" (Hall & Fong, 2007; p. 14). This class of behaviours consist of prepotent responses (or 'default' scripts) that are typically carried out in situations where the response is common. These kinds of behaviours are likely to be performed unless inhibited by higher-order executive functions (e.g., Norman & Shallice, 1986). Moreover, prepotent responding is also believed to be done with a relative lack of awareness of the behaviour. One operationalization of behavioural prepotency is habitual behaviour. Thus, one general goal of the present work is to examine whether some avoidance behaviour is habit-like in nature. According to TST, the second class of variables proposed to moderate the intention-behaviour relation consists

<div align="center">25</div>

of those variables related to self-regulatory capacity. Therefore, a second general goal of the present work is to examine whether executive-functioning abilities of an individual moderates the intention-behaviour relation. Specifically, here executive abilities are operationalized as the ability to inhibit prepotent responses. Both potential moderators (i.e., level of habitual avoidance and executive-functioning ability) and their potential relation to procrastination behaviour are further outlined below.

Habitual Avoidance Moderating the Intention-Behaviour Relation

In general, habits can be defined as, "learned sequences of acts that have become automatic responses to specific cues, and are functional in obtaining certain goals or end states." (Verplanken & Aarts, 1999; p. 104). Inherent in this definition is that habit-like behaviours are, at least initially, goal-directed in that they serve us in some way (e.g., give us immediate pleasure). Habits tend to develop in stable situations, or similar contexts, such that the behaviour itself becomes associated with features of the environment in which it is performed (Neal, et al., 2006). The result of this kind of paired-association is that features of the environment may directly cue behaviour in a way that is relatively automatic in nature (Neal, et al., 2006). In other words, although habits are often originally initiated by intentions to act, over time habit-like behaviours become less reliant on intentions and instead are directly triggered by environmental cues. Some evidence for the non-intentional nature of habits stems from diary studies of daily experience. For example, Wood, Quinn and Kashy (2002) had participants report on their hourly activities and rate several aspects of their experience including how often they had performed the current activity in the past and whether the context was similar to past contexts. The researchers also rated the level of correspondence between what the person was thinking at the time of task performance and what they were doing. Habits were defined as behaviours that tended to be repeated in stable contexts. The results of two studies indicated that one-third to one-half of all daily activities were habit-like in nature and that participants were much

less likely to think about what they were doing when performing habits. According to Wood et al. (2002), these data suggest that habitual behaviour need not rely on conscious intention either 1) because intentions are not required for these kinds of behaviours, or 2) because the behaviour was not intentional in the first place. A meta-analysis conducted by Ouelette and Wood (1998) is consistent with the premise that habits are initiated relatively automatically by environmental cues. In their review of how past behaviour predicts future behaviour, Ouelette and Wood (1998) outlined how past behaviour is a better predictor of performance than intentions when the behaviour is performed frequently in similar contexts (i.e., is habit-like). However, intentions empirically outperform previous behaviour in predicting future behaviour when the behaviour is performed less frequently in relatively unstable contexts. In summary, whereas non-habitual behaviours appear to be guided heavily by intentions, habitual behaviours do not follow directly from one's intentions to act. Further, the notion that habits are triggered relatively automatically by environmental cues makes the habitual avoidance behaviour a candidate variable for moderating the intention-behaviour relation.

There is evidence from the literature on habits that is consistent with the idea that avoidance patterns that are habit-like may limit the effectiveness of one's good intentions (e.g., to complete aversive tasks). For example, Ji Song and Wood (2007) reported on how the strength of habits can moderate the relation between explicit intentions and actual behaviour. These investigators predicted different behaviours (e.g., purchasing fast food; watching TV news; taking the bus) using a longitudinal design requiring participants to state their intentions ahead of time. Both intention to perform and level of habit were measured for each behaviour. The results confirmed that the level of habit moderated the intention-behaviour relation. When habits were weak-to-moderate in strength, the participants in these studies acted on their previously stated intentions (e.g., those intending to eat less fast food followed through with their original intention by eating less). However, when strong

habits were present, explicit intentions to act in a particular way had no effect on behaviour. Those with strong habits continued to perform the previous behaviour irrespective of their stated intentions (e.g., level of fast-food consumption remained stable despite intentions to the contrary). Stated differently, intentions guided actions only in the *absence* of strong habits.

The premise that habits are triggered automatically by environmental cues is supported by research examining context change. By examining college students' behaviours both before and after a transfer of universities, Wood, Tam and Guerrero Witt (2005) could determine how a change of one's environment affected the performance of habits. In a first session, participants reported on a number of behaviours at their old university, including how much they exercised, read the newspaper, and watched television. In addition, whether the behaviour at the old university was habitual (i.e., performed frequently in a stable context) was assessed. Participants also rated their intentions to engage in each behaviour at the new university. Four-weeks into their time at the new university, students were asked to rate how similar the performance contexts (e.g., location) were between universities. These ratings were completed for each behaviour. Wood and colleagues hypothesized that if habits are triggered by environmental cues, habitual behaviours performed at the old university would continue (regardless of intentions) if the contexts remained similar across the transfer. Conversely, if a change in context is perceived by the student, then behaviour should more closely follow one's intentions since the behaviour should no longer be triggered by (the old) environmental cues. The results were consistent with the idea that context change can disrupt strong habits, bringing them back under the control of one's intentions. When the context of performance was perceived as stable across the transfer, habitual behaviour was carried out regardless of the students' intentions. However, when students perceived a change in performance context, previously strong habits were successfully predicted by students' intentions. These data have led some authors (e.g., Verplanken & Wood, 2006) to propose that habit-changing interventions should

involve not only changing attitudes and intentions, but should be applied during times when individuals are experiencing naturally occurring changes (e.g., moving homes) so that changes in intention can more readily effect behaviour change.

With respect to procrastination, it seems reasonable to speculate that at least some avoidance behaviour is habit-like in nature. As reviewed above, estimates of procrastination indicate that from one-third to one-half of a student's day is spent avoiding tasks (e.g., Hill et al., 1976; Pychyl et al., 2000). Additionally, there is evidence to suggest that almost half of all of a student's daily activities are habit-like in nature (Wood, et al., 2002). Taken together, these two observations point to the possibility that some patterns of avoidance – especially those repeated frequently in a stable context – have the potential to take on the qualities of a behavioural habit. Given this possibility, the level of habit associated with a specific avoidance behaviour may moderate the effect of one's previous intentions in carrying out an unpleasant task.

Inhibitory Control Moderating the Intention-Behaviour Relation

Self-regulation is an important part of everyday life. We are bombarded with situations that require us to resist impulses that satisfy some of our more immediate desires. Our daily lives provide numerous examples of how we are forced to choose between short-term vices and longer-term payouts. Feelings of exhaustion may sway us toward staying in bed on a workday morning. The aroma of baked goods may tempt us to partake in unhealthy food choices. Similarly, the allure of a television drama may dissuade us from tasks we have the best intentions of completing. Yet, in spite of these temptations, we are simultaneously (although sometimes begrudgingly) motivated to keep our jobs, watch our waistline and complete important tasks in a timely manner. For these overarching goals to take precedence over our immediate gratifications requires that we regulate our own behaviour. *Self-regulation*, then, refers to the ability for "altering one's own responses, especially to bring them in line with standards such as ideals, values, morals, and social expectations,

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and to support the pursuit of long-term goals" (Baumeister, Vohs, & Tice, 2007; p. 351). This is consistent with the definition of self-regulatory capacity offered by Hall & Fong (2007) which emphasizes one's capacity to engage in the effortful process of regulating behaviour. It is important to note here that some investigators consider the terms "self-regulation" and "self-control" to be synonymous with each other. However, as pointed out by Baumeister et al. (2007), self-regulation is a construct that may also subsume processes that do not imply conscious self-control per se (e.g., homeostatic processes like maintaining body temperature). Therefore, here the term self-regulation is specifically used to denote the effortful component of regulating one's own behaviour. The ability to self-regulate has obvious implications for completing important, but unpleasant tasks. To behave according to one's longer-term goals or intentions, a degree of self-control is required in order to overcome the immediate contingencies of performing boring or aversive tasks. It is for this reason that some investigators (e.g., Steel, 2007) believe that procrastinating represents a fundamental failure to regulate the self. Stated differently, individuals who chronically avoid or delay unpleasant tasks may possess low self-regulatory abilities. Further, some researchers (e.g., Ferrari et al., 1995) have speculated that subtle neurological differences may exist between procrastinators and non-procrastinators and may be responsible for the procrastinator's relative inability to follow through with important tasks.

Executive functioning is a term often used interchangeably with concepts like cognitive control or supervisory attention in describing the collection of brain processes responsible for guiding our thoughts and behaviour (e.g., Norman & Shallice, 1986). Executive functioning is especially important when 'top-down' control of behaviour is required in novel or difficult situations wherein responses are not well-learned or where planning, decision-making, or troubleshooting are involved. Perhaps most relevant to the current discussion of procrastination, is the observation that situations requiring a person to overcome strong habitual responses and/or temptations are believed

to require executive functions in order for behaviour to reflect internally generated plans or goals (Norman & Shallice, 1986). Namely, although a college student may have formed the good intention to work on a term paper after dinner, the act of carrying out that task may involve a number of aversive contingencies that are unpleasant in the short-term (e.g., writing about a boring, prescribed topic). Here strong executive functioning is required to actually sit down and begin writing – especially if more immediately gratifying activities are also present (e.g., an opportunity to socialize with roommates). Taken together, stronger executive functioning abilities should allow a person to better overcome immediate contingencies in the service of longer-term goals or intentions. Conversely, weaker executive functioning abilities should be associated with the avoidance of tasks common in chronic procrastinators.

As pointed out by Hall and Fong (2007) in their development of the TST, executive functions are generally believed to be housed in the frontal lobes of the human brain. With respect to self-regulation, two structures appear to play central roles. First, there is evidence that the prefrontal cortex is associated with following through with previous intentions. Functionally speaking, the prefrontal cortex is involved in planning, working memory processes, goal formation, and the selection of appropriate behavioural responses (e.g., Gazzaniga, 1995; Nolte, 1999). Patients suffering trauma to this region demonstrate symptoms of planning difficulty, a paucity of goal-directed behaviour, and can easily be primed by environmental cues to perform certain actions (L'hermitte, 1983; L'hermitte, Pillon, & Serdaru, 1986; Shallice, Burgess, Schon, & Baxter, 1989). The second structure strongly implicated in self-regulation is the anterior cingulate (ACC), whose functional nature includes the regulation of both cognitive and emotional processes (Bush, Luu, & Posner, 2000). In his review of the ACC's role in behavioural control, Paus (2001) points out that the ACC not only has connections with prefrontal areas (suggesting a role in higher-order cognitive functions like goal-setting) and the motor cortex (suggesting a role in producing behaviour) but the

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ACC is also connected to structures associated with the arousal state of the organism. Evidence from imaging studies also suggests that ACC activity often co-occurs with prefrontal activation, and that the ACC becomes activated when novel actions compete against well-learned responses. From both the anatomical and functional evidence, Paus (2001) concluded that the ACC is a structure that may be partially responsible for propelling intentions into actions. In summary, the prefrontal cortex and the ACC are both candidates for regions in which procrastinators may show relative deficits compared to non-procrastinators.

Despite what is known about the neurological correlates of executive functioning, there have been questions about whether or not these varied functions represent the same underlying ability. Miyake, Friedman, Emerson, Witzki, and Howerter (2000) made an empirical attempt to answer this question by examining individual differences collected from a 'neurologically-intact' student sample. Using a multi-method approach, these researchers modeled the individual differences associated with three frequently cited executive functions – the shifting of mental sets, monitoring and updating working memory, and the inhibition of prepotent responses. This was accomplished using structural-equation modeling, measuring each of the purported functions using multiple indicators of performance for each potential function. The resulting factor analyses confirmed the presence of three correlated, but distinct, latent variables representing each of the proposed functions. Namely, a three-factor model (i.e., representing three separate executive functions) fit the data significantly better than a single-factor model which assumed the unity of the three executive functions. One conclusion drawn from this work was that executive abilities are not unitary. The three distinct factors were significantly correlated to some extent (i.e., latent relations among the executive functions ranged from .42 to .63). The fact that these functions are distinct is important for the present discussion. From reviewing the literature on procrastination, the executive function of *inhibition* appears most theoretically related to the tendency to delay unpleasant tasks. Miyake et al.

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(2001) define inhibition as, "one's ability to deliberately inhibit dominant, automatic, or prepotent responses when necessary" (p. 57). It is not hard to imagine our own natural proclivity for avoiding aversive tasks in favour of doing something that is more immediately gratifying. To the extent that task-alternatives are dominant, automatic, or prepotent responses it is reasonable to believe that the ability to inhibit such responses is related to the procrastination of unpleasant tasks. In order to carry out tasks that are aversive or unpleasant we require the ability to inhibit the performance of tasks that are more immediately reinforcing, but do not accord with our longer-term goals. Following this line of reasoning, chronic procrastinators should demonstrate relatively lower self-regulatory abilities. Compared to non-procrastinators, chronic procrastinators should evince relative deficits in the executive ability of inhibiting dominant response options. This relation between procrastination and inhibition should be evident at the trait level of analysis. Namely, trait-procrastinators should demonstrate these relative deficits in inhibitory control. Further, lowered executive abilities should also moderate the intention-behaviour relation at the level of action. Individuals with stronger executive functioning abilities should follow through with their intentions to act more than individuals whose executive functioning is relatively weak.

The proposed effect of executive abilities on procrastination behaviour is consistent with research investigating health-related behaviours. Across two studies, Hall, Fong, Epp and Elias (2007) investigated whether the relation between intentions to engage in health activities and actual behaviour was moderated by one's executive functioning ability. In both studies, participants attended two laboratory sessions. In the first session participants reported on their health behaviours in one of two domains in the past week (i.e., number of hours of vigorous exercise or the amount of fruits/vegetables consumed). They also rated their behavioural intentions in the same domain for the *upcoming* week. A computerized Go/NoGo task was also administered which assessed the executive ability to suspend prepotent responding to external cues. In the second session,

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participants in both studies reported on their actual behaviour in either the domain of exercise or healthy eating. The results were consistent across both study samples and for both health-related behaviours. Significant two-way interactions between Go/NoGo performance and behavioural intentions suggested that individual differences in executive functioning strongly moderated the relation between intentions and reported behaviour. Individuals with stronger executive functioning abilities were more likely to follow through with their intentions to exercise and eat healthily over the course of a week. In contrast, individuals with weaker executive functioning abilities followed through with their intentions to exercise, and to eat healthily, much less often than stated in intentions one week prior. This is consistent with a self-regulatory framework: those higher in executive functioning persisted and behaved according to their goals despite the short-term costs of inconvenience and discomfort normally associated with actual exercise and healthy eating. Since tasks are often avoided (i.e., procrastinated on) for similar reasons, it follows that procrastination may be related to the same type of executive functioning abilities.

To date, only one investigation has directly examined the relation between procrastination and executive functioning. Doctoral research conducted by Stone (1999) provided the first investigation of executive abilities in the context of procrastination. In this study, chronic procrastinators on academic probation were compared to non-procrastinators on neurologically-based measures which included those purported to assess executive-functioning abilities. The main tool used for assessing executive functioning was the Tinker Toy Test (TTT; Lezak, 1983), which required participants to assemble objects of their choice using up to fifty plastic construction pieces. The participant's final creation is then assessed based on a scoring system that takes both number of pieces used and the complexity of the object into account. This task was chosen over other executive-functioning tasks (e.g., the Wisconsin Card Sorting Test; WCST, Berg, 1948) because the TTT is less structured in nature. This was consistent with Stone's (1999) primary interest in examining the

executive abilities that are required for one to do well in unstructured environments (e.g., use of

planning abilities), and his assumption that procrastinators do poorly under these circumstances

because of relative deficit in these areas of functioning. Unfortunately, however, the data from this

investigation provided no evidence that this type of executive functioning was related to trait-level

procrastination. Yet Steel (2007) encouragingly noted that executive functions that are related to

impulsive behaviour still hold promise in relation to one's tendency to put off or delay tasks.

Provided that impulsivity is theoretically associated with lowered *inhibition*, it follows that

individuals lower in this executive function may tend to procrastinate more than those who are better

able to inhibit dominant or prepotent responses. Unlike the TTT, which was designed as a global

measure of executive functioning, the inhibition tasks identified by Miyake et al. (2000) add

specificity with respect to measuring an executive ability that should be directly related to

procrastination per se. Moreover, there is evidence that other tasks measuring inhibition (e.g., the

Go/NoGo task) are predictive of whether or not individuals follow through with their intentions with

respect to carrying out health-related behaviours that are not immediately rewarding (e.g., Hall et al.,

2007). Therefore, there is good reason to believe that chronic procrastinators will demonstrate

relative deficits in the executive ability of inhibition. Overall, this executive function is clearly a

good candidate to investigate with respect to the impulsive, distractible type of self-regulatory failure

often ascribed to procrastinators who give up on aversive tasks in favour of more immediately

rewarding alternative activities.

Summary and Research Questions

The literature review provided information from a number of domains ranging from

procrastination to theories regarding factors that moderate the relation between intentions and actual

behaviour. I have emphasized the following:

1. Avoiding important tasks or procrastinating is a pervasive problem that has both concrete and psychological consequences.

2. Task delay is associated with properties of both the task and the person. Boring, unpleasant, or otherwise aversive tasks are often avoided. When it comes to people, trait procrastination is most strongly associated with low self-efficacy, high impulsivity and low conscientiousness (especially with respect to low self-discipline).

3. Temporal Self-Regulation Theory (TST) is a good framework for modeling dilatory behaviour since procrastination has been conceptualized as a failure to carry out previous intentions (i.e., self-regulatory failure). Moreover, TST suggests classes of variables that moderate the intention-behaviour gap often associated with procrastination (i.e., prepotent responding and self-regulatory capacity).

4. Since much of our daily behaviour consists of habits, one possibility is that some avoidance behaviour may be habitual. The level of habitual avoidance associated with a particular behaviour may represent one form of prepotent responding that moderates whether one's intentions are carried out in task completion.

5. From the perspective of procrastination understood as self-regulatory failure, chronic procrastinators should demonstrate relative deficits in executive-functioning abilities. Procrastinators may, more precisely, have reduced abilities with respect to inhibiting dominant or prepotent responses.

Failures to self-regulate were examined in the context of performing important but unpleasant tasks. The following questions were examined in two studies:

1. Considering that many of our everyday behaviours become automatic responses cued by our environment, do frequent avoidance patterns take on the experiential profile of a habit?

2. If avoidance can be habit-like, what is the nature of that habit? Does habitual avoidance simply entail the evasion of behaviour (i.e., habitually avoiding course readings regardless of what the alternative behaviours are performed)? Or is habitual avoidance strongly linked to particular behaviours associated with more pleasant activities (e.g., one 'avoids' a task by always partaking in television watching)? The nature of avoidance is investigated in Study 1.

3. Does the level of habitual avoidance associated with a given task moderate the relation between one's intention to perform the task and future behaviour?

4. At the level of the person, are relative deficits in the executive ability of *inhibition* more prevalent in chronic procrastinators?

5. At the level of behaviour, does the executive function of inhibition moderate the relation between intentions to perform important tasks and actual task completion?

Study 1

The purpose of this study was to better understand the experience of avoiding important

tasks. One specific goal was to determine whether frequent avoidance patterns can be so entrenched

that they take on the qualities of a habit.   Important first steps toward this aim included investigating

the potential habit-like quality of avoidance, to demonstrate that habitual avoidance can be measured

systematically, to explore how habitual avoidance relates to intentions and other variables like

attitudes which inform intentions, and to investigate the environmental features that may trigger the

habitual-avoidance patterns themselves. Identifying habitual avoidance patterns is of central

importance because previous research suggests that changes in intentions do not directly correspond

with changes in habitual behaviour.

The Case for Avoidance as a Habit

Avoidance is not simply the absence of behaviour. Here it can be thought of as the act of

"refraining from, or escaping from, an action, person or thing" (Ottenbreit & Dobson, 2004; p. 293).

Since avoidance behaviour typically removes a person from an unpleasant circumstance, the avoidant

response is believed to be strengthened via mechanisms of negative reinforcement.   The behaviour

functions, at least in the short term, to remove the person from unpleasant experience (e.g., providing

relief). Avoidance can be an intentional behaviour which can be repeated, and therefore, has the

potential of developing into a habit over time (Wood & Neal, 2007). Preliminary evidence for

avoidance as a habit is evident in both animal and human research.

Animal studies have demonstrated that rats can learn to escape specific parts of an apparatus

(e.g., a Shuttle Box) to evade electric shocks (see Bouton, 2007 for a review). Over time, avoidance

behaviour can develop wherein no aversive stimulus need be delivered for the behaviour to persist

once relevant cues become associated with electric shock. During a learning phase, impending

aversive events co-vary with warning cues (e.g., tones) and these become associated with the same

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state (i.e., fear) elicited by the aversive stimulus (e.g., a shock). Once this association is learned, the animal successfully avoids the shock as a result of increased fear which is produced upon presentation of the warning signal alone.

With respect to habit-like avoidance, after extensive training warning signals no longer produce the same level of fear response. This finding provides evidence that a relevant-motivational state (i.e., fear) is no longer necessary to maintain the behaviour once it has become a habit (Bouton, 2007). The idea that behaviour like this can become a habit is consistent with reinforcer devaluation studies wherein animals learn to perform a response for food (e.g., pressing a lever). Rats eat less after the reinforcer is subsequently diminished (e.g., by associating the food with illness), suggesting that their behaviour is sensitive to goals or outcomes. This is not the case when the behaviour is habit-like. If the response is practiced extensively, then devaluation effects are minimal, indicating that over-learned habits are not goal-oriented but are automatic responses to situational cues (e.g., Balleine & Dickenson, 1998).

There is also evidence from human data that provides precedent for the idea that avoidance of a response can become habit-like. Baldwin, Rothman, Hertel, Linde and Jeffery (2006) examined the quitting behaviour of a large number of smokers following an eight-week cessation program. The primary focus of the study was on cognitive variables that were supported by the data: self-efficacy predicted successful quitting attempts for those early in the quitting process (i.e., initiators), whereas satisfaction with the outcomes of no longer smoking predicted whether participants who were not currently smoking (i.e., maintainers) stayed quit. Most interesting was that neither cognitive variable predicted which maintainers remained quit after nine months of not smoking. The only factor that continued to predict quit status was the number of continuous months that participants had avoided smoking. One interpretation of this finding is that once people have avoided smoking for a long

period of time their avoidance behaviour is no longer maintained by cognitive variables because it has taken on habit-like qualities which need not rely on motivational or cognitive influences.

Identifying Avoidance as Habit

Verplanken and Orbell (2003) note that habits not only have a history of repetition, but their performance takes on qualities of automaticity (i.e., they require little awareness for performance, are difficult to control, and are performed with efficiency). Therefore, habitually avoiding an unpleasant task should be *experienced* as a relatively automatic phenomenon as compared to the experience of avoiding unpleasant tasks which are not habitually avoided. Verplanken and Orbell (2003) also suggest that some habits may become assimilated as features of one's identity. Thus, if some avoidance patterns are habitual in nature, those more frequently avoided should be more likely to become part of one's personal identity.

The Present Study

Whereas previous work has assessed the habit level of specific behaviours (e.g., television watching) the level of habit for the *act of avoidance itself* is under consideration in the present study. Two possible forms of avoidance patterns are examined.

First, it is possible that habitual avoidance patterns are distinct and separate from common alternative behaviours, are triggered independent of cues prompting alternative activities, and may be replaced by any number of functionally-equivalent alternative behaviours. One may avoid doing homework in a habit-like manner. Yet, the alternative replacement behaviours may vary despite the automatic nature of the avoidance. For example, for students who often play video games instead of doing homework, taking away the gaming console will not affect the habitual avoidance of homework because the avoidance may be triggered by an independent cue (e.g., a notebook) and may be replaced by any available alternative behaviour (e.g., surfing the internet). Here we would expect no relation between the habit level of the avoidance pattern (homework avoidance) and a common

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alternative activity (video gaming). We would also expect the avoidance pattern and replacement behaviours to share few environmental triggers.

The second possibility is that the avoided task simply becomes associated with a replacement activity performed in the context of avoidance. In this sense, it would not *only* be the avoidance itself that is habitual, rather there would also be a particular habitual behaviour that becomes cued concurrently. If one typically plays video games while avoiding homework, it may be video game playing that is habitual *in addition to* homework avoidance being habit-like. In this case, taking away the gaming console should reduce habitual avoidance of homework because the avoidance was triggered by the same cue that prompted the habitual alternative behaviour (i.e., the console itself). If habitual avoidance is intrinsically linked to a habitual alternative behaviour, we would expect that habitual-avoidance levels to be positively related to the habit levels of a common alternative activity. In addition, avoidance patterns and common alternative behaviours should share similar environmental triggers.

Methods

Participants

Forty-eight university undergraduates (31 females) participated for course credit or pay (at a rate of $5/hour). The sample consisted primarily of students whose first language was English (n = 42). Most students reported their ethnicity as either Caucasian (n = 25) or Asian (n = 11). The academic majors of the participants included arts (n = 28), science (n = 11), math and/or computer science (n = 6) and engineering (n = 3). Most students in the sample were enrolled in a full-course load at the time of the study (mean number of courses = 4.2; SD = 1.5).

Procedure

Participants came into the laboratory to complete a number of questionnaires and responded to questions from a semi-structured interview developed for the purpose of this study (see Appendix

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A). They were told that the focus of this study was on tasks that they think are important – yet sometimes avoid because task performance is either unpleasant and/or unrewarding. Participants listed several examples of tasks they were presently avoiding. Then two avoided tasks were chosen as the focus of the remainder of the study (see Figure 4).

The first task was selected because it was avoided frequently whereas the second task was chosen because it was avoided much less often. This was done to exploit the known relation between frequency and habitual tendencies by maximizing the differences in avoidance frequency between the two patterns. A package of questionnaires associated with the task avoided most frequently (i.e., task "A") was then completed. This package also queried about what activity is normally engaged in *instead* of that task (i.e., activity "B"). This entire process was then repeated for the task avoided much less frequently (i.e., task "C") and its corresponding alternative behaviour (i.e., activity "D"). To gauge how often habitual avoidance may be tied to particular alternative behaviours, for both avoided tasks the experimenter asked about the percentage of time that the listed alternative behaviour was the activity performed. The entire procedure took approximately 120 minutes.

Avoided Task	Frequency of Avoidance	Common Alternative Activity
A "Studying"	↑	**B** "Watching television"
C "Cleaning room"	↓	**D** "Playing video games"
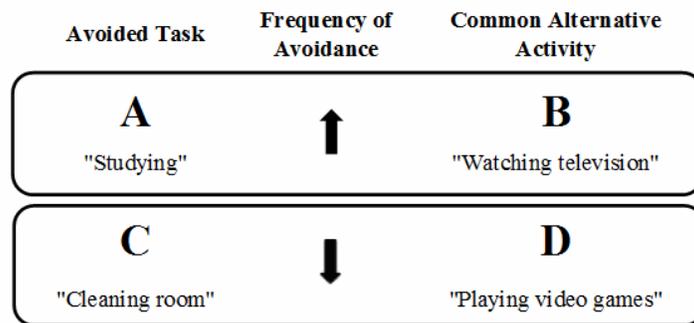
Figure 4. An example of Two Avoided Tasks and their Respective Alternative Activities.

Measures

Adult Inventory of Procrastination (AIP; McCown & Johnson, 1989). The AIP purportedly measures procrastination tendencies that are motivated by the avoidance of task aversiveness and outcomes related to task performance (e.g., revealing one's incompetence; Ferrari, 1993b). Hence,

the AIP is a measure of *avoidant procrastination*. The scale contains 15 items that asks participants to rate their level of agreement using a 5-point Likert scale (from Disagree to Agree). Sample items include, "I am not very good at meeting deadlines" and "Putting things off till the last minute has cost me money this year." This unidimensional scale also has an acceptable level of internal consistency (e.g., alpha = .79; McCown & Johnson, 1989).

Cognitive-Behavioural Avoidance Scale (CBAS; Ottenbreit & Dobson, 2004). The CBAS is a 31 item self-report scale that assesses both cognitive and behavioural avoidance in both social and non-social aspects of one's life. The CBAS has four scales representing avoidance in Behavioural Nonsocial (e.g., "Rather than getting out and doing things, I just sit at home and watch TV"), Behavioural Social (e.g., "I avoid attending social activities"), Cognitive Nonsocial (e.g., "I avoid making decisions about my future"), and Cognitive Social (e.g., "I just wait out tension in my relationships hoping that it will go away") domains. Each of these factors are reliable (alpha's from .75 to .86), and are moderately correlated with each other (r's between .39 and .57; Ottenbreit & Dobson, 2004). Of particular interest were the two scales of nonsocial avoidance. Items on the CBAS are rated using a 5-point Likert scale with higher scores indicating increased avoidance.

The following measures were included in packages presented to participants for each avoided task and associated alternative activity. Packages contained all the content outlined below. For ease of exposition, the measures are grouped below according to content (e.g., attitude measures for each avoided task are reported together). Unless otherwise specified, measures consisted of single items presented in likert-format with responses ranging from one to seven. Appendix A contains the full set of measures in the item order presented to participants.

Attitudes. It follows that strong negative attitudes about a task (or positive attitudes towards avoiding that task) may lead to repetitive avoidance behaviour (e.g., Ajzen & Madden, 1986) that could develop into habit. Attitudes were assessed both toward the avoided task and toward the

alternative activity normally carried out instead. Participants' attitudes were measured using bipolar adjective pairs (i.e., pleasant/unpleasant; good/bad; positive/negative; rewarding/unrewarding; boring/fun; pleasurable/painful) both toward the experience of performing the activity (i.e., short-term attitude) and toward the fact that one engaged in the activity (i.e., long-term attitude about having performed or avoided each task).

Intentions and Related Constructs. Participants rated their intentions when avoiding each task in addition to variables involved in the formation of intentions (see Ajzen & Madden, 1986). Specifically, they were asked whether people in their lives believe they should engage in (and not avoid) a particular activity (social pressures) and about beliefs regarding their ability to do the task (self-efficacy). Outcome measures about task quality and task completion were also assessed.

Avoidance and Alternative Activity Habit Indices. The Self-Report Habit Index (SRHI; Verplanken & Orbell, 2003) was used to assess the level of habit associated with each specific alternative activity (i.e., tasks "B" and "D"). In addition to past frequency, this 12-item scale measures whether the behaviour is experienced as occurring relatively automatically (i.e., with lack of awareness, difficulty to control, and with mental efficiency) as well as whether the behaviour has become part of one's self-identity. Across numerous studies the internal reliability of the measure is high (alphas mostly above .90; Verplanken & Orbell, 2003) and has discriminant and predictive validity across a number of domains (e.g., eating habits; Brug, de Vet, de Nooijer, & Verplanken, 2006). Modifications were made to the SRHI to test whether the tendency to *avoid* can be habitual. Whereas the items of the SRHI are normally used to assess the habit-level of a specific behaviour (e.g., "Watching television is something…I do without thinking"), item modifications were required to assess the tendency to *avoid* a particular behaviour (e.g., "Doing homework is something… I avoid without needing to think about it"). Hereafter this scale is referred to as the Avoidance Habit Index (AHI; see Appendix A).

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Environmental Features. Participants were asked to list features of their immediate environment typically present when they avoid or perform the alternative activity. They also rated how often these features are present and how much these affect behaviour. One open-ended question asked participants to describe how these features affected their actions. Whether the avoidance (or behaviour) often occurs in the same physical location, at the same time of day or in the presence of other people was also assessed. Participants also rated whether they typically feel the same way, and were asked an open-ended question about how they have felt when they avoid (or perform) the activity.

<div align="center">Results</div>

Task Characteristics

Ferrari and Scher (2000) documented how academic tasks are often completed less often than non-academic tasks. The same findings also demonstrated that college students also procrastinate on tasks unrelated to school. The present self-report data is consistent with these observations.

Three independent raters categorized each avoided task into one of three separate categories: academic tasks, household chores, and a miscellaneous category. Across raters, the mean kappa coefficient was .81. Interviewer ratings were then used to resolve discrepancies. For the most frequently avoided task (i.e., Task A), most often the avoided activity was either academic in nature (e.g., studying; N = 27) or involved a household chore (e.g., cleaning; N = 11). The remaining tasks included an assortment of miscellaneous items that were avoided (e.g., completing a tax return; N = 10). For the tasks that participants avoided much less frequently (i.e., Task C), the number of household chores (N = 11) remained the same. However, the proportion of academic tasks avoided were lower (N = 14) and the number of reported miscellaneous tasks were higher (e.g., paying bills; N = 23), compared to the tasks avoided much more frequently.

For each avoided task selected, participants were also asked to report the activity they normally engaged in instead of the task they were avoiding. The mean kappa coefficient among the raters was .90. Many of these activities fell into three general categories: solitary entertainment, socializing, and other productive tasks. The alternative behaviour normally associated with the most-frequently-avoided task (i.e., activity B) most often included solitary entertainment (e.g., watching television; N = 25). To a lesser extent, the most-frequently-avoided task was associated with activities related to socializing (e.g., talking with friends; N = 12), other productive tasks (e.g., tidying up; N = 8) or miscellaneous activities (e.g., sleeping; N = 3). The alternative behaviour normally associated with the less-avoided task (i.e., activity D) included similar frequencies of activities related to solitary entertainment (e.g., playing video games; N = 27), socializing (e.g., go out with friends; N = 7), other productive tasks (e.g., homework; N = 12), and other miscellaneous activities (e.g., go to the donut shop; N = 2).

Normative and Reliability Data for Habit Scales

Internal consistencies for the AHI scales associated with the avoidance of tasks A and C (and the alternative activities) are reported in Table 1. These reliability coefficients were reasonably high.

Table 1

Descriptive Statistics for Habit Scales Associated with Task Avoidance (AHI) and the Alternative Activity

		Standardized Coefficient Alpha	Total Score Mean	SD
Avoidance (AHI)	Task A	.88 (n = 48)	59.8	13.1
	Task C	.94 (n = 48)	42.0	17.6
Alternative Activity	Activity B	.89 (n = 48)	66.6	14.0
	Activity D	.95 (n = 48)	64.9	16.0

Note. Higher Total Scores Indicate a Greater Degree of Habit Level.

Construct Validity of Habitual Avoidance

Frequent avoidance of an unpleasant task should be experienced in a similar way as other habits might (i.e., with a high degree of automaticity and a high degree of relevance for self-definition). The central test of validity compared the habitual avoidance level of the most-frequently-avoided task to that of the less-frequently-avoided task. Total habit scores were calculated for each avoided task by summing the items of each habit scale. Three items from these indices directly assessed frequency and were removed for this analysis. The critical related-samples t-test confirmed that the avoidance associated with the more-frequently-avoided task is experienced as more habit-like than the avoidance associated with the task avoided less often, $t(47) = 4.7$, p < .01; partial eta squared = .32.

The second method for testing construct validity treated each task as an independent event (96 avoided tasks in total) and used AHI scores to predict other constructs. A series of multi-level analyses were conducted to determine whether task observations were independent for each criterion variable. This was necessary because tasks were nested within participants. Intraclass-correlation coefficients (ICC's) were calculated which represent the proportion of shared variance in the criterion scores that is attributable to the grouping variable – in this case *participant*. For relations wherein the ICC was negligible ($\leq$ .01), simple zero-order Person correlations were used. However, relations with substantial ICC's ($\geq$ .09) were examined by allowing mean participant scores to vary randomly in a series of multi-level analyses. Standardized fixed effect (SFE) relations between AHI scores and these variables were then used to interpret the strength of these relations (see Bickel, 2007). In essence, SFE's represent average relations among variables that are observed within each participant.

Frequency of Avoidance. Provided the known relation between behavioural frequency and

felt automaticity (e.g., Verplanken & Orbell, 2003), the experience of avoiding tasks habitually

should be positively associated with the frequency of task avoidance. The three frequency items on

the AHI measures (standardized alpha = .75) were summed to create a total frequency of avoidance

score for each pattern. The zero-order correlation demonstrated a substantial relation between

frequency of past avoidance and habit level (r = .87; p < .01).

Attitudes.   Separate total scores were created for participants' short-term attitudes towards

the task avoided and about the avoidance itself. Scores for negative items were reversed and all

items were averaged to create positive attitude scores. Average scores were also calculated for

participants' long-term attitudes. With respect to short-term attitudes towards the avoided task (alpha

= .75), there was a significant correlation between participants' short-term attitudes towards each

avoided task and the level of habitual avoidance experienced for that task (r = -.30; p < .01). This

pattern was consistent with long-term attitudes about the task (alpha = .78), suggesting that less

favourable long-term attitudes were related to more habit-like avoidance (SFE = -.23; p < .05).

Although there was no evidence that short-term attitudes towards *avoiding* a particular task predicted

AHI scores (SFE = .08; p > .05), there was a trend indicating that negative attitudes towards having

avoided the task were associated with habit-like avoidance patterns (SFE = -.19; p < .10).

Social Pressure / Self-efficacy. Measures of social pressure (rated with items ranging from 1

to 7) provided no evidence for relations between social pressure to engage (mean = 6.3; SD = 1.2), or

not avoid (mean = 2.2; SD = 1.8), the task (respective SFE's of .16 and -.13; p's > .05). However, it

is possible that these results reflected statistical ceiling/floor effects which were produced by high

levels of perceived social pressure. Similarly, there was no suggestion that self-efficacy beliefs were

related to habit-like avoidance patterns (SFE = -.05; p > .05), likely due to high endorsement rates

(mean = 6.1; SD = 1.2).

Intentions. A small relation between intentions to avoid and increased habit-like avoidance was observed (SFE = .22; p < .05). Future intentions to avoid were also related positively with habitual avoidance (SFE = .25; p < .05).

Predictive Validity. Associations between habitual qualities and task quality/completion were examined. As expected, experience of avoidance as habitual was associated with both reduced task quality (SFE = -.23; p < .05) and reduced levels of eventual task completion (r = -.31; p < .01). To explore the association more thoroughly, a hierarchical linear regression analysis was also used to predict task completion.   All motivational variables were entered on Step 1 (i.e., attitude towards the task and avoidance of the task; self-efficacy; social pressure; intentions); Step 2 included only the habitual avoidance score for each task. The group of motivational variables entered on Step 1 together predicted significant variability in the level of task completion F(9,95) = 3.0; p < .01.; $R^2 =$ .24. Importantly, Step 2 accounted for a significant increment in prediction of task completion over-and-above the motivational variables that may have led to the original habit formation ($F_{change}(1,95) =$ 4.6; p < .05; $\Delta R^2 = .04$).

Nature of Habitual Avoidance

Characterizing habitual avoidance includes describing whether the avoidance simply entails the absence of behaviour (i.e., avoiding homework to perform *any* other task) or whether habit-like avoidance more often results in the engagement of a particular alternative activity. In the present data, a positive relation was observed between habitual avoidance and the percentage of time that the common alternative was the chosen activity (SFE = .21; p < .05).

However, the results provided no evidence of a correlation between habitual avoidance and habit-level of the alternative behaviour (r = .00; p > .05).

Participants rated the extent to which they think about the consequences of their avoidance behaviour *while* they avoid. A prediction might be made that relatively habitual behaviour is done

independently of conscious-thought processes. However, there was no evidence that participants were less mindful of consequences when avoidance was habitual (SFE = .14; p > .05).

Environmental Triggers

There was no evidence that general variables such as stability of location (SFE = .04), time of day (SFE = .10), or whether others are consistently present (SFE = .08; all p's > .05) were associated with more habitual avoidance patterns. However, in contrast to previous work examining pre-specified behaviours (e.g., Wood et al., 2005) an idiosyncratic approach was used here such that participants could select any avoided task. This approach created a heterogeneous set of tasks and features that may have triggered the avoidance pattern.

Reported features typically present during the avoidance could be described as items associated with the aversive task (e.g., textbooks related to avoiding homework; n = 38), the alternative activity (e.g., video-game console to play; n = 42), or both (n = 2). Two raters categorized each feature as either *physical* (e.g., textbooks) or *non-physical* (Kappa = .82). Discrepancies were resolved by a third rater. Non-physical features often included task constraints (e.g., avoiding the task due to a lack of time) or task hurdles (e.g., not attending office hours because of inconvenience). One prediction is that physical triggers may represent cues that are a part of a stable environmental context in which the avoidance (and common alternative) has occurred repeatedly over time. In contrast, non-physical triggers associated with practical constraints (e.g., time constraints) may not be associated with habitual avoidance to the same degree because this type of avoidance may not be tied to a particular environmental context. To test this hypothesis, the level of habitual avoidance associated with each type of trigger was compared. An independent-sample t-test revealed that avoidance was more habit-like when identified environmental features were *physical features* (n = 71; mean = 53.6; SD = 17.5) as compared to *non-physical* features

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representing practical constraints on performing the task itself (n = 25; mean = 43.3; SD = 16.9; t[94] = 2.6; p < .05).

Participants also reported *how* their identified environmental feature(s) typically affect their behaviour. Common examples included how cues to avoid signal (or initiate) avoidance (e.g., a stack of books is a reminder of work) and how cues for the alternative activity are enticing in nature (e.g., the television affords a good distraction). Participants were asked how frequently that feature is present when they avoid task A (mean = 6.1; SD = .82) and task C (mean = 6.0; SD = 1.2). Given the high rates of endorsement for this item across both tasks, it is unsurprising that there was no relation between frequency of the feature and habitual avoidance (SFE = .01; p > .05). Participants were also asked to rate the extent to which they believe the identified feature affects their avoidance behaviour. Here, participants' beliefs about how the feature affects their behaviour were positively associated with habitual avoidance (r = .26; p < .05).

Finally, participants were asked whether they typically feel the same way while avoiding. Typical responses often included negative emotions including guilt, anxiety and sadness. Participants reported having more stable emotions while avoiding tasks when the avoidance was experienced as more habitual in nature (SFE = .22; p < .05).

Trait Analyses. As described above, the AIP measures *avoidant procrastination* tendencies – i.e., putting off a task because of task aversiveness or negative aspects of performing the task (e.g., due to a fear of failure). The CBAS assesses both cognitive and behavioural avoidance in both social and non-social aspects of one's life. Although the former has been shown to predict the delay of tasks, the latter has demonstrated relationships with more deleterious outcomes including symptom measures of depression and anxiety (e.g., Ottenbreit & Dobson, 2004). Therefore, the relationship between these two trait measures was examined here. The results of a correlational analysis revealed a modest relation between the AIP and the CBAS, r = .29; p < .05.

Discussion

The main goal of this study was to determine whether frequent avoidance patterns can display habitual qualities. The expectation was that the act of avoiding a frequently-avoided task should be experienced as an automatic phenomenon as compared to unpleasant tasks that are avoided less frequently. The results presented here confirm that frequent avoidance of a particular task can in fact result in avoidance patterns that take on the qualities of habit.

Habitual avoidance was associated in expected ways with motivational variables. There were negative relations found between attitudes toward the avoided task (in both the short- and long-term) and the level of habitual avoidance. There was also evidence that the intention to avoid is directly related to habit-like avoidance. No relations were observed between habitual avoidance and self-efficacy and/or social pressures – potentially due to ceiling/floor effects.

The fact that task attitudes and intentions were associated with habitual avoidance may speak to the original development of the habit itself. Like many everyday habits (e.g., strapping your seatbelt), the avoidance of an unpleasant task may have initially been informed by motivational tendencies and/or were driven by strong intentions. However, a recent model of how goals and habits interface with one another (Wood & Neal, 2007) describes the relative contribution of habits and goal-related constructs when both habits and goals dictate the same response. Once a habit is formed the habitual response itself is triggered by environmental cues independent of goals and intentions. When a behaviour becomes habitual, "goals in effect are rendered epiphenomena, as action control is outsourced to context cues that reliably co-varied with past performance" (Wood & Neal, 2007; p. 853). Research on habits suggests that future intentions to break habitual avoidance patterns may prove difficult for students. The present data also suggest that habitual avoidance is related to lower levels of quality of performance and less *eventual* task completion – even after controlling motivational variables like intentions.

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Participants more often chose the same alternative activity when avoiding habitually. However there was no evidence that habit level of avoidance is tied directly to the habit level of the alternative activity. Therefore, it is unlikely that habitual avoidance patterns are functionally equivalent to habit-like alternative behaviours. For example, the habitual avoidance of studying is likely not the by-product of a video-gaming habit. Instead, habitual avoidance appears to work independently of the habit-level of alternative activities which makes it unlikely that the cues that trigger the activation of the habitual avoidance pattern are the same cues that trigger other habitual alternatives. The construct of habit-like avoidance appears to be separable from habit-patterns of common alternative activities.

Nevertheless, participants did tend to select the same alternative activity more when the avoidance was habitual. Although the magnitude of this relation was small (i.e., .21), responding in the same fashion when avoidance is habit-like is consistent with the notion that the AHI measure used here is assessing habits which are not mediated by conscious goals. Whereas goal-dependent behaviour may be accomplished via a number of acceptable responses which satisfy the goal (i.e., any activity that is not the avoided task), here habit-like avoidance tended to be associated with a single alternative activity, suggesting that such instances may involve less conscious deliberation about the choice of the alternative activity.

With respect to environmental features, the data were consistent with the expectation that physical features prompting participants to avoid (or engage in the alternative activity) would demonstrate a greater association with habitual avoidance than non-physical features representing barriers to task completion – possibly because the latter type of avoidance does not consistently co-vary with physical features in the environment. In addition, triggers associated with more habit-like avoidance reportedly had more of an effect on whether participants avoided the task. Taken together,

this evidence is consistent with habit-like avoidance triggered by salient contextual cues in one's environment.

Another stable cue associated with habit-like avoidance came from within participants' *internal* milieu. Habitual avoidance was related to experiencing stable emotional states like anxiety and guilt. From the present data, however, it is unclear whether stable feelings work as a cue to behave or are a consequence or product of counter-intentional behaviour.

An analysis of secondary interest was conducted that involved trait-procrastination and trait-avoidance. Although statistically significant, the observed relation between procrastination and pathological avoidance was somewhat smaller than expected. One possibility for this result is that the procrastination items on the AIP focus exclusively on one's ability to effectively meet deadlines in a timely manner whereas the CBAS consists of items in which a deadline is not clearly specified. This measurement issue may reflect the current state of the psychological literature wherein the exact relation between procrastination and avoidance has not been clearly outlined. Another possible theoretical difference may surround the motivational ambivalence towards competing task alternatives. For example, it is possible that, at the trait level, chronic procrastinators are *simultaneously* motivated to avoid aversive tasks *and* also wish to engage them (i.e., procrastinators may experience high levels of motivational ambivalence). Alternatively, the strong avoidance-motivations of the chronic task-avoider may work largely in the absence of any motivations to approach aversive tasks (i.e., an experience of low motivational ambivalence). It is important to note here that the avoided tasks used in this study were selected specifically because they were important to participants. Thus, we can be somewhat confident that the processes examined here explore task avoidance that does involve some degree of ambivalence.

To summarize, the demonstration that avoidance patterns can become so entrenched they begin to take on the qualities of habit is important because habits are known to be less responsive to

intentions and are instead initiated directly by environmental cues. Paper piles littering a student's

dorm-room may represent more than clutter on the floor – they may also trigger entrenched

avoidance. Further, habitual avoidance patterns may weaken the effects of good intentions to stop

avoiding and may be particularly difficult to modify without a corresponding change in

environmental context. Effectively breaking avoidance patterns may involve a number of context

change-strategies for students including tidying paper piles or choosing to study in places absent of

avoidance cues.

The conclusions from Study 1 must be somewhat tempered by its limitations. The causal

inference of one variable on another requires that at least three criteria be met including that (1) the

cause precedes the effect in time (temporal precedence), that (2) the two variables are related

(covariation) and that there (3) are no plausible alternative explanations for the observed relation

(nonspuriousness; e.g., Pelham & Blanton, 2003). Although there is clear evidence of covariation

between habitual avoidance and the other constructs examined here (e.g., between habitual avoidance

and reduced task completion), naturally, it is difficult to eliminate all possible alternative

explanations for the observed relations. Despite attempts in Study 1 to control for many of these are

variables statistically (e.g., intentions) there is always a possibility that correlational results are the

product of unexamined variables. However, the most salient weakness of Study 1 is its self-reported

and retrospective nature – which fails to meet the criterion of temporal precedence and makes it

difficult to establish the directionality of the observed relations (e.g., whether intentions predict

behaviour and not that behaviour leads to biased and retrospective reporting of intentions).

Establishing temporal precedence is particularly important for establishing the relation between

intentions and behaviour given that intention-behaviour gaps are viewed as a quintessential form of

self-regulatory failure. Thus, a prospective design was adopted for Study 2 wherein a number of

independent variables were measured at Time 1 followed by behavioural outcomes at Time 2 one-

week later. This type of approach has the added benefit of reducing the need for participants to

retrieve personal experiences that have occurred in the distant past.

Study 2

In addition to building on the construct validity of habitual avoidance from Study 1, a main goal of the second study was to investigate the possible relation between the executive-functioning ability of inhibition and trait-level procrastination. Procrastination is often conceptualized as self-regulatory failure. In addition, the fact that procrastination has known relations to constructs like impulsivity and low self-discipline makes it likely that the ability to inhibit dominant behaviours (e.g., television watching) is one executive function that may be relatively impaired in chronic procrastinators. Compared to non-procrastinators, chronic procrastinators should demonstrate impaired executive functioning on a set of computer tasks used to assess the ability to inhibit prepotent responses.

Another general goal of Study 2 was to investigate factors that may impede one's ability to behave in a way that is consistent with the intention to complete arduous tasks. This was investigated at both the level of behaviour and at the level of the person. Participants were asked about their intentions to complete unpleasant, but important tasks. One week later they reported on their actual behaviour. At the behavioural level, the extent to which behaviours were avoided *habitually* was assessed to determine whether this construct moderated the observed intention-behaviour relation with respect to specific behaviours. A larger discrepancy between intentions and behaviour for tasks that are typically avoided in a habit-like way was also expected. For tasks avoided in an 'automatic' and habit-like way, intentions should not predict behaviour well. By comparison, tasks not associated with habit-like avoidance should more closely follow one's previous intentions.

At the person level, individual differences in the ability to inhibit prepotent responses were measured to determine whether one's executive-functioning abilities moderate the relation between intentions and actual task completion. Individuals with relatively strong executive functioning

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should follow through with their intentions to perform tasks (i.e., not avoid) even though tasks are often aversive to perform. Individuals with weak executive functioning, however, should not follow through with previous intentions to the same extent – precisely because they are unable to inhibit prepotent responses that are more immediately reinforcing (e.g., are more pleasurable than the intended task) or are more susceptible to cues that trigger other behaviour.

Wood and Neal (2007) recently outlined an empirically-based model describing the interface between goals and habits and how these systems interact when in conflict with one another. An understanding of this model may help to unpack the joint effects of habit-like avoidance and inhibitory abilities. According to this account, self-control is required to override habitual behaviour that is automatically cued and "exerting such control depends on available regulatory capacity to inhibit the unwanted habit" (p. 851). Notably, this is commensurate with TST's conceptualization that individuals with greater self-regulatory capacity should be better equipped to inhibit prepotent responses. Such a framework suggests a clear prediction with respect to how habitual avoidance and inhibitory abilities should interact. Tasks that are not avoided habitually should directly follow one's intentions to act because there is no conflict between current intentions and a previous habitual response. However, when habitual avoidance is present, a conflict arises between the habitual response to avoid and one's good intentions to carry out the unpleasant task. In such instances, the ability to inhibit prepotent responses should be a saving grace – allowing individuals with better inhibitory abilities to override prepotent avoidance patterns.

<div align="center">Methods</div>

Participant Recruitment and Sample

A large group of students enrolled in introductory psychology courses completed a package of surveys at the beginning of either the Fall or Winter school term. A subset of participants from this group was permitted to volunteer for the present study based on their AIP scores. English

fluency was also required for participation. A stratified-sampling procedure was utilized such that scores from each tail of the distribution of AIP scores were oversampled. Half of the students eligible to volunteer in the study had AIP scores of at least one standard deviation either above or below the mean of AIP scores. In a normal distribution, only thirty percent of the distribution would be expected to contain scores deviating from the mean to this extent. The remaining half of students eligible to volunteer were randomly selected from the middle segment of the distribution of AIP scores. This procedure ensured that variance in avoidance tendencies would be maximized, while still allowing for variables of interest to be continuous in nature for analytic purposes.

One-hundred and thirty-nine university undergraduates (97 female) participated in the study. The mean age of the sample was 19.5 years (SD = 2.4) and most participants were enrolled in Arts (N = 85), Science (N = 29), Health Studies (N = 15) or Math or Computer Science (N = 8). The most commonly identified ethnicity was Caucasian (N = 94) followed by Asian (N = 24). All participants reported speaking English for at least twelve years at the time of the study.

Procedure

Session Design. The study was comprised of two sessions. Time 1 consisted of a laboratory session requiring between 60 to 90 minutes. Participation at Time 2 occurred on-line one week later. Research on public commitment effects shows that people follow through with their intentions more if intentions are stated publicly and they are aware that their behaviour will be monitored (e.g., Schlenker, Dlugolecki, & Doherty, 1994; e.g., when compared to private intentions left unmonitored). Participants were therefore run individually and the follow-up session was an on-line format (as opposed to a laboratory session) to increase anonymity, thereby reducing these effects. The on-line session took approximately 30 minutes to complete and could be completed at a location of the participant's choosing. All participants were run individually. In addition to course credit,

participants who completed the surveys at Time 2 had their names entered into a draw for prizes including a restaurant gift certificate and a music player.

Timing. The timing of participation was restricted. Study sessions were only scheduled after the first month of the academic term had passed and participation had to be completed before the last month of the academic term had begun. The rationale for a later start in the term was to give students enough time at the beginning of each term to establish prepotent avoidance patterns towards academic tasks. At the end of a term, students are typically given time off to prepare for exams. This period was not investigated because anecdotal evidence suggested that some students leave campus during this time. The researcher running participant sessions was blind to participant AIP scores.

Time 1. In session one, individual participants came into the laboratory and completed three computerized tasks assessing the executive ability of inhibition. The presentation order for the three tasks was counterbalanced across participants. Next, participants completed personality questionnaires including measures of conscientiousness, neuroticism, procrastination, chronic-task avoidance, self-efficacy, impulsivity, and self-control. Finally, one *Future Intended Activity Report* (FIAR) was completed for each important but unpleasant task they believed they *should work on* in the following seven days. All materials are outlined in detail below.

Time 2. On the morning of the seventh day following the initial session, an e-mail reminder was sent to the participant requesting completion of the on-line component sometime between 6:00 pm and 11:59 pm. If participants failed to complete the on-line component that day, identical reminder e-mails were sent in the morning of subsequent days until either the surveys were completed or five days had passed.

The on-line component included completing a series of *Past Intended Activity Reports* (PIARs) – one for each task reported on the FIARs one week earlier. Among other things, the PIAR

assessed what percentage of their intended actions they actually accomplished and the number of hours they engaged in each task. Participants also completed the *Avoidance as Habit Index* (AHI) for each task which assesses the extent to which the participant typically avoids that task and whether the avoidance is experienced as relatively 'automatic.' At the end of the on-line session, participants were debriefed and thanked for their participation.

Measures

Executive Function. Three computerized tasks were used to assess the executive function of *inhibition*. E-Prime experimental software (Psychology Software Tools, 2002) controlled the timing and presentation of stimuli and logged responses and response times (RTs). Stimuli were presented on a standard 17" SVGA color monitor.

The first task was the Go/NoGo task used by Hall et al. (2007). For this task, participants were presented with a series of individual letters of either upper case or lower case. Trials were separated by a fixation cross. Participants were instructed to hit the 'enter' key each time a LOWER CASE letter was presented. In addition, they were told to refrain from pressing the 'enter' key on trials when UPPER CASE letters were presented. Participants began by completing a block of 12 practice trials (with equal number of upper and lower case letters) after which the experimenter emphasized the importance of speed and accuracy before commencing with the experimental trails. The experimental phase consisted of eight blocks of 60 trials. In half of the blocks lower case letters predominated ('Go' phase blocks) and in the remaining blocks upper case letters predominated ('NoGo' phase blocks). Following Hall et al. (2007), the dependent measure was overall RT to the target letter, collapsed across blocks.

The second task was the variant of the Stroop (1935) task described by Miyake et al. (2000). Participants were asked to name the color of a stimulus aloud as quickly as possible on each trial, with RTs measured by a voice key. Errors were coded by a male experimenter who entered

responses via keyboard while sitting in the room with the participant. The experimental trials

commenced after 30 practice trials. The experiment proper consisted of a single, mixed-block of

trials wherein stimuli included a string of asterisks printed in one of six colours (i.e., blue, green,

orange, purple, red, yellow; 60 trials), a colour word printed in a different colour (e.g., RED printed

in blue colour; 60 trials), or a colour word matching the printed colour (e.g., RED in red; 12 trials).

The difference in RTs when comparing asterisk trials to incongruent trials was the dependent

measure.

Also following Miyake et al. (2000), the final measure of inhibition was the antisaccade task

(Hallett, 1978; Roberts, Hager, & Heron, 1994). Each trial began with a fixation cross at the centre

of the screen – presented for one of nine randomly selected times (between 1500 and 3500

milliseconds (ms) in 250 ms intervals). Next, a visual cue (0.4°) was then presented for 225 ms on

one side of the display. Directly following, a target was presented on the *opposite* side of the display

for 150 ms, and was masked by a cross-hatched pattern. This occurred on every trial. The visual cue

was a simple black square, followed by the target which was an arrow (pointing left, up or right)

placed in the centre of a square box. On each trial, participants were required to press the button that

corresponded to the direction of the target arrow. Both the cues and targets appeared the same

distance from the centre of the screen (3.4 inches). After 22 practice trials, participants completed a

single block of 90 experimental trials. For this task, the dependent measures were the proportion of

correct experimental trials and RTs.   Naturally, what makes this task challenging is that the

participant must inhibit reflexively looking in the direction of the cue in order to correctly orient

attention toward the arrow presented on the opposite side of the screen. The antisaccade task is,

therefore, a good measure of one's ability to inhibit prepotent responses to external cues.

Cognitive-Behavioural Avoidance Scale (CBAS; Ottenbreit & Dobson, 2004). This scale is described in detail in Study 1. This inventory is included with all paper-and-pencil measures used for Study 2 in Appendix B.

International Personality Item Pool (IPIP; Goldberg, 1999). Given their known relation to procrastination tendencies, the personality dimensions of conscientiousness (including self-rated items such as, "Carry out my plans") and neuroticism (e.g., "Get upset easily") were each assessed using 10-items scales from the IPIP. According to Goldberg (1999), both of these dimensions have demonstrated good internal consistency (alphas of .92) and correlate highly with corresponding domains from other Big-5 measures like the NEO inventory (r's of .79 and .82, respectively). Participants rated their level of agreement with each item (from strongly disagree to strongly agree) using a 5-point Likert scale. Higher scores indicate higher levels of each trait.

Adult Inventory of Procrastination (AIP; McCown & Johnson, 1989). Characteristics of the AIP are presented in Study 1.

General Procrastination Scale (GPS; Lay, 1986). This 20-item scale requires participants to rate their level of agreement with a number of statements using a 5-point Likert format (e.g., "I usually buy an essential item at the last minute"). The procrastination tendencies assessed by the GPS are believed to be driven by the individual's need for sensation or thrill-seeking (Ferrari, 1992; 1993; however, see also Simpson & Pychyl, 2009). As such, this is purportedly a measure of *arousal procrastination*. This measure has demonstrated a high degree of internal consistency over a number of studies (i.e., alphas normally above .80; Ferrari, et al., 1995).

Aitken Procrastination Inventory (API; Aitken, 1982). The API is a 19-item measure that was developed to identify procrastinators in college samples. Participants rate whether each statement is more or less true about them (e.g., "I am often frantically rushing to meet deadlines"). The API has demonstrated good reliability (e.g., alpha = .82; Aitken, 1982) and appears to assess

procrastination that is motivated by fear of failure and sensitivity to the aversiveness of tasks (Ferrari et al., 1995).

New General Self-Efficacy Scale (NGSE; Chen, Gully, & Eden, 2001). The NGSE Scale measures participants' general self-efficacy. This includes the extent to which they "view themselves as capable of meeting task demands in a broad array of contexts" (Chen, et al., 2001; p. 63). For this 8-item scale, participants rate their level of agreement for each statement (e.g., "I will be able to successfully overcome many challenges") on a scale that ranges from 1 (strongly disagree) to 5 (strongly agree). The NGSE has demonstrated good reliability (alpha's between .85 and .88), successfully predicts achievement performance (e.g., exam scores), and is empirically distinct from related constructs like self-esteem (Chen, et al., 2001).

Impulsivity Inventory (Dickman, 1990). According to Dickman (1990; 2000), impulsivity is a two-dimensional construct that includes both functional and dysfunctional impulsivity. Whereas *dysfunctional impulsivity* is understood as a tendency to, "act with less forethought than most people of equal ability," (Dickman, 1990; p. 95), *functional impulsivity* is the tendency to act with little forethought when doing so is optimal for the self. The former tendency is often associated with negative outcomes, whereas, the latter is related to high activity and successful risk-taking behaviour. The dysfunctional scale contains 12 items (e.g., "Often, I don't spend enough time thinking about a situation before I act"). Similarly, the functional scale contains 11 items (e.g., "I am good at taking advantage of unexpected opportunities, where you have to do something immediately or lose your chance"). Both the dysfunctional (alpha = .85) and the functional (alpha = .74) have acceptable internal consistencies (Dickman, 1990). Participants rated their level of agreement for each item on a Likert scale that ranges from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate higher levels of each dimension of impulsivity.

Brief Self-Control Scale (SCS-Brief; Tangney, Baumeister, & Boone, 2004). Authors of the SCS based the scale on self-regulatory views of behaviour (e.g., Carver & Scheier, 1981). From this framework, self-control is, "the ability to override or change one's inner responses, as well as to interrupt undesired behavioural tendencies (such as impulses) and refrain from acting on them," (Tangney et al., 2004). The scale assesses four domains of self-control including the control of one's thoughts, emotions, impulses and behaviour. The alphas associated with the brief version of this scale (e.g., .83 - .85) indicate that the SCS is a reliable measure of self-control. Among other things, this measure of self-control is associated with better grades, fewer impulse-control problems (e.g., binge eating), and less depression and anxiety (Tangey et al., 2004).

Future Intended Activity Report (FIAR; adapted from Ferrari & Scher, 2000). Ferrari and Scher (Ferrari & Scher, 2000; Scher & Ferrari, 2000) used the FIAR to examine procrastination as the failure to complete *intended* tasks. In their original work, participants had to complete one FIAR for each task they intended to complete in the following 24 hours. The importance of the task was also rated using a 27-point Likert scale with anchors indicating that the task was "not at all important" to "very important." Participants circled the percentage of the tasks they intended to complete in the next day (from 5% to 100% presented in 5% increments). A variant of the FIAR was created for this study. The first major change was the use of multiple indices of intended action. These included the degree to which the participant 'intends,' 'wants' and is 'likely' to do the task (each rated on 11-point likert scales ranging from low- to high-endorsement). The final measure of intention was the number of intended hours to work on each task. Secondly, instead of a 24 hour interval, participants were asked to complete a FIAR for each task they intended to work on in the next *7 days*. This time period was extended in order to (1) more closely resemble the work of Hall et al. (2007) in their study of health-related behaviours, and to (2) maximize the likelihood that we could observe failures of intended action. The third major change surrounded *intentionality*. Namely,

instead of only asking participants to report on tasks they strongly *intended* to complete, they were asked to report on tasks they believed they *should work on* in the next seven days. This change was made to maximize the variance associated with participants' original intention levels. We did not want to ask only about intended tasks (as in Ferrari & Scher, 2000) because this would limit the range of task intention scores, thereby making it difficult to examine any relations between intention and our variables of interest (i.e., habitual avoidance and executive functioning). Tasks instructions also clearly stated that scheduled routines participants were in the habit of doing were to be excluded in favour of effortful tasks that might seem like a chore to actually perform. Finally, although the original measure included rating each task on a number of dimensions (e.g., whether the task was pleasurable), the modified measure omitted these items on the FIAR.

Past Intended Activity Report (PIAR; also adapted from Ferrari & Scher, 2000). Ferrari and Scher (2000; Scher & Ferrari, 2000) used the PIAR in conjunction with the FIAR to investigate failures of intention. Participants completed a PIAR for each task previously reported on using a FIAR. The original PIAR included a likert-rating of the time spent working on the task, a rating about the amount of time actually spent on the activity. Here participants also indicated the, "percentage of what they intended to accomplish that they actually *did* accomplish" (Scher & Ferrari, 2000; p. 258) using a scale that ranged from 0% to "> 100%." The modified version of the PIAR used here included a number of additional items about the task itself including ratings of how boring, difficult, and unpleasant the task was to perform, and how capable the participant felt in completing the task. To get a better sense for why tasks may not have been completed participants were also asked about whether they forgot about the task.

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<center>Results</center>

Time 1 Preliminary Analyses

    Computer Task Performance. Preliminary analyses were completed before calculating

composite inhibition scores from computer task responses. First, error rate data for each of the tasks

were examined. Participants whose performance was characterized by exceptionally high error rates

had their computer task data removed from subsequent analyses. The error rate data from the

antisaccade task revealed one participant who provided no correct responses for one of the response

directions. From the Go/NoGo task performance, five participants had error rates which were thirty

percent or higher. These errors included missing the target when present (i.e., errors of omission) or

hitting the button when they were supposed to inhibit a response (i.e., errors of commission). One

participant also invalidated over twenty percent of trials on the Stroop task by triggering the

microphone inappropriately. In total, this procedure resulted in the removal of task data from five

participants.

    Preliminary analyses for the antisaccade task also demonstrated a statistical ceiling effect for

trials which required participants to identify an upward facing arrow (4% error rate). A within-

subject ANOVA revealed that this was significantly lower than the average error rate for the "left"

(12%) and "right" (15%) arrow responses, $F(1, 138) = 57.8$, $MSE = .012$, $p < .01$. Hence, upward

arrow trials were removed from further analysis.

    For each computer task, the remaining RT data were subjected to a recursive outlier procedure in

which scores falling three or more standard deviations above or below the mean score for each

participant in each condition were eliminated from further analysis (Van Selst & Jolicoeur, 1994).

This resulted in elimination of 1.7%, 1.9% and 3.0% of the RTs from the Go/Nogo, Stroop and

antisaccade tasks, respectively.

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Computer Task Effects. The RT data from trials with a correct response were submitted to separate analysis of variances (ANOVAs) for each task. These confirmed basic RT effects including a block effect for the Go/NoGo task (Go Phase RTs were faster than No/Go Phase RTs; $F(1, 133) = 754.2$, MSE = 849.1, $p < .001$) and an archetypal Stroop effect (RTs on incongruent colour trials were slower than RTs on neutral trials; $F(1, 137) = 663.5$, MSE = 2437.7, $p < .001$). Error-rate analyses mirrored the same pattern of results. No basic effects were calculated for the Antisaccade task given there are no conditions within the task to compare.

Latent Structure of Inhibition

To examine the factor structure of the computer-task data, a confirmatory factor analysis was carried out using Amos 6.0 (Arbuckle, 2005) in which the four standardized dependent variables from the three tasks were allowed to load on the single latent factor labelled by Miyake et al. (2000) as inhibition. Overall, this model provided good fit to the data, $\chi^2(4, N = 134) = 1.78$, p = .777; comparative fit index (CFI) = 1.00, root-mean-square error of approximation (RMSEA) < .001, p = .865. However, given previous reports of women outperforming men on executive ability tasks in both preschool children (Weibe, Epsy, & Charak, 2008) and adults (Yuan, He, Qinglin, Chen, & Li, 2008), the latent factor structure was examined separately for each gender (see Figure 5a and 5b). To test for gender differences in the factor structure, a latent model was created which constrained the four path coefficients to be equal between the genders. This model did not fit as well, $\chi^2(7, N = 134) = 113.97$, CFI = .873, RMSEA = .085, p = .162, and fit statistically worse than an unconstrained model making no assumptions about path equality, $\chi^2_{diff}(3, N = 134) = 12.20, p < .05$. By inspection this appeared to be due to the Stroop effect RTs not correlating well with the other measures for women. Stroop effect RTs were removed as an indicator of inhibition. This final one-factor model (see Figure 5.c) fit the data very well, $\chi^2(7, N = 134) = 3.19$, CFI = 1.00, RMSEA < .001, and no evidence for model differences between genders was evident, $\chi^2_{diff}(2, N = 134) = 1.42, p > .05$.

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Latent inhibition scores produced from this model were used in all subsequent analyses. An independent-samples t-test did demonstrate a mean gender difference which contrasts with previous gender differences in executive functioning. Namely, in this sample of students, men performed better than their female counterparts, $t(132)= 2.0$, $p < .05$.
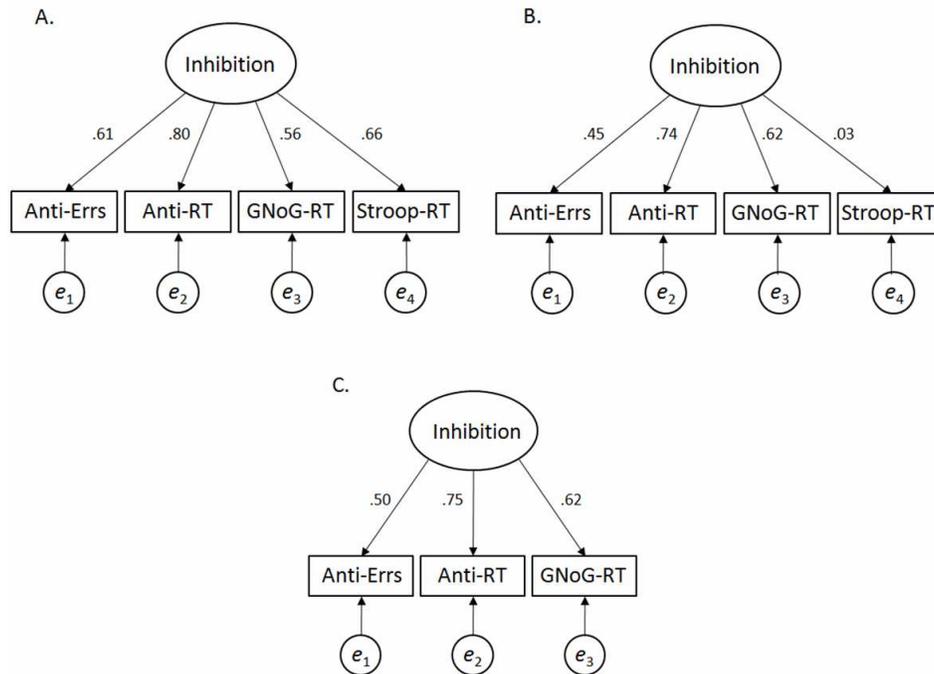
Figure 5: Model of Inhibition. Latent measurement models of inhibition for (A) men (n=42), (B) women (n=92) and the final model (C) which includes the three retained indicators for the entire sample (ignoring gender). The letters e_1 through e_4 represent error variables reflecting imperfect measurement by the respective indicators of inhibition. With the exception of the path to Stroop-RT for women, all paths from the inhibition variable to the indicators are significant at $p < .01$. Anti-Errs = proportion of errors on the antisaccade task; Anti-RT = RTs on the antisaccade task; GNoG-RT = overall RTs on the Go/NoGo task; Stroop-RT = Stroop effect in RTs for the Stroop naming task.

Inhibition and Self-reported Personality

Latent inhibition scores were used to predict procrastination and other person-level constructs. All self-reported personality traits were represented at the latent level using measurement models wherein each questionnaire item represented an indicator of the underlying construct. Overall procrastination scores from the AIP, API and GPS were highly related to each other (mean r = .81; range .79 - .83) and were modelled as three indicators of a single underlying factor. This

model fit the data quite well, $\chi^2(6, N = 134) = 5.08$, CFI = 1.00, RMSEA < .001, and latent scores from this factor were used to represent procrastination.

The gender differences for inhibition reported above prompted separate analyses for men and women. For all relations between inhibition and personality traits, the path representing each relation was constrained to be equal across genders. This model was then compared to an unconstrained model for which this assumption was not made. The observed gender differences using this procedure are reported in Table 2, which also includes the latent relations between inhibition and each trait for both men and women.

Table 2
Latent Inhibitory Ability Scores Predicting Latent Construct Scores of Self-reported Personality –
Reported by Gender (Standard Errors in Parentheses).

Personality Trait	Standardized Relation to Inhibition		Gender Difference
	Males N = 42	Females N = 92	
PROC	-.40† (.21)	-.05 (.14)	n.s.
SCS	.26 (.19)	-.17 (.14)	n.s.
DYS-I	-.54* (.24)	.21 (.16)	$p < .01$
FUNCT-I	.12 (.20)	.11 (.14)	n.s.
GSE	.45† (.27)	.03 (.12)	n.s.
CON	.23 (.21)	.03 (.13)	n.s.
NEUROT	-.54* (.24)	.14 (.13)	$p < .05$
CBAS	-.38† (.22)	.03 (.15)	n.s.

Note. Higher inhibition scores represent increased ability to inhibit prepotent responses. Gender difference = statistical difference in constrained vs. unconstrained models; PROC = latent procrastination score; SCS = latent Self-Control Scale score; DYS-I = latent dysfunctional impulsivity score from the Impulsivity Inventory; FUNCT-I = latent functional impulsivity score from the Impulsivity Inventory; GSE = latent General Self-Efficacy Scale score; CON = latent conscientiousness score; NEUROT = latent neuroticism score; CBAS = latent score from the Cognitive-Behavioral Avoidance Scale. † $p < .10$. * $p < .05$.

The significant gender differences suggest that inhibition predicts dysfunctional impulsivity and neuroticism differentially for men and women. Whereas no relations were observed for women, increased inhibitory abilities were related to reduced impulsivity and less neurotic tendencies in men.

By inspection, however, some of the remaining non-significant group tests may not adequately capture additional relations that seem evident for men but not women. For men, better inhibitory abilities significantly predicted reduced trait-procrastination, better global self-efficacy and less chronic avoidance behaviour (all tests one-tailed). In contrast, inhibition was not a significant predictor of any self-reported personality trait for women. The fact that the group tests between men and women were not significant is likely due to the lack of statistical power required for such comparisons. Nevertheless, the fact that these relations are present within the smaller group of men is a good demonstration that these effects are evident for the male cohort in this sample. Similarly, the relatively large female group allows for increased confidence that substantial effects could have been detected in this sample if they were indeed present. Furthermore, outlier analyses provided no evidence that any individuals unduly influenced the size of the observed relations for their gender (all *standardized dfbeta*'s < 1; Cohen, Cohen, West & Aiken, 2003), and a structural model constraining the variance of inhibition scores between the models for each gender provided no evidence, when compared to the unconstrained model, that the range of inhibition scores differed substantially between men and women, χ^2_{diff} (1, N = 134) = .023, p > .05. Having ruled out these distributional explanations for the observed gender differences, inhibitory ability, at least at the self-reported trait level, appears to have substantive relations with other constructs for men but not for women in this sample of students.

Time 2 Compliance

One-hundred and thirty-one participants (94%) completed the on-line surveys at Time 2. The majority submitted their responses on time (N = 94; 72%) or one day late (N = 24; 18%) with an overall mean of .43 days late (SD = .81).

Task Coding

A total of 1383 tasks (mean = 9.95 tasks/participant) were reported at Time 1. Tasks were coded on several dimensions in order to ensure that participants provided tasks that followed the study instructions, that the tasks could be assessed in terms of eventual completion, and that tasks could reasonably be avoided. These criteria maximized the possibility of observing intention-behaviour failures wherein moderating factors may alter the effect of intentions. Three independent raters were trained using a coding scheme designed for this study (see Appendix C for the detailed procedure). Basic task requirements included that (1) the reported task was fairly clear in what it entailed, (2) performing the task likely required at least moderate effort, (3) task completion was not dependent on unpredictable events (e.g., snowfall), (4) the task was not already scheduled, (5) the task described a behaviour and not the absence of behaviour (e.g., not smoking), the (6) task could likely be avoided or delayed without drastic consequences (e.g., job loss), and (7) the task could reasonably be assigned a particular number of hours to complete.

Two raters first coded all reported tasks for satisfaction of the basic task requirements. The tasks suspected of not meeting all requirements by either rater were categorized as 'pass' or 'fail' according to each of the seven basic task requirements. The inter-rater agreement for excluding items on this basis was high (Kappa = .82). Rater disagreements were then settled by a third independent party. This procedure resulted in the retention of 92% (N = 1272) of the originally reported tasks.

Since the focus was to examine important, but relatively unpleasant tasks, pleasantness ratings on the PIAR were investigated. Tasks rated as being pleasant in nature were removed by selecting tasks that were scored 7 (neutral) or lower on a likert-pleasantness scale that ranged from 1 (very unpleasant) to 11 (very pleasant). A total of 269 (20%) of the original tasks were removed because of this constraint.

After these procedures, participants completing the on-line surveys at Time 2 had a mean number of 7.4 reported tasks that were deemed valid for further analysis. These tasks were the focus of the remainder of the study.

Task Characteristics

Task type was coded by two independent raters (see Appendix C for details). Interrater reliability was high (Kappa = .92) and disagreements were settled by a third rater. Tasks were most frequently academic in nature (e.g., "reading for psychology"; 42%) or involved a household chore (e.g., "cleaning the washroom"; 26%). The remaining tasks included exercising (e.g., "running"; 7%), social acts that were not better described by other categories (e.g., "calling my parents for money"; 4%), and other miscellaneous activities (e.g., "applying for jobs"; 21%).

Intentions and Behaviour

Intentions. Composite intention scores at Time 1 were calculated for each reported task. As described above, the four intention measures on the modified FIAR included likert ratings assessing the degree to which the participant 'intended,' 'wanted' and was 'likely' to do each task and the number of hours intended to spend performing the task. Each of these four intention measures was first standardized *within* each participant such that scores were transformed (to have a mean of zero and a standard deviation of one) based on raw scores associated with all other tasks reported by that particular individual. For example, the 'intended hours' measure was standardized by taking each raw score for a particular participant and subtracting the mean number of hours for all tasks reported by that participant, then dividing the result by the standard deviation for 'intended hours' reported by that participant. This procedure is akin to group-mean centering described in multilevel modelling procedures (see Bickel, 2007).

The benefit of this standardization process is that it equates each of the four intention indices with respect to scale which permits the use of summation in calculating a total score. The use of an

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aggregated composite reduces the influence of errors associated with any particular estimate of intentions (e.g., correctly guessing the number of hours to complete a task). Hence, the four standardized intention scores were summed to arrive at a final composite intention score which was subsequently used as the primary measure of intention level.

One drawback of transforming intention scores in this manner is that intention levels for each task must be interpreted in relation to other tasks reported *by the same participant*. The focus on relative intentions within a person is not particularly problematic here considering that the aim of this study was to examine whether one follows through with *one's own intentions*. Following one's own intentions presumably involves weighing some personally-relevant tasks higher than others and that this process occurs somewhat independently of how strongly others intend to complete tasks that are of interest to them. This approach also makes the assumption of homoscedasticity which requires that the relation between intention and behaviour take the same form across the entire range of possible values. Here there is no strong apriori reason to believe that intentions predict behaviour in a manner that changes form depending on intention level[2].

Behaviour. Two measures of behaviour were assessed on the PIAR at Time 2: the percentage of intended action completed and the number of hours engaged in each task. Each dependent variable was analysed separately and reported in parallel.

Data Analysis Strategy

The study data has a multilevel structure consisting of two levels of analysis. Each reported task is a lower-level observation nested within a participant. The first level (within-person) contains information related to individual tasks. The second level (between-person) is comprised of data assessed at the person-level and represents variation between participants that may influence level-one constructs and relations. The main research questions concerned the prediction of level-one task completion using both level-one (i.e., task-level intentions and AHI scores), level-two predictors

(i.e., inhibition levels) and a cross-level interaction (i.e., inhibition scores moderating the intention-behaviour relation). Multilevel modelling is the approach of choice because it estimates variations in the data at all levels (i.e., within- and between-person) simultaneously. Analyses were conducted using HLM 6.0 (Raudenbush & Bryk, 2002) utilizing restricted maximum-likelihood estimates. Robust standard errors were also used since these estimates are relatively insensitive to violations of homoscedasticity (Chou, Bentler, & Satorra, 1991). All of the presented models permitted intercepts and slopes to vary at random for all variables – effectively creating unique relations among the variables for each participant. These estimates were then pooled across participants producing fixed (or average) effects of each predictor on task completion.

Finally, task level characteristics known to influence performance (i.e., task difficulty, boringness and self-efficacy) as well as person-level behaviour (i.e., days late in submitting Time 2 measures) were used as control variables at their respective levels. This was done for all analyses. Also assessed was whether participants "completely forgot" about each task. Unfortunately, only roughly half of the reported tasks included a rating on this item (N = 536 tasks). It is possible that the strong wording of the item implied to participants that item completion was required only if the task was forgotten entirely. Hence, the forgetting data was not reported.

Habitual Avoidance as a Moderator of the Intention-Behaviour Relation

The percentage of task completion and number of hours engaged in each task were predicted in separate analyses using models with identical independent variables[3]. Each analysis consisted of a multilevel model in which the dependent variable was predicted by level-one intention and AHI scores and the two-way interaction between these variables. Intercepts and slopes were allowed to vary among participants. Analyses also included all aforementioned covariates at their respective levels of analysis. Although the covariates were free to influence all variables of interest, none of the

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covariates significantly interacted with any of the main predictors for any of the reported analyses (all p's > .05). Hence, only the main effects of the covariates are reported.

The results are displayed in Table 3. Providing a direct replication of Study 1, stronger intentions produced increased task completion both in terms of percentage completed and number of hours (p's < .001). Both dependent variables also demonstrated reduced completion levels when avoidance patterns associated with the task were experienced as habit-like in nature (p's < .001). Contrary to expectations, there was no evidence of moderation for either outcome measure (p's > .10). The absence of the predicted interaction is depicted in Figure 6.

Table 3

Multilevel Regression Results Predicting Time 2 Task Completion From Time 1 Intentions and Avoidance-Habit Levels

	Percentage of Task Completed		Hours Completed	
Fixed effects	Unstandardized Coefficient	SE	Unstandardized Coefficient	SE
Intercept	50.9***	1.57	2.59***	.06
Intention	17.93***	2.10	.63***	.07
AHI	-7.74***	.81	-.18***	.03
Intention X AHI	-.04	.98	.04	.04
Covariates				
Boring	.12	.48	.00	.01
Difficult	-1.27**	.38	.05**	.02
Efficacy	1.63*	.70	.03	.02
Days late	3.26†	1.76	.00	.09

Note. AHI = Avoidance as Habit Index score for a particular task; Boring = rating of task boringness; Difficulty = level of task difficulty; Efficacy = level of capability for completing a task; Days late = number of days late Time 2 surveys were submitted; SE = robust standard error estimate. The sample included 134 participants. Although not reported, no effects of Gender were found nor did it moderate any relations. † $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.
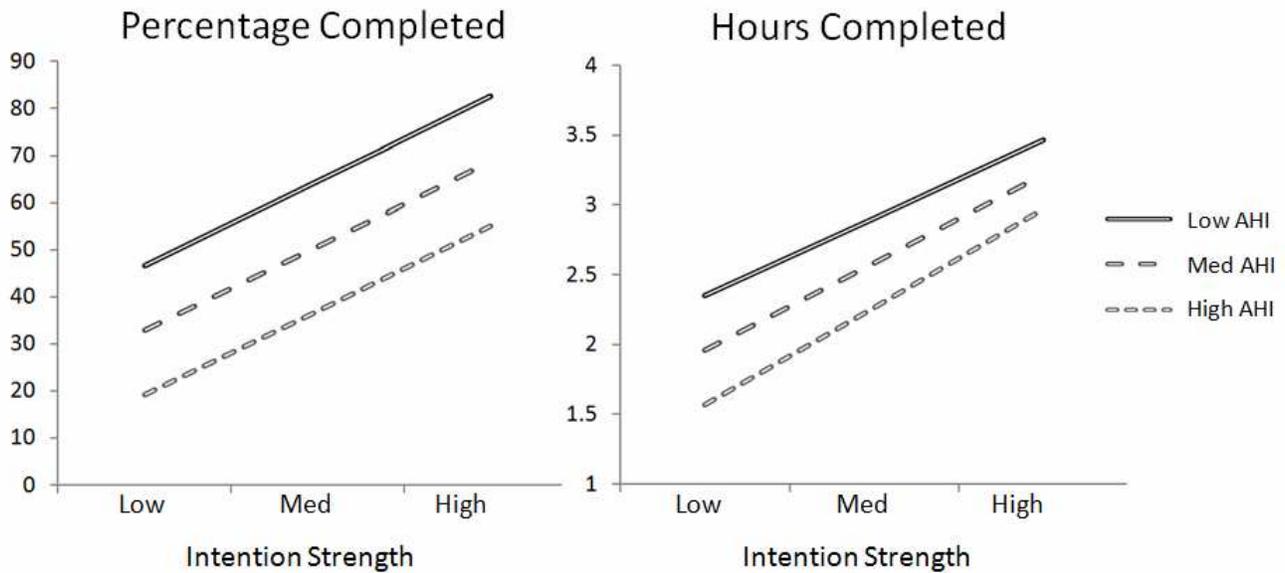
Figure 6: Joint Influence of Habitual Avoidance and Intentions. Pooled within-person effects of intention and AHI scores in predicting percentage and number of hours completed for each task. Low, med(ium) and high correspond to -1, 0, and +1 SD from the respective centered means for each variable. The figure depicts the main findings with all covariates at their respective-centered means of zero.

Inhibition as a Moderator of the Intention-Behaviour Relation

Two multilevel models were utilized such that each dependent variable was predicted by level-one intention scores and level-two inhibition scores. The cross-level interaction between intention scores and inhibition level was also examined. Both analyses included all covariates at their respective levels of analysis and only the main effects of these variables are reported.

The results are detailed in Table 4. As expected, stronger intention scores produced increased completion for both measured outcomes (p's < .001). Although no main effect of inhibition was evident (p's > .15), the predicted cross-level interaction was significant with respect to both percentage completed and time spent on tasks (p's < .05). For these unpleasant tasks, participants with higher inhibitory abilities followed their intentions to a greater extent than those with lower inhibitory abilities. The moderating effect of inhibition level on intentions can be seen in Figure 7.

Table 4
Multilevel Regression Results Predicting Time 2 Task Completion From Time 1 Intentions and Inhibition Levels

Fixed effects	Percentage of Task Completed		Hours Completed	
	Unstandardized Coefficient	SE	Unstandardized Coefficient	SE
Intercept	50.9***	1.56	2.58***	.05
Intention	22.08***	2.01	.73***	.07
Inhibition	2.51	1.72	-.03	.05
Intention X inhibition	4.26*	1.93	.14*	.07
Covariates				
Boring	-1.11*	.48	-.02	.02
Difficult	-1.86***	.42	.04*	.02
Efficacy	2.23**	.74	.03	.02
Days late	1.75	1.61	-.05	.08

Note. Inhibition = latent inhibition score indicating ability to inhibit prepotent responses; Boring = rating of task boringness; Difficulty = level of task difficulty; Efficacy = level of capability for completing a task; Days late = number of days late Time 2 surveys were submitted; SE = robust standard error estimate. The sample included 134 participants. No effects of Gender were found nor did it moderate any relations. † p < .10. * p < .05. ** p < .01. *** p < .001.
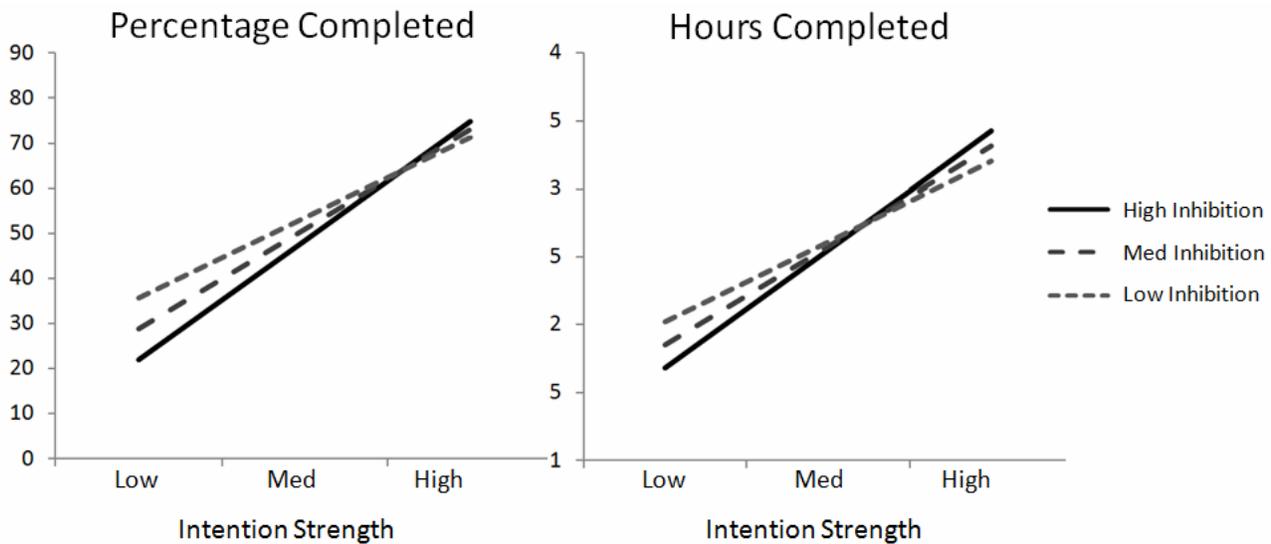
Figure 7. Joint Influence of Inhibition and Intentions: Pooled within-person effects of intention and inhibition scores in predicting percentage and number of hours completed for each task. Low, med(ium) and high correspond to -1, 0, and +1 SD from the respective centered means for each variable. The figure depicts the main findings with all covariates at their respective-centered means of zero.

The Role of Inhibition in Overriding Habitual Avoidance Patterns

Following through on intended-task completion should rely more on inhibitory ability if that task has been avoided previously in a habit-like manner. In theory, this increased need for inhibitory control should be the result of a conflict between good intentions to complete the aversive task and a pre-existing habitual avoidant response which is triggered by salient environmental cues (e.g., Wood & Neal, 2007; Hall & Fong, 2007). In contrast, task completion wherein this conflict is absent (i.e., where no habitual avoidance pattern exists) should more directly follow from one's intentions. This prediction was tested using a 3-way interaction wherein both habitual avoidance and inhibitory ability were included in the same analysis. The pattern of results was the same for both dependent variables. The observed main effects of intentions (p's < .001) and AHI level (p's < .001), and the interactions between intentions and inhibition (p's < .05), were qualified by significant 3-way interactions among intentions, AHI and inhibitory ability levels (p's < .05; one-tailed). Task completion followed intentions for all participants when no previous habitual-avoidance pattern was

present. However, when a pre-existing habit did exist, the intention-behaviour relation was stronger

for individuals with increased inhibitory abilities[4]. The results are outlined in Table 5 and are

depicted graphically in Figure 8.

Table 5
Multilevel Regression Results Predicting Time 2 Task Completion From Time 1 Intentions, Avoidance-Habit Levels, Inhibition, and their Interaction

Fixed effects	Percentage of Task Completed		Hours Completed	
	Unstandardized Coefficient	SE	Unstandardized Coefficient	SE
Intercept	51.0***	1.58	2.58***	.06
Intention	17.44***	2.06	.62***	.07
AHI	-7.91***	.80	-.18***	.03
Inhibition	-.84	1.69	.00	.05
Intention X AHI	-.13	.98	.04	.04
Intention X inhibition	4.63*	1.90	.14*	.07
AHI X inhibition	.63	1.15	-.01	.03
Intention X inhibition X AHI	2.51*	.95	.06†	.03
Covariates				
Boring	.10	.47	.01	.01
Difficult	-1.23**	.39	.05*	.02
Efficacy	1.67*	.71	.02	.02
Days late	3.92*	1.73	.00	.09

Note.   AHI = Avoidance as Habit Index score for a particular task ; Inhibition = latent inhibition score indicating ability to inhibit prepotent responses; Boring = rating of task boringness; Difficulty = level of task difficulty; Efficacy = level of capability for completing a task; Days late = number of days late Time 2 surveys were submitted; SE = robust standard error estimate. The sample included 134 participants. No effects of Gender were found nor did it moderate any relations. † $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.
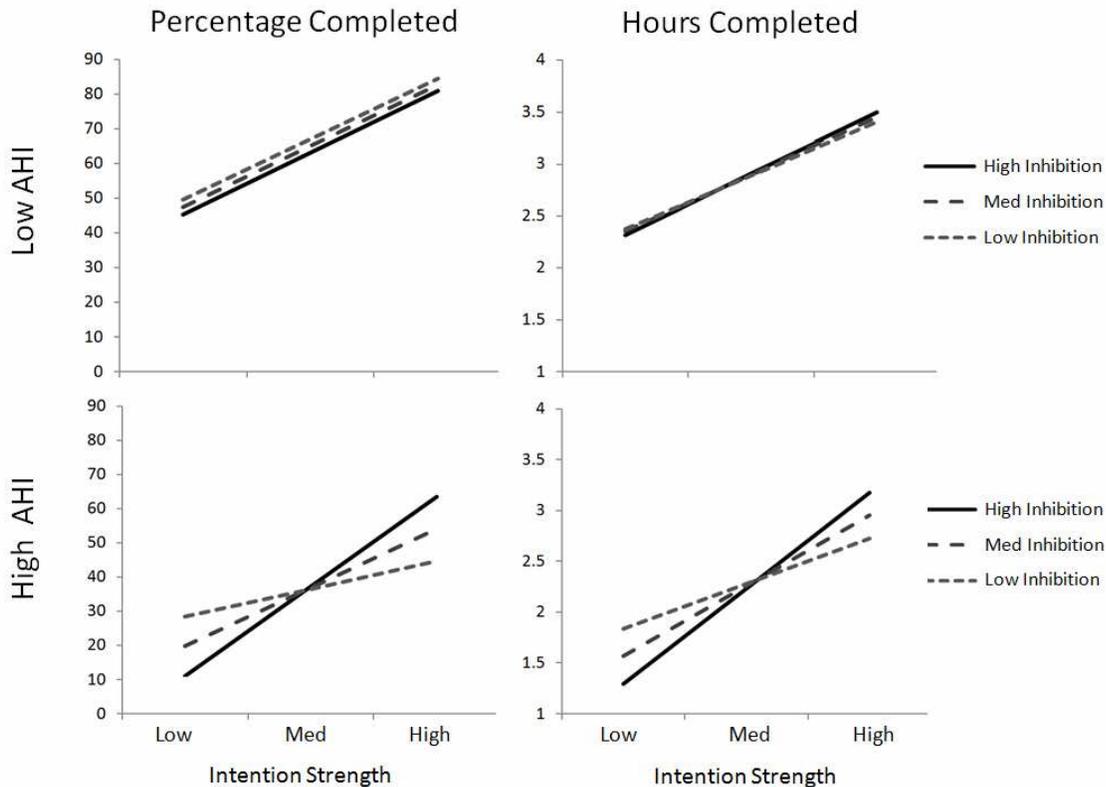
Figure 8:   Joint Influence of Habitual Avoidance, Inhibition and Intentions: Pooled within-person effects of intention and inhibition scores by previous habitual-avoidance pattern levels. The dependent variables are percentage of task completed and number of hours completed for each task. Low, med(ium) and high correspond to -1, 0, and +1 SD from the respective centered means for each variable. The figure depicts the main findings with all covariates at their respective-centered means of zero.

Personality as a Moderator of the Intention-Behaviour Relation

Possible moderating effects of personality were also examined. Two separate multilevel models were used to predict the dependent variables for each respective trait. These analyses were carried out for procrastination, dysfunctional impulsivity and neuroticism. Whereas the latter two traits were investigated because they interacted with Gender with respect to inhibitory abilities, procrastination was included because chronic procrastination should theoretically be associated with weakening the intention-behaviour relation. In separate analyses, each level-two personality score was permitted to interact with intentions to predict level-one behaviour. The cross-level interactions are shown in Table 6.

Table 6

Multilevel Regression Results Predicting Time 2 Task Completion From Time 1 Intentions and Self-Reported Personality Traits

Fixed effects	Percentage of Task Completed		Hours Completed	
	Unstandardized Coefficient	SE	Unstandardized Coefficient	SE
Procrastination				
Intercept	51.1***	1.49	2.60***	.05
Intention	22.0***	1.99	.74***	.07
PROC	-3.3*	1.54	-.12*	.05
Intention X PROC	2.5	2.01	.00	.06
Dysfunctional Impulsivity				
Intercept	51.3***	1.53	2.59***	.05
Intention	22.09***	1.99	.73***	.07
DYS-I	-1.65	2.41	-.01	.08
Intention X DYS-I	1.20	3.61	-.01	.13
Neuroticism				
Intercept	51.5***	1.48	2.69***	.05
Intention	21.8***	1.95	.73***	.07
NEUROT	-4.90*	2.05	-.15*	.07
Intention X NEUROT	0.38	2.88	.02	.10

Note. Despite reporting all effects in a single table, each of the three personality traits were subjected to separate analyses for both dependent variables. For ease of exposition, the covariates for each analysis are not presented here. PROC = latent procrastination score; DYS-I = latent dysfunctional impulsivity score; NEUROT = latent neuroticism score. The sample included 139 participants. No effects of Gender were found nor did it moderate any relations. [†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Significant main effects suggest that increased procrastination and higher neuroticism scores were associated with reduced task performance. However, in contrast to the deleterious effects of poor inhibitory control on the strength of intentions, none of the cross-level interactions (all p's > .05) demonstrated any moderating effects of self-reported personality. A final multilevel analysis, using Gender as an additional predictor, revealed that none of these effects depended on the sex of the participant (p's > .05).

Discussion

The first goal of Study 2 was to investigate the relation between the executive-functioning ability of inhibition and trait-level procrastination. Whereas some investigations have suggested that procrastination is related to reduced self-control tendencies (e.g., Ferrari & Emmons, 1995), previous work using neurologically-based measures of general executive functioning has found no evidence of a connection with trait-level procrastination (Stone, 1999). However, since the executive function of inhibition may be most closely related to impulsive behaviour, its relations to personality traits like procrastination were examined here. Prior to investigating these relations, a series of initial analyses was first undertaken.

Preliminary analyses revealed gender differences in the structure of inhibition. Stroop effect RTs did not correlate well with the other indices of inhibition for women. Although unexpected, this type of result is not without precedent. In his review of a half century of research on the Stroop effect, MacLeod (1991) described how relations between Stroop interference and other constructs have been reduced (or non-existent) for women as compared to men – understood to be the result of increased impulsivity in men. In the present sample, this result may be related to laboratory effects wherein the male experimenter affected Stroop performance differentially for participants. The Stroop task was the only task wherein the experimenter was present during the experimental trials. Women in the sample may have made concerted efforts to reduce impulsive tendencies when in the presence of the male experimenter (or alternatively experienced moderate levels of performance anxiety that attenuated typical impulsivity levels). This possibility is admittedly speculative in nature. Nevertheless, the final model which excluded Stroop scores did provide a replication of Miyake et al.'s (2000) work, demonstrated no structural differences between genders, and predicted behaviour in expected ways for both men and women at Time 2.

The main trait analyses revealed that inhibitory abilities predict self-reported personality differently across genders. Expected relations were observed for men including positive relations between inhibitory control and self-efficacy, and negative relations between inhibition and procrastination, dysfunctional impulsivity, neuroticism and chronic task avoidance. In contrast, inhibition was not a significant predictor of any self-reported personality trait for women. One reason for these different effects may reflect how the 'inhibition' tasks measured different constructs for men and women. For women, for example, these tasks may assess something other than the ability to inhibit a prepotent response. However, this possibility is unlikely given that latent 'inhibition' scores predict behaviour at Time 2 in the same way for both men and women. Alternatively, men and women may have reflected on different aspects of themselves when self-reporting as a consequence of their performance on the computer tasks. Whereas women's self-concepts are more influenced by maintaining harmonious relationships, men's self-definitions tend to rely more on having unique abilities and being distinguished from others (e.g., Cross & Madson, 1997).   If struggling on the computer tasks was experienced as a task-oriented failure by participants, such a failure may reflect more about the self for men as compared to women. Specifically, this experience may have provided a salient example for men of their (in)adequacy, and this exemplar may have then been used as a benchmark for their standing on the remaining psychological constructs assessed by the personality questionnaires (e.g., impulsivity; self-efficacy). By comparison, women who struggled on the computer tasks may not have viewed the experience as relevant to their self-views given that women often define their self-concepts in the relational domain, which should have been relatively unaffected by difficulties with computer task performance. Ultimately, however, it is difficult to be confident about the source of these gender effects from the present data and replication of these findings is warranted in future work.

Another general goal of Study 2 was to investigate factors that impede one's ability to behave in a way that is consistent with the intention to complete unpleasant tasks. Following the results of Study 1, the extent to which behaviours were avoided *habitually* was assessed to determine whether the degree of habituation moderated the observed intention-behaviour relation with respect to specific behaviours. Directly replicating results from Study 1, task AHI scores did predict reduced task performance while controlling for intentions, task difficulty, boringness, and self-efficacy towards the task. However, the moderation analysis indicated that, at least as an isolated variable, habitual avoidance does not weaken the effectiveness of intentions.

Individual differences in the ability to inhibit prepotent responses were also measured to determine whether one's executive-functioning abilities moderated the relation between intentions and task completion. Individuals with relatively high inhibitory abilities followed through with their intentions to perform tasks more than those with lower inhibition levels. The ability to inhibit prepotent responses modulated the strength of one's intentions for engaging in unpleasant tasks.

All of these effects were qualified by a 3-way interaction involving intentions, AHI scores and inhibition levels. In general, unpleasant tasks were completed according to intentions for participants when no habit-like avoidance patterns were present. However, when habit-like avoidance patterns were pre-existing, the role of one's inhibitory ability became apparent: the intention-behaviour relation was stronger for individuals with demonstrated superiority with respect to inhibiting prepotent responses.

The contextualized effects observed here allow for more precise interpretations of how inhibitory abilities work in strengthening the effect of previous intentions. Wood and Neal (2007) and Hall and Fong (2007) both point out how self-control resources are required when goal-directed systems are in direct conflict with systems responsible for habitual behaviour. When an unwanted habit is triggered by environmental cues, for example, additional top-down regulatory resources are

required to inhibit the (relatively) automatic response and act in accordance with one's previous intentions. Indeed, the present findings are consistent with the premise that better inhibitory abilities work to attenuate the prepotent triggering of pre-existing, habitual-avoidance patterns. This perspective is discussed at length in the General Discussion.

A final observation is that none of the personality traits moderated the intention-behaviour relation. Previous theorists have suggested that procrastination leads to failure of intentions specifically because of subtle neurological differences which are associated with impulsiveness (e.g., Steel, 2007). The assumption inherent in this argument is that (at the trait level) procrastination should predict more gaps in the intention-behaviour relation and that, more precisely, this should be the direct result of reduced self-regulatory capabilities. Yet Study 2 provided no evidence that trait procrastination weakens the effect of intentions for completing unpleasant tasks. Hence, the idea that the effects of trait procrastination on the intention-behaviour relation are mediated by subtle neurological differences is clearly not supported by the present data. This is particularly interesting because the results here do demonstrate that inhibition levels moderate the intention-behaviour relation. Although this finding is consistent with the original suggestion that self-regulatory abilities help in following through with one's intentions, the role of trait procrastination in this relation is not evident. In his discussion of the procrastination literature, Steel (2007) concluded that, "the degree to which people are susceptible to an intention–action gap is largely influenced by the trait of procrastination" (p. 84). Steel (2007) further cited the work of Van Hooft et al. (2005) as evidence for procrastinators following through less with their intentions. Yet, on close inspection, procrastination in that study did *not* actually moderate the relation between implementation intentions and behaviour. The lack of evidence, both here and in the literature, calls into question the utility of using trait-level procrastination measures in predicting the type of moderating effects demonstrated here in Study 2. One main contribution of the second study is that the joint assessment

of habitual avoidance and inhibitory control appears to readily capture self-regulatory failure for unpleasant tasks, which is believed to be a central feature of procrastination *behaviour*.

General Discussion

On the surface, self-regulation involves holding attitudes and intentions about engaging in tasks that serve our long-term goals. Having good intentions is the first step in implementing goal-oriented action. However, this assumes that people have the top-down regulatory capacity to *carry out* their good intentions. The present work investigated whether people complete unpleasant tasks, focusing on the influences of controlled and automatic processes and how these factors alter the effectiveness of intentions. A general goal of the present work was to understand whether some avoidance patterns can be described as prepotent responses that are enacted relatively automatically (i.e., habitually). The roles of habitual avoidance and executive functioning (i.e., inhibitory abilities) were also examined with respect to whether either factor moderated intentions for carrying out important (but unpleasant) tasks. This type of self-regulatory failure is often described as the core feature of procrastination behaviour. Finally, the hypothesized relation between trait-level procrastination and reduced executive functioning was also examined given previous suggestions that such a relation is responsible for producing intention-behaviour gaps in procrastinators.

These studies broadly sought to investigate the following questions:

1. Can the frequent avoidance of a task develop into a habit?

2. Does habitual avoidance simply entail the absence of behaviour or is habit-like avoidance linked to a particular alternate behaviour?

3. Does the level of habitual avoidance associated with a given task weaken the relation between one's intention to perform the task and future behaviour?

4. Does the executive function of inhibition strengthen the relation between intentions to perform important tasks and actual task completion?

5. Are relative deficits in the executive ability of inhibition more prevalent in chronic procrastinators?

The first question regarding the habitual qualities of avoidance was addressed in Study 1. The results clearly demonstrated that tasks which are frequently avoided were rated higher on a measure of habit assessing whether the avoidance itself was *experienced* as a relatively automatic phenomenon, compared to the experience of avoiding unpleasant tasks which are not avoided frequently. Frequent avoidance patterns were also more likely to become part of one's personal identity. According to Verplanken and Orbell (2003), these are the central features of a habit. The fact that habitual avoidance scores in Study 1 predicted reduced task completion after taking intentions and all motivational variables into account provides further validity for the construct and is evidence that the habit-like avoidance described here is not mediated by explicit goals, but is rather triggered in an automatic fashion. Furthermore, the results of Study 2 replicate the finding that habit-like avoidance patterns predict reduced task completion irrespective of one's intentions to act.

Question 2 was also examined in the first study. No evidence was found suggesting that the habit-level of the avoidance pattern is related to the habit-level of the common alternative activity. This is consistent with the idea that habitual avoidance patterns are not functionally equivalent to habit-like alternative behaviours, and likely work independently of cues that may (or may not) trigger the activation of a habitual alternative behaviour. However, participants *did* choose the same alternative activity more often when avoiding habitually. Stated differently, habitual avoidance patterns most often result in the same 'behaviour' – but that particular alternative need not be habit-like in nature. The observation that habit-like avoidance patterns often result in the same alternative activity is consistent with the notion that the AHI is measuring a habit – i.e., a behaviour that is not mediated by goals. Once a goal is activated, goal-dependent behaviour can be satisfied in a number of ways (i.e., various responses may satisfy a goal). In contrast, habit-like behaviour is believed to be driven by contextual cues that automatically trigger specific behaviour (see e.g., Neal et al., 2006).

Here habit-like avoidance patterns were associated with the same alternative response despite numerous activities that could accomplish a general goal of avoiding.

Idiosyncratic environmental features reported in Study 1 were often associated with avoidance or engagement in the alternative activity. These types of triggers demonstrated a greater association with habitual avoidance than features that represented barriers to task completion. This observation is likely due to the fact that the former type of avoidance frequently co-varies with physical features in the environment. Finally, participants reported that triggers associated with more habit-like avoidance affected them with respect to avoiding more often than triggers associated with non-habit-like avoidance. Taken together, the data from Study 1 provide evidence consistent with the idea that habit-like avoidance is triggered by salient environmental triggers.

The pattern of results surrounding habitual avoidance patterns from Study 1 is consistent with Temporal Self-Regulation Theory (TST; Hall & Fong, 2007). The observation that habit-like avoidance patterns are associated with environmental cues makes this behaviour-level variable a good candidate for a *behavioural prepotency* in the TST model, which describes how intentions may not guide behaviour for avoidance once a habit has formed. The general literature on habits further suggests that changes in intentions (i.e., to no longer avoid) may be difficult via intention-change alone.

Study 2 investigated Questions 3 and 4 by examining intention-behaviour gaps between Time 1 and 2. Habitual avoidance on its own did not moderate the intention-behaviour relation. Although motivationally-based models (e.g., TMT; Steel, 2007) do not explicitly incorporate the effects of prepotent responding, this null finding is also inconsistent with both the general habit literature (e.g., Ji Song & Wood, 2007) and the TST model of behaviour (Hall & Fong, 2007). According to these accounts, intentions should predict behaviour better in the absence of prepotent behavioural tendencies (e.g., habitual behaviour).

In contrast, greater inhibitory control at Time 1 strengthened the effect of intentions in producing behaviour at Time 2. This finding is consistent with TST which describes how we are hypersensitive to immediate contingencies in our environment (e.g., the pleasure of watching television) and that this tendency makes it difficult to carry out unpleasant tasks that serve longer-term goals (e.g., exercising). Self-regulatory capacity is believed to be necessary for the effortful completion of such tasks. It has been suggested that the executive ability to inhibit prepotent responses represents one such capability. The data from Study 2 are consistent with the theoretical position that those better able to inhibit prepotent responses should carry out intentional behaviour more often precisely because of their increased ability to inhibit immediately gratifying behaviours (Hall & Fong, 2007).

Temporal Motivational Theory is founded on a similar premise: distal consequences are discounted relative to more proximal ones and that this process is partially a function of one's sensitivity to delay (e.g., Steel & König, 2006; Steel, 2007). Greater sensitivity to delay should lower the preference for unpleasant, but goal-congruent, tasks when they are temporally distant – resulting in deferred action compared to individuals with lower sensitivity to the same period of delay. Regarding the present data, it is possible that individuals with superior inhibitory abilities were less sensitive to periods of delay, and were better able to inhibit preferences for distracting tasks which allowed for earlier task completion. However, according to Steel (2007), the ability to inhibit prepotent responses should be related to increased behavioural follow-through because of the conceptual associations with individual differences like procrastination and impulsiveness. In the present work these relations were evident for men but not women.

Questions 3 and 4 are best addressed by the interactions among intentions, habitual-avoidance and the inhibitory ability levels in Study 2. Unpleasant tasks were completed according to intentions for all participants when no existing habit-like avoidance pattern was present. In contrast, when such

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patterns did conflict with one's intentions to complete a task the intention-behaviour relation was stronger for those individuals who were better at inhibiting prepotent responses during the computer tasks. Inhibitory abilities mattered most when a countervailing pattern of habitual avoidance opposed carrying out the unpleasant task. Explaining this contextualized effect requires additional theoretical framing. For example, the interactive effects of these two variables are not explicitly outlined by the model of dilatory behaviour described by TMT. Recent accounts describing how habits and goal-dependent behaviour interface with one another (Wood & Neal, 2007; Hall & Fong, 2007) may provide the most appropriate characterization of the observed effects.

In their model, Wood and Neal (2007) outline three principles that guide habitual responding and how habits interact with goals. The first principle states that the automatic nature of habits is due to the fact that habits are cued by context. Habits are initially formed by covariation between performance environments and the responses themselves. Simple paired-associations develop between environmental triggers and responses which are stored in procedural memory upon frequent repetition. The authors explain how this type of associative learning is slow and is believed to rely on structures like the basal ganglia and cerebellum (e.g., Graybiel, 1998; Packard & Knowlton, 2002). This is consistent with human learning studies that demonstrate a neostriatal habit learning system which is distinguishable from explicit learning systems (Knowlton, Mangels, & Squire, 1996). Whereas goal-dependent behaviour relies on executive structures like the prefrontal cortex (PFC) for selecting intended actions (e.g., Miller & Cohen, 2001), repeated responses gradually promote the redistribution of brain activity to subcortical areas which rely less on frontal brain structures for action (Jonides, 2004; Kelly & Garavan, 2005). The product of this process is habitual behaviour that is triggered by performance cues in a relatively automatic manner.

According to the second principle of Wood and Neal's (2007) model, goals do not mediate the relation between triggers and action. Although habits may originally develop from goal-directed

behaviour, once a habit has formed, "habits are performed without mediation of a goal to achieve a particular outcome or a goal to respond (i.e., behavioural intention; Wood & Neal, 2007; p. 844)." Goal recruitment becomes less necessary as the behaviour becomes habitual. From this perspective, habits can be differentiated from behaviour driven by implicit goals because a behavioural habit is inflexibly cued by triggers whereas implicit, goal-driven behaviour is much more flexible and can take any number of forms that serve the same goal. For example, there are many responses that may satisfy an implicit goal of travelling, but travel modes (e.g., driving) cued in predictable ways by environmental triggers would be considered stimulus-driven or habit-like (for alternative views also see e.g., Verplanken & Aarts, 1999; Aarts, 2007).

The third principle most directly speaks to Questions 3 and 4 which focus on moderators of intentions. According to the third principle, goals and habits operate from relatively independent systems which can also interact. Wood and Neal's (2007) exposition describes how goals are often initially responsible for repetitive behaviour which may eventually develop into habit. However, once a habit has formed, habits tend to be relatively stable and do not readily change in the presence of opposing goals or behaviour. Most germane to the present questions is how these two systems interface when goals and habits conflict. Sometimes the habitual response is enacted in an environment that cues that particular behaviour. However, Wood and Neal (2007; and Hall & Fong, 2007) propose that the performance of a cued response may be inhibited once it has become activated by environmental triggers via the application of self-regulatory control – "people may implement effortful control to override the habit disposition and prevent it from manifesting in behavior" (Wood & Neal, 2007; p. 854).

Recent accounts suggest that self-control is a finite resource that can be depleted in strength like a muscle that tires from exertion (Muraven & Baumeister, 2000; Baumeister et al., 2007). Evidence for a strength-based model is consistent with suggestions about how habits and goal-

directed behaviour may conflict. For example, across several studies, Vohs, Baumeister and Ciarocco (2005) found that first engaging in an effortful activity depleted self-regulatory resources (e.g., trying to control one's thoughts) had the effect of reducing participants' ability to overcome habitual responses (e.g., when interacting with others in a subsequent task). Effortful attempts to overcome habitual self-presentation patterns had the similar effect of diminishing participants' ability to self-regulate in a second task (e.g., persisting on difficult problems). It appears that depleting self-control resources makes inhibiting habit-like responses difficult. A corollary of this finding is that preventing unwanted habitual responding *requires* self-control resources. Without adequate top-down resources one's ability to inhibit unwanted behaviours is significantly impaired.

In addition to the more dynamic levels of self-control, stable individual differences in self-control may also interact with habits in producing behaviour. Inherent in some definitions of self-control is the ability to break unwanted habits (e.g., Tangney et al., 2004). This conceptualization of self-control is a successful predictor of outcomes at the trait level. For example, the ability to interrupt undesired tendencies is associated with reduced impulsive behaviours (e.g., binge eating; alcohol abuse; Tangney et al., 2004). Individuals with higher trait-levels of self-regulatory abilities should have less difficulty inhibiting prepotent responding.

An account of the present data can be forwarded under the framework proposed by Wood and Neal (2007). Study 1 demonstrated that habitual-avoidance patterns were experienced by participants as occurring relatively automatically and reflecting their own self-identities, both of which are cardinal features of habit-like behaviour (e.g., Verplanken & Orbell, 2003). These kinds of behavioural patterns were also associated with contextual cues that participants believe have an effect on how they behave. Although correlational in nature, these data suggest that contextual triggers associated with habit-like avoidance patterns are associated with cueing prepotent patterns of avoidance. Further evidence that avoidance can become habit-like was provided by findings from

both studies suggesting that the construct works independently of motivational variables: habitual-avoidance scores predicted reduced task performance even after controlling for motivational constructs like intentions. Additional construct validity for avoidance-as-habit was found in the contextualized effect of how inhibition moderated intentions. In Study 2, all participants followed their intentions when no habit to avoid was present. However, when approach goals conflicted with habitual-avoidance patterns, individuals with better regulatory capacity (i.e., inhibitory abilities) were much more effective in breaking prepotent-avoidance responses in order to carry out their own intentions for the week. This pattern mirrors the findings expected when habits and goals conflict in guiding behaviour. Those with higher self-control resources at their disposal were more effective in breaking (relatively) automatic avoidance patterns.

Wood and Neal (2007) propose two possible mechanisms for self-regulation under such conflict. Whereas one mechanism involves controlling a habitual response once it has been evoked, another proposed strategy to improve self-regulation involves more pre-emptive measures.

First, control over cued behaviour may take place once the stimulus-driven response has been initiated through the "sheer dint of will" (Wood & Neal, 2007; p. 854). In Study 2, inhibitory ability may have translated into increased capacity for stopping an avoidance pattern even after it has been primed by environmental cues. This type of response inhibition represents the clearest parallel to the abilities required to perform well at the computer tasks at Time 1 (e.g., the antisaccade task). In Study 2, two of the three indicators of inhibition were taken from performance indices from the antisaccade task, which has been described as a task that, "yields reliable and sensitive measures of the processes involved in resolving the conflict between volitional and reflexive behavioral responses" (Hutton & Ettinger, 2006; p. 302). This type of conflict resolution may have helped participants stop avoidance patterns once they were initiated. A recent review synthesizing the current models of antisaccade performance suggests that doing well on antisaccade trials requires

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that activation in the neural systems underlying the prosaccade (toward the distracter cue) must somehow be reduced to allow the systems responsible for orienting attention away from the distracter to reach threshold activation first. Most models emphasize how antisaccade errors are the result of either (1) a failure to maintain task-relevant instructions (i.e., task set) in memory or (2) failure to adequately activate the intention to look away from the distracter cue (Hutton & Ettinger, 2006). This is commensurate with lesion data suggesting that errors on the antisaccade task are often associated with damage to brain structures responsible for top-down processing like the dorsolateral (and ventral) PFC and also the ACC (Hutton & Ettinger, 2006). To summarize, it is plausible that poor inhibitors in Study 2 were not able to sufficiently maintain their intentions for carrying out unpleasant tasks because they lost the mental representation for task completion (i.e., task set) when a competing avoidance habit was activated. Alternatively, poor inhibitors may not have translated their intentions into behaviour because of a deficit in converting their good intentions into action when faced with competing habit-like avoidance responses.

A second mechanism proposed for controlling habitual responses is to avoid exposure to cues that may trigger the habitual response (Wood & Neal, 2007). It is possible that those with increased inhibitory control also reduced their exposure to avoidance cues during the week. However there is no straightforward connection between this tendency and the computer task requirements assessed at Time 1.

Finally, the issue of how inhibitory control relates to trait procrastination (Question 5) was also addressed by Study 2. Whereas expected relations were found for men, no relations were found between inhibition and personality for women. Although the present data do not lend themselves to a single interpretation of this gender difference, the ultimate impact on the main focus of the present work is limited. A main reason for investigating the relation between inhibition and procrastination stemmed from previous suggestions that procrastinators fail to carry out intentions precisely because

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of subtle neurological impairments which result in lowered self-regulatory capabilities (e.g., Steel, 2007). Yet there was no evidence from Study 2 (or other published work) that trait-level procrastination actually moderates (or weakens) the influence of previous intentions. This type of result ultimately renders the test of mediation moot. Reduced inhibition cannot be responsible for why trait-procrastinators do not carry out their intentions if there is no evidence that chronic procrastinators follow through with their intentions to a lesser extent in the first place. With respect to moderating the intention-behaviour relation, Study 2 suggests that only two variables mattered: the ability to inhibit prepotent responses and the strength of habit-like avoidance patterns. Hence, the joint assessment of these two variables appears to be more sensitive in detecting the self-regulatory failure believed to underlie procrastination behaviour.

Limitations and Future Directions

The present work included theoretical and methodological limitations which may be addressed by future investigations. The first theoretical issue surrounds the role of goals, as there is presently a debate about the role of goals in habit-like behaviour. Whereas some have argued that goals do not mediate the stimulus-driven nature of habits (e.g., Neal, et al., 2006; Wood & Neal, 2007; Neal & Wood, in press), others believe that goal-pursuit can become automatized and that habits are one form of nonconsicous self-regulation (see Aarts, 2007 for a review). From the latter perspective, selecting a particular response repeatedly in the same context encourages the development of cognitive structures that associate goals with specific actions and environmental triggers. If a future situation allows for the performance of a habit, activation of this habit-like goal structure spreads automatically to behavioural representations and action occurs without requiring conscious intentions to behave. Despite no direct assessment of nonconscious goals in the current studies the possibility remains that the habit-like avoidance observed here is mediated by implicit

goal structures. Fortunately the presence of implicit goals in habitual responding does not affect the

main interpretations of the present work.

A related view is that goals can be flexibly pursued without conscious awareness (e.g., Aarts,

2007; Bargh, 2005). From this account, if a situation does not afford the performance of a habit, then

an activated goal can still result in nonconscious goal-pursuit that need not be rigid or stimulus-

driven. In contrast to traditional views wherein awareness is only required for behavioural control

when habits fail (e.g., Norman & Shallice, 1986), this type of flexible, nonconscious goal pursuit is

also thought to rely on executive processes like working memory and inhibition which aid in self-

regulation below the level of conscious awareness (e.g., Aarts, 2007; Bargh, 2005). One possibility

is that the habitual avoidance observed here is not truly habit-like, but instead reflects the automatic

experience of nonconscious goal pursuit. For example, the environmental cues to avoid identified by

participants may not directly trigger a rigid behavioural response, but instead may prime goal-related

structures which produce avoidance that achieves some goal (e.g., avoiding in order to bring relief

from studying for an impending exam). Notably such goal pursuit may take the form of any number

of behaviours that achieve the same goal (e.g., playing video games, watching TV, or eating). One

weakness of the present work is that the study does not directly assess nonconscious goal striving

(e.g., whether nonconscious priming of the goal to avoid can lead to different forms of alternative

activities). The results from Study 1 do suggest that automatic avoidance more often results in the

same alternative activity when compared to avoidance patterns that are not experienced in an

automatic fashion. This finding is consistent with AHI scores reflecting (relatively) rigid behavioural

patterns like habits. Additionally, the observation that the experience of automaticity was strongly

related to the frequency of past avoidance lends evidence to the interpretation that AHI scores

measure stimulus-driven habits which were developed from repeated performance. This is in

contrast to flexible (and implicit) goal pursuit which does not require a stable context or frequent

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repetition. Nevertheless, future work in this domain could involve manipulating nonconscious goals via implicit-priming paradigms while monitoring for variability in avoidance responding.

The fact that habits were conceptualized from a single perspective could also be expanded by future work. For example, Wood and colleagues have explicitly incorporated context stability in the measurement of habit wherein both frequency and context are taken into account (e.g., Ouellette & Wood, 1998; Wood et al., 2005). Habit scores are created by jointly assessing whether behaviours are enacted frequently *and* in a stable context. Habits measured in this way clearly moderate the intention-behaviour relation whereby intentions matter less when habits are strong (e.g., Wood et al., 2005; Ji Song & Wood, 2007). Recent work has demonstrated the utility of including the stability of context in the measurement of habit. In a correlational study spanning four weeks, Danner, Aarts and de Vries (2008) assessed initial intentions and habit levels associated with behaviours like snacking, drinking milk and travelling. Their findings one month later demonstrated that habits moderated the intention-behaviour relation when the measurement of habit included the joint assessment of frequency and context stability. No moderating effects of habit were found when past frequency was used as the sole indicator of a habit. Thus, context stability appears to add incremental validity in capturing habitual behaviour when compared to frequency alone. Taking a different approach, the studies presented here used a modified habit index (Verplanken & Orbell, 2003) which measured habits by tapping unique aspects of habit performance including the experience of automaticity (Bargh, 1994) and the extent to which avoidance patterns were assimilated by participants as features of their personal identities. The current data demonstrate that this introspective assessment of habits moderates the intention-behaviour relation for poor inhibitors. Furthermore, the observation that good inhibitors followed through with their intentions despite existing habitual-avoidance patterns is consistent with models of the habit-goal interface (i.e., Wood & Neal, 2007) and theories of controlled action (e.g., Norman & Shallice, 1986). Why habitual-

avoidance scores did not moderate the intention-behaviour relation overall (i.e., ignoring inhibition) is less clear. One direction for future research would be to replicate Study 2 using multiple measures of habitual avoidance which specifically incorporate the role of context.

Another future direction could include investigating additional cognitive variables that may moderate the intention-behaviour relation for unpleasant tasks. The present work focused on inhibitory control abilities. However, working-memory and task-switching abilities are executive functions that are correlated with inhibition (see Miyake et al., 2000) and are worth further study. For example, a set of studies by Hofmann, Gschwendner, Friese, Wiers, and Schmitt (2008) revealed that working memory capacity moderated the influence that automatic versus controlled precursors to behaviour had on actual performance. The results demonstrated that explicit attitudes predicted behaviour for individuals with high working memory capacity better than implicit measures. In contrast, the automatic impact of implicit attitudes was more predictive of behaviour for those with poor working memory abilities. These authors concluded that good working memory capacity is necessary for the inhibition of automatically activated influences on behaviour. Working memory may play an important role in both inhibiting irrelevant automatic representations of behaviour while also strengthening representations of goal-oriented action. In the face of prepotent-alternative behaviours, the ability to represent task-relevant information may also moderate the effect of one's intentions for carrying out unpleasant tasks. Future research could simultaneously examine all three executive functions to better understand the specific contribution of inhibitory control.

Although we agree with Neal and Wood (in press) that "naturalistic data can provide a uniquely valid window into the psychological and situational factors that impact real-world behavior" (p. 782), some consideration of methodological limitations is warranted given the correlational nature of the present studies. First, self-report biases could have been present in Study 1 wherein participants may have struggled in recalling their experience of low- and high-frequency

avoidance patterns. The prospective design of Study 2 aimed to reduce some of this bias by obtaining simple self-reports of behaviour at shorter intervals (e.g., one week or less) which presumably reduces potential biases that were due to recall difficulties. Second, correlational designs also limit causal interpretations of the data. In the first study, for example, it is possible that intention ratings were influenced by how often tasks were typically accomplished, as opposed to the preferred interpretation that intentions causally drive behaviour. The prospective design of Study 2 addressed this concern by measuring intention and inhibition levels prior to assessing outcomes (i.e., establishing temporal precedence; Pelham & Blanton, 2003). However, AHI scores were obtained at Time 2 with the main dependent outcome variables. This strategy is consistent with naturalistic studies of habit that typically collect habit data retrospectively in order to prevent drawing attention to behaviour during the performance of the habit. Evidence suggests that attending to habit-like performance can re-engage goal-directed control over responding (for a review see Neal & Wood, in press). Despite the intentional use of this strategy in Study 2, the possibility remains that participant reports of their avoidance experience were influenced by their actual behaviour (as opposed to the preferred interpretation that pre-existing habit-levels affected eventual task performance). For example, failing to complete an intended task for the week may have prompted participants to report that the experience was automatic, with the implication that it was somehow out of their control – effectively absolving themselves from responsibility for self-regulatory failure. While possible, this interpretation is unlikely given the complete pattern of findings in Study 2. It is difficult to imagine a plausible explanation for how the observed three way interaction is the result of simple biases reflecting impression management strategies at Time 2. An alternative explanation like this would need to include a plausible rationale for why poor inhibitors were more likely than good inhibitors to succumb to this tendency for intended tasks that went undone. Ultimately, correlational data must rely heavily on theory to guide the interpretation of data. Nevertheless, future work could most

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directly address these issues. For example, to reduce the need for recalling distant habit-like behaviour a daily-diary method of investigation could be adopted wherein reports can be obtained almost concurrently with the behaviour itself. This method of data collection could be used to support the evidence here that particular environmental cues are typically present when avoiding in a habit-like way and that specific alternative behaviours are more likely to occur when the avoidance is habitual. To address the issue of causality, future work could directly manipulate the main independent variables. For example, some computer task studies have manipulated the habit-level of responses (e.g., Hay & Jacoby, 1996). A possibility for future work would be to create prepotent avoidance patterns in the laboratory (e.g., the habitual avoidance of an aversive stimulus which is also associated with long-term rewards) and test for effects of self-regulation. For example, a manipulation of state levels of self-regulatory capacity via depletion techniques (e.g., Vohs et al., 2005) could be employed to determine whether habitual avoidance is more common when self-control resources are taxed in the laboratory. This may include manipulating factors known to affect self-regulatory abilities including amount of sleep (Nilsson et al., 2005) and level of alcohol consumption (see Baumeister & Heatherton, 1996).

Two final issues are of note. First, the decision to not limit the type of tasks reported by participants was made to increase the external validity of the findings. Yet the effects observed here may be stronger for some tasks compared to others. Additional research may choose to focus on specific task types (e.g., exercising) that may address explicit concerns (e.g., physical health). Finally, the intention-behaviour gaps observed in Study 2 were assessed over the period of seven days. It would be interesting to carry out further work to examine the generalizablity of the present results to larger time frames (e.g., a school term), wherein failures of intention may be associated with debilitating psychological sequelae like depression (e.g., Jacobson et al., 2001; Ottenbreit & Dobson, 2004).

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Implications

The cost of avoiding important tasks is clear. Procrastination related to delaying unpleasant tasks is detrimental to task-performance itself and is associated with poor psychological health. Furthermore, chronic avoidance patterns are strongly correlated with both clinical levels of anxiety and depression (e.g., Ottenbreit & Dobson, 2004). The fact that avoidance patterns can take the form of prepotent responses (i.e., habits) has implications for how to correct unhelpful behaviour patterns. Furthermore, the present results suggest that particular interventions may be more important for some people compared to others.

Whereas more traditional theories of persuasion and behaviour change make attempts to alter people's intentions (Ajzen & Madden, 1986), habitual avoidance patterns which are prepotent require increased self-control to inhibit their manifestation. Inhibitory abilities are especially important when intentions do not match prepotent-avoidance patterns. Three general strategies may prove useful in overcoming habitual avoidance in the service of conflicting intentions.

First, to the extent that environmental stimuli directly cue habitual avoidance, interventions that remove idiosyncratic triggers for avoidance should prevent the initiation of the behaviour proper (Wood & Neal, 2007). This approach is similar to addiction interventions which advise patients to avoid triggers that prompt problematic behaviour (e.g., Witkiewitz & Marlatt, 2004) and is consistent with the view that chronic drug-seeking behaviour is driven by habits primed by conditioned stimuli (Everitt & Robbins, 2005). For students this may involve removing self-identified avoidance triggers or choosing locations wherein distractions are few (e.g., the library). Alternatively, interventions may be most productive directly following a naturally occurring change (e.g., moving into a new residence). It has been proposed that this type of context change should allow for a window of opportunity wherein intentions for behaviour change become more effective and new habits can more readily develop (Verplanken & Wood, 2006).

Stopping the habitual behaviour once it has already been initiated is another possible area for intervention. For example, Quinn, Pascoe, Wood and Neal (2009) found that vigilant monitoring is a relatively effective method for curbing bad habits as they occur in a naturalistic setting (e.g., compared to distraction). This observation is consistent with the present finding that higher inhibitory control is associated with better follow through when habitual-avoidance patterns exist. Presumably, the effectiveness of this strategy will be limited by one's current level of self-regulatory ability. Fortunately there is evidence that practicing self-regulatory control can increase this type of willpower. Analogous to the strengthening of a muscle, exercising self-control regularly in one domain (e.g., using your nondominant hand for a period of time) has been shown to improve self-control efforts in unrelated domains (see Baumeister, Vohs & Tice, 2007). The main benefit of regularly exerting self-control is increased resistance to depletion (or endurance) for future tasks requiring self-control. Although poor inhibitors demonstrated reduced follow through when habits contradicted their intentions, practicing self-regulation (even in unrelated domains) may improve their capacity for inhibiting habitual-avoidance patterns in the future. Such practice may also include specific executive-control training procedures (e.g., Karbach & Kray, 2009). As an alternative to directly exercising self-regulatory abilities, increasing cardiovascular fitness has also been demonstrated to have positive effects on self control, including improving the executive abilities of planning, scheduling, working memory, and interference control (see McAuley, Kramer & Colcombe, 2004). Pharmacological interventions may also increase self-regulatory abilities in some cases. For example, attention-deficit hyperactivity disorder (ADHD) is a condition believed to involve self-regulatory deficits which are improved by stimulant medications. Further, there is some evidence that individuals with ADHD show improved performance on tasks of executive functioning when actively medicated (e.g. Biederman et al., 2008). Conversely, removing factors which are known to have deleterious effects on self-control levels may also be beneficial. For example, being

well rested (i.e., not sleep deprived; Nilsson et al., 2005) and not consuming alcohol when attempting to regulate one's own behaviour (e.g. before working) will help maintain self-regulatory strength (see Baumeister & Heatherton, 1996 for a review).

Major context changes and/or improving self-control capacity may help poor inhibitors overcome habit-like avoidance patterns. However these strategies are somewhat dramatic and may involve significant effort. A third possible strategy for improving self-regulation in the face of habitual avoidance is to replace old habits by directly cueing more adaptive, goal-oriented responses using implementation intentions. According to Gollwitzer (1999), intentions to behave can be bolstered by simple plans concerning where, when and how the intended behaviour will be performed. These implementation intentions psychologically link situational cues to goal-directed responses in the form of "Whenever situation X arises, I will initiate the goal-directed response Y" (Gollwitzer, 1999; p. 494). In essence, when the situation does arise, the control over action is delegated to these environmental cues which elicit the planned behaviour in a relatively automatic fashion. With respect to breaking old habits, Holland, Aarts, and Langendam (2006) used implementation intentions in a workplace setting to replace old habits with new recycling behaviour. The investigators surreptitiously measured employees' garbage disposal behaviour at a baseline, and also at one-week, two-week and two-months after the experimental manipulation. Half of the employees were asked to plan when, where and how they were going to recycle their old paper and plastic cups. The remaining employees in the control condition were given no such instructions. Employees also provided self-reported habit-levels of wastebasket use (i.e., as opposed to recycling materials). The results clearly showed that implementation intentions increased subsequent recycling behaviour while also reducing the amount of garbage. More importantly, whereas previous wastebasket habits predicted behaviour post-manipulation for those in the control condition, habit levels for those using implementation intentions no longer strongly predicted actual behaviour.

Adriaanse, de Ridder and de Wit (2009) provide a similar demonstration of how old habits can be replaced with new behaviours using implementation intentions. These authors replaced unhealthy snacking with healthy snacking by linking the cues that normally prompt the former with plans to carry out the latter. In their second study participants selected either a situational cue (e.g., being at home, at school, on a visit) or a motivational cue normally associated with a reason they eat unhealthily (e.g., feeling bored, enjoyment, distraction). Their implementation intentions included planning to eat a healthier alternative when they felt like snacking. A control group made no such implementation intentions. Compared to the control condition, only those using a motivational cue to prompt healthier eating were successful in replacing bad snacking habits with healthier eating.

To extrapolate, the findings of Holland et al. (2006) and Adriaanse et al. (2009) suggest that the negative effect of prepotent-avoidance patterns may be attenuated if the cues which initiate avoidance also become directly linked to goal-directed behaviour via implementation intentions. Provided that motivational cues may outperform traditional situational cues (e.g., when and where) in changing some habits (Adriaanse et al., 2009), further examination of these cue types in future studies is warranted. Selection of the most appropriate cues notwithstanding, the main advantage of this approach would be in creating 'if-then' plans that need not place any additional cognitive demands on those already struggling with poor inhibitory control.

Conclusion

The present results demonstrate that procrastination cannot so easily be equated with self-regulation failure – at least to the extent that trait-procrastination is believed to weaken the effect of good intentions. What is clear from the present studies is that habitual avoidance and inhibitory control jointly affect whether intentions translate into behaviour. Poor inhibitors have difficulty completing unpleasant tasks that they have avoided in a habit-like way despite good intentions to change their behaviour. In contrast, good inhibitors find a way to behave according to their previous

intentions irrespective of past avoidance patterns. The present research suggests that interventions aimed at helping people follow through with their intentions should incorporate an understanding of how both bottom-up and top-down factors jointly affect behaviour. Old avoidance patterns can take the form of automatically-triggered habits. Without sufficient self-regulatory strength to overcome prepotent-habitual avoidance patterns, our good intentions to change how we behave may be formed in vain.

Endnotes

1. K denotes the number of studies used for each result of the meta-analysis.

2. Notably, single-indicator intention scores (e.g., the number of intended hours) produced the same pattern of results (e.g., predicting number of completed hours) as the composite intention scores.

3. Given that proportion variables are bounded by zero and one, when used as a dependent variable relations with predictors may be non-linear (i.e., S-shaped). To ensure the shape of the distribution did not artificially influence the results, the percentage-completed dependent variable was converted to a proportion and then transformed using the archsine transformation to linearize any relations with this dependent variable (see Cohen et al., 2003). The main analyses were then re-conducted. The main results remained significant even after performing this transformation.

4. In the reported multilevel models, the regular and robust standard error estimates were comparable in magnitude for all the main analyses. This suggests that there were no substantial problems with normality or homoscedasticity in the present data (Raudenbush & Bryk, 2002).

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Appendix A

<u>Study 1 Materials</u>

Experimenter Script

< Participant reads Information Letter and provides written consent to participate>

"The first part of this study is completing this set of questionnaires. When you are complete, please place them in this empty envelope and open the door – then I'll return and we'll start the next part of the study."

> < The experimenter gives the participant a package containing a demographics questionnaire, the CBAS and AIP. The experimenter then leaves, returning when door opens. >

"For this part of the study we want you to think about tasks that you are currently avoiding."

> < Instructions for the "Thinking about Tasks You Avoid" sheet is reviewed, the participant completes the sheet and places the sheet face down on the table after completion.>

"Next I want you to think about one important task that you find yourself avoiding the most often."

> <Instructions for how to complete the "Two Tasks That You Avoid (Task I)" sheet are reviewed verbally. Participant completes the form.>

"Could I please take a quick look at what you wrote down so that I may ask some questions about that task?"

> <After briefly looking at the task, the experimenter queries:>

"In your own words, why do you think you avoid <Task A>?"

> <The experimenter ensures that the task is avoided, at least in part, because performing the task is unpleasant, unrewarding or extremely boring to perform. If the task is avoided for other reasons then the participant is asked to select another task and the process is repeated.>

"Whenever we avoid one task, there could be any number of things that we could do instead of that task. What percentage of the time (from 0 to 100%) would you say that you <Activity B> when you're avoiding <Task A>?"

> <This procedure is then repeated for Task C (the less-frequently-avoided task) – using the form entitled "Two Tasks That You Avoid (Task II).>

"The remainder of this study focuses on these two tasks. For this next part, please complete this package of questionnaires, place your responses in the envelope when you are finished, and open the door when you are complete – so that we can start the next part of the study."

> <Part I, containing items regarding avoided Task A (and alternative Activity B), is provided to participants to complete. The experimenter returns after the door opens. Part II (regarding avoided Task C and alternative Activity D are given to the participant when the door opens. After completing Part II, the participant is thanked and debriefed.>

INFORMATION LETTER

Title of Project: The Experience of Avoiding Important Tasks

Faculty Investigator: Dr. Jonathan Oakman
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                          Phone; 888-4567 Ext. 33659
                          e-mail: jmoakman@watarts.uwaterloo.ca

Student Investigator: Jeff Paulitzki (jrpaulit@watarts.uwaterloo.ca)

This study entitled '*The Experience of Avoiding Important Tasks*,' is being conducted by Jeff Paulitzki under the supervision of Dr. Jonathan Oakman of the Department of Psychology at the University of Waterloo. The purpose of the study is to take a closer look at different ways that people avoid tasks (or procrastinate) and their experience while avoiding.

If you decide to participate, you will also complete a questionnaire about how you generally avoid tasks (e.g., rating items like "I find myself avoiding tasks or assignments that are really important"). You will also participate in an informal interview in which you will be asked to select two tasks that you avoid because they are either unpleasant or unrewarding. For each task, you will be asked to complete some questionnaires asking about aspects of the task (e.g., rating how "good" vs. "bad" the task is to perform).

In recognition of your time given to this study (approximately 2 hours), you will receive two (2) experimental credits toward your Psychology Course. Another benefit of participating is the knowledge that your participation may help us better understand why people avoid important tasks. There are no known or anticipated risks from participating in this study. Participation in this study is voluntary. You may decline to answer any questions that you do not wish to answer and you can withdraw your participation at any time without penalty or loss of credit.

It is important for you to know that any information that you provide will be confidential. All of the data will be summarized and no individual could be identified from these summarized results. The data collected from this study will be accessed only by the two researchers named above and will be kept in a restricted access area in the Psychology, Anthropology, and Sociology Building (i.e., Dr. Oakman's lab area) for seven years after completion of the study. After 7 years, the data will be destroyed using a confidential shredder. Only individuals authorized by Dr. Jonathan Oakman will have access to the data during this period.

I would like to assure you that this study has been reviewed and received ethics clearance through the Office of Research Ethics at the University of Waterloo. However, the final decision about participation is yours. If you have any comments or concerns resulting from your participation in this study, please feel free to contact Dr. Susan Sykes, Director, Office of Research Ethics, at (519) 888-4567 ext. 36005 or by email at ssykes@uwaterloo.ca .

Should you have any questions about the study, please contact either Jeff Paulitzki by e-mail at jrpaulit@watarts.uwaterloo.ca or Dr. Jonathan Oakman by e-mail at jmoakman@watarts.uwaterloo.ca. Further, if you would like to receive a copy of the results of this study, please contact either investigator.

Thank you for considering participation.

Consent of Participant

I have read the information presented in the information letter about the "Experience of Avoiding Important Tasks" being conducted by Dr. Jonathan Oakman and Jeff Paulitzki of the Department of Psychology at the University of Waterloo. I have had the opportunity to ask any questions related to this study, to receive satisfactory answers to my questions, and any additional details I wanted. I am aware that I may withdraw from the study without penalty at any time by advising the researchers of this decision.

This project has been reviewed by, and received ethics clearance through, the Office of Research Ethics at the University of Waterloo. I was informed that if I have any comments or concerns resulting from my participation in this study, I may contact the Director, Office of Research Ethics at (519) 888-4567 Ext. 6005. However, the decision to participate is mine.

With full knowledge of all foregoing, I agree, of my own free will, to participate in this study.

_____   _____

Print Name   Signature of Participant

_____   _____

Dated at Waterloo, Ontario   Witnessed

Demographic Information

　　　Please complete the following set of questions. This information will help us understand some general characteristics about the participants in our study. All the information that is collected will be kept confidential and you may decline to answer any of the questions if you wish.

1. **Age:** _____

2. **Sex:** (Male / Female)

3. **Academic program (e.g., Math, Arts, etc):** _____

4. **Ethnicity** _____

5. **Country of Origin:** _____

6. **What is your native language?** _____

7. **How long have you been speaking English?** ____ **year(s)**

8. **How many courses are you taking this term?** _____

AIP

These statements are concerned with your opinions on different situations. No two statements are exactly alike, so please consider each statement carefully before responding. Answer as honestly as possible with the following rating scale:

1 = Strongly disagree
2 = Disagree
3 = Sometimes disagree/sometimes agree
4 = Agree
5 = Strongly Agree

		Rating
1.	I pay my bills on time.	
2.	I am prompt and on time for most appointments.	
3.	I lay out my clothes the night before I have an appointment so I won't be late.	
4.	I find myself running later than I would like to be.	
5.	I don't get things done on time.	
6.	If someone were teaching a course on how to get things done on time I would attend.	
7.	My friends and family think I wait until the last minute.	
8.	I get important things done with time to spare.	
9.	I am not very good at meeting deadlines.	
10.	I find myself running out of time.	
11.	I schedule doctor's appointments when I am supposed to without delay.	
12.	I am more punctual than most people I know.	
13.	I do routine maintenance (e.g., changing the car's oil) on things I own as often as I should.	
14.	When I have to be somewhere at a certain time my friends expect me to run a bit late.	
15.	Putting things off till the last minute has cost me money in the past year.	

CBAS

Instructions: Different people use different strategies to deal with situations and problems in their lives. Below are a number of strategies that people may use to deal with situations and problems. A number of the items below refer to dealing with situations at work or school. If you are not currently working or attending school, answer these items instead using your daily duties and activities. Please read each statement carefully and indicate how true, *in general*, each statement is for you using the following key:

1= **Not at all** true for me
2= **Somewhat** true for me
3= **Moderately** true for me
4= **Very much** true for me
5= **Extremely** true for me

	1	2	3	4	5
1. I avoid attending social activities.	1	2	3	4	5
2. When uncertain about my future, I fail to sit down and think about what I really want.	1	2	3	4	5
3. I would like to achieve things at work/school, but I have to accept my limits.	1	2	3	4	5
4. I fail to do what is needed to follow through with achievement goals I have set for myself.	1	2	3	4	5
5. In order to avoid feelings of disappointment, I just try not to get too serious about work/school.	1	2	3	4	5
6. Rather than try new activities, I tend to stick with the things I know.	1	2	3	4	5
7. I choose to turn down opportunities to further my education/career.	1	2	3	4	5
8. I do not answer the phone in case people are calling with social invitations.	1	2	3	4	5
9. I quit activities that challenge me too much.	1	2	3	4	5
10. I try not to think about problems in my personal relationships.	1	2	3	4	5
11. I think to myself that I will not be able to complete really challenging tasks.	1	2	3	4	5
12. While I know I should make decisions about my personal relationships, I just let things go on as they are.	1	2	3	4	5
13. I avoid trying new activities that hold the potential for failure.	1	2	3	4	5
14. I do not go out to events when I know there will be a lot of people I do not know.	1	2	3	4	5
15. Instead of thinking about problems in my social life, I tell myself that I prefer to be alone.	1	2	3	4	5
16. I fail to discuss/address tension that builds in a friendship.	1	2	3	4	5
17. I find that I often want to leave social gatherings.	1	2	3	4	5
18. I do not try to think about ways to improve my work/school performance.	1	2	3	4	5

CBAS

19. I try not to think about my future and what I will do with my life.	1	2	3	4	5
20. I just wait out tension in my relationships hoping that it will go away.	1	2	3	4	5
21. I tend to make up excuses to get out of social activities.	1	2	3	4	5
22. There is nothing I can do to improve problems in my relationships.	1	2	3	4	5
23. I turn down opportunities to socialize with the opposite sex.	1	2	3	4	5
24. I tend to remain to myself during social gatherings or activities.	1	2	3	4	5
25. I avoid making decisions about my future.	1	2	3	4	5
26. When I experience confusion in my relationships, I do not try to figure things out.	1	2	3	4	5
27. While I know that I have to make some important decisions about school/work, I just do not get down to it.	1	2	3	4	5
28. Rather than getting out and doing things, I just sit at home and watch TV.	1	2	3	4	5
29. I distract myself when I start to think about my work/school performance.	1	2	3	4	5
30. I do not bother thinking about how to solve problems in my family – it is useless.	1	2	3	4	5
31. I find myself avoiding tasks and assignments that are really important.	1	2	3	4	5

Please indicate how helpful you feel the above described type of avoidance strategies are for you in dealing with life situations and problems by circling the number corresponding with helpfulness rating that applies to you:

1	2	3	4	5
Not at all helpful	Somewhat helpful	Moderately helpful	Very much helpful	Extremely helpful

Thinking about Tasks You Avoid

General Instructions: There are many ways that people engage in the tasks and activities of their lives. ***Here we are interested in ways you avoid important tasks because they are unpleasant or unrewarding.*** These may include putting off homework to watch TV, sticking to activities you know instead of trying something new, or quitting an activity because it is too challenging. *What we are <u>not</u> interested in activities that you don't do because you have forgotten about the activity, or don't really care about whether or not it gets done.* Here we are interested in tasks that you care about, but that you may avoid because they are unpleasant or unrewarding to perform.

Please take a moment to consider the ways that you may avoid tasks. Try and think of recent examples in your own life where you have put off a task because you thought it may be unpleasant or unrewarding and ended up doing something else.

In the table below, please write down examples of how you have *recently* avoided, or put off, tasks because they might be unpleasant or unrewarding to perform. In each example, please include what you were avoiding (e.g., a homework assignment) and what you did instead of that task (e.g., watched TV; surfed the internet). Please write **at least three** situations.

Task Avoided	What You Did Instead of the Task
i.)	
ii.)	
iii.)	
iv.)	
v.)	

Two Tasks That You Avoid (Task I)

Please think carefully about the next sections, as you will be asked to refer to each of these later in the study.

In the table below, ***please write down (A) the important task that you find yourself avoiding the most often and (B) one activity what you normally do instead of working on that task***. Remember, the task in A is one that you think you should work on, but do not because it is either unpleasant or unrewarding. If you have difficulty thinking about which important task you avoid *often*, please pick one example from your life that most easily comes to mind. Similarly, if you have difficulty thinking about what you normally do instead of engaging in the important task, please pick a previous activity that most easily comes to mind.

Task Avoided *OFFEN*	What You Normally Do Instead of the Task
A.	**B.**

Approximately how often do you avoid the task described in "A" ?
(*Please check one box*)

☐ Less than Once a Month
☐ Monthly
☐ Every other week
☐ Weekly
☐ Twice Weekly
☐ Every other Day
☐ Daily
☐ Twice Daily
☐ More than Twice Daily

When given the opportunity, what percentage of the time do you avoid this task? (0 – 100%) _____(%)

	Never		Sometimes			Always	
Although you avoid the task in "A," do you eventually get around to doing it?	1	2	3	4	5	6	7

	Very Poor		Neutral		Very Good		
If you rated the *quality* of your work after doing task "A," how would you normally describe it?	1	2	3	4	5	6	7

Two Tasks That You Avoid (Task II)

In the next table, ***please write down (C) another important task that you find yourself avoiding and (D) what you normally do instead of working on that task***. *This time, please choose a task that you mostly do work on, but occasionally avoid doing it. Pick a task that you <u>avoid much less</u> than you avoid task "A" in the section of the table on the previous page* (i.e., a task you mostly do, but avoid occasionally because it is either unpleasant or unrewarding).

Task Avoided	What You Normally Do Instead of the Task
C.	**D.**

Approximately how often do you avoid the task described in "C" ?
(*Please check one box*)

      ☐ Less than Once a Month
      ☐ Monthly
      ☐ Every other week
      ☐ Weekly
      ☐ Twice Weekly
      ☐ Every other Day
      ☐ Daily
      ☐ Twice Daily
      ☐ More than Twice Daily

When given the opportunity, what percentage of the time do you avoid this task? (0 – 100%) _____(%)

	Never		Sometimes		Always		
Although you avoid the task in "C," do you eventually get around to doing it?	1	2	3	4	5	6	7

	Very Poor		Neutral		Very Good		
If you rated the *quality* of your work after doing task "C," how would you normally describe it?	1	2	3	4	5	6	7

PART I

In the space below, please *write down the important task that you find yourself avoiding the most often (i.e., copy your response from the table on the first page).*

Task Avoided *OFTEN*
A.

About Task "A"…

We can often have mixed feelings about how we behave. For example, sometimes a behavior can feel good in the short-term (e.g., while we are doing it) but feel less good in the long-term (e.g., because of the long-term consequences of the behavior) or vice versa. Keeping this in mind, please answer the next few items.

1. In the "short-term," *performing* **the task described in "A" is an experience that is…**
(place circle a number between <u>each pair</u> of words below)

Unpleasant	1	2	3	4	5	Pleasant
Good	1	2	3	4	5	Bad
Positive	1	2	3	4	5	Negative
Unrewarding	1	2	3	4	5	Rewarding
Boring	1	2	3	4	5	Fun
Pleasurable	1	2	3	4	5	Painful

2. In the "long-term," the *fact that I performed* **the task described in "A" is…**
(place circle a number between <u>each pair</u> of words below)

Unpleasant	1	2	3	4	5	Pleasant
Good	1	2	3	4	5	Bad
Positive	1	2	3	4	5	Negative
Unrewarding	1	2	3	4	5	Rewarding
Boring	1	2	3	4	5	Fun
Pleasurable	1	2	3	4	5	Painful

		Strongly think I Should Not			Neutral		Strongly think I Should	
3.	Do you believe that most people who are important to you think that you should (or should not) engage in activity "A"?	1	2	3	4	5	6	7

		Strongly Disagree			Neutral		Strongly Agree	
4.	I am capable of doing well at this task.	1	2	3	4	5	6	7

In the space below, please **write down the important task that you find yourself avoiding the most often (i.e., copy your response from the table on the first page).**

Task Avoided *OFFEN*
A.

Please indicate how much you agree or disagree with the statements in the following section.

The task described in "A" is something . . .

		Disagree		Neither Agree or Disagree				Agree
1.	…I avoid frequently.	1	2	3	4	5	6	7
2.	…I avoid automatically.	1	2	3	4	5	6	7
3.	…I avoid without having to consciously remember.	1	2	3	4	5	6	7
4.	…that feels sort of natural to me when I avoid it.	1	2	3	4	5	6	7
5.	…I avoid without thinking.	1	2	3	4	5	6	7
6.	…that would require mental effort to stop avoiding.	1	2	3	4	5	6	7
7.	…I avoid every day.	1	2	3	4	5	6	7
8.	…I start avoiding before I realize I'm avoiding.	1	2	3	4	5	6	7
9.	…I would find it hard to stop avoiding.	1	2	3	4	5	6	7
10.	…I avoid without needing to think about it.	1	2	3	4	5	6	7
11.	…that's pretty "in character" for me to avoid.	1	2	3	4	5	6	7
12.	…I have been avoiding for a long time.	1	2	3	4	5	6	7

Environmental Features

Even though situations can be different in many ways there may be some aspects (or features) that are common from one situation to another. This may involve coming into contact with the same objects, events, or features in your environment on different occasions. Some features of our environment may prompt us to behave in particular ways. For example, seeing particular features of our home environment (e.g., the entrance to the kitchen) may act as a trigger for us to behave in a certain way (e.g., avoid washing the dishes that are stacking up on the kitchen counter). Take a moment, and think carefully about times in the past when you have avoided <task A>. Think about how there may be triggers or events in your environment that have prompted the avoidance of this task.

Instruction: ***Please state a feature (or features) of your environment that you now realize may trigger or cause you to avoid <task A>.***

Feature(s) of Environment Usually Present When Avoiding Task "A":

→ _____

		Rarely or Never Present			Sometimes Present			Usually Present	
1.	How often is this feature (or these features) present when you avoid the task described in "A"?	1	2	3	4	5	6	7

		Little or No Effect			Some Effect			A Large Effect	
2.	What effect do you think this feature (or these features) of your environment has on your behavior?	1	2	3	4	5	6	7

3. Describe how this feature (or these features) affects how you behave:

_____

		Rarely or Never in the Same Location			Sometimes in the Same Location			Usually in the Same Location	
4.	Are you typically in the same physical location (e.g., in a particular room or building) when you have done this in the past?	1	2	3	4	5	6	7

		Rarely or Never at the Same Time of Day			Sometimes at the Same Time of Day			Usually at the Same Time of Day	
5.	When you have done this in the past, does it often happen at the same time of the day?	1	2	3	4	5	6	7

		Rarely or Never With Others		Sometimes With Others		Usually With Others	
6.	Are you usually with other people when you have done this in the past?	1	2	3	4	5	6	7

		Rarely or Never Feel the Same Way		Sometimes Feel the Same Way		Usually Feel the Same Way	
7.	Do you usually feel the same way when you have done this in the past?	1	2	3	4	5	6	7

8. In your words, describe how you feel when you have done this in the past:

_____

About Avoiding Task "A"…

We can often have mixed feelings about how we behave. For example, sometimes a behavior can feel good in the short-term (e.g., while we are doing it) but feel less good in the long-term (e.g., because of the long-term consequences of the behavior) or vice versa. Keeping this in mind, please answer the next few items.

1. In the "short-term," AVOIDING the task described in "A" is an experience that is…
(place circle a number between each pair of words below)

Unpleasant	1	2	3	4	5	Pleasant
Good	1	2	3	4	5	Bad
Positive	1	2	3	4	5	Negative
Unrewarding	1	2	3	4	5	Rewarding
Boring	1	2	3	4	5	Fun
Pleasurable	1	2	3	4	5	Painful

2. In the "long-term," the fact that I AVOIDED the task described in "A" is…
(place circle a number between each pair of words below)

Unpleasant	1	2	3	4	5	Pleasant
Good	1	2	3	4	5	Bad
Positive	1	2	3	4	5	Negative
Unrewarding	1	2	3	4	5	Rewarding
Boring	1	2	3	4	5	Fun
Pleasurable	1	2	3	4	5	Painful

	Strongly Disagree			Neutral			Strongly Agree
3. While you are avoiding the task described in "A," you think a lot about the consequences of this choice.	1	2	3	4	5	6	7

	Strongly think I Should Not			Neutral			Strongly think I Should
4. Do you believe that most people who are important to you think that you should (or should not) avoid task "A"?	1	2	3	4	5	6	7

		Not at all			Moderately		Very Strongly	

5. Before you avoid, to what extent *do you usually* INTEND to avoid the task described in "A"?

    1   2   3   4   5   6   7

         Not at all   Moderately   Very Strongly

6. To what extent do you INTEND to avoid the task described in "A" *in the future*?

    1   2   3   4   5   6   7

         Not at all   Moderately   Extremely
         energetic   Energetic   Energetic

7. How ENERGETIC do you generally feel?

    1   2   3   4   5   6   7

In the space below, please **write down what you normally do instead of working on that task described in "A" (i.e., copy your response "B" from the table on the first page).**

What You Normally Do **Instead of** Task "A"
B.

The next section refers to the activity you do most often when avoiding important tasks (i.e. the "B" part above). **Please answer each of the following items with respect to what you normally do instead of working on that important task.**

Please indicate how much you agree or disagree with the statements in the following section.

The activity described in "B" is something . . .

		Disagree			Neither Agree or Disagree			Agree
1.	… I do frequently.	1	2	3	4	5	6	7
2.	…I do automatically.	1	2	3	4	5	6	7
3.	…I do without having to consciously remember.	1	2	3	4	5	6	7
4.	…that feels sort of natural to me.	1	2	3	4	5	6	7
5.	…I do without thinking.	1	2	3	4	5	6	7
6.	…that would require mental effort not to do it.	1	2	3	4	5	6	7
7.	…I do every day.	1	2	3	4	5	6	7
8.	…I start doing before I realize I'm doing it.	1	2	3	4	5	6	7
9.	…I would find hard not to do.	1	2	3	4	5	6	7
10.	…I do without needing to think about it.	1	2	3	4	5	6	7
11.	…that's typically "me."	1	2	3	4	5	6	7
12.	…I have been doing for a long time.	1	2	3	4	5	6	7

Environmental Features

As mentioned above, some features of our environment may prompt us to behave in particular ways. For example, seeing particular features of our environment (e.g., the television) may act as a trigger for us to behave in a certain way (e.g., watch the television). Take a moment, and think carefully about times in the past when you have <task B>. Think about how there may be triggers or events in your environment that have prompted this behavior. ***Below, write down feature(s) of your environment that you now realize may trigger you to perform <task B>.***

Instruction: ***Please state a feature (or features) of your environment that you now realize may trigger or cause you to <task B>.***

Feature(s) of Environment Usually Present When Performing Activity "B":

→ _____

		Rarely or Never Present			Sometimes Present		Usually Present	
1.	How often is this feature (or these features) present when you do the behavior described in "B"?	1	2	3	4	5	6	7

		Little or No Effect			Some Effect		A Large Effect	
2.	What effect do you think this feature (or these features) of your environment has on your behavior?	1	2	3	4	5	6	7

3. Describe how this feature (or these features) affects how you behave:

_____

		Rarely or Never in the Same Location			Sometimes in the Same Location		Usually in the Same Location	
4.	Are you typically in the same physical location (e.g., in a particular room or building) when you have done this in the past?	1	2	3	4	5	6	7

		Rarely or Never at the Same Time of Day			Sometimes at the Same Time of Day		Usually at the Same Time of Day	
5.	When you have done this in the past, does it often happen at the same time of the day?	1	2	3	4	5	6	7

		Rarely or Never With Others			Sometimes With Others			Usually With Others	
6.	Are you usually with other people when you have done this in the past?	1	2	3	4	5	6	7

		Rarely or Never Feel the Same Way			Sometimes Feel the Same Way			Usually Feel the Same Way	
7.	Do you usually feel the same way when you have done this in the past?	1	2	3	4	5	6	7

8. In your words, describe how you feel when you have done this in the past:

_____

In the space below, *please copy your previous response "B" from the table on the first page.*

What You Normally Do *Instead of* Task "A"
B.

About Activity "B"…

We can often have mixed feelings about how we behave. For example, sometimes a behavior can feel good in the short-term (e.g., while we are doing it) but feel less good in the long-term (e.g., because of the long-term consequences of the behavior) or vice versa. Keeping this in mind, please answer the next few items.

1. In the "short-term," performing the activity described in "B" is an experience that is…
(place circle a number between <u>each pair</u> of words below)

Unpleasant	1	2	3	4	5	Pleasant
Good	1	2	3	4	5	Bad
Positive	1	2	3	4	5	Negative
Unrewarding	1	2	3	4	5	Rewarding
Boring	1	2	3	4	5	Fun
Pleasurable	1	2	3	4	5	Painful

2. In the "long-term," the fact that I engaged in the activity described in "B" is…
(place circle a number between <u>each pair</u> of words below)

Unpleasant	1	2	3	4	5	Pleasant
Good	1	2	3	4	5	Bad
Positive	1	2	3	4	5	Negative
Unrewarding	1	2	3	4	5	Rewarding
Boring	1	2	3	4	5	Fun
Pleasurable	1	2	3	4	5	Painful

	Strongly think I Should Not	Neutral	Strongly think I Should
3. Do you believe that most people who are important to you think that you should (or should not) engage in activity "B"?	1 2 3	4 5	6 7

		Strongly Disagree			Neutral			Strongly Agree
4.	I am capable of doing well in this activity.	1	2	3	4	5	6	7

		Not at all			Moderately			Very Strongly
5.	Before you perform the activity, to what extent *do you usually* INTEND to perform the activity described in "B"?	1	2	3	4	5	6	7

		Not at all			Moderately			Very Strongly
6.	To what extent do you INTEND to perform the activity described in "B" *in the future*?	1	2	3	4	5	6	7

PART II

In the space below, please *write down the OTHER important task that you find yourself avoiding (i.e., copy your response from the "C" section of the table on the first page).*

Task Avoided
C.

About Task "C"…

1. In the "short-term," *performing* the task described in "C" is an experience that is…
(place circle a number between <u>each pair</u> of words below)

Unpleasant	1	2	3	4	5	Pleasant
Good	1	2	3	4	5	Bad
Positive	1	2	3	4	5	Negative
Unrewarding	1	2	3	4	5	Rewarding
Boring	1	2	3	4	5	Fun
Pleasurable	1	2	3	4	5	Painful

2. In the "long-term," the *fact that I performed* the task described in "C" is…
(place circle a number between <u>each pair</u> of words below)

Unpleasant	1	2	3	4	5	Pleasant
Good	1	2	3	4	5	Bad
Positive	1	2	3	4	5	Negative
Unrewarding	1	2	3	4	5	Rewarding
Boring	1	2	3	4	5	Fun
Pleasurable	1	2	3	4	5	Painful

		Strongly think I Should Not		Neutral		Strongly think I Should
3.	Do you believe that most people who are important to you think that you should (or should not) engage in activity "C"?	1 2 3		4	5 6	7

		Strongly Disagree		Neutral		Strongly Agree
4.	I am capable of doing well at this task.	1 2 3		4	5 6	7

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In the space below, please *write down the important task that you avoid in the "C" section (i.e., copy your response from the "C" section of the table on the first page).*

Task Avoided
C.

Please indicate how much you agree or disagree with the statements in the following section.

The task described in "C" is something . . .

		Disagree		Neither Agree or Disagree				Agree
1.	…I avoid frequently.	1	2	3	4	5	6	7
2.	…I avoid automatically.	1	2	3	4	5	6	7
3.	…I avoid without having to consciously remember.	1	2	3	4	5	6	7
4.	…that feels sort of natural to me when I avoid it.	1	2	3	4	5	6	7
5.	…I avoid without thinking.	1	2	3	4	5	6	7
6.	…that would require mental effort to stop avoiding.	1	2	3	4	5	6	7
7.	…I avoid every day.	1	2	3	4	5	6	7
8.	…I start avoiding before I realize I'm avoiding.	1	2	3	4	5	6	7
9.	…I would find it hard to stop avoiding.	1	2	3	4	5	6	7
10.	…I avoid without needing to think about it.	1	2	3	4	5	6	7
11.	…that's pretty "in character" for me to avoid.	1	2	3	4	5	6	7
12.	…I have been avoiding for a long time.	1	2	3	4	5	6	7

Environmental Features

Even though situations can be different in many ways there may be some aspects (or features) that are common from one situation to another. This may involve coming into contact with the same objects, events, or features in your environment on different occasions. Some features of our environment may prompt us to behave in particular ways. For example, seeing particular features of our home environment (e.g., the entrance to the kitchen) may act as a trigger for us to behave in a certain way (e.g., avoid washing the dishes that are stacking up on the kitchen counter). Take a moment, and think carefully about times in the past when you have avoided <task C>. Think about how there may be triggers or events in your environment that have prompted the avoidance of this task.

Instruction: ***Please state a feature (or features) of your environment that you now realize may trigger or cause you to avoid <task C>.***

Feature(s) of Environment Usually Present When Avoiding Task "C":

→ _____

		Rarely or Never Present			Sometimes Present			Usually Present	
1.	How often is this feature (or these features) present when you avoid the task described in "C"?	1	2	3	4	5	6	7	

		Little or No Effect			Some Effect			A Large Effect	
2.	What effect do you think this feature (or these features) of your environment has on your behavior?	1	2	3	4	5	6	7	

3.   Describe how this feature (or these features) affects how you behave:

_____

		Rarely or Never in the Same Location			Sometimes in the Same Location			Usually in the Same Location	
4.	Are you typically in the same physical location (e.g., in a particular room or building) when you have done this in the past?	1	2	3	4	5	6	7	

		Rarely or Never at the Same Time of Day			Sometimes at the Same Time of Day			Usually at the Same Time of Day	
5.	When you have done this in the past, does it often happen at the same time of the day?	1	2	3	4	5	6	7

		Rarely or Never With Others			Sometimes With Others			Usually With Others	
6.	Are you usually with other people when you have done this in the past?	1	2	3	4	5	6	7

		Rarely or Never Feel the Same Way			Sometimes Feel the Same Way			Usually Feel the Same Way	
7.	Do you usually feel the same way when you have done this in the past?	1	2	3	4	5	6	7

8. In your words, describe how you feel when you have done this in the past:

_____

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About Avoiding Task "C"…

We can often have mixed feelings about how we behave. For example, sometimes a behavior can feel good in the short-term (e.g., while we are doing it) but feel less good in the long-term (e.g., because of the long-term consequences of the behavior) or vice versa. Keeping this in mind, please answer the next few items.

1. In the "short-term," AVOIDING the task described in "C" is an experience that is…
(place circle a number between each pair of words below)

Unpleasant	1	2	3	4	5	Pleasant
Good	1	2	3	4	5	Bad
Positive	1	2	3	4	5	Negative
Unrewarding	1	2	3	4	5	Rewarding
Boring	1	2	3	4	5	Fun
Pleasurable	1	2	3	4	5	Painful

2. In the "long-term," the fact that I AVOIDED the task described in "C" is…
(place circle a number between each pair of words below)

Unpleasant	1	2	3	4	5	Pleasant
Good	1	2	3	4	5	Bad
Positive	1	2	3	4	5	Negative
Unrewarding	1	2	3	4	5	Rewarding
Boring	1	2	3	4	5	Fun
Pleasurable	1	2	3	4	5	Painful

3. While you are avoiding the task described in "C," you think a lot about the consequences of this choice.

	Strongly Disagree		Neutral			Strongly Agree
	1	2	3	4	5	6	7

4. Do you believe that most people who are important to you think that you should (or should not) avoid task "C"?

	Strongly think I Should Not		Neutral			Strongly think I Should
	1	2	3	4	5	6	7

		Not at all			Moderately		Very Strongly	
5.	Before you avoid, to what extent *do you usually* INTEND to avoid the task described in "C"?	1	2	3	4	5	6	7

		Not at all			Moderately		Very Strongly	
6.	To what extent do you INTEND to avoid the task described in "C" *in the future*?	1	2	3	4	5	6	7

In the space below, please *what you normally do instead of working on that task described in "C"* *(i.e., copy your response "D" from the table on the first page).*

What You Normally Do ***Instead of*** Task "C"
D.

The next section refers to the activity you do most often when avoiding important tasks (i.e. the "D" part above). ***Please answer each of the following items with respect to what you normally do instead of working on that important task.***

Please indicate how much you agree or disagree with the statements in the following section.

The activity described in "D" is something . . .

		Disagree			Neither Agree or Disagree			Agree
1.	… I do frequently.	1	2	3	4	5	6	7
2.	…I do automatically.	1	2	3	4	5	6	7
3.	…I do without having to consciously remember.	1	2	3	4	5	6	7
4.	…that feels sort of natural to me.	1	2	3	4	5	6	7
5.	…I do without thinking.	1	2	3	4	5	6	7
6.	…that would require mental effort not to do it.	1	2	3	4	5	6	7
7.	…I do every day.	1	2	3	4	5	6	7
8.	…I start doing before I realize I'm doing it.	1	2	3	4	5	6	7
9.	…I would find hard not to do.	1	2	3	4	5	6	7
10.	…I do without needing to think about it.	1	2	3	4	5	6	7
11.	…that's typically "me."	1	2	3	4	5	6	7
12.	…I have been doing for a long time.	1	2	3	4	5	6	7

Environmental Features

As mentioned above, some features of our environment may prompt us to behave in particular ways. For example, seeing particular features of our environment (e.g., the television) may act as a trigger for us to behave in a certain way (e.g., watch the television). Take a moment, and think carefully about times in the past when you have <task D>. Think about how there may be triggers or events in your environment that have prompted this behavior. ***Below, write down feature(s) of your environment that you now realize may trigger you to perform <task D>.***

Instruction: ***Please state a feature (or features) of your environment that you now realize may trigger or cause you to <task D>.***

Feature(s) of Environment Usually Present When Performing Activity "D":

→ _____

		Rarely or Never Present			Sometimes Present			Usually Present	
1.	How often is this feature (or these features) present when you do the behavior described in "D"?	1	2	3	4	5	6	7

		Little or No Effect			Some Effect			A Large Effect	
2.	What effect do you think this feature (or these features) of your environment has on your behavior?	1	2	3	4	5	6	7

3. Describe how this feature (or these features) affects how you behave:

   _____

		Rarely or Never in the Same Location			Sometimes in the Same Location			Usually in the Same Location	
4.	Are you typically in the same physical location (e.g., in a particular room or building) when you have done this in the past?	1	2	3	4	5	6	7

		Rarely or Never at the Same Time of Day			Sometimes at the Same Time of Day			Usually at the Same Time of Day	
5.	When you have done this in the past, does it often happen at the same time of the day?	1	2	3	4	5	6	7

		Rarely or Never With Others			Sometimes With Others			Usually With Others	
6.	Are you usually with other people when you have done this in the past?	1	2	3	4	5	6	7

		Rarely or Never Feel the Same Way		Sometimes Feel the Same Way			Usually Feel the Same Way	
7.	Do you usually feel the same way when you have done this in the past?	1	2	3	4	5	6	7

8. In your words, describe how you feel when you have done this in the past:

_____

In the space below, *please copy your previous response "D" from the table on the first page.*

What You Normally Do *Instead of* Task "C"
D.

About Activity "D"…

We can often have mixed feelings about how we behave. For example, sometimes a behavior can feel good in the short-term (e.g., while we are doing it) but feel less good in the long-term (e.g., because of the long-term consequences of the behavior) or vice versa. Keeping this in mind, please answer the next few items.

1. In the "short-term," performing the activity described in "D" is an experience that is…
(place circle a number between <u>each pair</u> of words below)

Unpleasant	1	2	3	4	5	Pleasant
Good	1	2	3	4	5	Bad
Positive	1	2	3	4	5	Negative
Unrewarding	1	2	3	4	5	Rewarding
Boring	1	2	3	4	5	Fun
Pleasurable	1	2	3	4	5	Painful

2. In the "long-term," the fact that I engaged in the activity described in "D" is…
(place circle a number between <u>each pair</u> of words below)

Unpleasant	1	2	3	4	5	Pleasant
Good	1	2	3	4	5	Bad
Positive	1	2	3	4	5	Negative
Unrewarding	1	2	3	4	5	Rewarding
Boring	1	2	3	4	5	Fun
Pleasurable	1	2	3	4	5	Painful

		Strongly think I Should Not		Neutral		Strongly think I Should
3.	Do you believe that most people who are important to you think that you should (or should not) engage in activity "D"?	1 2	3	4	5	6 7

		Strongly Disagree			Neutral			Strongly Agree
4.	I am capable of doing well in this activity.	1	2	3	4	5	6	7

		Not at all			Moderately			Very Strongly
5.	Before you perform the activity, to what extent *do you usually* INTEND to perform the activity described in "D"?	1	2	3	4	5	6	7

		Not at all			Moderately			Very Strongly
6.	To what extent do you INTEND to perform the activity described in "D" *in the future*?	1	2	3	4	5	6	7

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FEEDBACK SHEET FOR PARTICIPANTS

The Experience of Avoiding Important Tasks
Dr. Jonathan Oakman & Jeff Paulitzki

Thank you for your involvement in this study!

The goal of this project was to get a sense of what the experience of avoiding an important task is really like. We had you choose two different tasks that you avoid. Even though both tasks are avoided because they are unpleasant, one of these tasks you avoid much more often than the other. Thus frequency of avoidance (or how often you avoid each task) was the main independent variable in this study.

We wanted to see whether the more frequently avoided task is experienced differently than tasks avoided less frequently. One possibility is that when we avoid tasks often (and in similar ways across time) the avoidance behaviour itself may develop into a habit. If this is the case, we expect that the frequent 'avoidance behaviour' should be experienced as happening more 'automatically' than avoidance behaviours that are less frequent. Therefore, how 'habit-like' each avoidance behavior was is the main dependent variable in this study. In addition, previous research has shown that some habit-like behaviours may be triggered by cues in our environment. Thus, we also examined whether frequent avoidance behaviour was triggered more by environmental cues than was less frequent avoidance behaviour.

In this study we were also interested in whether avoidance of a particular task is usually associated with a particular 'alternative' behaviour. For example, does avoiding one's homework usually mean watching TV instead (i.e. is TV watching the most frequent alternative behaviour)? We predict that the correspondence between task-avoidance and alternative behaviour may be strongest for task-avoidance that is more habit-like in nature. For example, if avoiding a particular task has become habitual (i.e. cued relatively consistently by one's environment) then that same environment may be cuing specific behaviours in particular (e.g., the television cuing TV watching).

This project has been reviewed by, and received ethics clearance through, the Office of Research Ethics at the University of Waterloo and you may contact this office at (519) 888-4567, Ext. 36005 if you have any comments or concerns resulting from your involvement in this study.

For further details regarding the logic behind this study, and some early results, please contact Jeff Paulitzki at mailto:jrpaulit@artsmail.uwaterloo.ca jrpaulit@uwaterloo.ca, or Dr. Jonathan Oakman at (519) 888-4567 Ext. 37197 or by e-mail at jmoakman@watarts.uwaterloo.ca.

For further reading on this issue you can refer to the following publications:

Verplanken, B. (2006). Beyond frequency: Habit as a mental construct. *British Journal of Social Psychology, 45*, 639-656.
Steel, P. (2007). The nature of procrastination: A meta-analytic and theoretical review of quintessential self-regulation failure. *Psychological Bulletin, 133*, 65-94.

Thanks again for participating!

Study 2 Materials

Experimenter Script (Study 2)

Session 1:
< Participant reads Information Letter and provides written consent to participate>

"This study looks at how people carry out their daily tasks. We are interested in the tasks that people think they should complete in the next week or so. We are also interested in what tasks people do over the course of that time. To do this we ask that you complete some on-line surveys one week from now. Today, we will ask you about tasks that you believe you should work on in the next week. One week from today, we will ask you a number of questions about each task you reported here. It is important that you complete the on-line surveys because we are interested in whether your responses today have anything to do with what you do over the next 7 days. Do you have any questions about this?

Before we start asking you about the tasks you think you should work on this week, we'll have you complete three brief computer tasks. Please take a seat here at the computer, and read the instructions on the screen for the first task."

> < After reading instructions, the experimenter asks if further clarification is needed and the participant completes the task. The same procedure is carried out for the next two computer tasks. >

"The next part of the study is a series of questionnaires. Here is the package of questionnaires. If you have any questions about these please open the door and I will be happy to answer them. Otherwise, please complete this package and place it in this empty envelope. Then open the door when you are finished and we'll continue with the next part of the study."

> < Participant completes questionnaire package and opens door >

"In the next part of the study I will be giving you ten of these forms < show participant blank FIAR form >. *What I want you to do is think about all the tasks you think you should work on in the next week. Although they should all be tasks that are important, some of them you may work on, whereas some of them you may not. For each task you think you should work on this week, please fill out one of one of these forms. I want to point out here what we mean by 'task.' What we are interested in are NOT scheduled routines that you are in the habit of doing every day. For example, you are NOT required to complete a form for things like "brushing your teeth" or "walking to campus." What we are interested in are tasks (or jobs) that are somewhat unpleasant and would take some effort to do, or might seem like a bit of a chore (e.g., working on a class assignment). Do you have any questions about this? Here is a sheet with some general instructions about the types of tasks we are looking for. Please complete these forms and place everything in this envelope. Then open the door when you are finished.*

> < Participant completes FIAR forms >

"All done? Great, thanks! The last is to complete the on-line component of the study in one week from now."

> < E-mail information is obtained and the participant is thanked and dismissed. One week later the participant is e-mailed and completes the on-line PIAR and AHI forms for each task. Feedback is administered on-line once the study is complete.>

INFORMATION LETTER

Title of Project: Daily Tasks Study

Faculty Investigator: Dr. Jonathan Oakman   Contact Info: Office: PAS 3015
                                                                                       Phone; 888-4567 Ext. 33659
                                                                                       e-mail: jmoakman@watarts.uwaterloo.ca
Student Investigator: Jeff Paulitzki (jrpaulit@watarts.uwaterloo.ca)

This study entitled '*Daily Tasks Study*,' is being conducted by Jeff Paulitzki under the supervision of Dr. Jonathan Oakman of the Department of Psychology at the University of Waterloo. The purpose of the study is to examine how different people carry out their daily tasks.

There are two parts to the study (90 minutes total). The first part of the study is the lab component (~ 60 minutes) during which you will complete several brief computer tasks that will require you to make decisions (e.g., about the direction of an arrow) as quickly as possible. You will then complete very short questionnaires about tasks you think you should work on over the next 7 days. The second part of the study happens one week from now when you will log on to a website to complete a set of brief surveys (30 minutes total) about the tasks you reported on today in the lab. If you decide to participate, you are required to complete both sessions (in lab and on-line). It is important that you are able to complete the on-line session because we will be using all of your responses taken together.

In recognition of your time given to this study, you will receive one and a half (1.5) experimental credits toward your Psychology Course. In addition, if you complete the on-line component, with your agreement, we will enter your name into a draw to win an i-Pod Nano (~$250 value) and a $25 gift certificate to a local restaurant. The chance of winning a prize is approximately 1/25. The draw for prizes will be held at the end of this academic term.

There are no known or anticipated risks from participating in this study. There are also no direct benefits to you – aside from participation credit. Participation in this study is voluntary. You may decline to answer any questions that you do not wish to answer and you can withdraw your participation at any time without penalty or loss of participation credit.

Any information that you provide will be confidential. All of the data will be summarized and no individual could be identified from these summarized results. The data collected from this study will be accessed only by the two researchers named above and will be kept in a restricted access area in the Psychology, Anthropology, and Sociology Building (i.e., Dr. Oakman's lab area) for seven years after completion of the study. After 7 years, the data will be destroyed using a confidential shredder. Only individuals authorized by Dr. Jonathan Oakman will have access to the data during this period.

I would like to assure you that this study has been reviewed and received ethics clearance through the Office of Research Ethics at the University of Waterloo. However, the final decision about participation is yours. If you have any comments or concerns resulting from your participation in this study, please feel free to contact Dr. Susan Sykes, Director, Office of Research Ethics, at (519) 888-4567 ext. 36005 or by email at ssykes@uwaterloo.ca .

Should you have any questions about the study, please contact either Jeff Paulitzki by e-mail at jrpaulit@watarts.uwaterloo.ca or Dr. Jonathan Oakman by e-mail at jmoakman@watarts.uwaterloo.ca. Further, if you would like to receive a copy of the results of this study, please contact either investigator.

Thank you for considering to participate.

Consent of Participant

I have read the information presented in the information letter about the "Daily Tasks Study" being conducted by Dr. Jonathan Oakman and Jeff Paulitzki of the Department of Psychology at the University of Waterloo. I have had the opportunity to ask any questions related to this study, to receive satisfactory answers to my questions, and any additional details I wanted. I am aware that I may withdraw from the study without loss of participation credit at any time by advising the researchers of this decision.

This project has been reviewed by, and received ethics clearance through, the Office of Research Ethics at the University of Waterloo. I was informed that if I have any comments or concerns resulting from my participation in this study, I may contact the Director, Office of Research Ethics at (519) 888-4567 Ext. 36005 (or e-mail: ssykes@uwaterloo.ca). However, the decision to participate is mine.

With full knowledge of all foregoing, I agree, of my own free will, to participate in this study.

_____   _____

Print Name   Signature of Participant

Furthermore, I understand that my name will be entered, by the researchers, into a prize draw if I complete the second (on-line) component of the study.

_____

Signature of Participant

_____   _____

Dated at Waterloo, Ontario   Witnessed

Demographic Information

Please complete the following set of questions. This information will help us understand some general characteristics about the participants in our study. All the information that is collected will be kept confidential and you may decline to answer any of the questions if you wish.

1. **Age:** _____

2. **Sex:** (Male / Female)

3. **Academic program (e.g., Math, Arts, etc):** _____

4. **Ethnicity** _____

5. **Country of Origin:** _____

6. **What is your native language?** _____

7. **How long have you been speaking English?** ___ year(s)

CBAS

Instructions: Different people use different strategies to deal with situations and problems in their lives. Below are a number of strategies that people may use to deal with situations and problems. A number of the items below refer to dealing with situations at work or school. If you are not currently working or attending school, answer these items instead using your daily duties and activities. Please read each statement carefully and indicate how true, *in general,* each statement is for you using the following key:

1= **Not at all** true for me
2= **Somewhat** true for me
3= **Moderately** true for me
4= **Very much** true for me
5= **Extremely** true for me

	1	2	3	4	5
1. I avoid attending social activities.	1	2	3	4	5
2. When uncertain about my future, I fail to sit down and think about what I really want.	1	2	3	4	5
3. I would like to achieve things at work/school, but I have to accept my limits.	1	2	3	4	5
4. I fail to do what is needed to follow through with achievement goals I have set for myself.	1	2	3	4	5
5. In order to avoid feelings of disappointment, I just try not to get too serious about work/school.	1	2	3	4	5
6. Rather than try new activities, I tend to stick with the things I know.	1	2	3	4	5
7. I choose to turn down opportunities to further my education/career.	1	2	3	4	5
8. I do not answer the phone in case people are calling with social invitations.	1	2	3	4	5
9. I quit activities that challenge me too much.	1	2	3	4	5
10. I try not to think about problems in my personal relationships.	1	2	3	4	5
11. I think to myself that I will not be able to complete really challenging tasks.	1	2	3	4	5
12. While I know I should make decisions about my personal relationships, I just let things go on as they are.	1	2	3	4	5
13. I avoid trying new activities that hold the potential for failure.	1	2	3	4	5
14. I do not go out to events when I know there will be a lot of people I do not know.	1	2	3	4	5
15. Instead of thinking about problems in my social life, I tell myself that I prefer to be alone.	1	2	3	4	5
16. I fail to discuss/address tension that builds in a friendship.	1	2	3	4	5
17. I find that I often want to leave social gatherings.	1	2	3	4	5
18. I do not try to think about ways to improve my work/school performance.	1	2	3	4	5

CBAS

19. I try not to think about my future and what I will do with My life.	1	2	3	4	5
20. I just wait out tension in my relationships hoping that it will go away.	1	2	3	4	5
21. I tend to make up excuses to get out of social activities.	1	2	3	4	5
22. There is nothing I can do to improve problems in my relationships.	1	2	3	4	5
23. I turn down opportunities to socialize with the opposite sex.	1	2	3	4	5
24. I tend to remain to myself during social gatherings or activities.	1	2	3	4	5
25. I avoid making decisions about my future.	1	2	3	4	5
26. When I experience confusion in my relationships, I do not Try to figure things out.	1	2	3	4	5
27. While I know that I have to make some important decisions about school/work, I just do not get down to it.	1	2	3	4	5
28. Rather than getting out and doing things, I just sit at home And watch TV.	1	2	3	4	5
29. I distract myself when I start to think about my work/school performance.	1	2	3	4	5
30. I do not bother thinking about how to solve problems in my family – it is useless.	1	2	3	4	5
31. I find myself avoiding tasks and assignments that are really important.	1	2	3	4	5

Please indicate how helpful you feel the above described type of avoidance strategies are for you in dealing with life situations and problems by circling the number corresponding with helpfulness rating that applies to you:

1	2	3	4	5
Not at all helpful	Somewhat helpful	Moderately helpful	Very much helpful	Extremely helpful

Personality Scale

On the following pages, there are phrases describing people's behaviours. Please use the rating scale below to describe how accurately each statement describes *you*. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. So that you can describe yourself in an honest manner, your responses will be kept in absolute confidence. Please read each statement carefully, and then fill in the bubble that corresponds to the number on the scale.

Response Options

1: Very Inaccurate
2: Moderately Inaccurate
3: Neither Inaccurate nor Accurate
4: Moderately Accurate
5: Very Accurate

Am always prepared.	1	2	3	4	5
Get stressed out easily.	1	2	3	4	5
Waste my time.	1	2	3	4	5
Am relaxed most of the time.	1	2	3	4	5
Pay attention to details.	1	2	3	4	5
Worry about things.	1	2	3	4	5
Find it difficult to get down to work.	1	2	3	4	5
Seldom feel blue.	1	2	3	4	5
Get chores done right away.	1	2	3	4	5
Am easily disturbed.	1	2	3	4	5
Do just enough work to get by.	1	2	3	4	5
Get upset easily.	1	2	3	4	5
Carry out my plans.	1	2	3	4	5
Change my mood a lot.	1	2	3	4	5
Don't see things through.	1	2	3	4	5
Have frequent mood swings.	1	2	3	4	5
Make plans and stick to them.	1	2	3	4	5
Get irritated easily.	1	2	3	4	5
Shirk my duties.	1	2	3	4	5
Often feel blue.	1	2	3	4	5

AIP

These statements are concerned with your opinions on different situations. No two statements are exactly alike, so please consider each statement carefully before responding. Answer as honestly as possible with the following rating scale:

1 = Strongly disagree
2 = Disagree
3 = Sometimes disagree/sometimes agree
4 = Agree
5 = Strongly Agree

		Rating
1.	I pay my bills on time.	
2.	I am prompt and on time for most appointments.	
3.	I lay out my clothes the night before I have an appointment so I won't be late.	
4.	I find myself running later than I would like to be.	
5.	I don't get things done on time.	
6.	If someone were teaching a course on how to get things done on time I would attend.	
7.	My friends and family think I wait until the last minute.	
8.	I get important things done with time to spare.	
9.	I am not very good at meeting deadlines.	
10.	I find myself running out of time.	
11.	I schedule doctor's appointments when I am supposed to without delay.	
12.	I am more punctual than most people I know.	
13.	I do routine maintenance (e.g., changing the car's oil) on things I own as often as I should.	
14.	When I have to be somewhere at a certain time my friends expect me to run a bit late.	
15.	Putting things off till the last minute has cost me money in the past year.	

GPS

On a scale of 1 (LOW VALUE) to 5 (HIGH VALUE) please answer each of the following items. These statements are concerned with your opinions on different situations. No two statements are exactly alike, so please consider each statement carefully before responding. Answer as honestly as possible. Thank you.

1 = False of me
2 = Not usually true for me
3 = Sometimes false/true for me
4 = Mostly true for me
5 = True of me

		Rating
1.	I often find myself performing tasks that I had intended to do days before.	
2.	I often miss concerts, sporting events, or the like, because I don't get around to buying tickets on time.	
3.	When planning a party, I make the necessary arrangements well in advance.	
4.	When it is time to get up in the morning, I most often get right out of bed.	
5.	A letter may sit for days after I write it before I mail it.	
6.	I generally return phone calls promptly.	
7.	Even with jobs that require little else except sitting down and doing them, I find they seldom get done for days.	
8.	I usually make decisions as soon as possible.	
9.	I generally delay before starting on work I have to do.	
10.	When travelling, I usually have to rush in preparing to arrive at the airport or station at the appropriate time.	
11.	When preparing to go out, I am seldom caught having to do something at the last minute.	
12.	In preparing for some deadlines, I often waste time by doing other things.	
13.	If a bill for a small amount comes, I pay it right away.	
14.	I usually return a "R.S.V.P" request very shortly after receiving it.	
15.	I often have a task finished sooner than necessary.	
16.	I always seem to end up shopping for birthday gifts at the last minute.	
17.	I usually buy even an essential item at the last minute.	
18.	I usually accomplish all the things I plan to do in a day.	
19.	I am continually saying "I'll do it tomorrow."	
20.	I usually take care of all the tasks I have to do before I settle down and relax for the evening.	

API

For each of the items below, please indicate the extent to which the statement is more or less FALSE (1) or TRUE (5) of you. Read each statement carefully; remember, there are no right or wrong answers.

1 = False
2 = Mostly false
3 = Sometimes false/sometimes true
4 = Mostly true
5 = True

		Rating
1.	I delay starting things until the last minute.	
2.	I'm careful to return library books on time.	
3.	Even when I know a job needs to be done, I never want to start it right away.	
4.	I keep my assignments up to date by doing my work regularly from day to day.	
5.	If there were a workshop offered that would help me learn not to put off starting my work, I would go.	
6.	I am often late for my appointments and meetings.	
7.	I use the vacant hours between classes to get started on my evening's work.	
8.	I delay starting things so long I don't get them done by the deadline.	
9.	I am often frantically rushing to meet deadlines.	
10.	It often takes me a long time to get started on something.	
11.	I don't delay when I know I really need to get the job done.	
12.	If I had an important project to do, I'd get started on it as quickly as possible.	
13.	When I have a test scheduled soon, I often find myself working on other jobs when a deadline is near.	
14.	I often finish my work before it is due.	
15.	I get right to work at jobs that need to be done.	
16.	If I have an important appointment, I make sure the clothes that I want to wear are ready the day before.	
17.	I arrive at college appointments with plenty of time to spare.	
18.	I generally arrive on time to class.	
19.	I overestimate the amount of work that I can do in a given amount of time.	

NGSE

Please read the following carefully and rate how much you agree with each statement by circling the corresponding number:

	Strongly Disagree				Strongly Agree
I will be able to achieve most of the goals that I have set for myself.	1	2	3	4	5
When facing difficult tasks, I am certain that I will accomplish them.	1	2	3	4	5
In general, I think that I can obtain outcomes that are important to me.	1	2	3	4	5
I believe I can succeed at most any endeavour to which I set my mind.	1	2	3	4	5
I will be able to successfully overcome many challenges.	1	2	3	4	5
I am confident that I can perform effectively on many different tasks.	1	2	3	4	5
Compared to other people, I can do most tasks very well.	1	2	3	4	5
Even when things are tough, I can perform quite well.	1	2	3	4	5

I I

Please carefully read and rate each of the statements below.

	Strongly Disagree			Strongly Agree
I don't like to make decisions quickly, even simple decisions, such as choosing what to wear, or what to have for dinner.	1 - 2 - 3 - 4 - 5			
I will often say whatever comes into my head without thinking first.	1 - 2 - 3 - 4 - 5			
I am good at taking advantage of unexpected opportunities where you have to do something immediately or lose your chance.	1 - 2 - 3 - 4 - 5			
I enjoy working out problems slowly and carefully.	1 - 2 - 3 - 4 - 5			
Most of the time, I can put my thoughts into words very rapidly.	1 - 2 - 3 - 4 - 5			
I frequently make appointments without thinking about whether I will be able to keep them.	1 - 2 - 3 - 4 - 5			
I am uncomfortable when I have to make up my mind rapidly.	1 - 2 - 3 - 4 - 5			
I frequently buy things without thinking about whether or not I can really afford them.	1 - 2 - 3 - 4 - 5			
I like to take part in really fast-paced conversations, where you don't have much time to think before you speak.	1 - 2 - 3 - 4 - 5			
I often make up my mind without taking the time to consider the situation from all angles.	1 - 2 - 3 - 4 - 5			
I don't like to do things quickly, even when I am doing something that is not very difficult.	1 - 2 - 3 - 4 - 5			
Often, I don't spend enough time thinking over a situation before I act.	1 - 2 - 3 - 4 - 5			
I would enjoy working at a job that required me to make a lot of split-second decisions.	1 - 2 - 3 - 4 - 5			
I often get into trouble because I don't think before I act.	1 - 2 - 3 - 4 - 5			
I like sports and games in which you have to choose your next move very quickly.	1 - 2 - 3 - 4 - 5			
Many times the plans I make don't work out because I haven't gone over them carefully enough in advance.	1 - 2 - 3 - 4 - 5			
I have often missed out on opportunities because I couldn't make up my mind fast enough.	1 - 2 - 3 - 4 - 5			
I rarely get involved in projects without first considering the potential problems.	1 - 2 - 3 - 4 - 5			
People have admired me because I can think quickly.	1 - 2 - 3 - 4 - 5			
Before making any important decision, I carefully weigh the pros and cons.	1 - 2 - 3 - 4 - 5			
I try to avoid activities where you have to act without much time to think first.	1 - 2 - 3 - 4 - 5			
I am good at careful reasoning.	1 - 2 - 3 - 4 - 5			
I often say and do things without considering the consequences.	1 - 2 - 3 - 4 - 5			

SCS-Brief

Please rate each of the statements below. No two statements are exactly alike, so please consider each statement carefully before responding. Answer as honestly as possible.

	Not at All								Very Much
I am good at resisting temptation.	1	----	2	----	3	----	4	----	5
I have a hard time breaking bad habits.	1	----	2	----	3	----	4	----	5
I am lazy.	1	----	2	----	3	----	4	----	5
I say inappropriate things.	1	----	2	----	3	----	4	----	5
I do certain things that are bad for me, if they are fun.	1	----	2	----	3	----	4	----	5
I refuse things that are bad for me.	1	----	2	----	3	----	4	----	5
I wish I had more self-discipline.	1	----	2	----	3	----	4	----	5
People would say that I have iron self- discipline.	1	----	2	----	3	----	4	----	5
Pleasure and fun sometimes keep me from getting work done.	1	----	2	----	3	----	4	----	5
I have trouble concentrating.	1	----	2	----	3	----	4	----	5
I am able to work effectively toward long-term goals.	1	----	2	----	3	----	4	----	5
Sometimes I can't stop myself from doing something, even if I know it is wrong.	1	----	2	----	3	----	4	----	5
I often act without thinking through all the alternatives.	1	----	2	----	3	----	4	----	5

General Task Selection Instructions

What we want you to do is think about ten (10) tasks that you believe you *should* do over the next 7 days.   For each task, please fill out one of these (FIAR) forms. I want to point out here what we mean by 'task.' What we are interested in are NOT scheduled routines that you are in the habit of doing every day. For example, you are NOT required to complete a form for activities like "brushing your teeth" or "walking to campus."

> **Type of Tasks:**
> What we are interested in are tasks (or jobs) that would take some effort to do, or might seem like a bit of a chore (e.g., working on a class assignment).
>
> **Please select 10 tasks that you think you *probably should work* on in the next 7 days. When selecting the 10 tasks, please select tasks that are:**
>
> **(1) <u>important</u> but are also**
> **(2) <u>unpleasant or unrewarding to actually perform</u>, and that you**
> **(3) <u>may or may not have gotten around to doing in the past</u>**
>
> **These might include tasks that you may or may not eventually get around to doing in the next 7 days – but they are <u>important nonetheless</u>.**

FIAR

Task name:	
Description of task:	

Please indicate **how important it is to work on this task during the next 7 days**:

Not at all   Very
Important   Important

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

Circle the percentage (%) of the task you intend to complete within the next 7 days

5   10   15   20   25   30   35   40   45   50   55   60   65   70   75   80   85   90   95   100

In the box below, indicate the total amount of time you intend to spend on this task in the next 7 days (in hours, to the nearest ½ hour)

hour(s)

	Not At All									Very Much	
Rate how much you *want* to work on this task this week.	1	2	3	4	5	6	7	8	9	10	11

	Not Strongly									Very Strongly	
How strongly do you intend to work on this task this week.	1	2	3	4	5	6	7	8	9	10	11

	Very Unlikely									Very Likely	
How likely is it that you will work on this during the next week?	1	2	3	4	5	6	7	8	9	10	11

Task name:	*<TASK NAME PRESENTED HERE>*

Based on what you intended to accomplish with this task, please indicate the percentage (%) of this task that you completed in the past 7 days. In other words, if you planned to work on a class project for 4 hours (but actually only worked on it for 2 hours) you would respond 50%.

5   10   15   20   25   30   35   40   45   50   55   60   65   70   75   80   85   90   95   100   >100

Please indicate how much time you actually spent on this task (e.g., 2.5 hours) **in the past 7 days** (in hours, to the nearest ½ hour):

	False									True	
I *completely forgot* about doing this task.	1	2	3	4	5	6	7	8	9	10	11

	Not at all Boring									Very Boring	
How *boring* is this task?	1	2	3	4	5	6	7	8	9	10	11

	Not at all Difficult									Very Difficult	
How *difficult* is this task?	1	2	3	4	5	6	7	8	9	10	11

	Very Unpleasant									Very Pleasant	
How *pleasant* is this task?	1	2	3	4	5	6	7	8	9	10	11

	Not at all True									Very True	
I am capable of doing well at this task	1	2	3	4	5	6	7	8	9	10	11

	By Last Week (or before)			By Today		In One Week			Not for at Least a Week		
When should this task be (or have been) completed?	1	2	3	4	5	6	7	8	9	10	11

	Not at all True									Very True	
I avoided this task during the week when I had opportunity to work on it (e.g., to do more pleasant activities).	1	2	3	4	5	6	7	8	9	10	11

AHI # <TASK # PRESENTED HERE>

Please indicate how much you agree or disagree with the statements in the following section.

<TASK NAME PRESENTED HERE> *is something . . .*

		Disagree		Neither Agree or Disagree				Agree
1.	…I avoid frequently.	1	2	3	4	5	6	7
2.	…I avoid automatically.	1	2	3	4	5	6	7
3.	…I avoid without having to consciously remember.	1	2	3	4	5	6	7
4.	…that feels sort of natural to me when I avoid it.	1	2	3	4	5	6	7
5.	…I avoid without thinking.	1	2	3	4	5	6	7
6.	…that would require mental effort to stop avoiding.	1	2	3	4	5	6	7
7.	…I avoid every day.	1	2	3	4	5	6	7
8.	…I start avoiding before I realize I'm avoiding.	1	2	3	4	5	6	7
9.	…I would find it hard to stop avoiding.	1	2	3	4	5	6	7
10.	…I avoid without needing to think about it.	1	2	3	4	5	6	7
11.	…that's pretty "in character" for me to avoid.	1	2	3	4	5	6	7
12.	…I have been avoiding for a long time.	1	2	3	4	5	6	7

Appendix C

Summary of Coding Strategy

- *Phase 1*:
  - After reviewing "Primary Task Characteristics" (see below) with coders, all coders will rate each task as either:
    - 1 = Straightforward   (i.e. Task <u>likely</u> meets all Primary task characteristics)
    - 0 = NOT straightforward (i.e. Task <u>may not</u> meet all Primary task characteristic requirements)

- *Phase 2*: All coders rate all "NOT straightforward" tasks according to all "Primary Task Characteristics" items
  - See below for coding details
  - Code all items on each "Primary Task Characteristic" before moving to the next characteristic

- *Phase 3*: A final list of "Satisfactory tasks" will be created based on whether tasks were either (1) scored as "Straightforward" in Phase 1 or (2) demonstrated valid "Primary Task Characteristics" for all of the Phase 2 items.
  - Rater disagreements settled by 3rd independent rater and a final list will be created and used in Phase 4

- *Phase 4*: All coders rate all "Satisfactory tasks" with respect to task type
  - See below for coding details

Primary Task Characteristics

1. Is it fairly clear what the task entails?

Purpose: Ensure that WHAT the individual plans to ACTUALLY DO is clear (or easily
inferred) from description

    Examples...
    TRUE (1):   "Working on my chemistry assignment" (presumably includes concrete
        activities like examining lab results, writing a lab report, etc.)
    FALSE (0):   "Being nicer to my family" (the concrete tasks required for this are
        unclear)

2. Does *performing* the task itself require moderate *effort*?

Purpose: Ensure that it is clear that the task will involve <u>moderate physical or mental
effort/energy</u> (participants instructed to think of tasks that would be like a "job" or
a "chore" to actually perform)

    Examples...
    TRUE (1):   "Cleaning the bathroom" (requires physical work)
    FALSE (0):   "Going to bed early" (not clear that at least moderate-level of
        physical/mental effort is required)

3. Task completion is *not* dependent on unpredictable/uncontrollable events?

Purpose: Ensure that task performance does not depend on other events to occur for
completion to be possible

    Examples...
    TRUE (1):   "Exercising" (no clear event necessary for completion to occur)
    FALSE (0):   "Shovelling snow" (depends on snowfall and accumulation on ground)

4. Is the task '<u>unscheduled?</u>'

Purpose: Only include tasks that can be carried out at more than one time (i.e. not @ one
very specific time). <u>Note</u>, for tasks where meetings are mentioned (but NOT
explicitly scheduled already; e.g., "Do psych studies") assume task is yet to be
scheduled and is acceptable.

    Examples...
    TRUE (1):   "Working on a chemistry assignment" (many opportunities to do this)
    FALSE (0):   "Attending classes" (exclude because it must happen at a specific time)

5. Task <u>must be a 'behaviour'</u> and <u>NOT the absence of a behaviour.</u>

Purpose: Only include tasks that can be described as "performed"

Examples...
TRUE (1): "Flossing my teeth everyday" (here flossing is the performed activity)
FALSE (0): "Not eating junk food" ("Not doing" does not describe a *performed* behaviour)

6. This task can likely be __avoided or delayed__.

Purpose: Only include tasks whose performance can reasonably be avoided or delayed (i.e. without drastic consequences, where drastic consequences are those not frequently occurring – e.g. losing your job. E.g. handing in assignments late or not at all occur frequently with some students.)

Examples...
TRUE (1): "Walking instead of taking the bus" (here can avoid walking by bussing); "Working on my chemistry assignment"
FALSE (0): "Walking to the bus stop" (How else would one get to bus stop?); "Cooking Thanksgiving meal for my relatives" (unlikely that this task will be avoided or delayed)

7. Can task be assigned a particular # of hours?

Purpose: Only include tasks that can easily be assigned to a particular number of hours

Examples...
TRUE (1): "Walking the dog" (a specific number of hours could be estimated)
FALSE (0): "Eating healthy" (not clear the time it would take to do this activity)

Secondary Task Characteristics

Task Type

5 Category Ratings
1 = Academic   (e.g., "Studying for an exam")
2= Household Chore   (e.g., "Cleaning my dorm room"; "grocery shopping")
3= Social   (social activities NOT involving other task types → e.g., "Call my parents for money")
4= Exercising   (e.g., "Running")
5=Other   (e.g., "Job hunting")

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Appendix D

Table D1

<u>Study 1: Statistics for Questionnaires</u>

Measure	Mean	SD	Alpha	Skew	Kurtosis
AIP	40.0	7.6	.75	-.06	-.74
CBAS	63.2	19.7	.94	1.2	1.3

Appendix E

Table E1

<u>Study 2: Statistics for Questionnaires and Computer Tasks</u>

Measure	**Mean**	**SD**	**Alpha**	**Skew**	**Kurtosis**
Antisaccade RTs	515 ms	68.7	.96	1.0	2.0
Antisaccade Errors	13.4 %	9.1	.82	.88	.07
Go/Nogo RTs	391 ms	39.0	.98	.61	.23
Stroop Effect RTs	153 ms	69.8	.84	1.1	1.9
AIP	39	10.2	.86	-.15	-.45
GPS	56	13.2	.88	-.09	-.60
API	51	11.8	.86	-.06	-.41
CBAS	56	15.8	.91	.70	-.17
Conscientiousness	33	6.7	.80	.04	-.63
Neuroticism	28	7.8	.85	.24	-.56
NGSE	32	4.9	.91	-.08	-.47
Funct-I	33	6.1	.78	.28	-.14
Dys-I	29	7.0	.78	.53	-.08
SCS	40	8.6	.84	.17	.17

Table F1

Zero-order Correlations in Study 2: Level 1 Variables Aggregated to the Person Level

Measure	Hours	Procrastination	Intentions	AHI	Inhibition
Percentage	.58**	-.22*	-.02	-.37**	.12
Hours		-.19*	.03	-.20*	.03
Procrastination			-.10	.47**	.09
Intentions				-.06	-.01
AHI					-.02

Note. Percentage = mean percentage of task completion across tasks; Hours = mean number of hours completed across tasks; Procrastination = latent procrastination scores; Intentions = mean intention scores across tasks; AHI = mean AHI score across tasks; Inhibition = latent inhibition score indicating ability to inhibit prepotent responses. The sample included 134 participants. [†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.