Exploring contributions of liking and wanting to the intention-behaviour link

by

Amanda Wudarzewski

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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

People often express intentions to pursue positive behavioural changes, but successful behaviour change is difficult to implement. Despite one's good intentions, behaviours are not always carried out as planned (the "intention-behaviour gap"; Sheeran, 2002). The present studies attempted to help account for the gap observed between intention and behaviour by examining the contribution of two separable factors, liking (pleasure derived from the behaviour) and wanting (motivation that promotes behavioural approach or engagement), to the intention-behaviour link. In particular, an individual's level of wanting may not always coincide with their level of liking towards a behaviour (e.g., in the case of overeating). It was hypothesized that these two components may serve different roles in the guiding intentions versus behaviours, particularly for behaviours that require a significant amount of self-regulation. Specifically, the weight placed on liking and wanting during the evaluation of intentions may differ from their contribution to later behaviour. Furthermore, because increasing the frequency of a behaviour is conceptually different from decreasing the frequency of a behaviour, it was predicted that the association of liking and wanting to the intention-behaviour link would differ depending on whether the behaviour is one the person wishes to increase or to decrease. These hypotheses were tested in five studies. For behaviours individuals wish to increase, more weight was placed on wanting (compared to liking) during intention evaluation; however, actual behaviour change was predicted by liking (and not wanting). A different pattern was found for behaviours individuals wish to decrease, such that neither liking nor wanting was strongly associated with intention or behaviour. The findings could guide development of interventions used to facilitate successful behaviour change.

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Introduction

Every day, people attempt to engage in lifestyle changes in order to improve their health and overall well-being. For example, an individual might attempt to go to the gym more or attempt to cut down on junk food. Unfortunately, simply forming these intentions does not guarantee that they will be carried out as planned. This discrepancy is often referred to as the intention-behaviour gap (Sheeran, 2002). For example, although New Year's resolutions typically involve strong intentions of behaviour change, only 48% of people successfully keep them (Norcross, Mrykalo, & Blagys, 2002). Understanding the reasons why people do not always behave in accordance with their intentions is fundamental to developing more effective interventions, aimed at positive lifestyle changes and improving health.

Significant progress has been made in understanding the modest correlation between intention and behaviour, with research centering on two main areas. The first area of research focuses on identifying various situational variables that prevent behaviours from being carried out (Ajzen, 1991; Sheeran, 2002; Sutton, 1998). For example, last minute work meetings prevent one from going to the gym as planned. The second area of research focuses on identifying key constructs (e.g., such as past behaviour) and various cognitive strategies (e.g., like planning) that facilitate behaviour change (Abraham & Sheeran, 2010; Norman, Connor, & Bell, 2000; Verplanken & Aarts, 2011). A third way to approach and explain the modest correlation between intention and behaviour (and the focus of the current dissertation) involves examining whether certain psychological variables influence intention and behaviour differently. This approach maintains that the gap arises because individuals underweight or overweight certain variables during the time at which one's intentions are evaluated (henceforth referred to as intention evaluation), relative to their impact on behaviour (Liberman & Trope, 1998; Schwarzer, 2008).

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My dissertation, building on a key distinction in the motivation literature (Berridge & Robinson, 1995; 1998; 2003), examines the role of two related, but separable factors: liking (pleasure derived from the behaviour) and wanting (motivation to initiate and sustain behaviour) in understanding motivated behaviours. Past research demonstrates that liking and wanting (although they often go hand-in-hand) can in some cases be dissociated, such that the two components have differing effects on behaviour (Ostafin, Marlatt, & Troop-Gordon, 2010). Thus, the aim of my dissertation is to examine the possibility that liking and wanting play distinct roles in intention versus behaviour. I argue that the lack of correspondence between intention and behaviour can be explained (at least in part) by the differing roles of these two components during the time of the intention evaluation versus behaviour. Specifically, the weight placed on liking and wanting during intention evaluation may differ from their relative contribution to actual behaviour.

Intention-Behaviour Gap

Several theories in psychology have been developed which share the belief that one of the best predictors of an individual's behaviour is simply his or her intention to engage in that behaviour (Theory of Reasoned Action, Fishbein & Ajzen, 1975; Theory of Goal-Setting, Locke & Latham, 1990; Transtheoretical Model of Behaviour Change, Prochaska & Velicer, 1997). One of the most prominent theories, the Theory of Planned Behaviour (TPB), proposes that a person's behaviour is determined by his/her intention to perform the behaviour and is typically measured with items such as: "I intend to do X"; "I plan to do X" (Azjen, 1991). The general premise is that the stronger one's intentions are, the more likely it is that the intended behaviour will be carried out (Ajzen 1991; Armitage & Conner, 2001; Godin & Kok, 1996). Consistent with this model, intentions have been found to be a reliable predictor of many health behaviours,

such as cancer screening (Sheeran & Orbell, 2000), condom use (Reinecke, Schmidt, & Ajzen, 1996), and healthy eating (Connor, Norman & Bell, 2002). In such studies, intention strength is typically measured several days, weeks, or months prior to the measurement of behaviour (Sutton, 1998).

Research examining the strength of the link between intention and behaviour indicates that intentions do not always correspond with behaviour. For example, a meta-analytic review of studies using the TPB model, found that intentions on average explained only 19-38% of the variance in later behaviour (Sutton, 1998). Similarly, another meta-analysis examining 422 studies, found that intentions on average accounted for 28% of the variance in later behaviour (Sheeran, 2002). Thus, intentions only moderately predict later behaviour; there is a gap between intention and behaviour (Sheeran, 2002). In response to this gap, many attempts have made to determine the factors that influence the relationship between intention and behaviour. With a more thorough understanding of the factors that contribute to the intention-behaviour gap, it becomes possible to help individuals more effectively implement successful behavioural changes in their lives.

Based on past literature, a number of different explanations for the intention-behavior gap have been discussed. Much of this research has focused on the influence of external and situational factors that hinder successful translation of intention to behaviour. For example, intentions are less likely to correlate with behaviour in circumstances where individuals do not have control over performing the behaviour (Ajzen, 1991; Sheeran, 2002), when unforeseen variables impede behaviour (Ajzen & Fishbein, 1977; Sutton, 1998), and when intentions shift over time (Sutton, 1998). Other research has attempted to explain the weak correspondence of intention and behaviour by including additional constructs into the model. For example,

frequency of past behaviour (Norman et al., 2000); strength of habits (Verplanken & Aarts, 2011); and feelings of regret from inaction (anticipated regret; Abraham & Sheeran, 2010) have all been found to explain additional variance in behaviour beyond solely intentions.

Since execution of goal-relevant behaviours often involve effortful action, gaps between intention and behaviour have also been attributed to a lack of self-regulatory strategies. For example, individuals need to successfully monitor goal progress in order to increase the chances for goal attainment (Michie, Abraham, Whittington, McAteer, & Gupta, 2009). Researchers have identified several facilitative cognitive factors that can lead to better goal attainment. For example, making plans for how to deal with anticipated barriers (coping planning; Sniehotta, Scholz, & Schwarzer, 2005) and specifying when, where and how to act (implementation intentions; Gollwitzer, 1999) align thoughts, feelings and actions to help facilitate behaviour change. Many of these strategies are aimed at facilitating goal achievement once the intention has been evaluated.

By contrast, other interventions have attempted to increase intention strength in the hopes that it will facilitate behaviour. Methods used to influence intentions have included: persuasive messages, information about health risks of engaging (or not engaging) in a particular behaviour, and increasing skill sets in an attempt to increase intention-behaviour consistency (Hardeman et al., 2002). For example, individuals presented with persuasive messages not only increased their intentions to engage in a testicular self-examination but were more likely to actually engage in the behaviour, compared to those who did not receive the message (Brubaker & Fowler, 1990). However, interventions used to influence intentions do not always lead to subsequent behaviour changes, as it has been reported that a medium-to-large change in intentions only leads to a small-to-medium change in behaviour (Webb & Sheeran, 2006). This research suggests that a

change in intention may not necessarily influence behaviour, which may particularly be the case if the factors considered during intention evaluation are different from the factors that guide behaviour.

Some existing models are supportive of the hypothesis that different factors may be associated with intention evaluation versus actual behaviour. The Health Action Process Approach (HAPA; Schwarzer, 2008) proposes that behaviour change can be separated into two separate stages, a pre-intentional phase of behaviour change that leads to an intention, and a post-intentional phase that leads to actual behaviour change. Depending on what stage of behaviour change an individual is in, different variables may be more instrumental than others. For example, although individuals are said to focus on perceived severity of health risks when evaluating intentions (e.g., "it would be bad to get skin cancer"), a separate variable, perceived susceptibility (e.g., "it is unlikely that I will get skin cancer"), was found to be a more important determinant of behaviour (Sheeran & Abraham, 1996).

Further evidence suggests that the weight placed on certain factors during decision making may end up as poor indicators of later behaviour. For example, when making decisions about engaging in temporally distant goal directed behaviours (versus near future behaviours), individuals tend to place more weight on the factors associated with the desirability of completing a behaviour (the "why" aspects of action), rather than focusing on factors that actually influence one's chances of completing the behaviour (the "how" aspects of action; Liberman & Trope, 1998). Thus, the factors that may be salient at intention formation may be different than the factors that are salient at the time of possible action. This work indicates that in order to better understand the reasons why this gap may arise, the relationship of different factors to both intention and behaviour need to be considered.

An area of research that may provide insight on what factors may differentially relate to intention and behaviour, is a body of literature showing that liking (affective appeal of reward targets) and wanting (motivational desire to pursue targets) represent separate processes that can have independent effects on behaviour. In other words, although many behaviours are both wanted and liked (e.g., spending time with a loved one), situations may arise where liking and wanting do not match up. This could be especially true of behaviours that are difficult to implement or stop. For example, an individual may 'want' or be motivated to continue eating even though they no longer "like" or derive pleasure from consumption. Given the potential divergence of these two components, it is possible that these constructs may be particularly valuable when examining whether the antecedents of intention are different from the antecedents of behaviour.

Liking and Wanting as Separate Constructs.

In an attempt to understand factors that regulate behavior, Berridge and Robinson (1995; 1998; 2003) deconstructed a unitary reward system into distinct affective and motivational components of reward: liking and wanting. Liking, the affective component, is characterized by the "hedonic impact or pleasure" (Berridge, 2009, p. 540) that accompanies behaviour and reflects the extent to which a behaviour is found to be pleasurable (e.g., How pleasant would it be to experience a mouthful of chocolate right now?).[1] In contrast, wanting is the motivational component that is characterized by a "motivation that promotes approach toward and consumption of rewards" (Berridge, Robinson, & Aldridge, 2009, p. 67). Wanting attaches a "motivational magnet" property to stimuli to which it's attributed, and makes those stimuli

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[1] In rats, affective liking was characterized by tongue protrusions (signifying the pleasure associated with sweet foods), and gapes (signifying aversive reactions) and has been associated with opioid activation in the nucleus accumbens and the posterior ventral pallidum (also known as the 'hedonic hotspot') of the brain (Berridge & Robinson, 1998).

attractive, desirable and effectively able to elicit approach (e.g., how hard are you willing to work for that chocolate?).[2]

Numerous studies in both human and non-human animals provide evidence that liking and wanting are distinct and separable components. Studies in neuropsychology provide evidence that these components are controlled by different neural systems (Berridge, 1995; Berridge & Robinson, 1998). Liking, or hedonic pleasure, is associated with opioid activation in the nucleus accumbens and the posterior ventral pallidum (also known as the 'hedonic hotspot') of the brain. Whereas wanting, or approach motivation, is associated with mesolimbic dopamine activity (Berridge & Robinson, 1998). Pharmacological manipulations to the brains of rats have shown that it is possible to alter the level of wanting without changing liking. For example, when rats were injected with dopaminergic antagonists, a decrease in consumption of sweet rewards (e.g., sucrose) was observed, while hedonic reactions were unaffected (Berridge, 1995).

Although, there is a lack of research linking the two components to intentions, liking and wanting have been found to play different roles in predicting human behaviour. For example, Dai, Ariely and Brendl (2010) asked men and women to rate the attractiveness of male faces and found that although men liked attractive male faces just as much as women, they did not want to look at them longer. Another study found that wanting can be enhanced after failures in obtaining a target (e.g., failure to obtain an expected reward), even though self-reported liking of the target may decrease (Litt, Khan, & Shiv, 2010). Similarly, playing "hard to get" can increase one's wanting toward that person while simultaneously decreasing their level of liking toward him/her (Dai, Dong, & Jia, 2014). In another study, Hsee, Zhang, Cai, and Zhang (2013) set up a computer task where participants had the option to engage in a leisurely pleasant task or a work

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[2] In contrast to liking, wanting in rats has been typically measured using choice preference, amount of consumption and/or effort expended to obtain a reward (such as pressing a bar or the degree of approach or avoidance) and is associated with mesolimbic dopamine activity (Berridge & Robinson, 1998).

task in order to earn chocolates. Individuals who worked harder and earned more chocolate (which could be taken as an expression of greater wanting) were reportedly less happy overall (which could be taken as a reflection of liking) (Hsee et al., 2013).

With regards to behaviours that one would likely wish to change, research has mostly focused on the contribution of liking and wanting to addictive behaviours (alcohol use, cocaine use, and smoking; see Berridge, 2009; Hobbs, Remington & Glautier, 2005; Lambert, McLeod & Schenk, 2006; Ostafin et al., 2010) and eating behaviours (see Finlayson & Dalton, 2012; Finlayson, King, & Blundell, 2007; Lemmens et al., 2009). In particular, Robinson and Berridge (1993) maintain that drug addiction reflects a special case of behaviour where excessive wanting drives increased drug use independently of any evidence for increased liking or drug pleasure. For example, Ostafin et al. (2010) measured wanting (using an "urge to drink" likert scale), and liking (by rating how 'delicious' and 'satisfying' the beer was) toward alcohol and found that wanting (but not liking) significantly related to alcohol consumption in experienced drinkers. Similarly, another study found that although initial cocaine use was predicted by both liking and wanting, lifelong drug use was associated with higher wanting levels compared to liking of the drug (Lambert et al. 2006).

The role of wanting and liking in eating behaviours has also received attention in an addiction-type context (e.g., eating disorders). For example, Lemmens et al. (2011) found that although induced stress increased wanting (food intake) for snacks and dessert at a much greater rate in overweight individuals (versus normal weight individuals), liking toward these foods was unaffected. Although prior work has examined the relationship between liking, wanting, and various addiction-related behaviours, it is less clear how these components relate in the context of non-addictive behaviours. Thus, a major contribution of my dissertation is to investigate the

role of liking and wanting to non-addictive behaviours that individuals may wish to change. Although past research indicates that liking and wanting may be more likely to go hand-in-hand with non-addictive behaviours (e.g., such as with initial cocaine use; Lambert et al., 2006), it may still be the case that one component may be more or less associated with intention versus behaviour.

Increasing versus Decreasing Behaviours

Making behavioural changes can involve not only decreasing the frequency of behaviours (e.g., overeating), but also increasing the frequency of behaviours (e.g., exercising). I hypothesize that the relative contribution of liking and wanting to intentions and behaviour may differ depending on whether the behaviour in question is one that the person intends to increase or decrease. Indeed, research indicates that the processes involved with acting versus not acting are distinct (Richetin, Conner & Perugini, 2011). For example, research has distinguished the behavioural activation system (BAS), which involves moving toward a desirable goal (e.g., eating healthier leads to weight loss), from the behavioural inhibition system (BIS), which involves inhibiting behaviour, in order to move away from an undesirable state (e.g., avoiding high fat foods prevents weight gain; Carver & White, 1994). Hence, successfully increasing the frequency of a behaviour may rely more on one's ability to engage in goal-directed action, whereas reducing the frequency of a behaviour may rely more on one's ability to resist temptations. If these behavioural processes are distinct it is possible that liking and wanting will differentially relate to the intention-behaviour link, in the case of increasing versus decreasing the frequency of a behaviour. Specific hypotheses about the roles that liking and wanting may play in the intention-behaviour relation are therefore developed separately below for the cases of goals to increase and to decrease a particular behaviour. The particular increase/decrease

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behaviours that are looked at in my dissertation are centered on health, such that the behavioural goals focus on increasing health-promoting or decreasing health-compromising behaviours.

Increasing health-promoting behaviours.

When individuals wish to increase the frequency of health-promoting behaviours, it is often a behaviour that many people strive for but is relatively difficult to implement (e.g., exercise). To successfully increase these types of behaviours one must be willing to engage in goal-directed actions. Thus, when individuals are evaluating their intentions to increase a behaviour, concerns about their ability to initiate and sustain the behaviour, concerns arguably more related to wanting (e.g., "I really *want* to get in shape!") may be more salient. Perugini and Bagozzi (2001) specifically identified desire as the motivation to act. Desire is considered to be a proximal predictor of intentions, such that it is assumed that intentions can only be formed once a person recognizes his or her desire to act (Perugini & Bagozzi, 2001). On the other hand, when intentions are being evaluated liking concerns may not be as salient when compared to wanting, as individuals may be less focused on how the actual experience will feel (i.e., what it feels like to get up for an early morning run when the rest of the world is sleeping). Therefore, I hypothesize that when individuals are evaluating their intentions to increase the frequency of a behaviour more weight will be placed on wanting, compared to liking.

H1: More weight will be placed on concerns relating to wanting (compared to liking) during the formation of intentions for behaviours one wishes to increase.

However, the concerns that are salient at the time of intention evaluation may be different from the factors that drive behaviour change. Since these behaviours often require significant self-regulation to maintain and are not a regularly repeated behaviour, the compulsion or the urge to engage in the behaviour may be less strongly associated with successful behaviour change.

Instead, the ability to effectively regulate behaviours may rely more on the actual pleasure derived from engaging in the behaviours, which are factors related to liking rather than wanting. The more enjoyable a behavioural experience the more likely one may be to continue engaging in the behaviour. For example, affective attitudes, which reflect one's feelings and emotions about a behaviour (similar to liking), have been found to be a direct predictor over and above intentions for a variety of health behaviours (Conner, Rhodes, Morris, McEachan, & Lawton, 2011; Lawton, Conner, & McEachan, 2009; Lowe, Eves, & Carroll, 2002). For example, affective attitudes (compared to cognitive attitudes) were found to better predict health-promoting behaviours, such as fruit and vegetable consumption (Lawton et al., 2009). Likewise, Lowe et al. (2002) found that affective attitudes predicted exercise behaviour, over and above intentions. Therefore, I hypothesize that although wanting may be associated more with intentions, successful behaviour change may actually depend more on liking, that is, the extent to which people derive pleasure from the behaviour.

H2: Behaviour change will be driven more by factors relating to liking (compared to wanting) for behaviours one wishes to increase.

Decreasing health-compromising behaviours.

In comparison to increasing health-promoting behaviours, individuals typically wish to decrease behaviours that compromise their health but can be relatively enjoyable (e.g., eating junk food). In order to successfully disengage from health-compromising behaviours individuals need to give up experiences that are rewarding but unhealthy. Therefore, in contrast to increasing behaviours, I hypothesize that when individuals are evaluating their intentions to decrease the frequency of a behaviour they may be more concerned about the pleasurable experience they need to give up as opposed to how compelling the behaviour is.

H3: More weight will be placed on concerns relating to liking (compared to wanting) during intention evaluation for behaviours one wishes to decrease.

Once again, the concerns salient at the time of intention evaluation may be different from the factors that drive behaviour change. Liking and wanting may relate to a successful increase in behaviour differently compared to how they relate to a successful decrease in behaviour. Specifically, wanting may be more predictive of health-compromising behaviours compared to liking. For example, impulsivity (a measure similar to wanting) was found to predict saturated fat consumption; however, impulsivity was not associated with fruit or vegetable consumption (Mullan, Allom, Brogan, Kothe, & Todd, 2014). In addition, Robinson and Berridge's (1993) theory of addiction maintains that behaviours are driven by wanting over and above liking. It can be reasoned that wanting may be more of a driver for behaviours individuals wish to decease, since these behaviours are typically repeated quite regularly (e.g., watching TV, snacking etc.) Therefore, I hypothesize that although liking may be associated more with intentions to decrease a behaviour, successful behaviour change may actually depend more on wanting, that is, the compulsion toward engaging in the behaviour.

H4: Behaviour change will be driven more by factors relating to wanting (compared to liking) for behaviours one wishes to decrease.

If support for these hypotheses is found, the constructs of liking and wanting may be important variables to consider when predicting an individual's likelihood of carrying out an intended behaviour. Such a result would also be consistent with the possibility that gaps between intention and behaviour arise in part due to the differing roles of liking and wanting in determining intention versus behaviour. Finally, if the roles of liking and wanting differ

depending on how the change in behaviour is framed (increasing versus decreasing), this would suggest that the motivating factors involved with engaging versus not engaging in a behaviour are not the same.

Overview of Studies

In a series of five studies, I examined how the variables of liking and wanting relate to intention evaluation versus behaviour for activities that individuals wish to increase or to decrease. Study 1 provided the first test of the predictive utility of liking and wanting to the intention-behaviour relationship, with regards to a behaviour that individuals wish to increase (exercising). Study 2, examined the role of liking and wanting on the intention-behaviour link for both increasing and decreasing behavioural goals and extended Study 1 by including a variety of different behaviours. Study 3, used a more refined study design and attempted to rule out alternate explanations for the effects of liking and wanting on intention and behaviour. Study 4 more directly compared the case of doing more versus less of a behaviour by framing the same behavioural goal of eating well in terms of increasing (eating more healthy food) versus decreasing the opposite of that behaviour (eating less unhealthy food). Finally, Study 5 employed an intervention to more closely examine the underlying mechanism of the effects of liking and wanting on intention versus behaviour.

Study 1

Study 1 was designed to provide an initial test of the hypothesis that the role of liking and wanting would differ in predicting intentions versus actual behaviour. Specifically, it was hypothesized that wanting would be weighted more (compared to liking) when evaluating intentions to increase the frequency of a behaviour. However, actual behaviour change was expected to depend more on liking compared to wanting. To test this, intentions to increase the frequency of exercising over a four-week period were measured, along with liking and wanting. Intentions were assessed by behavioural intention (Conner, Norman & Bell, 2002) and behavioural expectation (Warshaw & Davis, 1985) scale items which have been used in previous TPB studies.[3] Following the measurement of intentions in an in-lab session, participants made online reports of their exercise frequency over four subsequent weeks; these weekly reports served as the measure of self-reported behaviour. This first study focused exclusively on the health behaviour of exercising, as it is a behaviour that many individuals struggle with, and often intend to increase.

Although past research has mostly utilized self-report measures to assess liking and wanting, it has been suggested that the evaluation of liking and wanting may operate without conscious awareness (Berridge & Robinson, 2003; Finlayson et al., 2007). Therefore, a secondary interest of Study 1 was to include both explicit and implicit measures of liking and wanting. Numerous studies have utilized both explicit and implicit measures of liking and wanting (De Houwer, Custers & De Clercq, 2006; Friese, Hofmann & Wanke, 2008; Tibboel et al., 2011; Veenstra & de Jong, 2010), and have obtained mixed results. For example, Tibboel et al. (2011) found that participants were able to distinguish between liking and wanting on explicit

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[3] A debate exists on whether behavioural intentions and behavioural expectations are distinct constructs that lead to different levels of predictive validity on self-reported behaviour (see Warshaw & Davis, 1985 for a thorough discussion.) However, these items are commonly used in combination to assess intentions in the literature.

measures such that deprived smokers reported more explicit wanting for nicotine compared to satiated smokers, even though no differences were found in explicit liking. However, others argue that individuals have difficulty in explicitly distinguishing between liking and wanting on self-report measures (Havermans, 2011). For example, Friese et al., (2008) found that explicit measures of liking (versus implicit liking) predicted consumption of high-fat foods; however, this was only when participants had full cognitive resources. When participants were depleted of their self-regulatory strength, implicit (and not explicit) liking predicted consumption. Thus, a potential advantage of using implicit measures are that they are more likely to tap into an individual's automatic attitude and/or motivation toward a target, regardless of whether they are consciously aware of them or not. Also, since individuals are not directly aware of what the task is measuring, the threat of desirability bias is minimized (De Houwer, 2006). Due to the potential benefits of implicit tasks, Study 1 aimed to develop and test a set of implicit as well as explicit measures for both liking and wanting.

Past research has utilized self-report measures to assess liking and wanting by obtaining direct reports of subjective pleasure versus desires or cravings (e.g., Finlayson et al., 2007; Cowdrey, Finlayson, & Park, 2013). In my dissertation, explicit liking was measured using items reflecting affective evaluation (Ajzen, 1991) as they assess the hedonic experience of engaging in a behaviour (e.g., one's positive or negative feelings associated with the experience of exercising). Explicit wanting was measured using a desire scale (Perugini & Bagozzi, 2001) which was developed to assess one's appetite to engage in a behaviour (e.g., one's level of desire to exercise), and is considered to be conceptually distinct from intention and affect (Perugini & Bagozzi, 2004). With regards to implicit tasks, little is known about the best types of tasks to use in order to capture the constructs of liking and wanting; different measures each have their

strengths and weaknesses (Havermans, 2011). To increase the chances of finding a measure with good validity, two implicit measures of liking and two implicit measures of wanting were employed in Study 1.

Two potentially viable methodologies used to assess implicit liking were the Personalized Implicit Association Task (IAT; Olson & Fazio, 1994) and the Affective Misattribution Procedure (AMP; Murphy & Zajonc, 1993; Payne, Cheng, Govorun, & Stewart, 2005). The IAT involved the use of reaction times to assess one's implicit attitude/evaluation of a target stimulus, and has been used in several past studies to assess liking (De Houwer et al., 2006; Tibboel et al., 2011). The AMP is also used to assess implicit attitude by relying on people's tendency to misattribute their affective reactions from one source to another when conditions are ambiguous. This task has been employed in the past as a measure of how pleasant versus unpleasant a target is perceived to be (Payne, Govorun, & Arbuckle, 2008).

Implicit wanting has been commonly measured using tasks that assess one's automatic approach/avoidance tendencies toward a stimulus and how hard one is willing to work toward their goal (e.g., Epstein, Truesdale, Wojcik, Paluch & Raynor, 2003; Veenstra & de Jong, 2010). Two viable implicit wanting measures were selected for this study: the Joystick task (Fishbach & Shah, 2006) and the Goal Initiation/ Pursuit Task (Aarts, Gollwitzer, & Hassin, 2004). The Joystick task was used to assess the strength of automatic approach and avoidance motivational processes toward a target behaviour. The task required individuals to respond to stimuli on a computer screen, by either pulling a joystick (and the stimuli on the screen) toward them or by pushing the joystick (and the stimuli) away from them (Fishbach & Shah, 2006). Tasks comparable to the Joystick task (Affective Simon Task; De Houwer, 2003) have also been found to reflect wanting (and not liking). For example, Veenstra and de Jong (2010) compared levels of

liking and wanting for high-fat foods between restrained eaters (individuals who limit their caloric intake) and unrestrained eaters. The results revealed that restrained eaters had relatively strong automatic approach tendencies (i.e., strong wanting) toward high-fat foods compared to unrestrained food eaters; even though the groups did not differ in their level of liking toward the foods (Veenstra & de Jong, 2010).

The goal pursuit/initiation task was included as a measure of wanting as it is said to measure an individual's automatic goal striving behaviour by assessing the amount of effort one is willing to put in to work toward the goal (Aarts et. al., 2004). The measure consisted of a mouse-clicking task that measured goal initiation and goal pursuit depending on how quickly one clicked through it. Before starting the task, individuals were told that they would be provided an opportunity to engage in a task that promotes goal attainment, depending on how quickly they move through the initial clicking task. It is assumed that the more motivated individuals are to attain the goal, the faster they will be to start and complete the clicking task in order to engage in the subsequent task (Aarts et al., 2004).

In summary, Study 1 employed both implicit and explicit measures of liking and wanting in order to examine whether the predictive value of these components differ with regards to intention versus behaviour. The results of Study 1 also aimed to shed some light on whether individuals are able to explicitly distinguish between liking and wanting, or whether the use of implicit measures are required to accurately distinguish and assess the constructs of liking and wanting.

Participants

Participants. Participants ($N = 148$; 31 males, 117 females) were recruited from the University of Waterloo in exchange for course credit. Due to attrition in the follow-up measures,

119 participants (26 males, 92 females, 1 undisclosed) were included in final data set and in all subsequent analyses. The mean age was 19.6 years ($SD = 2.4$).

Procedure

Participants completed one in-lab session and four follow-up measures of self-reported exercise behaviour. In order to focus on participants who were motivated to increase the frequency of exercising, only participants who reported an intention to increase their current level of exercising were pre-selected for this study. During the in-lab session, participants were instructed to complete both implicit and explicit measures of liking and wanting, a goal-setting task, and an intention strength measure (amongst other measures that are not the focus of this dissertation). The implicit measures were always completed first in order to avoid being influenced by goal salience (from the goal-setting task) and the explicit measures. The presentation order of three out of the four implicit tasks were counterbalanced, with the goal initiation/pursuit task always presented last, as the instructions for that task stated that it would be immediately followed by the goal- setting task.

Immediately after the goal initiation/pursuit task, participants completed the goal-setting task in which they were asked to set an exercise goal for the following four weeks. Next, participants completed the explicit measures which followed a fixed presentation order. First, participants indicated their strength of intention to carry out the specific goal they had set (intention measure). Then, they completed the explicit wanting measure, followed by the explicit liking measure. After the completion of the in-lab session, the follow-up measures used to assess the level of exercise behaviour were administered online once every week for the following four weeks.

Measures

  Pre-selection. Participants completed a pre-screen questionnaire which included a measure to assess participants' current exercise behaviour (adapted from Marcus, Rakowski, & Rossi, 1992). The measure, completed prior to signing up for the study, asked participants to choose one of the following options that best described their current exercise behaviour: "I currently exercise regularly", "I currently exercise some, but would like to exercise more", "I currently do not exercise, but I am thinking about starting to exercise", and "I currently do not exercise and I do not intend to start exercising". Respondents selecting one of the two middle options ("I currently exercise some, but would like to exercise more" and "I currently do not exercise but I am thinking about starting to exercise") were eligible for participation in the study.

  Implicit measures.

  Implicit liking. The AMP (Murphy & Zajonc, 1993; Payne et al., 2005) involved presenting subliminal primes (exercise versus neutral words) in order to examine whether the primes altered the participant's evaluation of a second ambiguous stimulus target - Chinese characters.[4] Three exercise-related words were used as primes: athletic, exercise and fitness (Berry, 2006). The neutral words (acoustic, occasion, and caravan) were matched to the exercise related words in terms of length and frequency of use using the MRC Psycholinguistic Database (Wilson, 1988). Each word was shown seven times as a prime, for a total of 42 trials. In addition, 42 unique Chinese characters were used as the ambiguous targets. Participants were told the task was about making snap judgements of novel stimuli. Next, participants were informed that they would view drawings of Chinese characters presented at very high speeds. The objective of the

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[4] A pre-selection criterion was set in order to exclude Chinese speaking participants in this study. Also, a check was placed at the end of the study to determine whether participants were Chinese-speaking or whether they were able to read any of the Chinese characters from the task.

task was to rate the ambiguous target (Chinese character) as being more or less pleasant than the average symbol.

The task was initiated with a fixation cross that was presented in the center of the screen for 1000 milliseconds (ms), and then a prime (either exercise-related or neutral word) was presented on a screen for 16ms, followed immediately by a pattern mask for 175ms.[5] Finally, the target was presented for 100ms. The next trial did not begin until participants made a pleasant-unpleasant response on the target (see Figure 1 for an overview of the task). The proportion of pleasant responses following exercise-related primes versus those following neutral primes was used as a measure of implicit liking of exercise. Participants with a greater proportion of pleasant responses following exercise related primes (compared with neutral primes) were considered to have greater liking toward the behaviour of exercise.

Figure 1. *Study 1: The Subliminal Affective Misattribution Procedure (AMP)*

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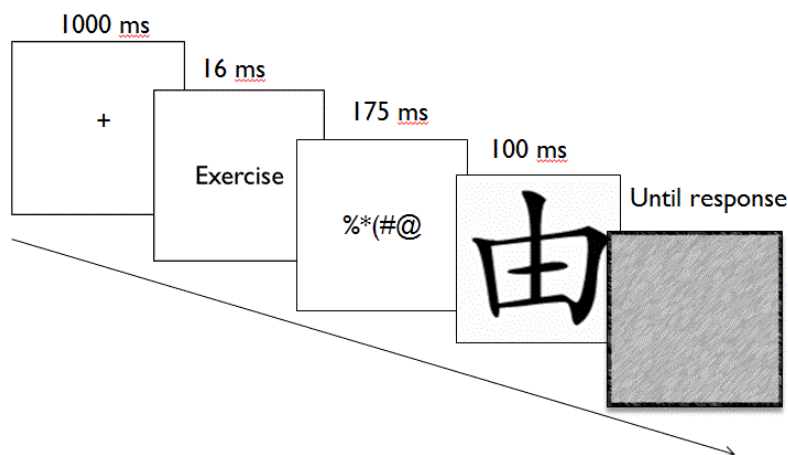
[5] Several pilot studies were conducted in order to find the optimal prime duration. Indeed, the pilot study confirmed that a prime duration of 16ms went undetected by the majority of participants. Murphy and Zajonc (1993) used a prime duration of 6ms.

The personalized IAT (Olson & Fazio, 2004), a variant of the traditional IAT (Greenwald, McGhee, & Schwartz, 1998) measures implicit attitudes by drawing on differences in reaction times in a rapid computerized categorization task. The key responses of "I like" and "I dislike" were used in this variant of the IAT to assess one's liking toward exercise. Both words (negatively and positively valenced) and pictures (exercise-related versus neutral) were presented in an attempt to measure how strongly people associated the target category (exercise-related pictures) with positively and negatively valenced words, compared to neutral, non-exercise related pictures.

Participants' task was to categorize the words in terms of "I like" or "dislike" and to categorize the pictures as either exercise-related or non-exercise related. Responses were made by pressing either one key with the left hand (A-key) or another key with the right hand (K-key). Participants were asked to respond as quickly as possible in making their categorizations, with response time being the primary dependent variable. Positive words (friend, love, peace and freedom) and negative words (poverty, jail, grief and disaster) were matched on frequency and word length. The exercise-related pictures depicted a genderless person engaging in various exercises: running, lifting weights, spinning on a bike, and jumping rope. The neutral pictures included a lamp, pen, chair and telephone. See Figure 2 for the stimuli used in the study.

Figure 2. *Study 1: Picture stimuli used in the Personalized IAT*
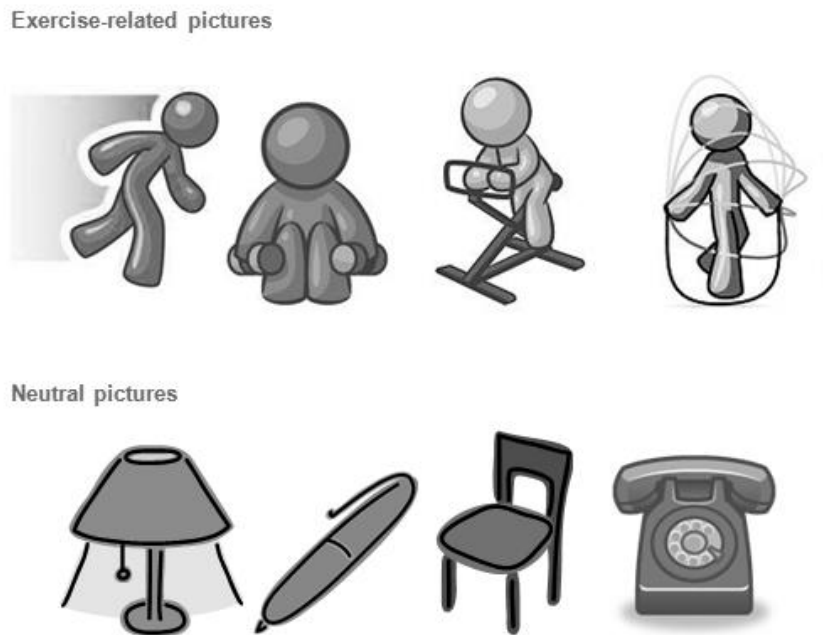
The IAT consisted of five blocks (see Figure 3). The task was counterbalanced between participants, such that blocks 2 and 3 were counterbalanced with blocks 4 and 5. The more an individual likes to exercise, the faster their reaction times should be in block 5 when the exercise-related pictures are paired with the response key of "I like", compared to Block 3 when the exercise-related pictures are paired with "I dislike". The mean difference between these two reaction times was used to calculate the IAT effect (Greenwald et al., 2008).

Figure 3. *Study 1: The Personalized Implicit Association Task*

			Personalized IAT	
Block	**Trials**	**Function**	**L-key response**	**R-key response**
Block 1	16	Practice	"I dislike"	"I like"
Block 2	16	Practice	Neutral pictures	Exercise pictures
Block 3	32	Test	"I dislike" or Neutral pictures	"I like" or Exercise pictures
Block 4	16	Practice	Exercise pictures	Neutral pictures
Block 5	32	Test	"I dislike" or Exercise pictures	"I like" or Neutral pictures

Implicit wanting. For the Joystick task (Fishbach & Shah, 2006) participants were

handed a joystick and told that they would be presented with a series of letter strings. The

participants' task was to indicate as quickly as possible whether each letter string was a word or

a non-word, by either pushing or pulling the joystick. Participants responded to a mix of

exercise-related words (athletic, exercise and fitness) and neutral words (acoustic, occasion and

caravan). For consistency purposes, the words used in this task were the same as those presented

in the AMP. There were also six non-words that were matched in length to each of the words

using the MRC Psycholinguistic Database (Wilson, 1988). Examples of the non-words included:

"franched", "traughts" and "skronks". The task included two blocks of 60 trials (each word and

non-word was presented five times). In one block participants were told to pull the joystick

toward them for words and push it away for non-words; in the other block the response mapping

was reversed. The order of blocks 1 and 2 were counterbalanced with blocks 3 and 4 across

participants. During the actual task a fixation cross was presented in the middle of the screen for

200ms before the target was presented. The next trial began 500ms after a response was made (see Figure 4). The dependent variable was the reaction time of the push/pull.

Figure 4. *Study 1: Approach/Avoidance Joystick Task*
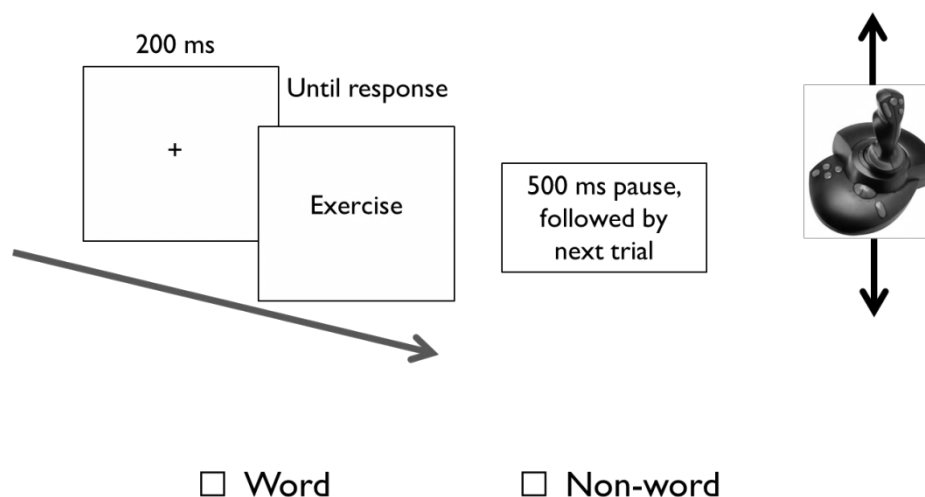
The stronger one's motivation or approach is toward exercising, the faster they should be to pull the joystick towards them and vice versa with exercise avoidance and pushing the joystick away from them. The difference in response times for pushing /pulling exercise-related and neutral words produced an implicit wanting score.

After completing the three implicit measures participants completed the goal initiation/ goal pursuit task (Arts et al., 2004). Participants learned that the first part of the study was almost completed and after this next task they would be given a chance to set a plan of action as to how their exercise goal could be reached. However, participants were told that they would only be able to engage in this goal-setting task if there was sufficient time left. All of this information was presented in a message that appeared on the screen. In order to continue participants were asked to erase the message from the screen. After erasing the message participants completed the goal pursuit task, which involved clicking on various boxes that appeared on the screen (see

Figure 5). A fixation cross appeared in the center of the screen and then a dot appeared in one of

four positions. The task was to simply click on the box that contained the dot.

Two implicit wanting measures were derived from the task: First, initiation or eagerness

to move toward the goal was operationalized as the time it took participants to erase the initial

instructions; second, eagerness of goal pursuit was operationalized in terms of participants'

speed of clicking responses to the presented boxes. High wanting toward exercising was

characterized by one who quickly clicked through the instructions and the goal pursuit task in

order to reach the goal-setting task.

Figure 5. *Study 1: The Goal Pursuit Task*
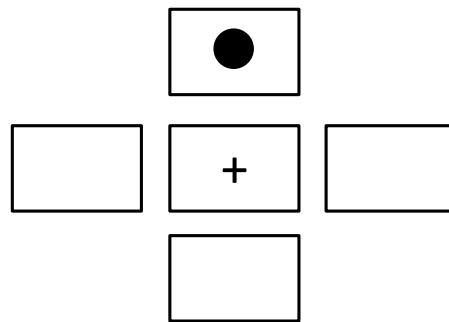
Explicit measures.

Goal-setting task. After completing the series of implicit tasks participants were given a

definition of exercise and were asked to set an exercise goal. Specifically, an exercise session

was defined as:

 Physical exertion aimed at improving or maintaining physical fitness and must be intense

enough to work up a sweat and/or causing heavy breathing. An exercise session is usually

at least 20 minutes long; however, people's definition of exercise may vary with regard to

the length and exertion in an exercise session. (Milne, Orbell, & Sheeran, 2002)

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The behavioural goal was then set using the following item: "In the next 4 weeks, my goal is to exercise X times per week". Participants were instructed to enter a number to represent their exercise goal.

Intention. A measure of intention strength was administered directly after the goal-setting task. The personal exercise goal (frequency) set by the participant in the previous section was presented, such that the intention items pertained to the specific goal. The following four items (derived from Conner, Norman, & Bell, 2002) were used to assess behavioural intentions: "I intend to exercise X times per week over the next 4 weeks" (*definitely do not-definitely do*), "I will try to exercise X times per week over the next 4 weeks" (*unlikely-likely*), "I expect to exercise X times per week over the next 4 weeks" (*unlikely-likely*), and "Realistically, what is the probability (% chance) that you will exercise X times per week over the next 4 weeks?" (*0%-100%*). Responses were provided on 7-point scales (except for the last item which was administered in 10% intervals). The four items were standardized and combined to constitute the measure of intention ($\alpha = .90$).

Explicit wanting. The explicit wanting scale items were also tied to the specific goal set by the participant, coinciding with how the scale has been used in previous research (Peruguni & Bagozzi, 2001). The following three items ($\alpha = .87$) were used to assess wanting: "I desire to exercise X times per weeks over the next 4 weeks", followed by a 7-point scale anchored by 'false' and 'true', "My desire for exercising X times per week over the next 4 weeks can be described as...", followed by a 6-point scale anchored by 'no desire' to 'very strong desire', and "I want to exercise X times per week over the next 4 weeks", followed by a 7-point scale from 'false' to 'true'. The three items were standardized and combined to constitute the measure of wanting toward the behaviour of exercise.

Explicit liking. The explicit liking scale items were tied to the behaviour of exercise. To measure explicit liking participants were told to finish the following sentence: "For me exercising would be…". Participants were given three bipolar adjective scales that ranged from *unpleasant* to *pleasant*, *dull* to *interesting*, and *boring* to *stimulating*, on a 7-point scale. The three items have been used previously as a measure of one's feelings or emotions toward a target (affective attitudes; Ajzen, 1991). The three items were standardized and combined to constitute the measure of liking ($\alpha = .89$).

Follow-up behavioural measure. Follow-up measures were collected from participants every week for one month in order to obtain self-reported measures of exercise behaviour. Participants answered the following question as part of a brief online questionnaire, "How many times did you exercise over the past 7 days?" in order to get an average frequency of exercise behaviour over the 1-month period. This was seen as the most dependable and accurate measure of exercise behaviour as it was collected at four weekly intervals as opposed to obtaining a single measure at the end of the 1-month period. Data were included in the analyses only if at least three of the four self-reported behaviour measures were completed. The mean frequency of self-reported behaviour across the (three or four) follow-up questionnaires constituted the measure of self-reported behaviour.

Other measures. Several other scales were included in this study, results from which are not reported here. During the in-lab session, these scales included the goal commitment scale (Hollenbeck, Williams, & Klein, 1989) and the other TPB construct measures: subjective norm and perceived behavioural control (Rhodes & Courneya, 2003). Participants' age, gender, weight and past exercise behaviour (frequency) was also measured. Participants' satisfaction with their current level of exercise was measured on a 7-point scale (*not satisfied at all- completely*

satisfied). Other questions in the follow-up questionnaires included: "Are you satisfied with your level of exercise over the past 7 days" *(not satisfied at all-completely satisfied),* and "How much progress do you feel you have made toward your exercise goal over the past 7 days?" *(none-very much*). In the final follow-up questionnaire, participants were asked additional questions about their overall goal progress: "Did you manage to reach your personal goal?", "Did you engage in exercise X times per week over the past 4 weeks?, "Are you satisfied with your overall progress toward your goal over the past 4 weeks?", and "How much progress have you made toward your exercise goal over the past 4 weeks?" all on a 7-point scale. Lastly, the final follow-up questionnaire also included a measure of self-concordance (Sheldon & Houser-Marko, 2001), action planning/ coping planning (Sniehotta, Schwarzer, Scholz, & Schüz, 2005), and maintenance self-efficacy (Luszczynska & Schwarzer, 2003).

Results

Pre-selection. Recall that only those participants expressing an intention to increase their frequency of exercise were selected for inclusion in the study. The majority (*n* =84; 71%) of these participants indicated that they, "currently do not exercise, but intend to start exercising"; whereas the remainder indicated that they, "currently exercise some, but would like to exercise more" (*n* = 35; 29%).

Attrition. A series of independent t-test comparisons were conducted with the 30 participants who dropped out of the study versus the ones who did not, in order to ensure that there were no important differences on any of the explicit measures (from the in-lab session). Tests were conducted using Bonferroni adjusted alpha levels of .01 per test (.05/7). The results found no differences on age, gender, exercise goal, past exercise, intention, liking, wanting or

any of the TPB constructs (all p's > .1.) The only significant difference between these two groups was on satisfaction with current level of exercise, $t(146)= 2.67$, $p= .01$.[6]

Implicit measures. Scores for each of the implicit liking and implicit wanting measures were calculated. Additional data reduction needed to be taken on the personalized IAT and Joystick task.[7] Reliabilities for each implicit measure were calculated, and most were found to be unsatisfactory. Reliabilities were especially low for the AMP task ($\alpha = .19$), and the Joystick task ($\alpha = .26$). The split-half reliability for the personalized IAT was calculated and was found to be moderate ($\alpha = .61$); however, this measure showed low corresponding correlations with the other implicit liking measure and all of the explicit measures.[8] None of the implicit measures of liking and wanting were found to exhibit significant correlations with any of the corresponding explicit measures of liking or wanting, or with intention or behaviour (see Table 1).

In an attempt to improve the reliability or correlations between the implicit measures, a number of alternative dependent measures were extracted from the tasks (e.g., calculating a separate approach versus avoidance score on the Joystick task), however, none of these alternative measures improved the reliabilities or correlations with any of the other variables. Therefore, after a thorough analysis, the implicit measures were not considered further in the results section (or in any of the subsequent studies) due to low reliabilities of the tasks and the lack of relationship between the implicit tasks and dependent measures of intention and behaviour.

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[6] Participants who dropped out of the study indicated they were less satisfied ($M=2.06$, $SD= 1.23$) with their current level of exercise (at the time of the study) compared to those who did not drop out of the study ($M= 2.8$, $SD= 1.57$).
[7] Data reduction on the IAT data was modelled closely with that of Greenwald et al., (2008) and data reduction on the joystick task data was similar to that of Veenstra and de Jong (2010).
[8] The reliability of the initiation task was not calculated as the task involved one data point. Likewise, the reliability for the goal pursuit task was not calculated as it only involved a total of eight trials.

Table 1. *Study 1: Zero-order correlations for the implicit and explicit measures of liking and wanting*

Wanting

Measure		Wanting	Intention	Behaviour	Joystick	Initiation
Explicit	Wanting	-				
	Intention	.753**	-			
	Behaviour	.247**	.228*	-		
Implicit	Joystick	-.028	.056	-.019	-	
	Initiation	-.045	-.079	-.007	-.091	-
	Goal pursuit	.059	.007	-.034	.162	.283**

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Liking

Measure		Liking	Intention	Behaviour	AMP
Explicit	Liking	-			
	Intention	.364**	-		
	Behaviour	.290**	.228*	-	
Implicit	AMP	-.096	.098	-.073	-
	IAT	.011	.033	.038	.138

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Descriptives. The average self-reported frequency of exercise behaviour one week prior to the study was 1.44 times, ($SD = 1.4$) whereas the average exercise goal set by the participant was 2.87 times per week ($SD = 1.48$). The zero-order correlations between liking, wanting, intention and behaviour can be found in Table 2. The inter-correlations indicated significant positive relationships between all of the variables of interest (Pearson r ranging from .228-.753). Variable means, and standard deviations are shown in Table 3.

Table 2. *Study 1: Zero-order correlations between liking, wanting, intentions and behaviour*

Measure	Liking	Wanting	Intention
Liking	-		
Wanting	.414**	-	
Intention	.364**	.753**	-
Behaviour	.290**	.247**	.228*

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table 3. *Study 1: Variable means (standard deviations in parentheses)*

Measure	*M*
Liking	5.08 (1.43)
Wanting	5.46 (1.04)
Intention	5.08 (1.20)
Behaviour	1.66 (1.51)

Factor analysis. To examine whether participants were able to discriminate between the three variables of interest that were measured in the first session, the individual scale items from the intention, liking and wanting measures were factor analyzed using principal component analysis with Varimax (Kaiser Normalization) rotation. The KMO and Bartlett's Test of Sphericity both indicated that the set of variables were adequately related for factor analysis. As expected, the analysis yielded three separate factors (see Table 4). The intention items loaded onto Factor 1, explaining 55.28% of the variance. The second factor appeared to reflect wanting, as all of the items loaded onto this factor and explained 15.10% of the variance. Finally, all of the liking items loaded onto the third factor, explaining 9.74% of the variance (for a total variance of 80.12% explained by these three factors). Thus, there was initial evidence to support the idea that participants were able to explicitly distinguish between the three explicit concepts (liking, wanting and intentions) and that the scale items measured what they were intended to measure.

Table 4. *Study 1: Rotated component loadings for liking, wanting and intentions*

| | Loadings | | | |
| | Factor 1: | Factor 2: | Factor 3: | |
	Intention	Wanting	Liking	Communality
Liking 1			.844	.690
Liking 2			.900	.833
Liking 3			.874	.820
Wanting 1		.824		.606
Wanting 2		.731		.573
Wanting 3		.802		.577
Intention 1	.619	.510		.667
Intention 2	.740			.656
Intention 3	.875			.773
Intention 4	.897			.882
Eigenvalue	6.082	1.662	1.071	

Notes. Only factors with eigenvalues greater than 1 were extracted. Factor loadings that are <. 400 were excluded from the table. Communality represents the overall proportion of the variance attributable to the factors.

Predicting intentions. This and all of the subsequent results were analysed using the same statistical methods. A model, including the interaction between liking and wanting was always tested; however interactions are only reported if they were found to be significant. Intentions to exercise were regressed on the measures of liking and wanting (see Table 5). The model was significant, $F(2, 116) = 50.59$, $p < .001$, and as expected, wanting was a significant predictor of intentions, such that higher levels of wanting were associated with stronger behavioural intentions (Panel A in Figure 6) even after controlling for liking.[9] In contrast, and

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[9]. In order to examine whether the results of the regression (predicting intentions) were influenced by those who dropped out of the study (30 participants) vs. those who did not (attrition), a regression was run using this variable

also as expected, liking was not a significant predictor of intentions after controlling for wanting. To ensure that the results were not affected by those who dropped out of the study versus those who did not (attrition), or by a difference between those who 'currently exercise' and those who 'do not currently exercise' (pre-test measure), these variables were controlled for in the model. The results revealed the same general pattern when attrition and pre-test were accounted for, $F(4, 144) = 42.37$, $p < .001$. To test whether wanting was a significantly stronger predictor of intentions compared to liking, Fisher r-to-z transformation analysis was conducted by comparing the partial correlations between liking/wanting and intentions. Semi-partial correlations (instead of zero-order correlations) were used as they represent the correlation between the criterion and a predictor after common variance from both the criterion and the predictor of interest are removed. The test was significant, $Z = 5.63$, $p < .001$, indicating that the relative power of wanting to predict intentions was significantly stronger than liking.

Table 5. *Study 1: Multiple regression analyses for predicting behavioural intentions*

| Model | Unstandardized Coefficients | | Standardized Coefficients | | | Correlations | |
	B	$SE\ B$	β	T	Sig. (p)	Zero-order	Semi-Partial
(Constant)	5.045	.073		69.334	<.001		
Wanting	.834	.077	.727	10.866	<.001	.753	.662
Liking	.053	.056	.063	.940	.349	.364	.057

Notes: $R^2 = .570$.

as a predictor. No interactions between liking, wanting and the attrition variable were found to be significant, all p's > .1, indicating no differences between the two groups.

Figure 6. *Study 1: Regression slopes for liking and wanting on intentions (panel A) and self-reported behaviour (panel B)*

(A)

(B)
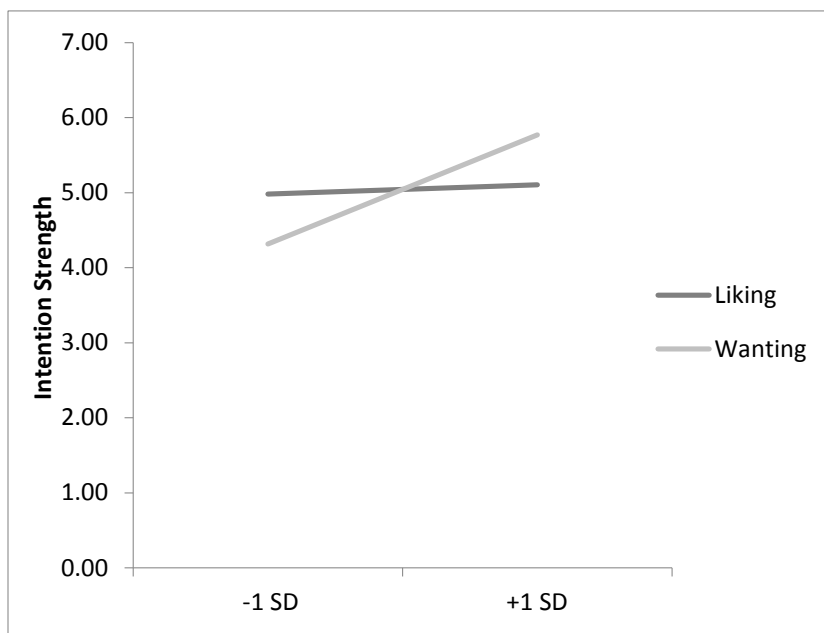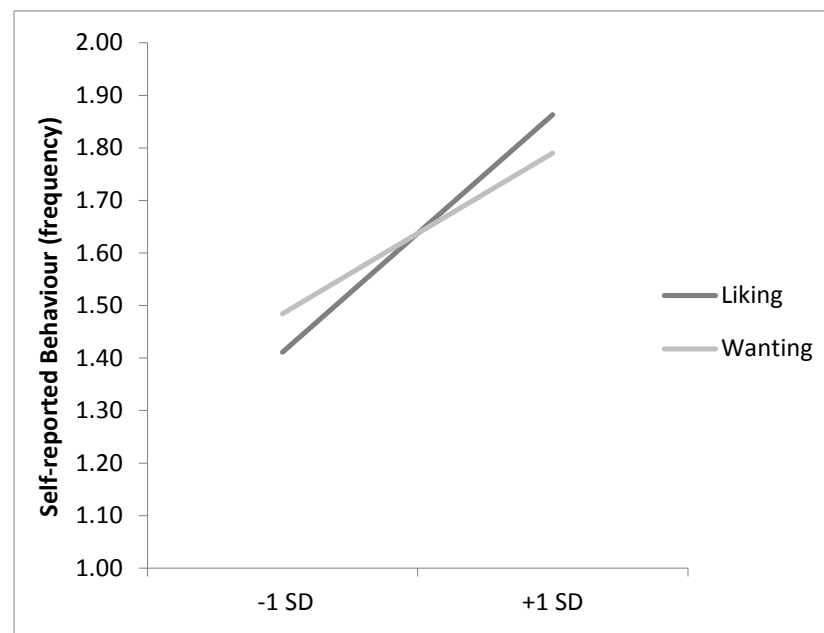
Predicting behaviour. Exercise goals ($M = 2.89$, $SD = 1.48$), which reflected intended exercise frequency over the next four weeks, were significantly higher than participants' past self-reported exercise behaviour ($M = 1.44$, $SD = 1.4$), $t(117) = 10.62$, $p < .001$. Although participants hoped to nearly double their weekly exercise behaviour, participants' actual mean exercise behaviour over the next four weeks ($M = 1.66$ $SD = 1.51$) fell short of their goals, $t(117) = -7.60$, $p < .001$. Rather, participants' actual exercise behaviour was similar to their past exercise behaviour, $t(117) = -1.75$, $p = .08$. See Figure 7 for a graph depicting the mean self-reported exercise behaviour over the four weeks. No significant differences in exercise frequency were found between the four sessions (all p's $> .1$).

Figure 7. *Study 1: Histogram of self-reported behaviour (frequency) over time*
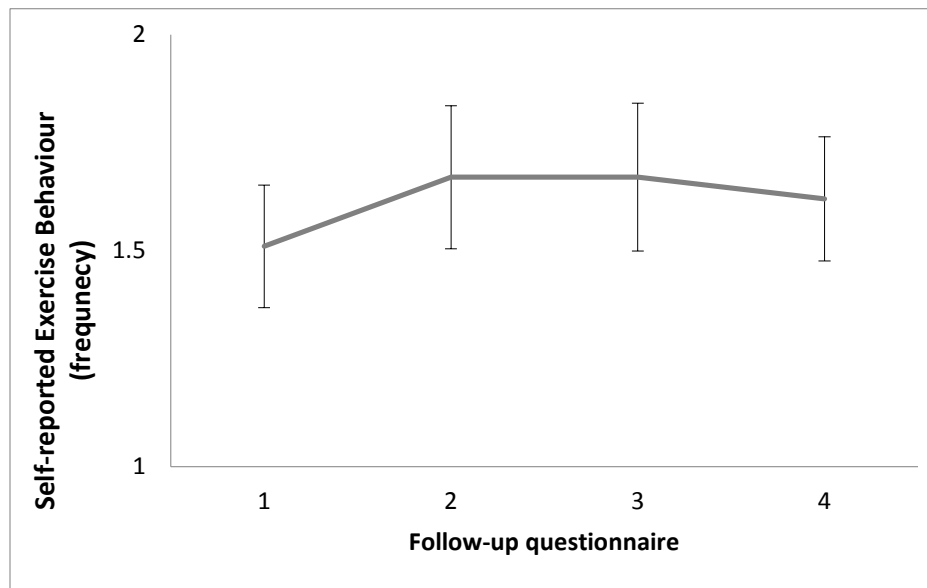
Notes. Error bars represent standard errors of the mean.

Mean self-reported exercise behaviour (frequency) was regressed on liking and wanting. The regression model was significant, $F(2, 116) = 13.88$, $p = .002$. As expected, liking significantly predicted self-reported exercise behaviour even after controlling for wanting, such that higher levels of liking were associated with higher reported levels of exercise (Panel B in Figure 6). By contrast, wanting did not predict behaviour when controlling for liking. These relations also held after controlling for the effects of intentions (see Table 6). When the pre-test measure was entered as a control variable, liking emerged as a marginal predictor of behaviours, over and above intentions, $\beta = .19$, $SE = .10$, $t = 1.86$, $p = .06$. Although liking predicted behaviour and wanting did not in a model that included both variables, a Fisher r-to-z transformation analysis was conducted on the semi-partial correlations between liking/wanting and self-reported behaviour and found that liking was not a significantly stronger predictor compared to wanting, $Z = -.52$, $p = .60$. The same non-significant result was found when the semi-partials that controlled for intentions were used, $Z = -1$, $p = .32$.

Table 6. *Study 1: Multiple regression analyses for predicting self-reported exercise behaviour*

		Unstandardized Coefficients		Standardized Coefficients			Correlations	
	Model	*B*	*SE B*	β	*t*	Sig. *(p)*	Zero-order	Semi-Partial
1	(Constant)	1.637	.132		12.371	<.001		
	Wanting	.221	.140	.153	1.586	.116	.247	.139
	Liking	.239	.102	.226	2.341	.021	.290	.206
2	(Constant)	1.640	.133		12.351	<.001		
	Wanting	.153	.181	.106	.844	.401	.247	.074
	Liking	.235	.102	.223	2.293	.024	.290	.202
	Intention	.085	.142	.072	.595	.553	.216	.052

Notes: Model 1 R^2 = .103, Model 2 R^2 = .105 (R^2 change = .002, F = .285, p = .595).

Discussion

The purpose of Study 1 was to provide an initial test of the hypothesis, that wanting and liking would be differentially related to intentions versus actual behaviour. The results offer a first demonstration that liking and wanting do in fact play different roles in the intention-behaviour relationship, in a situation where individuals were motivated to increase their level of exercise. As hypothesized, wanting significantly predicted intentions after controlling for liking but not vice versa, whereas liking predicted self-reported behaviour after controlling for wanting but not vice versa. Based on this first study, however, these effects can only be generalized to one behaviour, as Study 1 focused exclusively on exercise. A range of behavioural domains would need to be studied in order to examine whether the observed effects of liking and wanting on intention and behaviour generalize to other behaviours.

The results found that the effect of wanting on intentions was stronger than the effect of liking on behaviour. A potential reason why the effects may be stronger for intention (versus

behaviour) could have to do with the way the variables were measured. Specifically, wanting and intention were administered together as one measure which may have inflated the relationship between the two measures. In addition, intention and wanting were measured somewhat differently from liking, such that intention and wanting were measured with respect to the specific goal of increasing exercise behaviour (e.g., I want/intend to exercise X times next week), whereas the liking items were measured with respect to the behaviour (e.g., I like to exercise). Contributing to the weaker effect of liking and wanting on behaviour could also be due to fact that self-reported behaviour was measured in a completely different session, four weeks after the liking and wanting measures were assessed.

It is interesting that in contrast to much of the work on the TPB (Ajzen, 1991); intentions did not significantly predict behaviour once the effects of liking and wanting were controlled for. A reason for this could have to do with the overlapping constructs of wanting and intention. The relationship between intention and behaviour was indeed significantly correlated ($r = .228$); however, when intention was included into the regression model, intentions did not explain any additional unique variance in behaviour over and above the contribution of liking and wanting. Thus, it is possible that the measures of intention and wanting share a significant amount of variance with one another. This, along with the fact that the wanting measure was presented alongside the intention items, could have increased the overlap between the intention and wanting measures. In the next study an attempt is made to reduce multicollinearity between liking, wanting, and intentions, by making the differences between the constructs more apparent.

Study 1 also developed and tested both implicit and explicit measures of liking and wanting. The results provide evidence that participants were able to explicitly distinguish between the two constructs, as the two components emerged as separate factors in a factor

analysis. More compellingly, the explicit measures were found to have different levels of predictive value for intention and behaviour. Although it may certainly be worthwhile to investigate how best to capture liking and wanting implicitly, the implicit measures in Study 1 had a lot of reliability issues. Furthermore, neither implicit liking nor wanting was related to intentions or behaviour.

The lack of relationships between the implicit measures and the dependent measures could have to do with the presentation order of the measures. Specifically, the goal-setting task was always completed after the implicit tasks, but always before the explicit measures. Therefore, the behavioural goal is salient before completing the explicit measures. On the other hand, the implicit tasks may have only measured general liking and wanting toward exercising in the absence of a behavioural goal. Due to the issues with the implicit measures and the apparent success with the explicit measures, future studies utilized the explicit measures of liking and wanting.

Study 2

Study 1 found that wanting and liking played different roles in the prediction of exercise intentions versus exercise behaviour. The aim of Study 2 was to replicate the initial finding that wanting (but not liking) predicts behavioural intentions; as such, no measure of behaviour was obtained in this study. Given that Study 1 only focused on the behaviour of exercise, Study 2 aimed to generalize the finding from Study 1 to domains other than exercise. In contrast to Study 1's focus on a behaviour that individuals often wish to increase, another goal of Study 2 was to examine behaviours that individuals wish to decrease (e.g., eat less junk food). Thus, Study 2 was designed to provide an initial test of the hypothesis that the role of liking and wanting would differ in predicting behavioural intentions for behaviours that individuals wish to increase versus decrease. Specifically, in contrast to Study 1, it was hypothesized that liking would be weighted more, compared to wanting, when evaluating intentions to decrease the frequency of a behaviour. To test this, intentions to decrease and increase the frequency of behaviours were measured along with liking and wanting for those behaviours.

To rule out potential alternative explanations for the effects found in Study 1, several changes were made in Study 2. First, in order to more explicitly and cleanly distinguish between liking, wanting, and intentions, individual instructions for each measure were developed. To emphasize the differences between the constructs, the items within the measures were refined. Further, each of the measures was presented separately. In order to strengthen the methodology from Study 1, the presentation order of the three measures were varied systematically such that the order of the liking and wanting measures was counterbalanced and presented either before or after the intention measure. Finally, in Study 1, there was a concern that the effect of wanting on intentions may have been stronger because the wanting and intention items were tied to the

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specific goal, (e.g., I want to exercise X times per week) in contrast to the liking items, which were tied to the behaviour (e.g., I like to exercise). Therefore in Study 2, the goal-setting task was excluded and all of the measures were tied to the behaviour rather than to a goal.

Participants

Participants (N= 174; 83 males, 90 females, 1 undisclosed) were recruited from Amazon Mechanical Turk (Mturk) and successfully completed the study online. The mean age was 34.7 years (SD = 12.6).

Procedure

After reading an information letter and indicating consent participants were presented with the following instructions:

> People sometimes wish to increase how frequently they engage in a certain activity. For example, you may intend to increase the time you spend with your significant other. Likewise, people may wish to decrease how frequently they engage in other activities. For example, you may want to decrease the amount of time you spend procrastinating on Facebook. You will be presented with a list of activities, from which we would like you to select one that you wish to engage in more frequently in the near future (specifically, next week). After that, you will be asked to select an activity that you wish to engage in less frequently.

Participants were presented with a list of 15 different behaviours and were instructed to choose one behaviour that they wished to increase (subsequently referred to as "increase behaviours") and one behaviour they wished to decrease (subsequently referred to as "decrease behaviours"). After choosing the two behaviours participants completed the intention, wanting, and liking measures, first with respect to one of the two behaviours and then again with respect to the other.

The order in which the two behaviours were evaluated (increase or decrease behaviours), intention order (either before or after the liking and wanting measures), and order of the liking and wanting measures were counterbalanced across participants.

Measures

      Wanting. Specific instructions were developed for the wanting measure and asked participants to, "Please answer the following questions based on how you would feel if the opportunity to engage in this activity was a possibility right now". In addition to the three items used in Study 1, four new items were added. The new scale items included: "I have a craving to X"; I have a strong urge to X"; "I would prefer to X over anything else"; and "I would give up a lot to X". Participants completed the wanting scale for each of the behaviours they chose (and not the goal). For example, if the behaviour was to decrease unhealthy snacking, the wanting items were tailored to the behaviour, (e.g., how much do you desire unhealthy snacks?) rather than focusing on the specific goal at hand (e.g., how much do you desire to decrease unhealthy snacking?). The seven items were standardized and combined to constitute the measure of wanting ($\alpha = .95$).

      Liking. Specific instructions were developed for the liking measure and asked participants to, "Please answer the following questions based on how you would feel if you were engaging in this activity right now." The two items from Study 1 that used the bipolar adjective scales of *dull* to *interesting* and *boring* to *stimulating* were replaced by three new scale items. The new scale items included: "I enjoy X"; "I like X"; "X is fun"; and "X is pleasant" on a 7-point scale (from *strongly disagree- strongly agree*). Just as with the wanting items, the liking items focused on the target behaviour as opposed to the goal of increasing or decreasing its

frequency. The seven items were standardized and combined to constitute the measure of liking (α = .97).

Intentions. The same four intention items from Study 1 were used. Each scale item referred to the specific behaviour in terms of engaging in it more or less frequently in the future (e.g., I intend to X more/less frequently next week). The three items were standardized and combined to constitute the measure of intention (α = .88).

Results

Increase Behaviours.

Descriptives. A breakdown of the behaviours that individuals selected as the one they wished to increase "in the following week" can be seen in Figure 8.[10] The results indicated that the goal of exercising was the most popular behaviour - with over half of the participants (51%) choosing this behaviour. The zero-order correlations between liking, wanting, and intention (see Table 7) indicated that there were significant strong relationships between all of the variables of interest (Pearson *r* ranging from .422-.735). Variable means and standard deviations are found in Table 8.

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[10] Two participants were removed from the analysis, one for choosing to increase "smoking", and another was removed for choosing to increase the behaviour of "drinking alcohol".

Figure 8. *Study 2: Increase behaviours (N= 172).*

Table 7. *Study 2 (increase behaviours): Zero-order correlations between liking, wanting and intentions*

Measure	Liking	Wanting
Liking	-	
Wanting	.735**	-
Intention	.422**	.545**

**. Correlation is significant at the 0.01 level (2-tailed).

Table 8. *Study 2 (increase behaviours): Variable means (standard deviations in parentheses)*

Measure	*M*
Liking	5.22 (1.65)
Wanting	4.89 (1.52)
Intention	5.45 (1.22)

Factor analysis. To examine whether participants were able to discriminate between the three variables of interest, the individual scale items from the intention, liking and wanting measures were factor analyzed using principal component analysis with Varimax (Kaiser Normalization) rotation. The KMO and Bartlett's Test of Sphericity both indicated that the set of variables were adequately related for factor analysis and yielded three separate factors (see Table 9). The wanting items loaded onto Factor 1, explaining 31.61% of the variance. The second factor reflected liking and explained 29.25% of the variance. Finally, intention loaded onto the third factor, explaining 22.16% of the variance, for a total variance of 83.02% explained by these three factors. As in Study 1, the factor analysis provided supporting evidence that participants could explicitly distinguish between the three constructs.

Table 9. *Study 2 (increase behaviours): Rotated component loadings for liking, wanting and intentions*

	Loadings			
	Factor 1: Wanting	Factor 2: Liking	Factor 3: Intentions	Communality
Liking 1	.411	.862		.941
Liking 2		.872		.929
Liking 3		.842		.859
Liking 4		.858		.917
Liking 5		.883		.925
Liking 6		.872		.939
Liking 7		.858		.917
Wanting 1	.775			.800
Wanting 2	.759			.780
Wanting 3	.702	.425		.740
Wanting 4	.838			.853
Wanting 5	.798			.832
Wanting 6	.783			.737
Wanting 7	.739			.666
Intention 1			.902	.888
Intention 2			.873	.833
Intention 3			.900	.871
Intention 4			.810	.714
Eigenvalue	9.764	2.333	1.188	

Notes. Only factors with eigenvalues greater than 1 were extracted. Factor loadings that are $< .400$ were excluded from the table. The communality column represents the overall proportion of the variance attributable to the factors.

Predicting intentions. Intentions to increase the frequency of a behaviour were regressed on liking and wanting (see Table 10). The model was significant, $F(2, 169) = 40.16$, $p < .001$ and replicated findings from Study 1, showing that wanting significantly predicted intentions (see Figure 9), after controlling for liking. Also replicating study 1, liking was not a significant predictor of intentions. A Fisher r-to-z transformation analysis compared the two partial

correlations between liking/wanting and intentions, and indicated that the relative predictive

power of wanting was significantly stronger than that of liking, $Z = 3.1$, $p = .001$.

Table 10. *Study 2 (increase behaviours): Multiple regression analyses for predicting intentions*

	Unstandardized Coefficients		Standardized Coefficients			Correlations	
Model	*B*	*SE B*	β	*t*	Sig. *(p)*	Zero-order	Semi-partial
(Constant)	5.450	.078		69.624	< .001		
Wanting	.415	.077	.518	5.371	< .001	.545	.346
Liking	.026	.071	.036	.372	.711	.422	.024

Notes: $R^2 = .289$.

Figure 9. *Study 2 (increase behaviours): Regression slopes for liking and wanting on intentions*
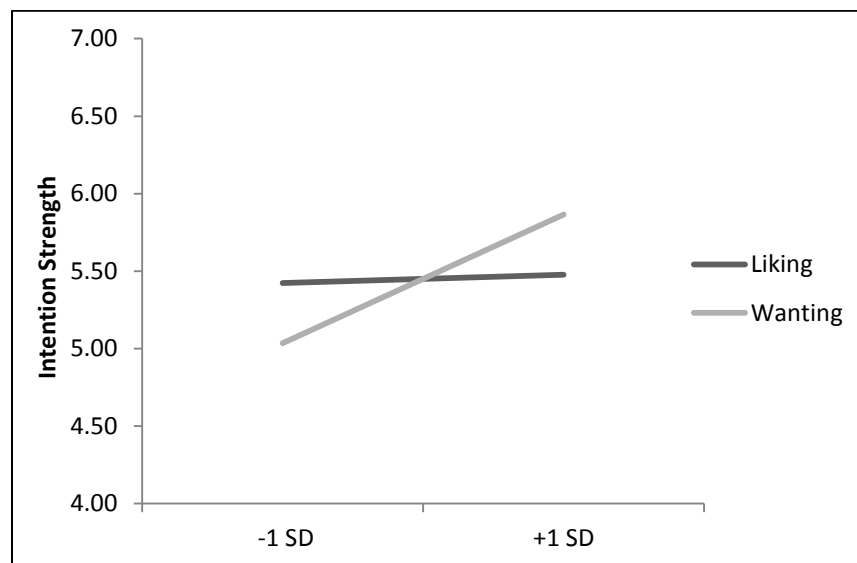
Since the target behaviour of exercise comprised just over half of the responses a

regression was run using exercise versus non-exercise behaviour as a predictor variable. All

associated interactions were also included in the model. Replicating the general pattern, wanting

still significantly predicted intentions, $β = .39$, $SE = .25$, $t = 5.26$, $p < .001$. More importantly,

none of the interaction terms emerged as being significant (all p's > .1), indicating that the pattern of results were similar for both the exercise and non-exercise behaviours.

To test for order effects, the presentation order of the intention measure (either before or after the liking/wanting measures), liking/wanting measures (liking measured either before or after wanting), and the order in which the two behaviours were evaluated (increase behaviours before or after the decrease behaviours) were entered as control variables in the regression model.[11] Overall, the pattern of results were not affected by any order effects, as wanting remained a significant predictor of intentions, ($\beta = .38$, $SE = .08$, $t = 4.74$, $p < .001$) while liking was not ($\beta = .05$, $SE = .07$, $t = .67$, $p = .50$).

Decrease behaviours.

D*escriptives.* A breakdown of the behaviours that individuals selected as the one they wished to decrease "in the following week" can be seen in Figure 10. The results indicated that the top two behaviours participants wished to decrease were eating unhealthy food and surfing the internet. The zero-order correlations between liking, wanting, and intention can be found in Table 11. The near-zero correlations between intentions and the liking and wanting measures indicated a markedly different pattern of results, to those seen for the increase behaviours. Variable means and standard deviations are found in Table 12.

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[11] Results found that intentions to increase the frequency of a behaviour were higher when intentions were measured before ($M = 5.7$, $SD = 1.1$) versus after ($M = 5.23$ $SD = 1.28$) the liking and wanting measures, $\beta = -.459$, $SE = .18$, $t = -2.44$, $p = .01$. No differences were found with regard to the order of the liking/wanting measures ($\beta = .238$, $SE = .185$, $t = 1.29$, $p = .20$), or the order in which the two behaviours were evaluated ($\beta = -.15$, $SE = .18$, $t = -.81$, $p = .42$).
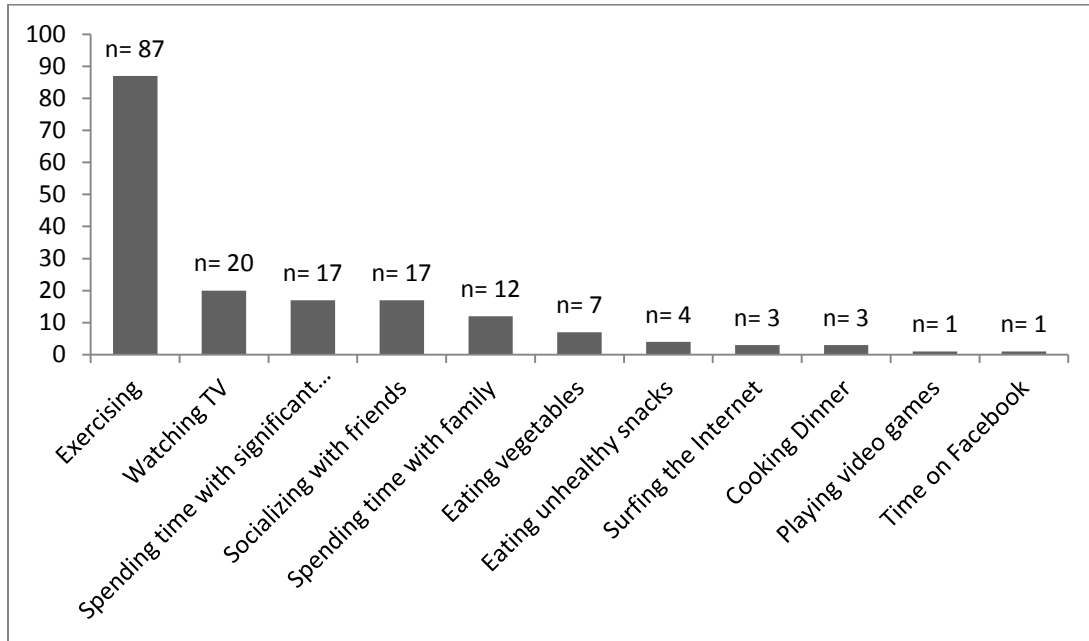
Figure 10. *Study 2: Decrease behaviours (N= 174).*
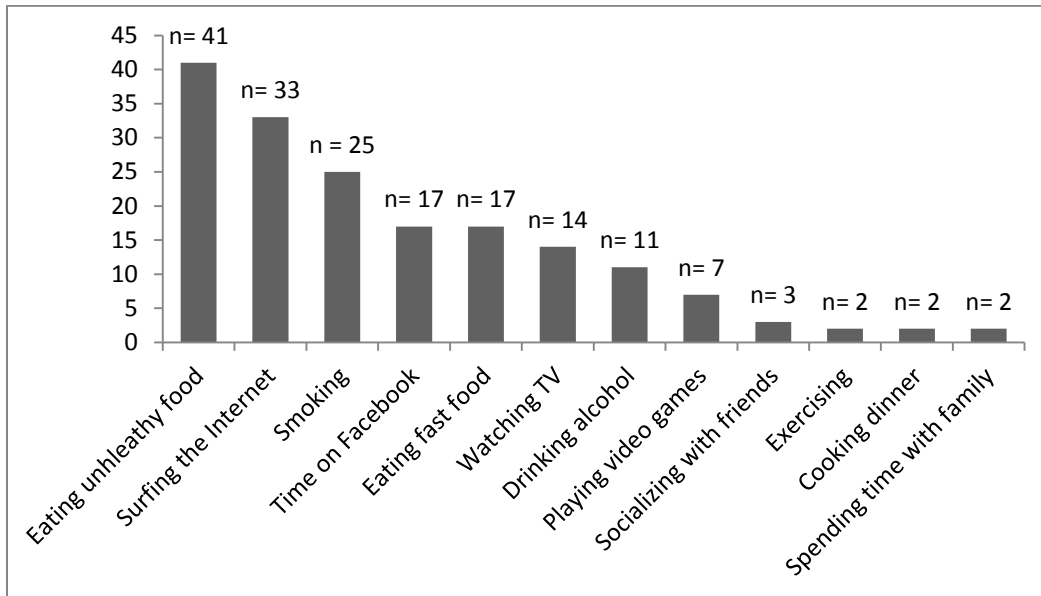
Table 11. *Study 2 (decrease behaviours): Zero-order correlations between liking, wanting and intention*

Measure	Liking	Wanting
Liking	-	
Wanting	.597**	-
Intention	-.030	-.040

**. Correlation is significant at the 0.01 level (2-tailed).

Table 12. *Study 2 (decrease behaviours): Variable means (standard deviations in parentheses)*

Measure	M
Liking	5.11 (1.45)
Wanting	4.10 (1.43)
Intention	4.97 (1.25)

Factor analysis. To examine whether participants were able to discriminate between the three variables of interest, the individual scale items from the intention, liking and wanting measures were factor analyzed using principal component analysis with Varimax (Kaiser Normalization) rotation. The KMO and Bartlett's Test of Sphericity both indicated that the set of variables were adequately related for factor analysis and the analysis yielded three separate factors (see Table 13). The wanting items loaded onto Factor 1, explaining 30.64% of the variance. The second factor reflected liking and explained 28.97% of the variance. Finally, intention loaded onto the third factor, explaining 18.77% of the variance, for a total variance of 78.38% explained by these three factors.

Table 13. *Study 2 (decrease behaviours): Rotated component loadings for liking, wanting and Intentions*

	Loadings			
	Factor 1: Wanting	Factor 2: Liking	Factor 3: Intentions	Communality
Liking 1		.864		.769
Liking 2		.855		.824
Liking 3		.814		.832
Liking 4		.874		.600
Liking 5		.878		.822
Liking 6		.872		.778
Liking 7		.870		.677
Wanting 1	.775	.471		.783
Wanting 2	.778	.418		.776
Wanting 3	.729	.495		.818
Wanting 4	.815			.778
Wanting 5	.845			.721
Wanting 6	.835			.577
Wanting 7	.728			.856
Intention 1			.876	.856
Intention 2			.905	.799
Intention 3			.912	.867
Intention 4			.747	.865
Eigenvalue	8.088	2.976	1.478	

Notes. Notes. Only factors with eigenvalues greater than 1 were extracted. Factor loadings that are <. 400 were excluded from the table. Communality represents the overall proportion of the variance attributable to the factors.

Predicting intentions. Intentions to decrease the frequency of a behaviour were regressed on liking and wanting (see Table 14). The overall model was not significant, $F(2, 171) = .24$, $p = .78$. Contrary to the hypothesis and unlike the increase behaviours, neither wanting nor liking significantly predicted intentions. Moreover, Fisher r-to-z transformation analysis was conducted and found no differences between the two semi-partial correlations between liking/wanting and intentions, $Z = -.31$, $p = .75$.

Table 14. *Study 2 (decrease behaviours): Multiple regression analyses for predicting intentions*

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. (p) | Correlations | |
	B	$SE\ B$	β			Zero-order	Semi-partial
(Constant)	4.971	.095		52.225	<.001		
Wanting	-.008	.082	-.010	-.100	.921	-.030	-.008
Liking	-.030	.083	-.034	-.357	.721	-.040	-.027

Notes: R^2 = .003.

In addition to non-addictive behaviours, the above analysis also included common substance-related, addictive behaviours (smoking, $n = 25$; drinking alcohol, $n = 11$). It may be necessary to examine these two categories of behaviours separately, as different motivations may drive intentions to decrease addictive versus non-addictive behaviour. For example, when evaluating intentions to decrease common addictive behaviours individuals may be more concerned with factors surrounding the addiction (e.g., potential withdrawal symptoms, level of dependency, or the severity of the addiction), whereas these factors may be less of a concern when contemplating to reduce non-addictive behaviours (Hajek, 1991).

To check whether the general pattern of results was consistent for both the addictive versus non-addictive behaviours a regression was run by adding the addiction variable as a predictor in the model, along with all associated interaction terms. A significant liking by addiction interaction emerged ($\beta = .32$, $SE = .15$, $t = 2.10$, $p = .037$). Simple slopes were examined for addictive and non-addictive behaviours at one standard deviation above and one standard deviation below the mean of liking. The results indicated that when liking was high toward non-addictive behaviours, intentions to decrease the behaviour were marginally lower compared to intentions to decrease addictive behaviours, $\beta = .58$, $p = .089$. No significant

differences between non-addictive and addictive behaviours were found in intention ratings when liking was low, β = -.35, *p* = .24 (see Figure 11). Due to the potential differences between addictive versus non-additive behaviours, the 36 participants who chose to decrease addictive behaviours were removed from a subsequent analysis. Removing these participants revealed a similar pattern of results, such that neither liking (*β* = -.12 *SE* =.11, *t* = 1.13, *p* = .261) nor wanting (β = .02, *SE* =.11, *t* = .19, *p* = .85) predicted intentions.

Figure 11. *Study 2 (decrease behaviours): Liking by addiction interaction.*
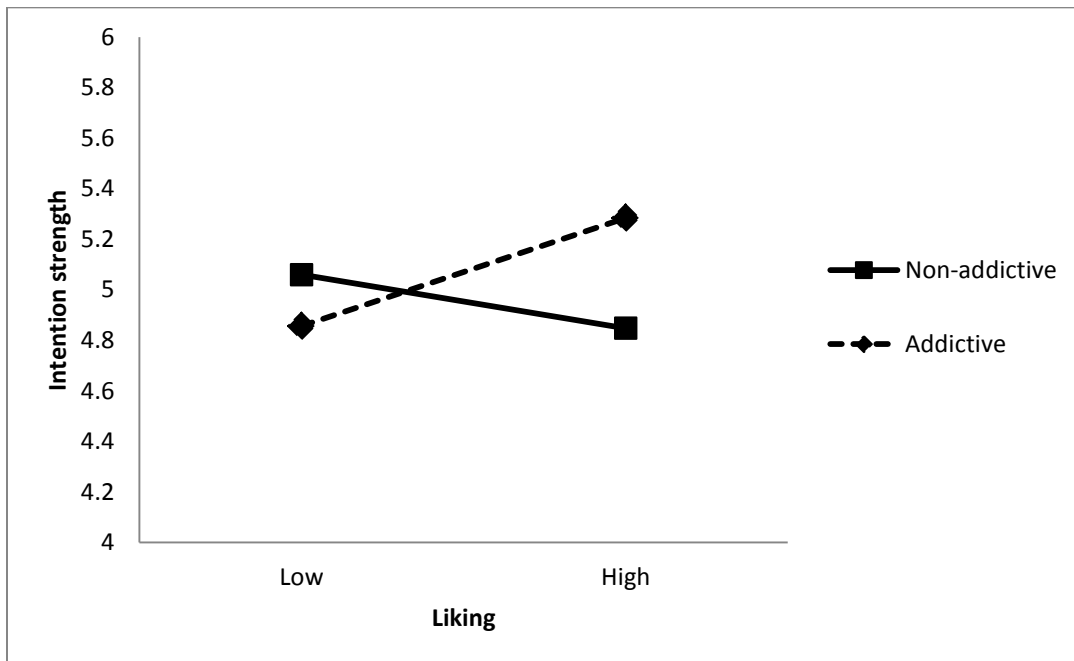
To test for order effects, the order of the intention measure (either before or after the liking/wanting measures), liking/wanting measures (liking measured before or after wanting), and the order in which the two behaviours were evaluated (increase behaviours before or after the decrease behaviours) were included as control variables.[12] Overall, the pattern of results were

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[12] Intentions to decrease a behaviour were greater when the decrease behaviour was presented before (*M* = 5.88, *SD* = 1.33) compared to after the increase behaviour (*M* = 5.36, *SD* = 1.5), *β* =.556, *SE* = .243, *t* = -2.29, *p* = .024. No

not affected by any order effects, as both wanting ($\beta = .002$ $SE = .12$, $t = .01$, $p = .98$) and liking ($\beta = -.16$, $SE = .12$, $t = -1.33$, $p = .18$) remained non-predictors of intentions.

Discussion

The goal of Study 2 was to examine whether the predictive roles of liking and wanting differed with regards to intentions to increase versus decrease the frequency of a behaviour. For behaviours that individuals wish to increase the results found that wanting, but not liking, significantly predicted intentions; replicating the results from Study 1. The Fisher r-to-z transformation analysis once again showed that the relative weight of wanting was greater compared to liking when evaluating intentions to increase behaviours. Study 2 was also able to generalize the influence of wanting on intentions to a variety of other behaviours, besides exercising. Study 2 also addressed the concern from study 1, that wanting (but not liking) may have been a better predictor of intentions because of the way the scale items were tied to the behaviour goal. Study 2 replicated the effect of wanting on intentions even when all of the explicit measures were tied to the behaviour.

Ambivalence - the state of simultaneously feeling both positive and negative about something (Thompson, Zanna, & Griffin, 1995) - provides a potential alternate explanation for the observed effects of liking and wanting on the intention-behaviour link. Specifically, the components of liking and wanting may be characterized by different levels of ambivalence. In the case of ambivalence in liking, for example, it is possible that individuals might find exercising to be simultaneously pleasant and unpleasant. Individuals may experience ambivalence about wanting, such that they simultaneously experience approach and avoidance toward a behaviour. Given that research has indicated that higher levels of attitudinal

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differences were found with regard to the order of the liking/wanting measures ($\beta = .12$, $SE = .19$, $t = -.04$, $p = .65$), or intention order ($\beta = -.02$, $SE = .18$, $t = -.10$, $p = .92$).

ambivalence results in weaker attitude-behaviour relationships (Conner, Sparks et al., 2002), it is possible that one component may be characterized by ambivalence more than the other. These differences might be responsible for driving the differences in the predictive utility of each of the constructs. This potential explanation is investigated in Study 3.

Study 2 was the first to examine the relation of liking and wanting to intentions to decrease a target behaviour. In contrast to increasing behaviours it was hypothesized, that liking (but not wanting) would predict intentions to decrease the frequency of a behaviour. However the results were not consistent with this hypothesis, as neither liking nor wanting significantly predicted intentions to decrease the frequency of the target behaviour. The lack of relation of liking and wanting with intentions suggests that weight is being placed on factors other than liking and wanting when individuals are evaluating their intentions to decrease a behaviour. Even though the results were different from what was hypothesized, they provide evidence that the relation of wanting and liking to intentions is different for behaviours people wish to increase versus decrease. Finally, although liking and wanting were not found to predict intentions to decrease the target behaviour, it is not clear whether either of these components is associated with actual decrease behaviour. Study 3 examined this possibility.

The high correlations between liking, wanting and intention increase the possibility that the results were affected by multicollinearity effects. One possibility for the inflated correlations is that participants may have had difficulty in perceiving the differences between each of the constructs, and may have rated the scales as if they measured the same underlying construct. Likewise, since these constructs were all measured in the same session, the responses may have been affected by individuals' general tendency to provide consistent answers on each of the self-report scales (common method variance; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

Inflations in correlations may also be attributed to mood effects, such that general affective states not associated with the target behaviour may have impacted responses. Therefore, steps in Study 3 were used to decrease the impact of multicollinearity. Finally, the within-subjects design also presented a weakness in Study 2, as the responses may have been affected by carryover effects. The results provided some evidence for this, as the order in which the two behaviours were presented (increase versus decrease) was found to influence intentions (at least for the decrease behaviours condition). Study 3 attempted to reduce the impact of carryover effects by making changes to the design of the study.

Study 3

Studies 1 and 2 demonstrated that liking and wanting are differentially weighted during intention versus behaviour for activities that individuals wish to increase. Intentions to increase the frequency of a behaviour seem to be driven more by wanting (compared to liking); however, actual behaviour was predicted by liking (and not wanting). Study 3 aimed to replicate these patterns for both intentions and behavior and to also address the potential explanation that differing ambivalence levels in each of the components may be driving the observed effects. In addition, the strong positive correlation between the two components of liking and wanting posed a potential problem in past studies. Therefore, in order to reduce the correlation between liking and wanting, Study 3 also attempted to replicate the observed effects by using a subset of items from the liking and wanting scales that were the most distinct from one another.

Study 2 also provided the first evidence to suggest that liking and wanting may not be related to intentions to decrease the frequency of a behaviour. However, given that Study 2 did not include measures of actual behaviour change, it was not possible to examine how liking and wanting relate to actual behaviour in the case of a decreasing behaviour. Therefore, Study 3 conceptually replicated Study 2, but also included self-reported follow-up measures of behaviour change. Study 3 provided a first test of whether liking or wanting better predicted actual behaviour in the case of a decrease goal. Specifically, it was hypothesized that wanting may predict behaviour (compared to liking), as the ability to decrease a pleasurable behaviour may depend more on the compulsion to engage (wanting) compared to how much pleasure one derives from the behaviour (liking).

Two critical changes were made to the design of the study in an attempt to decrease the impact of response biases. First, in contrast to Study 2, Study 3 was run as a between-subjects

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design such that participants were randomly assigned to select a behaviour they wished to do more of (subsequently referred to as "increase condition") or less of (subsequently referred to as "decrease condition"). Second, to reduce the impact of common method variance and mood effects, Study 3 was run in three separate sessions such that liking and wanting were assessed in a completely separate session from intentions. This design change made it possible to assess liking and wanting in the absence of any intention assessment. Further, changes were made to the instructions of each measure in order to more explicitly point out to participants the differences between the constructs. Any significant associations among liking, wanting and intention after these changes were implemented, would provide stronger support for my hypotheses.

Participants

Participants (*N*= 164; 38 males, 125 females, 1 undisclosed) were recruited from the University of Waterloo in exchange for course credit. The mean age was 20.3 years (*SD* = 4.1).

Procedure

All three sessions were completed as online questionnaires. In session 1, participants completed the explicit wanting and liking measures for each of the following four behaviours: exercising, spending time with friends and family, eating unhealthy food, and surfing the Internet. The behaviours were chosen from Study 2, as they were the most frequently selected options (i.e., the top two increase and top two decrease behaviours). Two days later, participants completed session 2 and were randomly assigned to the increase or decrease condition. Participants were asked to choose the behaviour (out of two) that they wished to increase (or decrease) over "the next week". After choosing the target behaviour, participants evaluated their intention, with respect to increasing/decreasing the target behaviour. Finally, one week after session 2, a link to the follow-up questionnaire was sent via email and asked participants to

answer several questions pertaining to whether or not and to what extent the target behaviour was performed over the previous week.

Session 1 measures.

Wanting. The set of instructions for the wanting measure were elaborated on by asking participants to imagine that they had an opportunity to engage in the behaviour "this very moment". Further instructions were added which asked participants to evaluate the items based on how much they wanted or desired to do the behaviour. As in Study 2, the same seven items were used to assess wanting and each of the items were assessed with respect to the specific behaviour in question. The seven items were standardized and combined to constitute the measure of wanting for each of the four behaviours (α's > .90).

Liking. The set of instructions for the liking measure were also elaborated on by asking participants to imagine what it would be like to engage in the behaviour "this very moment". Further instructions were added which asked participants to evaluate the items based on how much they liked or enjoyed doing the behaviour. As in Study 2, the same seven items were used to assess liking and each of the items were tailored to the specific behaviour. The seven items were standardized and combined to constitute the measure of liking for each of the four behaviours (α's > .91).

Ambivalence. To test this alternate explanation, an ambivalence measure (adapted from Thompson et al., 1995) was administered in session 1. Ambivalence levels in both liking and wanting for each of the behaviours was assessed. The set of questions for wanting ambivalence asked participants to separately consider both the desirable and undesirable aspects of a behaviour (e.g., *eating unhealthy food).* Participants were asked, "For a moment, please only consider those desirable aspects of *eating unhealthy food* that make you WANT to do it, and

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ignore any undesirable aspects. To you, personally, how desirable is *eating unhealthy food*".

Participants rated the question on a 7-point scale (*not at all desirable - extremely desirable*).

Next, participants were asked to only consider those undesirable aspects and answered the

question, "To you, personally, how undesirable is *eating unhealthy food*" on a 7-point scale (*not

at all undesirable - extremely undesirable*). The liking ambivalence measure was assessed

similarly, except that participants were asked to "consider both the enjoyable and unenjoyable

aspects of *eating unhealthy food*" and answered on scales ranging from *not at all enjoyable -*

extremely enjoyable and *not at all unenjoyable - extremely unenjoyable*. Ambivalence scores

were calculated based on the formula used in Thompson et al. (1995) and were plotted on a scale

between -3 and 6 (with positive numbers indicating more ambivalence toward the target

behaviour). The order of the liking and wanting ambivalence measures was counterbalanced.

Session 2 measures.

Intentions. The same four intention items from Study 1 and 2 were used and made

reference to the behaviour in terms of engaging in it "more" or "less" frequently in the next week

(e.g., I will try to *eat unhealthy food* less frequently next week). The four items were

standardized and combined to constitute the measure of intention ($\alpha = .87$).

Session 3 measures.

Self-reported behaviour. A final follow-up measure was collected one week after session

2 in order to examine to what extent the target behaviour was increased or decreased over the

previous week. Participants answered the following questions, "Did you increase/decrease the

behaviour of X last week?", and "How much less (or more) than usual did you engage in X last

week?" These two items constituted the measure of self-reported behaviour change, with positive

numbers indicating successful behaviour change in the intended direction.

Results

Increase behaviours.

The results indicated that 55% ($n = 46$) of the participants chose to increase the behaviour

of exercise as their behavioural goal, compared to 45% ($n = 38$) who chose to increase time spent

with friends and family. The following results section presents the findings from the behaviour

of exercise first, followed by results for spending time with friends and family.

Exercise behaviours.

The zero-order correlations between liking, wanting, and intention for the behaviour of

exercise can be found in Table 15. The inter-correlations indicated strong positive relationships

between all of the variables of interest (Pearson r ranging from .275- .701), indicating that the

variables were related to one another. Variable means and standard deviations are found in

Table 16.

Table 15. *Study 3(exercise): Zero-order correlations between liking, wanting, intentions and*
behaviour

Measure	Liking	Wanting	Intention
Liking	-		
Wanting	.701**	-	
Intention	.358**	.520**	-
Behaviour	.406**	.275	.301*

*. Correlation significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Table 16. *Study 3 (exercise): Variable means (standard deviations in parentheses)*

Measure	*M*
Liking	5.26 (1.47)
Wanting	4.38 (1.18)
Intention	5.02 (1.21)

Factor analysis. As expected, the results of the factor analysis indicated that participants were able to explicitly discriminate between the three variables of interest (see Table 17). Specifically, the liking items loaded onto Factor 1 (% of variance = 30.9), wanting loaded on to Factor 2 (% of variance = 28.02) and intentions loaded on to Factor 3 (% of variance = 16.97). The total variance explained by the three variables was 75.89%.

Table 17. *Study 3 (exercise): Rotated component loadings for liking, wanting and intentions*

	Loadings			
	Factor 1: Liking	Factor 2: Wanting	Factor 3: Intentions	Communality
Liking 1	.789	.414		.813
Liking 2	.811			.815
Liking 3	.828			.822
Liking 4	.845			.793
Liking 5	.855			.808
Liking 6	.791			.721
Liking 7	.856			.836
Wanting 1		.804		.695
Wanting 2		.787		.703
Wanting 3		.801		.802
Wanting 4		.793		.774
Wanting 5		.706		.649
Wanting 6		.705		.679
Wanting 7	.789	.841		.800
Intention 1			.906	.831
Intention 2			.859	.753
Intention 3			.838	.720
Intention 4			.783	.647
Eigenvalue	9.351	2.682	1.628	

Notes. Only factors with eigenvalues greater than 1 were extracted. Factor loadings that are <. 400 were excluded from the table. The communality column represents the overall proportion of the variance attributable to the factors.

Predicting intentions. Intentions to increase exercise behaviour were regressed on liking and wanting (see Table 18). The model was significant, $F(2, 43) = 7.96$, $p = .001$. As predicted, wanting was a significant predictor of intentions, such that higher levels of wanting were associated with stronger behavioural intentions (see panel A in Figure 12). Liking did not predict intentions. A Fisher r-to-z transformation analysis comparing the two semi-partial correlations revealed that the relative predictive power of wanting was marginally stronger than liking, $Z = -1.88$, $p = .06$.

Table 18. *Study 3 (exercise): Multiple regression analyses for predicting intentions*

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. (p) | Correlations | |
	B	SE B	β			Zero-order	Semi-partial
(Constant)	4.694	.177		26.534	<.001		
Wanting	.542	.187	.529	2.893	.006	.520	.377
Liking	-.010	.150	-.012	-.068	.946	.358	-.009

Notes: $R^2 = .270$.

Figure 12. *Study 3: Regression slopes for liking and wanting on exercise intentions (panel A) and exercise behaviour (panel B)*

(A)

(B)
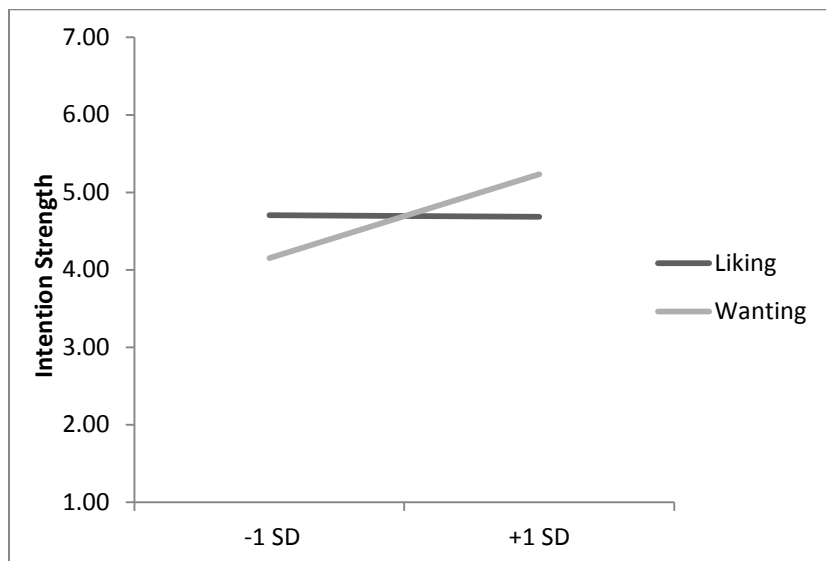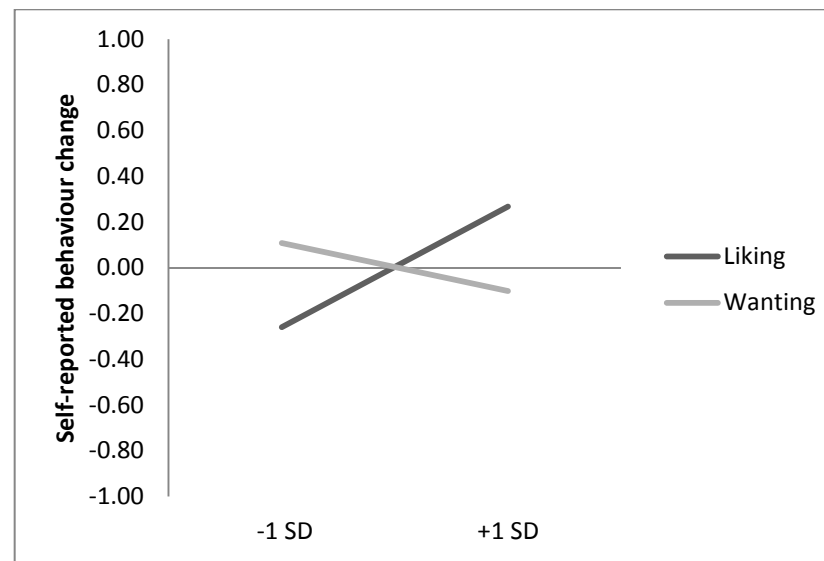
Predicting behaviour. The two items that measured behavioural change: "Did you increase the behaviour of exercise last week?" and "How much more (or less) than usual did you engage in exercise last week?" were standardized and computed into a single score ($r = .64$). Behaviour change was then regressed on liking and wanting. The model was significant, $F(2,43) = 4.23$, $p = .02$ (see Table 19). As predicted, liking (but not wanting) was found to significantly predict self-reported exercise behaviour, such that higher levels of liking were associated with higher reported levels of exercise (see panel B in Figure 12). These relations held controlling for the effects of intentions. Although the results of the regression indicated that liking significantly predicted self-reported behaviour it could not be concluded that liking was a statistically stronger predictor than wanting, as a Fisher r-to-z transformation analysis was conducted on the partial correlations and found that the analysis was not significant, $Z = -1.49$, $p = .13$.

Table 19. *Study 3 (exercise): Multiple regression analyses for predicting self-reported behaviour change*

	Model	Unstandardized Coefficients		Standardized Coefficients			Correlations	
		B	*SE B*	β	*t*	Sig. *(p)*	Zero-order	Semi-partial
1	(Constant)	.004	.144		.026	.979		
	Wanting	-.014	.152	-.018	-.092	.927	.275	-.013
	Liking	.262	.122	.418	2.139	.038	.406	.298
2	(Constant)	-.781	.1594		-1.315	.196		
	Wanting	-.105	.165	-.134	-.635	.529	.275	-.088
	Liking	.264	.121	.421	2.174	.035	.406	.300
	Intention	.167	.123	.220	1.361	.181	.301	.188

Notes: Model 1 $R^2 = .165$, Model 2 $R^2 = .200$ (R^2 change = .035. $F = .1.85$, $p = .18$).

Ambivalence. The results indicated that ambivalence levels did not differ between the liking ($M = .80$, $SD = .40$) and wanting measures ($M = .86$, $SD = .65$) for exercising, $t (44) = .61$, $p = .54$. To examine whether the same pattern of results remained after controlling for ambivalence levels, liking and wanting ambivalence scores were entered as a control variables in a regression model. Overall, the pattern of results were similar, such that wanting ($\beta = .539$ *SE* $=.21$, $t = 2.58$, $p = .01$) still predicted intentions to increase exercising, but liking did not ($\beta = -.04$, *SE* $=.16$, $t = -.266$, $p = .79$).The results indicate that ambivalence cannot explain the differential effect of liking and wanting to intention versus behaviour.

Multicollinearity. The high correlation between the two components of liking and wanting poses a potential problem in the current ($r = .701$) and past studies. In an attempt to reduce multicollinearity effects, three liking items that correlated the lowest with the composite wanting measure, and vice versa for the wanting items, were picked to represent a subset measure of liking and wanting. The aim was to choose the liking and wanting items that were most distinct from one another in order to reduce the correlation between liking and wanting. The three scale items in the subset of liking (for the behaviour of exercising) included: "exercising is fun", "exercising is pleasant", and "I think exercising is *dull versus interesting*" ($\alpha = .89$). The subset of wanting items consisted of the following items: "I desire to exercise", "I want to exercise", and "my desire to exercise can be described as *no desire – very strong desire*" ($\alpha = .83$). Using a composite of these subset items the correlation between liking and wanting was reduced by .19 (see Table 20).

To examine whether the same pattern of results would emerge with the new subset of liking and wanting, the regressions were re-run using the subsets as predictors of intention and behaviour. The analyses served as a more stringent test of our hypotheses. For intentions the

results found that, as expected, the subset of wanting items still predicted intentions to exercise ($\beta = .47$ $SE = .19$, $t = 2.46$, $p = .02$) whereas liking remained a non-significant predictor ($\beta = .12$, $SE = .12$, $t = -.95$, $p = .34$). When the subsets of liking and wanting were included as predictors of behaviour, liking marginally predicted behaviour ($\beta = .17$ $SE = .09$, $t = 1.73$, $p = .09$), whereas wanting did not ($\beta = .14$, $SE = .15$, $t = -.91$, $p = .37$).

Table 20. *Study 3: Simple correlations between liking and wanting before and after subset items*

Behaviour	r	subset r
Exercising	.701**	.507**
Eating unhealthy food	.696**	.310*

Spending time with family and friends.

Intentions to increase spending time with family and friends were regressed on liking and wanting. Neither liking nor wanting significantly predicted intentions, p's > .22. Likewise, neither liking nor wanting was predictive of actual behaviour change, p's > .69. In hindsight, the selection of this behaviour for use in Study 3 proved to be problematic. The decision to combine the two behaviours may be an issue (spending time with family *and* friends), as the behaviours are not necessarily synonymous with one another and may be associated with different levels of liking and wanting. For example, an individual may think that spending time with friends is more pleasurable than spending time with family. The two behaviours may even represent two opposing goals. For example, someone may wish to spend more time with family, but at the same time wish to spend less time with their friends.

Furthermore, the behaviour of spending time with family and friends may not pose the same self-regulatory problem as exercising does. Exercising is a behaviour that many individuals

wish to increase but is relatively difficult to implement. Thus, the amount of self-regulation needed to increase exercising may surpass that of spending time with family and friends. To provide support for this claim, ambivalence levels were found to be the lowest for the behaviour of spending time with family and friends (See Figure 13), indicating that individuals had less conflicted feelings toward the behaviour of spending time with family and friends, compared to the others. Again, because the behavioural domain was a combination of two different behaviours, individual's level of self-regulation may have varied depending on whether they based their responses on spending time with "friends" or "family". For example, students may find it more difficult to spend more time with family but spending time with friends may be relatively easier to do. Because spending time with friends and family did not appear to pose the self-regulatory challenge as expected, it does not offer a good test of my hypotheses and, as such, no further analyses for this target behaviour are reported.

Figure 13. *Study 3: Ambivalence ratings for each behaviour*
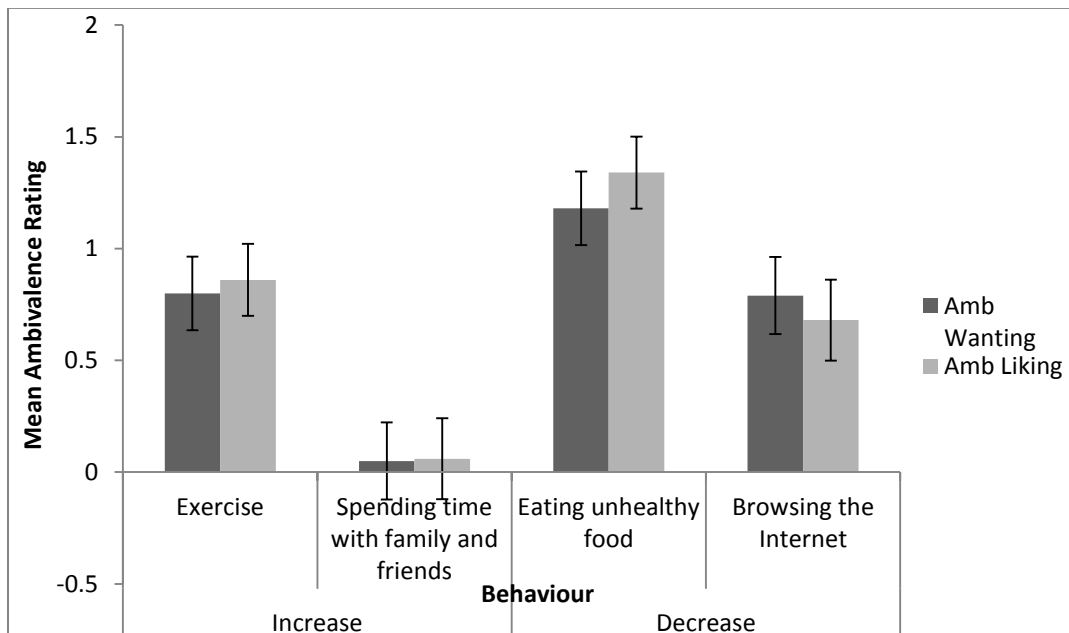
Notes. Error bars represent standard errors of the mean.

Decrease behaviours.

Descriptives. The results indicated that most 72% (*n* = 58) of the participants chose to decrease the frequency of eating unhealthy food as their goal, compared to only 28% choosing to decrease the amount of time spent browsing the Internet (*n* = 22). The following section presents the findings from the behaviour of eating unhealthy food first, and is followed by results of browsing the Internet.

Eating unhealthy food.

The zero-order correlations between liking, wanting, and intention for the behaviour of eating unhealthy food can be found in Table 21. The inter-correlations showed a mix of non-significant negative and positive relations among the variables of interest (Pearson *r* ranging from -.243 to.696). The near zero correlations between intention and either liking or wanting were similar to those obtained for the decrease behaviours in Study 2. Variable means and standard deviations are found in Table 22.

Table 21. *Study 3 (unhealthy food): Zero-order correlations between liking, wanting, intentions and behaviour*

Measure	Liking	Wanting	Intention
Liking	-		
Wanting	.696**	-	
Intention	-.193	-.042	-
Behaviour	-.217	-.243	.305*

*. Correlation is significant at the .05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Table 22. *Study 3(unhealthy food): Variable means (standard deviations in parentheses)*

Measure	*M*
Liking	3.92 (1.23)
Wanting	3.00 (1.23)
Intention	5.22 (1.34)

Factor analysis. As expected, the results of the factor analysis indicated that participants were able to explicitly discriminate between the three variables of interest (see Table 23). Specifically, the liking items loaded onto Factor 1 (% of variance = 41.88), wanting loaded on to Factor 2 (% of variance = 16.94) and intentions loaded on to Factor 3 (% of variance = 9.24). The total variance explained by the three variables was 68.06%.

Table 23. *Study 3 (unhealthy food): Rotated component loadings for liking, wanting and intentions*

	Loadings			
	Factor 1: Liking	Factor 2: Wanting	Factor 3: Intentions	Communality
Liking 1	.732			.649
Liking 2	.707	.417		.675
Liking 3	.763			.646
Liking 4	.734			.642
Liking 5	.773			.630
Liking 6	.768			.644
Liking 7	.786			.649
Wanting 1		.725		.661
Wanting 2	.516	.681		.732
Wanting 3		.840		.770
Wanting 4		.809		.742
Wanting 5		.710		.560
Wanting 6		.699		.523
Wanting 7		.792		.745
Intention 1			.899	.811
Intention 2			.880	.775
Intention 3			.866	.752
Intention 4			.799	.643
Eigenvalue	5.539	3.049	1.663	

Notes. Only factors with eigenvalues greater than 1 were extracted. Factor loadings that are <. 400 were excluded from the table. The communality column represents the overall proportion of the variance attributable to the factors.

Predicting Intentions. Intentions to decrease the frequency of eating unhealthy food were regressed on liking and wanting (see Table 24). The model was non-significant, $F(2, 55) = 1.56$, $p = .22$ and indicated that neither liking nor wanting significantly predicted intentions to decrease eating unhealthy food. However, the results did reveal a marginal effect of liking, such that higher levels of liking were associated with weaker behavioural intentions. A Fisher r-to-z transformation analysis comparing the two semi-partial correlations revealed that the relative predictive power of liking on intentions was marginally stronger than wanting, $Z = 1.9$, $p = .06$.

Table 24. *Study 3 (eating unhealthy food): Multiple regression analyses for predicting Intentions*

| Model | Unstandardized Coefficients | | Standardized Coefficients | | | Correlations | |
	B	$SE\ B$	B	t	Sig. (p)	Zero-order	Semi-partial
(Constant)	5.878	.498		11.806	.000		
Wanting	.163	.166	.179	.981	.331	-.042	.129
Liking	-.292	.168	-.317	-1.738	.088	-.193	-.228

Notes: $R^2 = .054$.

Predicting behaviour. The two items that measured behavioural change: "Did you decrease the behaviour of eating unhealthy food last week?" and "How much less (or more) than usual did you engage in eating unhealthy food last week?" were standardized and combined into a single measure ($r = .384$). Behaviour change was regressed on liking and wanting. The interaction term between liking and wanting was also added as a predictor in the model. Overall the model was marginally significant, $F(2,54) = 2.46$, $p = .072$ (see Table 25). The results indicated that neither liking nor wanting significantly predicted actual behaviour change, though there was a marginally significant liking by wanting interaction. However, that interaction

dropped out when intentions were included in the regression model. Intentions were found to significantly predict behaviour change, such that stronger intentions were associated with successfully decreasing behaviour.

Table 25. *Study 3 (eating unhealthy food): Multiple regression analyses for predicting self-reported behaviour change*

	Model	Unstandardized Coefficients		Standardized Coefficients			Correlations	
		B	$SE\ B$	β	t	Sig. (p)	Zero-order	Semi-partial
1	(Constant)	.007	.109		.066	.947		
	Wanting	-.120	.122	-.178	-.982	.330	-.243	-.128
	Liking	-.063	.123	-.093	-.514	.610	-.217	-.067
2	(Constant)	-.099	.121		-.821	.415		
	Wanting	-.194	.126	-.289	-1.545	.128	-.243	-.197
	Liking	-.018	.123	-.027	-.150	.881	-.217	-.019
	Wanting x Liking	.103	.055	.251	1.864	.068	.175	.238
3	(Constant)	-1.088	.502		-2.167	.035		
	Wanting	-.213	.123	-.317	-1.734	.089	-.243	-.215
	Liking	.030	.122	.044	.247	.806	-.217	.031
	Wanting x Liking	.085	.054	.207	1.557	.125	.175	.193
	Intention	.194	.096	.262	2.026	.048	.305	.251

Notes: Model 1 R^2 = .064, Model 2 R^2 = .120 (R^2 change = .057, F = 3.47, p = .068), Model 3 R^2 = .183 (R^2 change = .063, F = 4.103, p = .048).

Multicollinearity. For the behaviour of eating unhealthy food the subset of liking included the following items: "I think unhealthy food is (*dull versus interesting*)"," I think unhealthy food is *(boring versus stimulating)*", and "I think unhealthy food is (*pleasant versus unpleasant*)". The subset of wanting consisted of the following items: "I have a craving to eat

unhealthy food", "I would prefer to eat unhealthy food over anything else", and "I would give up a lot to eat unhealthy food". Using a composite of these subset items the correlation between liking and wanting was reduced by .39 (see Table 20). To examine whether the same pattern of results emerged with the new subset of liking and wanting, the regressions were re-run using the subsets as predictors of intention versus behaviour. For intentions, the results were similar, such that neither the subset of wanting (β = .12 *SE* = .15, *t* = .82, *p* = .41) nor liking (β = -.24, *SE* =.15, *t* = -1.63, *p* = .11) significantly predicted intentions to decrease eating unhealthy food. When the subsets of liking and wanting were included as predictors of behaviour, the results found once again that neither liking (β = -.04 *SE* =.12, *t* = -.38, *p* = .71) nor wanting (β = -.09, *SE* = .11, *t* = -.84, *p* = .40) predicted behaviour. The interaction term between liking and wanting was non-significant (*p* > .1), however intentions marginally predicted behaviour when the effects of liking and wanting were controlled for, β =.195, *SE* =.11, *t* =1.78, *p* = .08.

Browsing the Internet.

Compared to the goal of reducing the frequency of eating unhealthy food, the number of participants that chose the goal of decreasing the amount of time spent browsing on the Internet was very small (*n* = 22). When liking and wanting were regressed on intentions neither liking nor wanting significantly predicted of intentions, *p's* > .19. Likewise, neither liking nor wanting was predictive of actual behaviour change, *p's* > .39. Due to this small sample size no strong conclusions could be made from the statistical analyses and therefore, no further results were reported for this behaviour.

Discussion

Study 3 provided evidence that wanting and liking related to intention and behaviour differently in the case of increasing versus decreasing a behaviour. Replicating Studies 1 and 2,

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intentions and behaviour were differentially predicted by liking and wanting for the behaviour of exercise. Specifically, intentions were predicted by wanting, but not liking. However, behaviour change was predicted by liking, but not wanting. The effect was also not explained by differences in ambivalence levels in the components. The results showed, similar to Study 1, that liking directly influenced behaviour even when intentions were controlled for. These results once again demonstrated the differential effect of liking and wanting on the intention-behaviour link, especially for behaviours that individuals wished to do more of. The results for spending time with family and friends showed no association between liking or wanting and either intention and behaviour. The pattern of results suggests that the differential contributions of liking and wanting to the intention-behaviour link may be more relevant for behaviours that are difficult to self-regulate. Thus, the focus of future studies will be on these types of behaviours.

Study 3 was the first to examine the relation of liking and wanting, with respect to both intentions and actual behaviour change, for behaviours that the person wishes to engage in less frequently. Consistent with Study 2 (but contrary to what had been originally hypothesized), Study 3 found that intentions to decrease a behaviour were not well predicted by liking or wanting. However, Study 3 demonstrated that behaviour change is predicted differently in the case of decreasing behaviour, compared with increase behaviours. One reason for the difference between predictive roles of liking and wanting for increase versus decrease behaviours is the possibility that weight may be placed on entirely different factors (other than liking and wanting) when intentions to decrease behaviours are formed. In accordance with TPB, intentions were found to predict behaviour change; therefore the considerations that were taken into account during intention evaluation may have been also related to actual behaviour change.

The comparison between the behaviours used in the increase and decrease condition represented a weakness in Study 3, as the behaviours themselves were in different domains; exercising for the increase and eating behaviour for the decrease behaviour. A more refined test would involve framing the same behavioural domain (e.g., healthy eating) in terms of an increasing (i.e., eating healthier foods) versus a decreasing (i.e., eating less unhealthy food) behavioural goal. Study 4 more directly compared of the role of liking and wanting in the case of increasing versus decreasing the frequency of a behaviour.

Study 4

Study 4 was designed to address three key issues. First, the study used a more rigorous design in an attempt to make a tighter comparison of the role of liking and wanting in the case of an increase versus decrease behaviour. This was achieved by taking the same general behaviour of "eating well" and framing it in terms of a behaviour one may wish to increase versus decrease. For example, one may achieve the goal of "eating well" by eating more healthy foods *or* eating less unhealthy foods. This methodology addresses potential issues of using two different behavioural domains when comparing increase versus decrease behaviours. Second, Study 4 was run as a between-subjects design in order to reduce the impact of response biases (similar to Study 3); however, in Study 4 participants were not offered a choice of the behavioural goal they wished to increase versus decrease. Instead, all participants evaluated a common increase (or decrease) goal. Therefore, Study 4 was the first study in which people who may have no intention of pursuing the goal were included in the sample. This change was implemented in order to a) increase the amount of variance in intentions, and b) avoid unequal sample sizes arising from self-selection of target behaviours. Third, Study 4 used more stimulus-specific wanting and liking measures by eliciting and then making reference to specific healthy (or unhealthy) food items that individuals have consumed in the past or intend to consume in the future. The aim was to get participants to more concretely imagine a scenario of consuming the specific food items in an attempt to make the behavioural experience more vividly imagined.

Participants

Participants (*N*= 211; 59 males, 151 females, and 1 undisclosed) were recruited from the University of Waterloo in exchange for course credit. Due to attrition, only data from 179 (51

males, 127 females, 1 undisclosed) participants were included in the final data set. The mean age was 21.14 years ($SD = 6.2$).

Procedure

Study 4 involved two separate sessions and used a between-subjects design, such that participants were randomly assigned to the increase healthy food or decrease unhealthy food framing condition. Participants in the increase healthy food condition evaluated the goal of "eating healthy foods more often", whereas participants in the decrease unhealthy food condition evaluated the goal of "eating unhealthy foods less often". Both sessions were completed with online questionnaires. In session 1, participants were prompted to list different healthy/unhealthy foods (depending on the condition) which were later presented as examples when completing the other variable measures. Session 2 included a follow-up questionnaire which was administered exactly one week later to assess to what extent participants ate more healthy/ less unhealthy food over the intervening week.

Measures

Eliciting healthy/unhealthy foods. Depending on the condition, at the start of the session participants were asked to "please list 2-3 different healthy/unhealthy foods that you currently consume regularly". These responses were later presented as concrete examples of foods that were to be evaluated by participants.

Liking. The set of instructions for the liking measure were similar to those in Study 3, except that participants were explicitly asked to "please imagine what it would be like to eat healthy/unhealthy foods at this very moment, such as… (healthy/unhealthy foods listed here as examples)". The same seven liking items from Studies 2 and 3 were used. The seven items were

standardized and combined to constitute the measure of liking for the increase healthy food and decrease unhealthy food conditions (α's > .91).

Wanting. The set of instructions for the wanting measure were similar to those in Study 3, except that participants were explicitly asked to "please imagine what it would be like if you had the opportunity to eat healthy/unhealthy foods at this very moment, such as… (same food items listed here again)". The same seven wanting items from Studies 2 and 3 were used. The seven items were standardized and combined to constitute the measure of wanting for the increase healthy food and decrease unhealthy food conditions (α's > .91).

Intention. Since participants were not given a choice about what behaviour they might want to change they were presented with the following instructions:

Past research found that many participants are interested in reducing unhealthy eating (increasing healthy eating) in their own lives. Now we invite you to think about the coming week and consider whether you might want to try and eat healthy/unhealthy food more (less) often.

The list of unhealthy foods/healthy foods that the participants listed earlier in the session were included as examples of foods they might wish to eat less/more of. The same four intention items from Studies 1-3 were used, however the items referred to the specific goal in terms of eating healthy/unhealthy food "more" or "less" often in the following week. The four items were standardized and combined to constitute the measure of intention (α's > .87).

Follow-up behavioural measure. A follow-up measure was completed online, one week after session 1 in order to examine to what extent to which participants ate more healthy/ less unhealthy food over the previous week. Participants answered the same questions as in Study 3. The two items: "Did you eat (un)healthy food more (or less) last week?", and "How much less

(or more) than usual did you eat (un)healthy food last week?" These two items constituted the measure of self-reported behaviour change, with positive numbers indicating successful behaviour change (i.e., either eating more healthy foods or less unhealthy foods).

Results

   Descriptives. Of the 179 participants, 87 (21 males, 65 females, 1 undisclosed) were assigned to the increase healthy food condition, and 92 (30 males, 62 females) were assigned to the decrease unhealthy food condition. The zero-order correlations between liking, wanting, intention and actual behaviour for the two framing conditions are presented in Table 26. The inter-correlations indicated positive relationships between all of the variables of interest for the increase healthy food condition (Pearson r ranging from .161-.590). In the decrease unhealthy food condition there was a strong positive relationship between liking and wanting ($r = .553$) and intentions and behaviour ($r = .433$). Similar to earlier studies, liking and wanting had near zero correlations with intention and behaviour. Variable means and standard deviations can be found in Table 27. In general, the means and standard deviations of the variables were similar to those found in the previous studies, indicating that eating more healthy food/ less unhealthy food is a goal that most people subscribe to. Examples of popular unhealthy food items included: cookies, chips and fries, whereas popular healthy food items included: apples, broccoli and spinach.

Table 26. *Study 4: Zero-order correlations between liking, wanting, intentions and behaviour for the increase and decrease framing conditions*

	Measure	Liking	Wanting	Intentions
Increase healthy food	Liking	-		
	Wanting	.590**	-	
	Intentions	.161*	.248**	-
	Behaviour	.330**	.223	.319**
Decrease unhealthy food	Liking	-		
	Wanting	.553**	-	
	Intentions	-.022	-.041	-
	Behaviour	.019	-.004	.433**

*. Correlation is significant at the .05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Table 27. *Study 4: Variable means (standard deviations in parentheses)*

Increase healthy food		Decrease unhealthy food	
Measure	*M*	Measure	*M*
Liking	5.08 (1.0)	Liking	4.82 (1.07)
Wanting	4.13 (1.15)	Wanting	3.39 (1.31)
Intention	4.79 (1.45)	Intention	4.67 (1.40)

Factor analysis. To examine whether participants were able to discriminate between the three variables of interest, the individual scale items from the intention, liking and wanting measures were factor analyzed using principal component analysis with Varimax (Kaiser Normalization) rotation. The KMO and Bartlett's Test of Sphericity both indicated that the set of

variables were adequately related for factor analysis. The results yielded three separate factors

for both the increase healthy food and decrease unhealthy food conditions (see Table 28).

Table 28. *Study 4: Rotated component loadings for liking, wanting and intentions for the increase and decrease framing conditions*

| | Increase healthy food | | | | Decrease unhealthy food | | | |
| | Loadings | | | | | | | |
	1	2	3	Communality	1	2	3	Communality
Liking 1	.852			.817	.829			.737
Liking 2	.880			.799	.800			.679
Liking 3	.660	.428		.652	.783			.668
Liking 4	.851			.824	.883			.816
Liking 5	.730	.456		.749	.661			.496
Liking 6	.732	.464		.753	.792			.632
Liking 7	.765			.646	.847			.759
Wanting 1		.843		.797		.806		.785
Wanting 2		.841		.763	.508	.624		.650
Wanting 3		.835		.764		.839		.784
Wanting 4		.607		.555		.845		.732
Wanting 5	.409	.516		.436		.673		.610
Wanting 6		.489		.304		.722		.545
Wanting 7		.784		.703		.789		.731
Intention 1			.960	.943			.886	.798
Intention 2			.942	.890			.921	.849
Intention 3			.944	.907			.903	.829
Intention 4			.860	.799			.780	.617
Eigenvalue	8.16	3.32	1.60		7.228	3.144	2.344	

Notes. Only factors with eigenvalues greater than 1 were extracted. Factor loadings that are <.400 were excluded from the table. The communality column represents the overall proportion of the variance attributable to the factors.

Predicting intentions. To examine the relation of liking and wanting to both the increase healthy food and decrease unhealthy food conditions, intentions were regressed on liking and wanting. The framing variable (increase versus decrease) was also entered as a predictor into the model, along with all interaction terms. However, the overall model was non-significant, $F(6, 172) = 1.22$, $p = .30$, indicating that none of the main effects or interactions were significant predictors of intentions (all $p's > .15$). Since the model yielded null effects a less stringent test was conducted, to examine the specific predictive roles that wanting and liking have on the increase healthy food versus decrease unhealthy food condition. Thus, intentions were regressed on liking and wanting for each of the framing conditions separately (see Table 29). For the increase healthy food condition, the overall model was marginally significant, $F(2, 84) = 2.77$, $p = .07$). Comparable to past results, wanting marginally predicted intentions but liking did not (See Panel A in Figure 14). A Fisher r-to-z transformation analysis comparing the two semi-partial correlations was not significant, $Z = 1.13$, $p = .25$. In the decrease unhealthy food condition, the overall model was not significant, $F(2, 89) = .07$, $p = .93$, and found that neither wanting nor liking significantly predicted intentions (see Panel B in Figure 14). A Fisher r-to-z transformation analysis comparing the two semi-partial correlations was not significant, $Z = -0.24$, $p = .81$.

Table 29. *Study 4: Multiple regression analyses for predicting intentions for healthy (panel A)
and unhealthy food (panel B)*

(A)

| Model | Unstandardized Coefficients | | Standardized Coefficients | | | Correlations | |
	B	SE B	β	t	Sig. (p)	Zero-order	Semi-partial
(Constant)	4.693	.158		29.655	< .001		
Wanting	.296	.165	.235	1.797	.076	.248	.190
Liking	.032	.187	.022	.171	.865	.161	.018

Notes: R^2 = .062.

(B)

| Model | Unstandardized Coefficients | | Standardized Coefficients | | | Correlations | |
	B	SE B	β	t	Sig. (p)	Zero-order	Semi-partial
(Constant)	4.658	.156		29.936	< .001		
Wanting	-.044	.136	-.041	-.326	.745	-.041	-.035
Liking	.001	.167	.001	.005	.996	-.022	.001

Notes: R^2 = .002.

Figure 14. *Study 4: Regression slopes for liking and wanting on intentions and behaviour for increasing healthy food (A) and decreasing unhealthy food (B)*

(A)

(B)
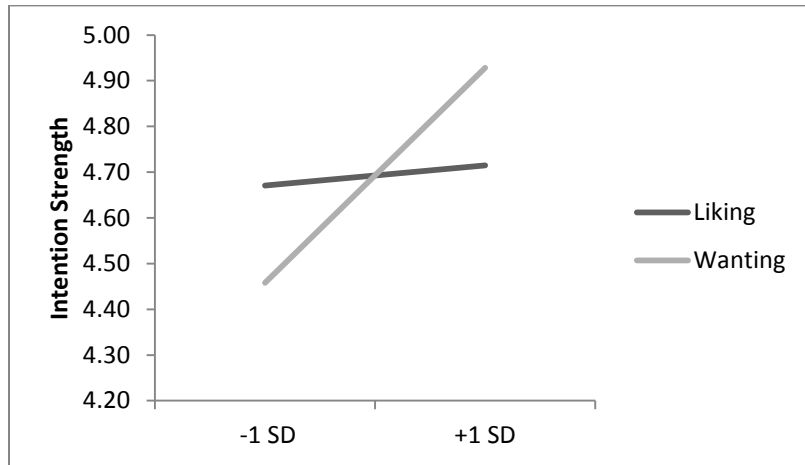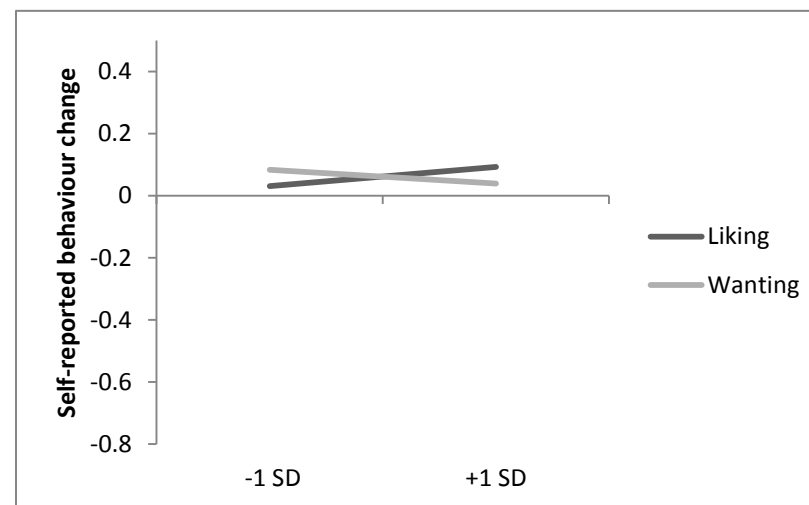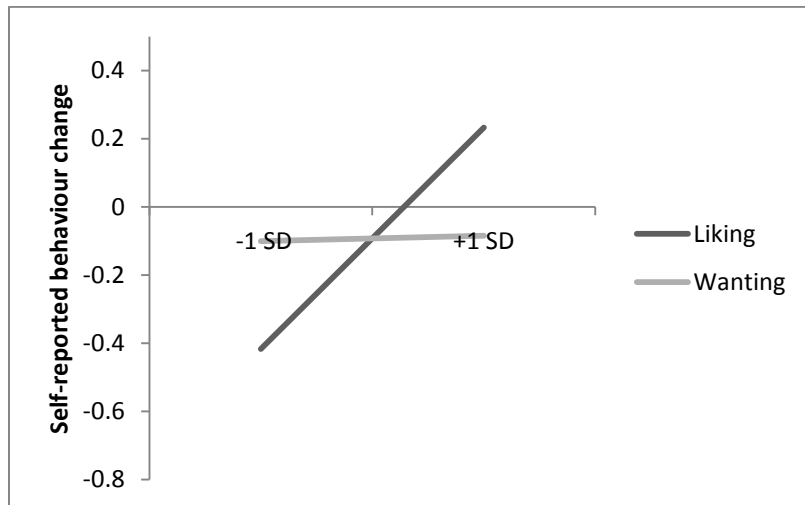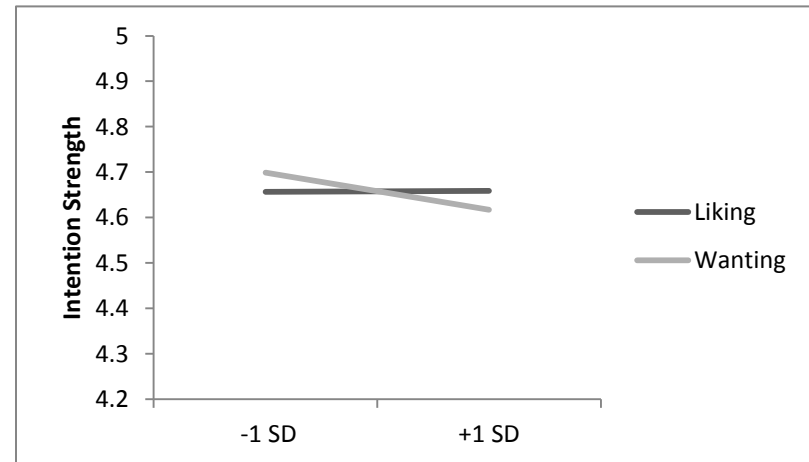
Predicting behaviour. The two items that measured self-reported behaviour were standardized and combined into a single score ($r_{increase}$ = .668; $r_{decrease}$ = .407). Self-reported behaviour was regressed on liking, wanting and framing condition. All interaction terms were also included in the model. The overall model was non-significant, $F(6, 172) = 1.515$, $p = .18$, indicating that none of the main effects or interactions were significant predictors of intentions (all p's >.32) . Since the model yielded null effects, a less stringent test was conducted in which behaviour was regressed on liking and wanting for the each of the framing conditions separately. Intentions were also entered as a predictor in each of the models. For the increase healthy food condition, the overall model was marginally significant, $F(3, 84) = 4.87$, $p = .004$(see Table 30). The findings from earlier studies were replicated, such that liking significantly predicted behaviour, while wanting did not (see Panel A in Figure 14). However, a Fisher r-to-z transformation analysis comparing the two semi-partial correlations was non-significant, $Z = -.75$, $p = .22$. When intentions were included in the model, liking was still found to be a significant predictor of behaviour. A Fisher r-to-z transformation analysis comparing the two semi-partial correlations (when controlling for intentions) indicated that liking marginally predicted behaviour, compared to wanting ($Z = -1.74$, $p = .08$).

Self-reported behaviour was regressed on liking and wanting for the decrease unhealthy food conditions, and the resulting model was non-significant $F(2, 89) = .023$, $p = .98$ (see Table 31). Findings for the case of decrease behaviours from earlier studies were replicated, as neither liking, nor wanting significantly predicted behaviour (see Panel B in Figure 14). A Fisher r-to-z transformation analysis comparing the two semi-partial correlations was not significant, $Z = -.29$, $p = .77$. Intentions were found to significantly predict behaviour change, over and above the effects of liking and wanting, when included into the model.

Table 30. *Study 4 (increase healthy food condition): Multiple regression analyses for predicting self-reported behaviour change*

	Model	Unstandardized Coefficients		Standardized Coefficients			Correlations	
		B	*SE B*	β	*t*	Sig. *(p)*	Zero-order	Semi-partial
1	(Constant)	-.092	.105		-.874	.385		
	Wanting	.006	.114	.008	.054	.957	.223	.006
	Liking	.267	.125	.325	2.146	.035	.330	.244
2	(Constant)	-.816	.322		-2.532	.014		
	Wanting	-.034	.112	-.045	-.305	.761	.223	-.034
	Liking	.253	.121	.307	2.092	.040	.330	.230
	Intentions	.156	.066	.269	2.368	.021	.319	.260

Notes: Model 1 R^2 = .109, Model 2 R^2 = .177 (R^2 change = .068. F = .5.60, p = .021).

Table 31. *Study 4 (decrease unhealthy food condition): Multiple regression analyses for self-reported behaviour change*

	Model	Unstandardized Coefficients		Standardized Coefficients			Correlations	
		B	*SE B*	β	*t*	Sig. *(p)*	Zero-order	Semi-partial
1	(Constant)	.061	.115		.527	.600		
	Wanting	-.015	.102	-.022	-.147	.884	-.004	-.018
	Liking	.025	.117	.031	.210	.834	.019	.026
2	(Constant)	-1.264	.351		-3.604	.001		
	Wanting	-.027	.093	-.039	-.293	.771	-.004	-.032
	Liking	.065	.107	.082	.611	.543	.019	.068
	Intentions	.283	.072	.440	3.956	< .001	.433	.438

Notes: Model 1 R^2 = .001, Model 2 R^2 = .192 (R^2 change = .192, F = 15.65, p < .001).

Discussion

Study 4 more directly compared the contribution of liking and wanting to the intention-behaviour relation for behaviours that one wishes to increase versus decrease. This was done by framing a single behavioural domain in terms of a goal to increase or decrease its opposed behaviour. With regard to behaviours individuals wish to increase, the results replicated previous findings, such that wanting (but not liking) was associated with intentions, while actual behaviour was predicted by liking (but not wanting). Although the effects were in the hypothesized direction, the effect of wanting on intentions was only marginal. However, contrasting past results, intentions in the increase conditions was found to significantly predict behaviour change when the effects of liking and wanting were controlled for. With regard to the behaviours that individuals wish to decrease, the results replicated findings from the previous study, such that neither liking nor wanting was associated with intentions or behaviour. Also in line with findings from the Study 3, intentions significantly predicted behaviour change in the decrease condition, over and above liking and wanting.

One reason why the link between wanting and intentions may have been weaker in Study 4 could have been due to the food elicitation task and the specific foods that participants considered while completing the measures. Specifically, as opposed to explicitly asking participants to list foods that they may be interested in increasing (or decreasing) the frequency of, participants were asked to identify healthy/unhealthy foods that they "currently consume". It is likely that individuals could have wished to increase (or decrease) foods other than the ones listed in this elicitation task. For example, if the participant already consumes a lot of spinach, he or she may not necessarily want to further increase spinach consumption. Therefore, it is possible that during intention evaluation less weight may have been placed on liking and wanting, as they

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pertained to the specific food items that were listed, but were not necessarily the foods that individuals wished to increase. This would also explain the stronger effect of intention on behaviour. Both intention and behaviour may have been evaluated on completely different food items than those used to evaluate liking and wanting.

Overall, the results from Studies 1-4 suggest that the differential effects of liking and wanting are a) more closely associated with intention versus behaviour, for behaviours individuals wish to increase (versus decrease), and b) that the effects are more apparent for behaviours that require a significant amount of self-regulation. Study 5, examines more closely the potential underlying mechanism, that the specific effects are driven by the relative weight that participants place on the liking and wanting components during intention evaluation versus actual behaviour. Study 5 addresses this by implementing a manipulation that was designed to influence the weight placed on liking and wanting, when evaluating intentions to increase a behaviour.

Study 5

A key finding from the previous studies is that wanting (and not liking) predicts intentions to increase a behaviour, while actual behaviour is predicted by liking (and not wanting). In other words, gaps between intention and behaviour may arise because the factors salient at the time of the intention evaluation are not predictive of actual behaviour. To better examine the potential underlying mechanism of this effect, a manipulation that influences the weight placed on wanting versus liking in the evaluation of intention strength may not only influence intentions directly, but help with reducing gaps between intention and behaviour. Therefore, Study 5 aimed to assess whether the differential effects of liking and wanting on intention versus behaviour are driven by the relative weight that is placed on liking versus wanting. This was tested by attempting to manipulate the weight that participants place on the two components during intention evaluation. The target behaviour of exercise was used in this study as it meets the following criteria: a) it is a behaviour that many individuals wish to increase, and b) it is a goal that many people subscribe to, but is difficult to implement. Furthermore, this behaviour was used in study 1 and 2, where it yielded reliable and consistent results.

The primary goal of Study 5 was to successfully implement such a manipulation, as well as examine how this manipulation affects intentions and their relation with later behaviour. Past literature indicates that the most accessible information is often what is taken into account when forming a judgement (Schwarz & Strack, 1991). Thus, by making liking (or wanting) salient at the time of the intention evaluation, it was expected that people would be more likely to take that factor into account when evaluating their intentions. Since intentions to increase a behaviour have been found to be predicted more by wanting, compared to liking, wanting was still expected

to predict intentions when wanting was salient during the intention evaluation. On the other hand, when liking is salient, I hypothesized that participants would be more likely to take liking concerns into account when evaluating intentions, compared to weight that is placed on liking in the wanting salience condition. Finally, Study 5 tested whether the intention-behaviour relation was influenced by the manipulation. I hypothesized that the correlation between intention and behaviour may be stronger in the liking salience condition, compared to the wanting salience condition.

Participants

Participants (N= 73; 31 males, 41 females, and 1 undisclosed) were recruited from the University of Waterloo in exchange for course credit. The mean age was 20 years ($SD = 2.0$). Of the 73 participants, 37 were randomly assigned to the wanting salience condition, and 36 participants were assigned to the liking salience condition.

Procedure

This study was run as a between-subjects design and took place in two separate sessions. Both sessions were completed with online questionnaires. In Session 1, participants were randomly assigned to the wanting or liking salience condition. As in Study 4, at the beginning of the first session participants were prompted to, "list 1 to 2 different forms of exercise that you would be likely to do (either exercises you have done before or exercises you might do in the future)". Similar to Study 4, these responses were listed as examples when completing the liking, wanting and intention measures. Participants in the wanting salience condition completed only the wanting measure directly prior to the intention measure. After the intention evaluation, liking was assessed. Likewise, in the liking salience condition, participants completed only the liking measure directly prior to the intention measure. Then, after the intention evaluation, wanting was

assessed. In session 2, a follow-up measure of behaviour was collected, in order to determine the extent to which participants exercised more or less, over the previous week.

Measures

 Liking. The set of instructions were similar to those in Study 4, in that participants were explicitly asked to imagine what it would be like to engage in the exercises listed previously in the session. The same seven liking items from Studies 2-4 were standardized and combined for each of the salience conditions (α's > .93).

 Wanting. The set of instructions were similar to those in Study 4, in that participants were explicitly asked to imagine what it would be like if they had the opportunity to engage in the exercises that they listed previously in the session. The same seven wanting items from Studies 2-4 were standardized and combined for each of the salience conditions (α's > .92).

 Intention. To further enhance the salience of either liking or wanting during intention evaluation, participants were instructed, "As you go through the following questions, please take into consideration the ratings that you just made regarding how compelling (wanting salience condition)/ enjoyable (liking salience condition) these exercise are for you". The four intention items were standardized and combined to constitute the measure of intention (α's > .87).

 Follow-up behavioural measure. A follow-up measure was administered one week after session 1 in order to examine to what extent participants exercised more or less compared to the previous week. Participants answered the same follow-up questions as in Study 4. These two items constituted the measure of self-reported behaviour change, with positive numbers indicating an increase in exercise behaviour.

Results

Descriptives. The zero-order correlations between liking, wanting, and intention for the salience conditions can be found in Table 32. The relationships between all of the variables of interest were positive, for both of the liking and wanting salience conditions (Pearson *r* ranging from .159-.741). Variable means and standard deviations are found in Table 33. In general, intention ratings to increase exercising were lower, compared to those from Study 4 (*M* = 4.79).

Table 32. *Study 5: Zero-order correlations between liking, wanting, intentions and behaviour for the salience conditions*

	Measure	Intention	Wanting	Liking
Wanting Salience Condition	Intention	-		
	Wanting	.396*	-	
	Liking	.159	.688**	-
	Behaviour	.533**	.406*	.161
Liking Salience Condition	Intention	-		
	Wanting	.480**	-	
	Liking	.334*	.741**	-
	Behaviour	.387*	.493*	.335

*.Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Table 33. *Study 5: Variable means (standard deviations in parentheses)*

Wanting Salience Condition		Liking Salience Condition	
Measure	*M*	Measure	*M*
Liking	5.28 (1.37)	Liking	5.00 (1.74)
Wanting	4.38 (1.42)	Wanting	3.71 (1.68)
Intention	3.93 (1.68)	Intention	4.41 (1.88)

Factor analysis. As expected, the results of the factor analysis indicated that participants were able to explicitly discriminate between the three variables of interest (see Table 34) . Specifically, the liking items loaded onto Factor 1 (% of variance = 61.17), wanting loaded on to Factor 2 (% of variance = 14.88) and intentions loaded on to Factor 3 (% of variance = 7.69). The total variance explained by the three variables was 83.74%.

Table 34. *Study 5: Rotated component loadings for liking, wanting and intentions for the salience conditions*

Loadings				
	Factor 1: Liking	Factor 2: Wanting	Factor 3: Intentions	Communality
Liking 1	.907			.921
Liking 2	.800			.793
Liking 3	.845			.836
Liking 4	.845			.880
Liking 5	.766			.730
Liking 6	.786			.719
Liking 7	.867			.889
Wanting 1	.475	.796		.886
Wanting 2	.491	.762		.841
Wanting 3		.831		.920
Wanting 4	.443	.749		.808
Wanting 5		.715		.586
Wanting 6		.784		.827
Wanting 7	.406	.824		.876
Intention 1			.939	.932
Intention 2			.930	.908
Intention 3			.920	.930
Intention 4			.812	.792
Eigenvalue	11.012	2.678	1.385	

Notes. Only factors with eigenvalues greater than 1 were extracted. Factor loadings that are <. 400 were excluded from the table. The communality column represents the overall proportion of the variance attributable to the factors.

Predicting intentions. Intentions to increase exercising were regressed on liking, wanting, and salience condition (see Table 35). Salience condition was also added as a predictor into the model along with all associated interaction terms. The overall model was significant, $F(3, 69) = 6.26$ $p = .001$; however, the results did not reveal any significant or marginally significant interactions (p's > .4). A Fisher r-to-z transformation analysis comparing the two semi-partial correlations found that wanting was a significantly stronger predictor, compared to liking, $Z = 1.96$, $p = .05$. The results indicated that the manipulation in the liking salience condition was not successful. However, the simple correlations in Table 32 are encouraging as the correlation between liking and intention is higher in the liking salience than in the wanting salience condition ($r = .334$ versus $r = .159$).

Table 35. *Study 5: Multiple regression analyses for predicting intentions*

Variable	Unstandardized Coefficients		Standardized Coefficients			Correlations	
	B	SE B	β	t	Sig. (p)	Zero-order	Semi Partial
Constant	.061	.262		.233	.816		
Wanting	.592	.172	.540	3.435	.001	.451	.367
Liking	-.149	.172	-.134	-.869	.388	.258	-.093
Salience	-.124	.378	-.036	-.327	.745	-.138	-.035

Notes: $R^2 = .181$.

However, the strong, positive, correlation between liking and wanting could be of concern ($r = .689$ for the wanting salience condition, and $r = .742$ for the liking salience condition). Comparatively, these correlations are high when they are compared to the correlation of liking and wanting found in Studies 3 ($r = .507$) and 4 ($r = .590$). Therefore, similar to Study 3, a subset of items that best captured the differences between liking and wanting was used in a

subsequent analysis. Based on the factor analyses and the simple correlations between the scale items, it was determined that liking item 1 ("I enjoy exercising"; $r = .607$) and wanting item 5 ("I prefer to exercise over anything else"; $r = .501$) showed to be the most distinct from one another. Only one item was selected from the liking and wanting measures because all of the other items had similar high correlations with the composite score of liking/wanting. For example, the correlations of the other wanting items (excluding wanting item 5) with a composite score of liking indicated correlations ranging from $r = .603\text{-}718$, compared to $r = .501$ for item 5. Using these items the correlation between liking and wanting was reduced to .474 in the wanting salience condition and .401 in the liking salience condition. The regression was re-run with intentions regressed on the sub items of liking and wanting, and found that the model was significant, $F(6, 66) = 2.55 \, p = .028$ (see Table 36). The results found a marginally significant liking by salience interaction; no other interactions were found to be significant (p's $> .1$).

Table 36. *Study 5: Multiple regression analyses for predicting intentions using sub items of liking and wanting*

Model	Unstandardized Coefficients		Standardized Coefficients				Correlations	
	B	*SE B*	β	*t*	Sig. *(p)*	Zero-order	Semi partial
1 (Constant)	4.827	.318		15.183	<.001		
Salience	-.273	.461	-.069	-.592	.556	-.139	-.067
W5	.276	.135	.265	2.042	.045	.327	.231
L1	.117	.141	.104	.830	.410	.219	.094
2 (Constant)	4.611	.339		13.601	<.001		
Salience	-.263	.452	-.067	-.581	.563	-.139	-.064
W5	.290	.134	.278	2.166	.034	.327	.240
L1	.139	.148	.124	.942	.350	.219	.104
W5 x L1	.100	.079	.152	1.272	.208	.082	.141
W5x Salience	-.358	.270	-.166	-1.327	.189	-.019	-.147
L1x Salience	.550	.280	.244	1.965	.054	.194	.218

Notes: Model 1 R^2 = .119, Model 2 R^2 = .190 (R^2 change = .071, F = 1.92, p = .134).

In order to examine the marginal liking by salience condition interaction, simple slopes were examined for wanting salience and liking salience conditions at one standard deviation above and one standard deviation below the mean of liking (see Figure 15). The results indicated that the slope of the regression line in the wanting salience condition was not significantly different from zero, $\beta = .02$, $p = .89$. However, in the liking salience condition the slope of the regression line was significant $\beta = .420$, $p = .018$, indicating that there was a significant relationship between liking and intention strength; only in the condition where liking was made salient at the time of intention evaluation.

Figure 15. *Study 5*: *Liking by salience Interaction*
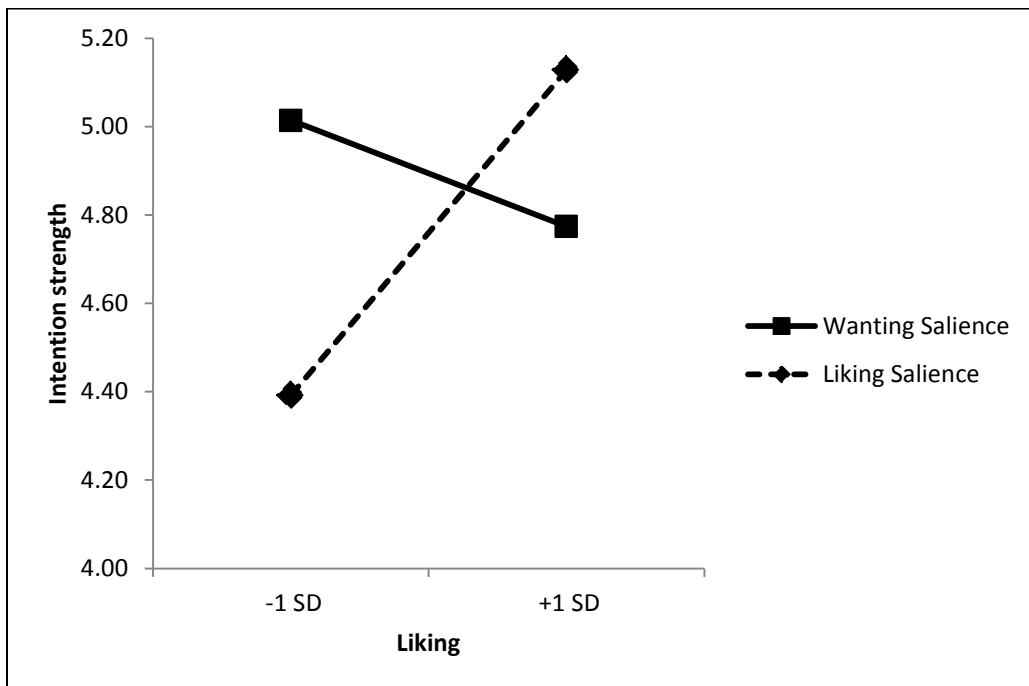
Impact on intention-behaviour link. In order to examine whether the manipulation impacted the intention-behaviour link, simple correlations were calculated separately for the two salience conditions. Contrary to what was expected, the correlation between intention and behaviour was higher in the wanting salience condition ($r = .533$) than in the liking salience condition ($r = .387$), though the difference between the two correlations was not significant, $Z = .76$, $p = .45$, by a Fisher r-to-z transformation.

Discussion

Previous studies found that wanting (and not liking) predicts intentions, but that liking (and not wanting) predicts behaviour. It was hypothesized that these effects arise from the relative weight that participants place on liking versus wanting during intention evaluation, which can be contrasted with their impact on actual behaviour. Therefore, Study 5 aimed to more directly examine this potential underlying mechanism by implementing a manipulation that influenced the relative weight that participants place on liking versus wanting during intention evaluation. The results indicated that the manipulation was for the most part, unsuccessful, as wanting predicted intentions irrespective of what component was made salient at the time. When a subset of liking and wanting items were used to help reduce the correlation between liking and wanting, the manipulation was found to be successful in the liking salience condition, such that liking significantly predicted intentions to increase exercise. Overall, the results suggest the need for a stronger manipulation in order to influence the weight that is placed on liking versus liking during intention evaluation.

Finally, although the manipulation was not as successful as predicted, the impact of the manipulation on the intention–behaviour link was examined by looking at the correlations between intention and behaviour for each of the salience conditions. Contrary to what was

expected, the results indicated a weaker correlation between intention and behaviour in the condition where liking concerns were made salient, compared to the wanting salience condition (although the difference was not statistically significant). The non-significant results could partly be due to the small sample size of the study ($n = 37$ and $n = 36$). Further research with a stronger manipulation and a larger sample size is required to conclusively investigate how the intention-behaviour link is affected by influencing the weight that is placed on liking and wanting during intention evaluation.

General Discussion

Theories in psychology, such as the Theory of Planned Behavior (Ajzen, 1991) have long relied on the use of intention in predicting future behaviour. Yet, evidence suggests that a significant amount of variance in predicting behaviour is left unexplained by intentions (Sheeran, 2002). The main goal of this dissertation was to examine whether there are different antecedents of intention and behaviour, which in turn could help explain the modest correlation between them. This was done by drawing on research showing that liking and wanting are related but distinct reward processes involved with regulating behaviour. It was expected, that the relative weight placed on liking and wanting during intention formation would differ from their relative contribution to actual behaviour. A secondary goal of this dissertation was to examine whether liking and wanting contribute to the intention-behaviour link differently for intentions to increase health-promoting behaviours versus intentions to decrease health-compromising behaviours.

In terms of increasing behaviours it was hypothesized, that more weight would be placed on wanting (compared to liking) during intention evaluation (H1), as individuals may be more concerned about their ability to initiate and sustain the behaviour as opposed to how the actual experience will feel. In terms of actual behaviour it was hypothesized that liking would relate more to behaviour compared to wanting (H2), as successful behaviour change may depend more on the extent to which people derive pleasure from the behaviour. With regards to decreasing health-compromising behaviours it was hypothesized that the reverse pattern would be found, such that more weight would be placed on liking (compared to wanting) during intention evaluation (H3), as in this case individuals may be more concerned about the pleasurable experience they need to give up as opposed to how compelling the behaviour is. By contrast, it was hypothesized that actual behaviour change would be driven more by wanting, compared to

liking (H4), as behaviours a person wishes to decrease are typically repeated quite regularly and thus their occurrence may be driven more by on the compulsion to engage in the behaviour.

The results of studies 1-4 provide evidence that liking and wanting do in fact relate to intention versus behaviour differently. Further, their relative contribution also depends on whether the behavioural goal is described in terms of increasing versus decreasing the frequency of a behaviour. In Study 1, H1 was tested by asking participants to complete measures of liking and wanting toward the behaviour of exercise and then examining their relation to intentions (to increase exercising) versus actual exercise behaviour. Consistent with H1, wanting (but not liking) significantly predicted intentions to exercise. However, liking (but not wanting) predicted actual exercise behaviour (supporting H2). This first demonstration of the differential weighting of liking and wanting to the intention-behaviour link was successfully generalized to other behavioural domains (in addition to exercise) in Study 2. Studies 3 and 4 focused on extending these results. In study 3, it was observed that the differential effect of liking and wanting on the intention behaviour link was more evident for behaviours that are difficult to self-regulate. Study 4 found that the effect of wanting on intentions was attenuated when the same behavioural goal was evaluated by all individuals (no choice of goal was offered) and when more stimulus-specific measures were used.

In Study 5, a manipulation expected to influence the weight placed on liking and wanting during the intention evaluation was implemented (for the behaviour of exercise). It was hypothesized that the weight placed on liking and wanting would shift during the evaluation of the intention, depending on what component was salient at the time. In contrast to what was expected, wanting significantly predicted intentions regardless of what component was made accessible at the time of the intention evaluation. Only when a subset of liking and wanting items

were used, liking, in addition to wanting, predicted intentions to exercise when liking was made salient during the intention evaluation. Furthermore, it was hypothesized that the relation between intention and behaviour may be strengthened, given that individuals placed more weight on the component of liking when forming their intentions. However, the correlation between intention and behaviour was not stronger when liking was made salient during the intention evaluation, compared to when wanting was salient. The results suggest that a stronger manipulation may be needed in order to influence the weight that is placed on liking versus liking during intention evaluation. The results may also suggest that targeting intentions is not be the easiest route to bridge the lack of correspondence between intention and behaviour.

The hypotheses regarding the case of a decrease behavioural goal lacked support from the current studies. In contrast to the H3, Study 2 provided the first demonstration that neither liking nor wanting was related to intentions which was shown with a variety of different behaviours. In Study 3, the relation of liking and wanting with respect to intentions and actual behaviour change was examined, and found that neither liking nor wanting predicted intention or behaviour, in contrast to H3 and H4. However, intentions were found to significantly predict behaviour change (over and above liking and wanting). These results were also replicated in Study 4.

The null effects of liking and wanting on intention versus behaviour are interesting given that studies using TPB, have largely focused on the case of increasing the frequency of a behaviour and not on the case of decreasing the frequency of a behaviour. The few studies that have examined a decrease behavioural goal (see McMillan & Conner, 2003) have tended to measure intentions to *engage* in a behaviour (e.g., intentions to consume alcohol) rather than intentions to *reduce* a behaviour (e.g., intentions to decrease alcohol consumption), which was the focus in the current studies. In particular, the way the intention questions were framed in the

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current studies may have significantly altered responses, such that it may have prompted participants to place weight on variables other than liking and wanting. Specifically, liking and wanting were measured with respect to the occurrence or execution of the behaviour, both for behaviours the person wished to increase and for those the person wished to decrease. Intentions, however, were measured with respect to the desired direction of behaviour change (i.e., strength of intention to change). In the increase case, therefore, increases in wanting and liking were congruent with increases in intention strength; but in the decrease case, they were incongruent as increases in either liking or wanting would be expected to be associated with decreases in intention strength. Thus, when evaluating intentions to decrease a behaviour individuals may have been in a different frame of mind as the consideration of (incongruent) liking and wanting of the target behaviour may have prompted them to consider other factors related to decreasing a behaviour (e.g., such as how committed they are to reducing the behaviour etc.).

Contribution

Together, this work adds to the growing body of work on liking and wanting, by showing that these two components are not equally predictive of intention versus behaviour. To date, the majority of research dissociating liking from wanting has been conducted on addictive behavioural domains (Berridge, 2009; Hobbs et al., 2005; Lambert et al., 2006; Ostafin et al., 2010). Thus, the current dissertation adds to the existing literature by examining the roles of liking and wanting to non-addictive behavioural domains.

In addition to contributing to research on liking and wanting, my work also contributes to literature on TPB by refining the determinants of intention and behaviour. The results indicate that the relative contribution of liking and wanting to intention versus behaviour differs depending on how the behaviour is framed; supporting literature that maintains different

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motivations are involved with engaging in a behaviour versus suppressing a behaviour (Carver, & White, 1994, Richetin et al., 2011). More specifically, the findings inform existing theory by suggesting that the differential influence of liking and wanting to intention versus behaviour is strongest for activities that require significant self-regulation. For example, the differential effects were found for the behaviour of exercise, but not with spending time with friends and family. The results provide evidence that when individuals are evaluating their intentions to increase a behaviour that is difficult to implement, they may focus on or place more weight on factors related to wanting. For example, they may be more concerned with their ability to initiate the behaviour, as opposed to how much they will enjoy it. The finding that liking predicts behaviour (even when intentions were controlled for), is inconsistent with TPB, as intentions are expected to be the immediate precursor of behaviour (Azjen, 1991). However, this direct effect of liking on behaviour is not unprecedented, as recent studies using the TPB have reported that a direct link between how enjoyable a behaviour is reported to be and behaviour (Conner et al., 2011; Lowe et al., 2002; Lawton et al., 2009).

Alternative Explanation

Construal level theory (Trope & Liberman, 2003) proposes that future behaviours are construed on a higher level, in terms of the behaviour's end state (e.g., "I desire to exercise in order to lose weight") compared to the concrete "how" details of the behaviour. It is possible that in the current studies the behaviour considered during the intention evaluation was construed at a higher level in terms of its superordinate goal. It could also be argued that the wanting measure in particular may have also been construed at a higher level compared to the liking measure, providing an alternate explanation for why wanting was found to better predict intention (compared to liking). To elaborate, when individuals were completing the wanting items (e.g., "I

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desire to engage in X"), they may have been more prone to thinking about the higher level goal associated with the behaviour compared to when completing the liking items (e.g., "I enjoy engaging in X). However, steps were taken in the current studies to hold construal level constant. This was done by tying both the liking and wanting measures to the specific behaviour rather than to the overarching goal.

Limitations

Use of self-report measures.

Although the use of self-report measures are quite common in the liking and wanting literature, and also TPB; the possibility exists that the responses to these measures could have been systematically distorted or biased and thus may not have reflected a person's true attitude. Reportedly, the processes of liking and wanting may operate on a more implicit level, thus individuals may not always have conscious access to them (Berridge & Robinson, 2003). If this is the case, there is a possibility that liking and wanting may not have been fully captured by the self-reported measures in this study. For example, individuals may have answered the liking and wanting measures as if they were tapping into the same overarching construct. However, this is unlikely in the present studies as the two measures did not perfectly correlate with one another. In addition, the two constructs (and intentions for that matter) loaded onto the appropriate separate factors in the factor analysis, providing further support that individuals were able to explicitly distinguish between the different constructs. Alternatively, participants may not have had conscious access to certain information to accurately complete the liking and wanting measures. For example, it is possible that individuals may not have been consciously aware of their level of wanting toward a target (i.e., how compelling a behaviour is), or may have altered their self-reported wanting levels in an attempt to show themselves in a better light. It is possible

that these possibilities may have been more of a problem in the case of decreasing the frequency of a behaviour. For example in Study 4 the mean level of wanting for healthy food was 4.13 whereas, wanting for unhealthy food was only 3.39 (which was below the midpoint of the scale). Therefore, individuals may have downplayed how compelling these behaviours truly are in their responses on the measures.

It would have been ideal, although difficult to obtain a more objective behaviour change measure as opposed to relying on self-reported behaviour change as individuals may not have been completely accurate on assessing their own behaviour change. Furthermore, the data could have been affected by self-presentational biases. For example, individuals may have overstated their degree of behaviour change in an effort to present themselves in a desirable way. In addition, self-report measures are subject to demand characteristics, such that participants may have altered their responses based on their interpretation of the experiment's purpose. Participants may have recalled their previous responses and used it to guide their responses on the behaviour change measure. Although the current studies relied on self-report feedback, there is no reason to suspect that individuals in the increase behavioural goal condition distorted their self-reported behaviour to better fit their assessment of liking of the behaviour (and not wanting).

Reliance on correlational data.

As with all correlational data, causal inferences cannot be made with certainty in this dissertation. Although the current studies treated liking and wanting as precursors to intention, and as such were measured prior to intention ratings, the possibility may not be ruled out that individuals may infer their wanting or liking of a behaviour (such as exercising) on the basis of their intention to engage in the behaviour. An attempt to control for this was made in Study 4, as liking and wanting was measured in a separate session, days before completing the intention

ratings. This design allowed for liking and wanting to be completed without the influence of the intention measure and yielded similar results. Another way to test the causal impact of, for example, wanting on intentions, it is necessary to change the level of wanting and observe whether there is a corresponding change in intention (Webb & Sheeran, 2006). If a causal relationship exists between wanting and intention, an experimental manipulation that produces a significant increase in levels of wanting should also produce a significant increase in intention strength. Although a manipulation of this sort was tested in Study 5, it proved to be ineffective. Therefore, strong conclusions could not be made with regards to causality.

Practical implications

This research has important implications for health interventions. My research shows that interventions aimed at facilitating successful increases in a target behaviour may be more effective if the construct of liking is targeted. For instance, if the intention-behaviour gap can be explained partly by the underweighting of factors related to hedonics, interventions that focus on increasing liking in addition to increasing the salience of liking should lead to more desirable outcomes. One potential manipulation would involve asking participants to recall a specific behavioural experience where they enjoyed/ or felt compelled to engage in a behaviour before evaluating their intentions. For example, Biondolillo and Pillemer (2014) found that recalling a positive experience (compared to a negative experience) not only increased intentions to exercise in the future, but was associated with an increase in exercise behaviour. Therefore, manipulating levels of liking using memories of positive emotion (related to a behaviour) may be a fruitful avenue to help increase the correspondence between intention and behaviour.

However, in accordance with past literature (Hardeman et al., 2002) my data indicates that not only are changes in intentions difficult to manipulate, but they do not necessarily lead to

desirable behaviour changes. Another, perhaps more effective approach would be to focus on increasing the perceived hedonic experience of the behaviour; as interventions may impact behaviour without generating significant changes in intentions (Webb & Sheeran, 2006). One way to accomplish this is by pairing an enjoyable behaviour with a not so enjoyable behaviour. For example, Rhodes, Warburton, & Bredin (2009) attempted to increase the frequency of physical exercise by coupling a stationary bike with an interactive gaming system that allowed participants the opportunity to play a videogame while cycling on the bike. The authors found that individuals who were randomly assigned to the video gaming condition had higher affective attitudes on the exercise experience over a six-week period compared to those in the comparison cycling condition. More importantly, those in the video gaming condition were more likely to adhere to the cycling program across the six weeks compared to the other cycling condition. Rhodes et al. (2009) found that affective attitudes directly contributed to adherence, independently of intention. Similarly, research shows that gym attendance can be increased by coupling instantly gratifying activities with behaviours that require self-regulation (Milkman, Minson & Volpp, 2013). The authors maintain that the coupling facilitates behaviour change by reducing the unpleasantness of many beneficial activities.

Conclusion

In conclusion, the results of my dissertation provide support that the components of liking and wanting are separable factors that differentially influence intention and behaviour – especially in the case where individuals wish to increase the frequency of a behaviour. Specifically, the results speak to the conclusion that the motivations that drive intentions are different from the motivations that drive behaviour; thus providing an explanation for modest correlation between intention and behaviour. Finally, the results provide practical information to individuals interested in increasing the frequency of a behaviour, by suggesting that focus should be placed on optimizing the pleasure of a behavioural experience. For example, simply labeling exercise as being "fun" rather than "exercise" has been found to reduce perceptions of exertion associated with the physical exercise and increased positive mood (Werle, Wansink, & Payne, 2014).Thus, exercise programs should focus on introducing factors that can make exercising more fun such as listening to music, or exercising with a friend. As the saying goes, "focus on the journey, not the destination. Joy is found not in finishing an activity but in doing it" – Greg Anderson.

References

Aarts, H., Gollwitzer, P.M., & Hassin, R.R. (2004). Goal contagion: Perceiving is for pursuing. *Journal of Personality and Social Psychology*, *87*(1), 23-37.

Abraham, C., & Sheeran, P. (2010). Acting on intentions: The role of anticipated regret. *British Journal of Social Psychology*, *42*(4), 495-511.

Ajzen, I. (1991). Theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179-211.

Ajzen, I., & Fishbein, M. (1977). Attitude-behavior relations: A theoretical analysis and review of empirical research. *Psychological Bulletin*, *84*(5), 888-918.

Armitage, C.J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology*, *40*(4), 471-499.

Berridge, K.C. (1995). Food reward: Brain substrates of wanting and liking. *Neuroscience and Biobehavioral Reviews*, *20*(1), 1-25.

Berridge, K.C. (2009). 'Liking' and 'wanting' food rewards: Brain substrates and roles in eating disorders. *Physiology & Behavior*, *97*(5), 537-550.

Berridge, K.C., & Robinson, T.E. (1995). The mind of an addicted brain: neural sensitization of wanting versus liking. *Current Directions in Psychological science*, *4*(3), 71-76.

Berridge, K.C., & Robinson, T.E. (1998). What is the role of dopamine in reward: Hedonic impact, reward learning, or incentive salience? *Brain Research Reviews*, *28*(3), 309-369.

Berridge, K.C., & Robinson, T.E. (2003). Parsing reward. *Trends in Neurosciences*, *26*(11), 507-513.

Berridge, K.C., Robinson, T.E., & Aldridge, J.W. (2008). Dissecting components of reward: 'Liking', 'wanting', and learning. *Current Opinion in Pharmacology*, *9*(1), 65-73.

Berry, T.R. (2006). Who`s even interested in the exercise message? Attentional bias for exercise and sedentary-lifestyle related words. *Journal of Sport & Exercise Psychology, 28*(1), 4-17.

Biondolillo, M.J., Pillemer, D.B. (2014). Using memories to motivate future behaviour: An experimental exercise intervention. *Memory, 26*. doi: 10.1080/09658211.2014.889709

Brubaker, R.G., & Fowler, C. (1990). Encouraging college males to perform testicular self-examination: Evaluation of persuasive message based on the revised theory of reasoned action. *Journal of Applied Social Psychology, 20*(17), 1411-1422.

Carver, C.S., White, T.L. (1994). Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: the BIS/BAS scales. *Journal of personality and Social Psychology, 67*(2), 319-333.

Conner, M., Norman, P., & Bell, R. (2002). The theory of planned behavior and healthy eating. *Health Psychology, 21*(2), 194-201.

Conner, M., Sparks, P., Povey, R., James, R., Shepard, R., Armitage, C.J. (2002). Moderator effect of attitudinal ambivalence on attitude-behaviour relationships. *European Journal of Social Psychology, 32*(5), 705-718.

Conner, M., Rhodes, R.E., Morris, B., McEachan, R., & Lawton, R. (2011). Changing exercise through targeting affective or cognitive attitudes. *Psychology and Health, 26*(2), 133-149.

Cowdrey, F.A., Finlayson, G., & Park, R.J. (2013). Liking compared with wanting for high- and low-calorie foods in anorexia nervosa: aberrant food reward even after weight restoration. *American Society for Nutrition, 97*(3), 463-470.

Dai, X., Dong, P., & Jia, J.S. (2014). When does playing hard to get increase romantic attraction? *Journal of Experimental Psychology, 143*(2), 521-526.

114

Dai, X., Brendl, M., & Ariely, D. (2010). Wanting, liking and preference construction. *Emotion*, *10*(3), 324-334.

De Houwer, J. (2003). The extrinsic affective simon task. *Experimental Psychology*, *50*(2), 77-85.

De Houwer, J. (2006). What are implicit measures and why are we using them. In R. W. Wiers & A. W. Stacy (Eds.), *The handbook of implicit cognition and addiction* (pp. 11–28). Thousand Oaks, CA: Sage.

De Houwer, J., Custers, R., & De Clercq, A. (2006). Do smokers have a negative implicit attitude toward smoking? *Cognition and Emotion*, *20*(8), 1274-1284.

Epstein, L.H., Truesdale, R., Wojcik, A., Paluch, R.A., & Raynor, H.A. (2003). Effects of deprivation on hedonics and reinforcing value of food. *Physiology and Behavior*, *78*(2), 221-227.

Finlayson, G., & Dalton, M. (2012). Hedonics of food consumption: Are food 'liking' and 'wanting' viable targets for appetite control in the obese? *Current Obesity Report*, *1*(1), 42-49.

Finlayson, G., King, N.A., & Blundell, J.E. (2007). Liking vs. wanting food: importance for human appetite control and weight regulation. *Neuroscience & Behavioral Reviews*, *31*(7), 987-1002.

Fishbach, A., & Shah, J.Y. (2006). Self-control in action: Implicit dispositions toward goals and away from temptations. *Personality Processes and Individual Differences*, *90*(5), 820-832.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*. Reading, MA: Addison Wesley.

Friese, M., Hofmann, W., & Wanke, M. (2008). When impulses take over: Moderated predictive validity of explicit and implicit attitude measures in predicting food choice and consumption behaviour. *British Journal of Social Psychology, 47*(3), 397-419.

Godin, G., Kok, G. (1996) The theory of planned behavior: A review of its applications to health-related behaviors. *American Journal of Health Promotion, 11*(2), 87-98.

Gollwitzer, P.M. (1999). Implementation intentions: Strong effects of simple plans. *American Psychologist, 54*(7), 493-503.

Greenwald, A.G., McGhee, D.E., Schwartz, J.L.K. (1998). Measuring individual differences in implicit cognition: The implicit association test. *Journal of Personality and Social Psychology, 74*(6), 1464-1480.

Hajek, P. (1991). Individual differences in difficulty quitting smoking. *British Journal of Addiction, 86*(5), 555-558.

Hardeman, W., Johnston, M., Johnston, D., Bonetti, D., Wareham, N., & Kinmonth, A.L. (2002). Application of the theory of planned behaviour in behaviour change interventions: A systematic review. *Psychology & Health, 17*(2), 123-158.

Havermans, R.C. (2011). "You say it's liking, I say it's wanting…". On the difficulty of disentangling food reward in man. *Appetite, 57*(1), 286-294.

Hobbs, M., Remington, B., & Glautier, S. (2005). Dissociation of wanting and liking for alcohol in humans: A test of the incentive-sensitisation theory. *Psychopharmacology, 178*(4), 493-499.

Hollenback, J.R., Williams, C.R., & Klein, H.J. (1989). An empirical examination of the antecendents of commitment to difficult goals. *Journal of Applied Psychology, 74*(1), 18-24.

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Hsee, C.K., Zhang, J., Cai, C.F., Zhang, S. (2013). Overearning. *Psychological Science*, *24*(6), 852-859.

Lambert, N.M., McLeod, M., & Schenk, S. (2006). Subjective responses to initial experience with cocaine: An exploration of the incentive-sensitization theory of drug abuse. *Addiction*, *101*(5), 713-725.

Lawton, R., Conner, M., & McEachan, R. (2009). Desire or Reason: Predicting health behaviors from affective and cognitive attitudes. *Health Psychology*, *28*(1), 56-65.

Lemmens, S.G.T., Schoffelen, P.F.M., Wouters, L., Born, J.M., Martens, M.J.I., Rutters, F., & Westerterp-Platenga, M.S. (2009). Eating what you like induces a stronger decrease of 'wanting' to eat. *Physiology & Behavior*, *98*(3), 318-325.

Liberman, N., & Trope, Y. (1998). The role of feasibility and desirability considerations in near and distant future decisions: A test of temporal construal theory. *Journal of Personality and Social Psychology*, *75*(1), 5-18.

Litt, A., Khan, U., & Shiv, B. (2009). Lusting while loathing parallel counterdriving of wanting and liking. *Psychological Science*, *21*(1), 118-125.

Locke, E.A., & Latham, G.P. (1990). *A theory of goal setting & task performance*. Englewood Cliffs, NJ: Prentice Hall.

Lowe, R., Eves, F., & Carroll, D. (2002). The influence of affective and instrumental beliefs on exercise intentions and behavior: A longitudinal analysis. *Journal of Applied Social Psychology*, *32*(6), 1241-1252.

Luszczynska, A., & Schwarzer, R. (2003). Planning and self-efficacy in the adoption and maintenance of breast self-examination: A longitudinal study on self-regulatory cognitions. *Psychology & Health*, *18*(1), 93-108.

Marcus, B.H., Rakowski, W., Rossi, J.S. (1992). Assessing motivational readiness and decision making for exercise. *Health Psychology, 11*(4), 257-261.

McMillan, B., & Conner, M. (2003). Using the theory of planned behaviour to understand alcohol and tobacco use in students. *Psychology, Health & Medicine*, 8(3), 317-328.

Michie, S., Abraham, C., Whittington, C., McAteer, J., Gupta, S. (2009). Effective techniques in healthy eating and physical activity interventions: A meta-regression. *Health Psychology, 28*(6), 690-701.

Milkman, K.L., Minson, J.A., Volpp, K.G.M. (2013). Holding the hunger games hostage at the gym: An evaluation of temptation bundling. *Management Science, 60*(2), 283-299.

Milne, S., Orbell, S., & Sheeran, P. (2002). Combing motivational and volitional interventions to promote exercise participation: Protection motivation theory and implementation intentions. *British Journal of Health Psychology, 7*(2), 163-184.

Mullan, B., Allom, V., Brogan, A., Kothe, E., Todd, J. (2014). Self-regulation and the intention behaviour gap. Exploring dietary behaviours in university students. *Appetite*, 73(1), 7-14.

Murphy, S.T., Zajonc, R.B. (1993). Affect, cognition and awareness: Affective priming with optimal and suboptimal stimulus exposures. *Journal of Personality and Social Psychology, 64*(5), 723-739.

Norcross, J.C., Mrykalo, M.S., & Blagys, M.D. (2002). Auld Lang Syne: Success predictors, change processes and self-reported outcomes of New Year's resolvers and nonresolvers. *Journal of Clinical Psychology, 58*(4), 397-405.

Norman, P., Conner, M., & Bell, R. (2000). The theory of planned behaviour and exercise: Evidence for the moderating role of past behaviour. *British Journal of Health Psychology, 5*(3), 249-261.

Olson, M.A., & Fazio, R.H. (2004). Reducing the influence of extrapersonal associations on the implicit association Test: Personalizing the IAT. *Journal of Personality and Social Psychology, 86*(5), 653-667.

Ostafin, B.D., Marlatt, A.G., & Troop-Gordon, W. (2010). Testing the incentive-sensitization theory with at-risk drinkers: Wanting, liking and alcohol consumption. *Psychology of Addictive Behaviors, 24*(1), 157-162.

Payne, B.K., Cheng, C.M., Govorun, O., & Stewart, B.D. (2005). An inkblot for attitudes: Affect misattribution as implicit measurement. *Journal of Personality and Social Psychology, 89*(3), 277-293.

Payne, B.K., Govorun, O., & Arbuckle, N.L. (2008). Automatic attitudes and alcohol: Does implicit liking predict drinking? *Cognition and Emotion, 22*(2), 238-271.

Perugini, M., & Bagozzi, R.P. (2001). The role of desires and anticipated emotions in goal-directed behaviors: Broadening and deepening the theory of planned behavior. *British Journal of Social Psychology, 40*(1), 79-98.

Perugini, M., & Bagozzi, R.P. (2004). The distinction between desires and intentions. *European Journal of Social Psychology, 34*(1), 69-84.

Podsakoff, P.M., MacKenzie, S.B., Lee, J., & Podsakoff, N. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879-903.

Prochaska, J.O., & Velicer, W.F. (1997). The transtheoretical model of health behavior change. *American Journal of Health Promotion*, 12(1), 38-48.

Reinecke, J., Schmidt, P., & Ajzen, I. (2006). Application of the theory of planned behavior to adolescents' condom use: A panel study. *Journal of Applied Social Psychology, 26*(9), 749-772.

Rhodes, R.E., & Courneya, K.S. (2003). Investigating multiple components of attitude, subjective norm, and perceived control: An examination of the theory of planned behavior in the exercise domain. *British Journal of Social Psychology, 42*(1), 129-146.

Rhodes, R.E., Warburton, D.E.R., & Bredin, S.S.D. (2009). Predicting the effect of interactive video bikes on exercise adherence: An efficacy trial. *Psychology, Health & Medicine, 14*(6), 631-640.

Richetin, J., Conner, M., & Pergugini, M. (2011). Not doing is not the opposite of doing: Implications for attitudinal models of behavioral prediction. *Personality and Social Psychology Bulletin, 37*(1), 40-54.

Robinson, T.E., & Berridge, K.C. (1993). The neural basis of drug craving: An incentive-sensitization theory of addition, *Brain Research Reviews, 18*(3), 247-291.

Schwarz, N., & Strack, F. (1991). Evaluating one's life: A judgement model of subjective well-being. In F. Strack, M. Argyle, & N. Schwarz (Eds.), *Subjective well-being: An interdisciplinary perspective* (pp. 27-47). New York: Pergamon

Schwarzer, R. (2008). Modeling health behavior change: How to predict and modify the adoption and maintenance of health behaviors. *Applied Psychology: An International Review, 57*(1), 1–29.

Sheeran, P. (2002). Intention-behavior relations: A conceptual and empirical review. *European Review of Social Psychology, 12*(1), 1-36.

Sheeran, P. & Abraham, C. (1996) The health belief model. In M. Conner and P. Norman (Eds.), Predicting health behaviour: *Research and practice with social cognition models*, (pp. 23-61), Buckingham, UK: Open University Press.

Sheeran, P., Orbell, S. (2000). Using implementation intentions to increase attendance for cervical cancer. *Health Psychology, 19*(3), 283-289.

Sheldon, K.M., & Houser-Marko, L. (2001). Self-concordance, goal attainment, and the pursuit of happiness: Can there be an upward spiral? *Journal of Personality and Social Psychology, 80*(1), 152-165.

Sniehotta, F.F., Scholz, U., Schwarzer, R. (2005). Bridging the intention-behavior gap: Planning, self-efficacy, and action control in the adoption and maintenance of physical exercise. *Psychology & Health, 20*(2), 143-160.

Sniehotta, F.F., Schwarzer, R., Scholz, U., & Schüz, B. (2005). Action planning and coping planning for long-term lifestyle change: Theory and assessment. *Journal of Social Psychology, 35*(4), 565-576.

Sutton, S. (1998). Predicting and explaining intentions and behavior: How well are we doing? *Journal of Applied Social Psychology, 28*(15), 1317-1338.

Thompson, M.M., Zanna, M.P., Griffin, D.W. (1995). Let's not be indifferent about (attitudinal) ambivalence. In R.E. Petty & J.A. Krosnick (Eds.) *Attitude strength: Antecedents and consequences*, (pp.361-386). Hillside, NJ: Erlbaum.

Tibboel, H., De Houwer, J., Spruyt, A., Field, M., Kemps, E., & Crombez, G. (2011). Testing the validity of implicit measures of wanting and liking. *Journal of Behavior Therapy and Experimental Psychiatry, 42*(3), 284-292.

Trope, Y., Liberman, N. (2003). Temporal Construal. *Psychological Review, 110*(3), 403-421.

Veenstra, E.M., & de Jong, P.J. (2010). Restrained eaters show enhanced automatic approach tendencies toward food. *Appetite, 55*(1), 30-36.

Verplanken, B., & Aarts, H. (2011). Habit, attitude, and planned behaviour: Is habit an empty construct or an interesting case of goal-directed automaticity? *European Review of Social Psychology, 10*(1), 101-134.

Warshaw, P.R., & Davis, F.D. (1985). Disentangling behavioral intention and behavioral expectation. *Journal of Experimental Social Psychology, 21*(3), 213-228.

Webb, T.L., & Sheeran P. (2006). Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. *Psychological Bulletin, 132*(2), 249-268.

Werle, C.O.C., Wansink, B., & Payne, C.R. (2014). Is it fun or exercise? The framing of physical activity biases subsequent snacking, *Marketing Letters*. doi: 10.1007/s11002-014-9301-6

Wilson, M.D. (1988). The MRC psycholinguistic database: Machine readable dictionary, version 2. *Behavioural Research Methods, Instruments and Computers, 20*(1), 6-11.