Chapter

A CRITICAL ENGAGEMENT WITH SOCIAL PSYCHOLOGICAL CONTRIBUTIONS TO MODIFYING BEHAVIORS THAT EFFECT THE HEALTH OF PEOPLE AND THE PLANET

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ABSTRACT

Two of today's most pressing problems are how to improve the health of individuals and of the planet. On the one hand, despite advances in health care, individuals continue to face serious health issues. Similarly, global warming caused by climate change has been recognized as "too serious for the world any longer to ignore its danger" (Tony Blair, 2005). These two problems are linked because their solutions, in part, require individuals to change their behavior. Thus, those concerned with improving individuals' or the planet's health must look to the psychology of behavior change for solutions (e.g., Michie, van Stralen, & West, 2011; Whitmarsh, 2009), along with insights from other disciplines. In this chapter, we first describe the theory of planned behavior (TPB; Ajzen, 1991) that has been used as the basis of programs designed to change individuals' behavior in both domains. This theory proposes that the proximal determinants of behavior are an intention to behave in a particular way (i.e., a behavioral intention) and individuals' perceptions of how much control they have over their behavior (i.e., perceived behavioral control; PBC). Behavioral intentions are, in turn, determined by attitudes, subjective norms, and PBC. We examine the utility of TPB by considering meta-analyses of both correlational studies and interventions designed to change behavior from that which is less, to more, healthy/environmentally sustainable. However, many of these interventions have been relatively ineffective likely because of the habitual nature of the behavior in question (i.e., it is automatically elicited in specific situations or contexts). Thus, we discuss how to modify this type of behavior. We then consider why individuals might resist changing habitual behavior and provide suggestions for strategies that can be used to overcome this resistance, using recent theoretical developments of

practice theory that shed further light on this problem (Boldero & Binder 2013). We end the chapter by considering the bounded nature of psychological theory and how disciplinary 'silos' can be breached so that more holistic theory and strategies for change can be developed and implemented, respectively.

Keywords: Practice theory, psychology, habit, behavior change, multidisciplinary

To live the best of all possible lives is a goal that those of us privileged enough to live in a developed country aspire to. Achieving this partly involves being as healthy as we possibly can for as long as possible. However, despite advances in health care, individuals living in these countries continue to experience problems with their health. Many of these are those associated with 'unhealthy lifestyles' (e.g., alcohol and obesity; Brundtland, 2005). Further, these problems are becoming more prevalent in developing nations (Brundtland, 2005). Accordingly, it has been recognized that changing behavior is "key to improving population health" (Cane, Richardson, Johnston, Ladha, & Michie, 2015, p. 131).

Not only does disease prevention have obvious benefits for individuals but also it has societal benefits. Health care systems, designed to maintain, restore, and improve the health of a country's citizens (Horoho, 2014), cost governments relatively large amounts of money. For example, the United States spent approximately $3.8 trillion on healthcare in 2013.[1] Thus, there is also a public interest argument for improving individuals' health.

Alongside 'lifestyle' factors, the physical environment also contributes to individuals' health and well-being. For example, extreme weather events can lead to loss of life, especially for vulnerable individuals, such as the homeless, the young, and the elderly. Similarly, rising sea levels threaten coastal communities, with poorer countries being at greater risk due to them being less resilient. Both of these physical changes to our environment are linked to climate change which is primarily attributed to the presence and rising levels of greenhouse gases (e.g., carbon dioxide, methane) in the atmosphere. These gases are by-products of, for example, in the case of carbon dioxide, burning fossil fuels to produce electricity and provide transport, and, in the case of methane, of agricultural practices,[2] namely, industrial and post-industrial human activities.

Taken together, there is a clear need for people in the global north to change their behavior both to improve their personal health and the health of the planet. At the same time, there is a need to improve the personal health and the environmental conditions faced by people in the global south. Responding to these threats and problems, governments use, among other things, the results of behavior change research to develop policies and strategies designed to improve the health of their citizens, on the one hand, and to achieve better environmental conditions, for example, greenhouse gas emission reduction targets, on the other (e.g., Michie, van Stralen, & West, 2011; Whitmarsh, 2009). However, despite the development of these policies and strategies, the prevalence of risk factors associated with some diseases continues to increase (e.g., obesity; Butland, Jebb, Kopelman, McPherson, Thomas, Mardell, & Parry, 2007). Similarly, levels of greenhouse gases continue to rise.[3]

[1] http://www.forbes.com/sites/danmunro/2014/02/02/annual-u-s-healthcare-spending-hits-3-8-trillion/

[2] http://planetsave.com/2009/06/07/global-warming-effects-and-causes-a-top-10-list/

[3] http://planetsave.com/2009/06/07/global-warming-effects-and-causes-a-top-10-list/

Thus, key questions are why, despite some success with interventions designed to change health-related behaviors, "behavior change has proved to be a formidable challenge?" (Michie, Rothman, & Sheeran, 2007, p. 249), and why "have strategies for mitigating climate change apparently failed to engender public support?" (Whitmarsh, 2009, p. 14). Although a review of the literature cannot definitively answer these two questions, in this chapter we begin by considering the efficacy of interventions based in the Theory of Planned Behavior (TPB; Ajzen, 1985).

We focus on TPB because it "has been the dominant theoretical approach to guide research on health-related behavior for the past three decades" (Sniehotta, Presseay, & Araújo-Soares, 2014, p. 1) and, although not the 'dominant theory' in environmental psychology, it is a "popular social psychological theory for explaining behavioral choices" (De Groot & Steg, 2009, p. 1817) that "has been used successfully to understand a range of environmentally responsible behaviours" (Fiedling, McDonald, & Louis, 2008, p. 319).

Despite its popularity (e.g., being cited 4550 times in 2010), TPB is not without its critics in the health psychology domain (e.g., Ogden, 2014; Sniehotta et al., 2014) and more broadly within social psychology (e.g., Armitage & Conner, 2001). This has led, in some cases, to the predictive utility of its constituent factors being compared to that of other factors (e.g., Heath & Gifford, 2002; Norman & Cooper, 2011). As a result, some argue that other factors should be formally included in the theory (e.g., Rhodes, 2014) whereas others argue that TPB has outlived its usefulness (e.g., Sniehotta et al., 2014). Accordingly, we consider the theory's predictive utility by reviewing the results of meta-analyses of correlational studies and studies that have examined whether interventions based in the theory lead to 'substantial' changes in behavior. We then consider the role of habitual behavior and how this is maintained and can be transformed. Finally, we draw on the insights from practice theory (e.g., Shove, 2003). However, before doing this we describe TPB and consider why it was likely selected as the basis of health and environmental psychological research.

THE THEORY OF PLANNED BEHAVIOR

TPB (Ajzen, 1985, 1991) is an extension of the Theory of Reasoned Action (TRA; e.g., Ajzen & Fishbein, 1980). Both theories specify that the proximal determinant of behavior is behavioral intentions (hereafter intentions). In addition, both specify that intentions are determined by individuals' attitudes to the specific behavior and their perceptions of social pressure from important others to perform or not perform the behavior (i.e., subjective norms). Thus, attitudes and subjective norms are only indirectly related to behavior as their effects are mediated by intentions.

The difference between the two models is that TPB has an additional factor that is a predictor of intentions, specifically, individuals' perceptions of how much control they believe they have over the specific behavior (i.e., perceived behavioral control, PBC). Thus, whereas TRA was designed to account behaviors under volitional control, TPB was designed to account for those which vary in terms of this control. Not surprisingly, Ajzen (1991) argued that attitudes, subjective norms, and PBC differ in terms of their impact on intentions as a function of the particular behavior under consideration. In addition, he argued that this impact can vary across situations, such that in one situation, subjective norms, for example,

may have a greater impact than attitudes on intentions whereas in another situation attitudes may have the greater impact. Finally, when PBC reflects accurately the amount of control individuals have over the particular behavior, this factor can either be a direct predictor of behavior or moderate the relationship of intentions and behavior (Ajzen & Madden, 1986). Accordingly, TPB proposes that the impact of attitudes and subject norms on behavior is fully mediated, and the impact of PBC is partially mediated, by intentions. However, it also acknowledges that intentions change with time (Ajzen, 1991).

According to Webb and Sheeran (2006), the impetus for the development of TRA and TPB, along with other models of attitude-behavior relationships (e.g., Triandis', 1977, model of interpersonal behavior), was Wicker's (1969) review of studies examining these relationships. This examined the assumption that as "attitudes are evaluative predispositions, they have consequences for the way people act" (Cohen, 1964, pp. 137-138). Accordingly, Wicker (1969) reviewed the results of 33 studies that examined the links between attitudes and behaviors. These were selected using four criteria, specifically, that individuals rather than groups were the unit of observation, at least one attitudinal and overt behavioral measure was obtained for each participant, behavior was assessed subsequent to the assessment of attitudes, and that behavior was observed rather than being simply reported by the participant (i.e., self-reported behavior). Using three classifications for attitudes and behavior (i.e., jobs, minority group members, and miscellaneous objects), Wicker (1969) concluded that although the studies examined "a wide range of subject populations, verbal attitude measures, overt behavioral measures, and attitude objects … [their results] suggest that is considerably more likely that attitudes will be unrelated or only slightly related to overt behaviors than that attitudes will be closely related to actions" (pp. 64-65). Thus, there was a need to try to explain why attitudes might, in some circumstances, be unrelated to behavior, including the possibility that attitudes might exert an influence in combination with other factors. This need was fulfilled by including subjective norms, perceived behavioral control, and intentions as additional predictors of behavior in TPB.

WHY CHOOSE TPB AS THE BASIS FOR BEHAVIOR CHANGE INTERVENTIONS?

Early approaches to changing behavior were based on the assumption that individuals have a great deal of control over their behavior. This is in keeping with neo-classical economic theory (Arrow, 1994), currently reflected in neo-liberal political economic relations, whereby people are conceived of as being rational decision makers who evaluate a given situation and make decisions that are based on self-interest (i.e., *homo economicus*; Felin & Foss, 2008). For example, within the health domain, the 1979 US Surgeon General's Report focusing on *Healthy People* argued that individuals "make personal lifestyle choices [and] healthy behavior is a significant area of individual responsibility" (p. 2-7). As a result, "most of the programs that grew out of the early push for health promotion in the U.S. tended to focus primarily on the level of personal behavior change" (Minkler, 1989, p. 19). These assumed that change could be achieved using education because individuals make rational choices to engage in a particular behavior. Accordingly, "for many years, attempts to change the health behavior of the broader public largely consisted of 'health propaganda' whereby

people would be told what to change on the assumption that they would acquiesce" (Armitage, 2014, p. 1), with a concomitant relative neglect of psychological models and paradigms (Marteau & Johnston, 1987).

Similarly, the recognition that that human activities use excessive natural resources led some researchers in environmental psychology[4] to focus on how human behavior could be changed to protect the environment (i.e., by engaging in pro-environmental behavior; Gifford, 2002). This behavior-change focus, like that in health psychology, assumed that individuals 'choose' to engage in 'environmentally-relevant behaviors' (Bonnes & Bonaiuto, 2002). This assumption of rationality led to the use of cost-benefit analyses and applied behavior analysis as a method of changing behavior (e.g., Geller, 1987). However, this approach was considered limited, partly because interventions based in it (i.e., those in which the rewards and costs associated with enacting a particular behavior are modified) can be relatively ineffective. Specifically, if the structure of rewards and costs reverts back to those that existed before the intervention, any changes in behavior will be 'lost' (Kurz, 2002). Thus, there was a need to select or develop exploratory models that would allow a fuller understanding of both health-related (e.g., Weinman, 1987) and environmental behaviors (e.g., Bonnes & Bonaiuto, 2002; Gifford, 2002). When selecting these models, those that assume that behavior is rationally determined, like TRA or TPB, were 'obvious' choices.

However, TPB is only one of a number of attitude-behavior models that assumes that behavior is rationally determined (e.g., Triandis, 1977). Its choice over these other models likely reflects the fact that it is parsimonious (McEachan, Conner, Taylor, & Lawton, 2011) in that few factors are proposed as determinants of behavior. This is particularly useful when developing interventions as, because many factors are potentially associated with behavior (Craig, Dieppe, Macintyre, Michie, Nazareth, & Petticrew, 2008; Michie, Johnston, Francis, Hardeman, & Eccles, 2008), the theory provides explicit information about those that should be considered. Second, there are clear guidelines about how to measure its constituent factors (e.g., Fishbein & Ajzen, 2010), how to analyse data that test its propositions (Hankins, French, & Horne, 2000), and how to develop appropriate interventions based on it (Sutton, 2002).

As TPB has been widely used, it is possible to determine its utility by conducting meta-analyses of the results of appropriate studies. Of course, those which have used TPB as the basis of a behavior-change intervention are the most appropriate for this purpose. However, as many more studies have considered the theory's predictions using a correlational design and have considered a relatively wide range of behaviors with various populations, we consider the meta-analyses of these studies before considering the results of intervention studies.

The meta-analyses of correlational studies have focused on both specific behaviors (e.g., breast self-examination; Norman & Cooper, 2011; alcohol consumption; Cooke, Dahdah, Norman, & French, 2014) and behavior more generally (e.g., Armitage and Conner, 2001). As these latter meta-analyses have considered the impact of a number of potential moderators of the relationships between TPB's components, we focus on these rather than those that have focused on specific types of behavior. Of these moderating factors, of specific interest are the effects of type of behavior, the length of time between the assessment of attitudes, subjective

[4] The focus of early research in environmental psychology was on the impact of both the physical and built environments on human behavior.

norms, perceived behavioral control, and intentions on the one hand and of behavior on the other, the impact of descriptive rather than subjective norms on intentions and behavior, and, finally, the role of past behavior.[5]

META-ANALYSES OF TPB-BASED CORRELATIONAL STUDIES

There have been a number of meta-analyses of correlational studies examining the predictive utility of TPB for a range of behaviors. Here, we focus on four such analyses, specifically those of Armitage and Conner (2001) and Manning (2009), who included studies examining a wide range of behaviors, and those of Bamberg and Möser (2007) who examined pro-environmental behaviors and McEachan et al. (2011) who examined health behaviors.

The behaviors under consideration in the studies analysed by Armitage and Conner (2001) and Manning (2009) ranged from children's registration in physical activity programs to household recycling and from cannabis use to sunscreen use. Forty-four of the studies examined by Armitage and Conner (2001) included a measure of self-reported behavior whereas 19 had behavioral measures that involved independent ratings or were objective. In all cases, behavior was measured prospectively, consistent with the arguments of Wicker (1969), that "a measure of behaviour taken contemporaneously with intention is actually a measure of past behaviour" (Armitage & Conner, 2009, p. 479). The remainder of the studies included focused on behavioral intentions, assessed variously as desires, intentions, and self-predictions about behavior. In contrast, all the studies examined by Manning (2009) had a measure of behavior. However, although the majority of these data (85%) were gathered prospectively, he also included studies in which behavior was measured contemporaneously with the TPB predictors. Manning (2009) argued for the inclusion of these latter studies because his "research questions were not restricted to the prediction of behaviors … [and] valuable information could be garnered from including studies that concurrently measured … behaviour (which, strictly speaking, is recollection of behaviour)" (p. 664).

Armitage and Conner (2001) included data from 185 samples published before the end of 1997. Together behavioral intentions and PBC accounted for 27% of the variance in behavior, with PBC accounting for 2% of this variance over and above that accounted for by intentions. As noted by Armitage and Conner (2001), the relatively small percentage of variance accounted for by PBC is not problematic for TPB as this factor does not predict behavior that is under an individual's volitional control which would likely vary across the behaviors included in the studies analyzed. In addition, intentions and PBC together accounted for 31% of the variance in self-reported behavior but only 20% of that in observed behavior, suggesting that self-reports of behavior may be biased in some way. Finally, consistent with TPB, attitudes, subjective norms, and PBC independently accounted for variance in intentions, with the three constructs together accounting for 39%.

In addition to examining TPB relationships, Manning (2009) considered the impact of descriptive norms (i.e., perceptions of how others behave). Ajzen and Fishbein (2005)

[5] As noted by Conner (2014), many of the studies examining TPB predictions include additional factors. It is beyond the scope of this chapter to consider the impact of these factors except where relevant (e.g., the role of past behavior).

recommended that this factor should be included in research examining TPB predictions.[6] One hundred and fifty-two studies, published between 1996 and 2006, were included. Like Armitage and Conner (2001), Manning (2009) found that attitudes, both subjective and descriptive norms, and PBC predicted behavior. However, subjective norms were a stronger predictor of intentions than descriptive norms whereas descriptive norms had a slightly stronger relationship than subjective norms. This result is, of course, inconsistent with the TPB prediction that intentions fully mediate the effect of, at least, subjective norms. Consistent with the results of Armitage and Conner (2001), PBC was a relative weak predictor of behavior. Finally, descriptive norms had a stronger relationship with behavior as the interval between their measurement increased whereas the strength of the relationship between intentions and behavior decreased. This latter result is consistent with Ajzen's (1991) argument that as this interval increases, intentions will be influenced by factors (e.g., motivational considerations) such that these may change with time.

Neither Armitage and Conner (2001) nor Manning (2009) considered whether the type of behavior examined moderates the strength of the relationships between intentions and behavior. Thus, it is possible that this is the case for pro-environmental and health behaviors. Further, as suggested by Stern (2000a), it is possible that these different types of behavior have different predictors. We now explore this by considering the meta-analyses of studies examining pro-environmental and health behaviors, respectively, those conducted by Bamberg and Möser (2007) and McEachen et al. (2011).

The studies included by Bamberg and Möser (2007) included data gathered from 57 independent samples, published from 1995 (including an *in press* study). In addition to TPB constructs, they also considered factors that comprise the norm activation model (NAM; Schwartz, 1977), specifically, moral norms, attributions of responsibility, awareness of the problem, and feelings of guilt. The inclusion criterion was that a study included at least two of the constructs of interest. As a result, only 36 studies included a self-reported measure of behavior. The behaviors of interest in these studies ranged from recycling, the use of public transport, and purchasing 'green' products.

Consistent with TPB and like Armitage and Conner (2001) and Manning (2009), Bamberg and Möser (2007) found that intentions and PBC were correlated with behavior, attitudes, social norms, and PBC were correlated with intentions, and intentions fully mediated the relationship of attitudes with behavior. In addition, NAM factors were correlated with both intentions and behavior. Bamberg and Möser (2007) also performed a meta-analytic structural equation model. This analysis revealed that, despite the correlational analysis results, intentions were predicted by PBC, attitudes and moral norms (i.e., subjective norms did not predict intentions) and behavior was only predicted by intentions (i.e., PBC was not a predictor). Further, although intentions accounted for 27% of the variance in behavior, because behavior was self-reported, Bamberg and Möser (2007) acknowledged that a reporting "bias may have resulted in an overestimation of the intention-behavior correlation" (p. 21). Despite this, it is clear that intentions do account for at least some of the variance in pro-environmental behaviors.

[6] It should be noted that Manning (2009) refers to subjective norms, as defined by TPB, as injunctive norms, the term used by Cialdini, Reno, and Kallgren (1990), and used the term subjective norms to refer to both injunctive and descriptive norms. Here we retain the use of the TPB term subjective norms.

As the pool of studies available to Bamberg and Möser (2007) was relatively limited, they were not able to examine the predictors of different types of pro-environmental behavior (e.g., recycling vs. public transport use). However, McEachen et al. (2011) were able to identify 237 tests of the predictors of some type of health behavior which met their inclusion criteria, specifically that behavior was measured prospectively,[7] that the study involved an explicit test of TPB (i.e., all model components were assessed), and that, at a minimum, the correlations between intention and behavior and PBC and behavior were reported.

To allow comparison of their results with those of other studies (e.g., Armitage & Conner, 2001), McEachen et al. (2011) examined the strength of the relationships regardless of the type of behavior. However, as they were also interested, among other things, in examining the impact of the type of behavior on TPB relationships, they coded the behaviors examined into six 'types', specifically, physical activity, dietary, risk (e.g., drug use), detection (e.g., self-examination), safer sex, and abstinence behavior.

In their test of the model using all behaviors (i.e., regardless of type), McEachen et al. (2011) found that, consistent with the results of previous meta-analyses, intentions had the strongest relationships with behavior although PBC and attitudes were also related. Similarly, consistent with TPB, attitudes, PBC, and subjective norms were related to intentions.

McEachen et al. (2011) were also able to test the impact of past behavior in a subset of the studies (k = 89). This factor was related to all TPB factors, including subjective norms. Together, intentions and PBC accounted for approximately 19% of the variance in behavior. However, past behavior accounted for an additional 11% of the variance in prospective behavior and "greatly attenuated the effects of bother intention … and PBC … although both remained significant" (p. 108).

Not surprisingly, behavior type was a moderator. More variance in physical activity (23.9%) and dietary behaviors (21.2%) was accounted for by TPB factors than in the other four behavior types. Further, the relationships between PBC and behavior and between subjective norms and intentions were attenuated across the different behavior types. Specifically, PBC has a stronger relationship to physical activity and dietary behaviors compared to detection and safer sex behaviors. In addition, subjective norms had a stronger relationship to safer sex behaviors. Finally, past behavior had a greater impact on risk and physical activity behaviors and intentions. McEachen et al. (2011) concluded that these results "may provide useful guidance as to which variables to target when attempting to change different health behaviours" (p. 127).

Taken together, the results of these four meta-analytic studies indicate that TPB not only accounts for variance in a range of behaviors but also in pro-environmental and health behaviors. Specifically, they demonstrate that intentions, descriptive norms and, in some cases, PBC are factors that predict behavior. However, because the studies included in these meta-analyses are correlational, experimental studies are required to determine whether the relationships are causal (e.g., do intentions 'cause' behavior). Consistent with this conclusion, Bamberg and Möser (2007) proposed, "the next decade of research … should concentrate more on the direct experimental test of the causal processes postulated by the theoretical frameworks" (p. 23). Similarly, Michie et al. (2007) noted that "[b]ecause the structure and

[7] Some studies included self-reported behavior. Consistent with the results of other studies (e.g., Armitage & Conner, 2001), the relationships between intentions and behavior were stronger for self-reported behavior than for that which was objectively measured.

implication of out theories … involve questions of the form, "Does changing factor X cause a change in outcome Y?, a "good" test of a theory requires an experimental design – because this is the only design that can answer questions about whether changing X engenders and change in Y" (p. 250). This necessarily involves determining the results of the intervention by comparing an experimental and a control group. We now consider whether intervention studies indicate that changing intentions, consistent with TPB's propositions, leads to changes in behavior.

DOES CHANGING INTENTIONS CHANGE BEHAVIOR?

In a relatively early examination of whether changing intentions leads to changes in behavior, Hardeman, Johnston, Johnston, Bonetti, Wareham, and Kinmonth (2002) identified 24 interventions designed to modify health behaviors predominantly among students (only one study did not use student participants). The behaviors of interest ranged from smoking cessation to testicular self-examination. Finally, the interventions designed to change intentions included presenting information either in print or recorded in some form (e.g., videotaped) or as classes/educational session(s).[8] Of the 24 studies, only 13 reported information about changes in intentions and behavior.[9] Of these, approximately half reported changes in intentions and two-thirds reported a change in behavior in the 'desired' direction. However, these represented relatively small effects and, given the relatively limited number of studies that these could be calculated for, Hardeman et al. (2002) stated that these "should be interpreted with great caution" (p. 149). Further, they argued that whereas TPB "may have a valuable contribution to make to developing effective interventions aimed at behavior changed … current evidence is lacking" (p. 151).

Like Hardeman et al. (2002), Webb and Sheeran (2006) focused on studies that evaluated the impact of an intervention designed to change intentions on changes to intentions and subsequent behavior. To be included in the analysis, the intervention had to lead to a change in intentions.[10] Webb and Sheeran (2006) identified 47 instances of such interventions. Although the majority of behaviors targeted were health behaviors, including condom use and sun protection behaviors, the review was not restricted to this type of behavior and studies designed to modify other behaviors (e.g., seat belt use) were included. In addition, a range of interventions were used, including personalized messages, experiential tasks, environmental changes, and social encouragement/pressure/ support.[11] Finally, the time span from the measurement of intentions the measurement of behavior was, on average, 15 weeks.

Webb and Sheeran (2006) reported medium-to-large changes in intentions and small-to-medium changes in behavior. However, behavior changes were larger when behavior was

[8] These can all be thought of as designed to change beliefs and, subsequently, attitudes toward the behavior.

[9] Hardeman et al. (2001) reported that they were not able to classify which TPB components were targeted in the remainder of the studies.

[10] Webb and Sheeran (2006) reported that analyses of the results of the studies where there was no change in intentions indicated that small change in behavior. This change was, not surprisingly, as large as that in studies where intention-change occurred.

[11] These interventions can be thought of as targeting not only attitudes but also, among other factors, subjective norms.

objectively measured than when it was self-reported suggesting, consistent with Bamberg and Möser's (2007) conclusion, that self-reports can be biased. Further, intention changes had less of an impact when PBC was low and when the behavior of interest was performed frequently and consistently in a particular context (e.g., wearing seat belts) rather than when it occurred in different contexts. This suggests that "[h]abitual control has a strong effect on intention-behavior relations" (Webb & Sheeran, 2006, p. 257), such that interventions are less effective to the extent that behavior is habitual. Thus, it is important to consider how habitual behavior can be changed. However, before doing this, one final result of Webb and Sheeran (2006) results requires consideration. They reported that interventions that "incorporated incentives for behaving or remaining in the program and social encouragement or support" (p. 258), had medium effects on behavior whereas other intervention types had either medium-to-small or small effects. Thus, the question is why is this type of intervention was more effective than the others.

Although Webb and Sheeran (2006) did not provide a detailed description of these different intervention types, the inclusion of social encouragement and support in the more effective intervention category suggests that normative factors are likely more effective behavior change agents than other factors. That these might be relatively effective is consistent with Manning's (2009) finding that both subjective (i.e., injunctive) and descriptive norms predicted behavior. Accordingly, we now consider whether providing individuals with information about these norms is associated with changes in behavior before we consider how to modify habitual behavior.

EVIDENCE THAT NORMATIVE FACTORS HAVE BEHAVIORAL EFFECTS

A number of studies have examined the impact on environmental behavior of providing individuals with normative information. However, few have examined the impact of this information on health behaviors (Reid & Aiken, 2013). In addition, to date meta-analyses of the results have not been conducted. As a result, we now briefly review some relevant studies.

Within the environmental domain, individuals litter more in 'littered' environments than in 'clean' ones and are more likely to do this when another litters and less likely when another picks up litter (Cialdini, Reno, & Kallgren, 1990; Reno, Cialdini, & Kallgren. 1993), indicating the impact of implied descriptive norms on behavior. In addition, when individuals focus on anti-littering injunctive norms, littering is suppressed in both clean and littered environments (Reno et al., 1993).

Studies have focused on the impact of explicit injunctive and descriptive norms on behavior. Cialdini, Demaine, Sagarin, Barrett, Rhoads, and Winter (2006) found that information about theft levels in a state forest (i.e., descriptive norms) resulted in more theft whereas injunctive norms (i.e., others' disapproval of theft) reduced it. However, Oceja and Berenguer (2009) found that when descriptive and injunctive norms are inconsistent, descriptive norms take precedence, such that observed behavior is consistent with them.

Nolan, Schultz, Cialdini, Goldstein, and Griskevicius (2008) examined the influence of descriptive and injunctive norms on energy use along with their perceived influence. Although Study 1 participants reported that others' behavior had little influence on their

energy-use, self-reported use was predicted by perceptions of others' usage (i.e., descriptive norms) along with environmental protection and money-saving motives. Their second study examined the impact of five sets of 'messages' on energy-use behavior.[12] Although descriptive normative messages were reported to be least motivating, they were the most effective in the short-term (i.e., across the first month of the study). However, after an additional month, there were no differences between message groups, suggesting "that the impact of the descriptive norm message had begun to erode" (p. 920). Together, these results indicate that salient descriptive norms influence behavior but individuals are unaware of this.

These results do not necessarily mean that beliefs and values have no influence on behavior. Göckeritz, Schultz, Rendón, Cialdini, Goldstein, and Griskevicius. (2012) found that personal involvement with energy-use issues, along with injunctive norms, modified the relationship between descriptive norms and self-reported energy conservation. Specifically, personal involvement weakened the impact of descriptive norms whereas injunctive norms strengthened it. This suggests that raising awareness of environmental problems, which some (e.g., Lorenzoni, Nicholson-Cole, & Whitmarsh, 2007; Whitmarsh, 2009) have called for, can have an impact on behavior. However, it is neither necessary nor sufficient to ensure behavior change.

Göckeritz et al.'s (2012) results are consistent with those of Schultz, Nolan, Cialdini, Goldstein, and Griskevicius (2007). They provided households with current energy use information and neighbourhood average use. Energy use was then monitored for two periods and households provided current energy use information alone or with a smiling 'emoticon' when they reduced use or a frowning one when they had not (i.e., injunctive normative feedback). All households that used more energy reduced their consumption. However, of those who used less, those who received only information increased consumption whereas households who also received the smiling emoticon did not. These consumption patterns were found both for both monitoring periods.

Mahler, Kulik, Butler, Gerrard, and Gibbons (2008) examined whether providing individuals with injunctive normative information and/or descriptive normative information enhanced the impact of an appearance-based sun protection intervention (i.e., the provision of information about how to prevent photo-aging and a photo depicting their levels of underlying sun damage). Compared to a control group, those receiving the intervention were more likely to increase their engagement in sun protection behaviors over the one-month follow-up period. Further, despite the frequency of behavior of those receiving normative information of one type not differing from that of individuals exposed to the intervention, those receiving both types of normative information were more likely to show the largest increase in the frequency of sun protection behaviors over the follow up period.

Although the results of Mahler et al. (2008) suggest that both descriptive and injunctive normative information is required, Reid and Aiken (2013) considered the role of injunctive norms. Specifically, they investigated whether correcting misperceptions of these norms with respect to sun protection versus tanning (e.g., that the 'typical' woman approves of those who protect themselves from the sun) along with information recommending the use of sunscreen,

[12] The message sets comprised four messages focusing on environmental protection information, self-interest in the form saving money, social responsibility information, information about energy conservation, and descriptive normative information. Each set focused on one energy-conservation behavior. Messages were successively distributed over a month.

protective clothing, and avoidance of sun exposes residents led to self-reported reductions in tanning behavior among a sample of female community members compared to information alone. They found that correcting these misperceptions lead to changes in self-reported behavior four weeks after the intervention. Further, this change was fully mediated by changes in attitudes and their effect on behavior, consistent with TPB, was full mediated by intentions.

Descriptive and injunctive norms provide different types of information, specifically what are the 'correct' and the socially approved courses of action, respectively (Jacobson, Mortenson, & Cialdini, 2011). Jacobsen et al. (2011) found that when individuals exert self-control this decreases the impact of injunctive norms and increases the impact of descriptive ones. They argued that this reflects the relatively effortful nature of acting in socially approved ways.

Taken together, these results indicate that when descriptive and injunctive norms are consistent, they have a relatively strong influence on behavior. They also suggest that descriptive norms can override injunctive norms when they are inconsistent, likely because following these latter norms is effortful. However, because the descriptive norms likely reflect unsustainable or unhealthy behavior, these results have limited utility for policy makers. In contrast, evidence that habitual behaviors can be changed is useful. We now review how these behaviors can be modified.

CHANGING HABITUAL BEHAVIOR

Stern (2000a) argued that some, if not most, behaviors that require changing to achieve sustainable outcomes "are matters of personal habit or household routine" (p. 415). Although initially discussed by James (1890), habitual behaviors were neglected until relatively recently. However, the recognition that between 45% and 95% of human action occurring in the same physical context is habitual (e.g., Bargh & Chartrand, 1999; Wood, Quin, & Kashy, 2002) led to a revival of interest in these behaviors across several academic disciplines (Binder, 2012).

Habitual behavior is defined as learned, goal-directed acts that become automatic with time (Aarts, Verplanken, & van Knippenberg, 1998; Verplanken, Aarts, van Knippenberg, & van Knippenberg, 1994). Thus, behavior is consciously enacted at first and, though repetition (i.e., social or didactic learning), comes to be elicited by the specific situation (Verplanken, 2006) without deliberate consideration (Verplanken et al., 1994). Further, situational cues, rather than the original goal(s), elicit it even though individuals believe that their behavior is goal-directed (Neal, Wood, Labrecque, & Lally, 2012).

It was originally assumed that the behavioral frequency is a proxy for how habitual behavior is (i.e., habit strength; Ouellette & Wood, 1998). However, equating behavioral frequency with habit strength "is … unfortunate … [as] the habit construct … is richer than behavioral frequency because it encompasses information about how behavior is executed" (Verplanken & Melkevik, 2008, p. 23). Further, it means that behaviors remain habitual without being performed frequently and that the frequency of their enactment depends on how often eliciting cues are encountered (Gardner, 2012). For example, one may travel by air infrequently but habitually queue at the passport control whenever one does.

The extent to which behavior is habitual moderates the intention-behavior relationship, such that intentions do not predict habitual behavior (Verplanken et al., 1994, Verplanken, Aarts, van Knippenberg, & Moonen, 1998). These results are consistent with Webb and Sheeran's (2006) meta-analytic results that indicate that intention-change interventions have less impact on behavior that is performed frequently and consistently in a particular context (e.g., wearing seat belts) than on behavior that occurs in different contexts. Thus, habitual behavior is "under stimulus control and can be initiated without … conscious intent and guidance" (Webb & Sheeran, 2006, p. 261) and modifying individuals' intentions with respect to behavior does not change it. Rather, the automatic associations between habitual behavior and its environmental 'triggers' require breaking. Studies that have examined how this can be achieved have focused on changing individuals' environments (i.e., the context in which behavior occurs) and forming implementation intentions that specify how to behave in a non-habitual way.

Verplanken et al. (2008) examined the effect of moving house on car use among those high or low in environmental concern. They argued that moving would increase the likelihood that important values (e.g., environmental concern) would be considered and guide behavior. Consistent with this proposition, they found that the proportion of car use by those high in environmental concern was substantially lower when they moved. Using an experimental approach, Neal, Wood, and Kurlander (2011) found that habitual 'cinema' popcorn eaters ate more popcorn, regardless of whether it was stale or fresh, in the cinema when they used their dominant hand. Further, the amount eaten was unrelated to reported hunger or liking. However, when habitual eaters used their non-dominant hand, those given stale popcorn ate less than those given fresh, indicating that changes in context/environment can lead to changes in habitual behavior, likely because this 'disrupts' the cue-behavior automatic associations and individuals engage in deliberative cognitive processing.

Implementation intentions are specific intentions of the form "I intend to do X in situation Y" (Gollwitzer, 1993). Thus, unlike intentions that specify the more general "I intend to do X", they entail specifying when behavior will occur. Although these have been successfully used to modify health-related behaviors,[13] they have been relatively neglected in studies of environmental behavior. However, Bamberg (2002, Study 1) found that among individuals who did not normally use public transport, those who formed implementation intentions to use a 'new' bus route on a specific day were more likely to use it than those who formed intentions.

Together, evidence indicates that habitual behavior can be modified either when individuals' environments change or they form implementation intentions. Holland, Aarts, and Langendam (2006) compared these methods' efficacy. They were asked to develop a program by a company whose employees, despite being repeatedly informed about the presence of recycling facilities, had not reduced their waste. These employess were exposed to one of three interventions.[14] These were providing personal paper recycling boxes, asking individuals to form implementation intentions about when, where and how to recycle paper

[13] See Gollwitzer and Sheeran (2006) for a meta-analysis of the effectiveness of forming implementation intentions on behavior.

[14] Other employees formed control groups. Their behavior did not change over the course of the study.

and plastic cups, or providing individuals with a recycling box and asking them to form implementation intentions.[15]

Holland et al. (2006) recorded the amount of paper and number of cups in employees' personal waste bins before the intervention and one week and one and two months after it. The amount of paper in bins reduced immediately following the interventions and was stable over time. Similarly, the number of cups discarded by those asked to form implementation intentions decreased and was stable over time. However, those provided with only a recycling box, not surprisingly, did not discard fewer cups. Thus, the interventions led to appropriate "almost flawless" (p. 781) recycling behavior. Further, implementation intentions and environment change had equivalent and immediate effects and new habitual behaviors emerging over the course of the study.

What these studies, and their commensurate theories, do not address is how these their findings might be understood holistically and when and why there might be resistance to changing habitual behaviors. To answer these questions we now consider the nature of social practices (hereafter practices) and Binders' (2008, 2012) Model of Recursive Cultural Adaptation (MORCA).

Although theories of practice are yet to cohere (Reckwitz, 2002), Reckwitz (2002) argued that they are:

> routinized type(s) of behaviour which consists of several elements, interconnected to one other: forms of bodily activities, forms of mental activities, 'things' and their use, a background knowledge in the form of understanding, know–how, states of emotion and motivational knowledge. A practice – a way of cooking, of consuming, of working, of investigating, of taking care of oneself or of others, etc. – forms so to speak a 'block' whose existence necessarily depends on the existence and specific interconnectedness of its elements and which cannot be reduced to any one of these single elements (p. 250).

Thus, from this perspective, a practice has material, organizational [16] and psychological aspects, each of which is necessary for that practice to be enacted. The logic of this is that a change in one aspect will change the resultant behavior (i.e., the expression of the practice in situ). Hence, practice theory 'decentres' the individual and locates behavior within a constellation of 'enablers'. However, decentring the individual means that agency is not clearly articulated nor is how and under what circumstances practices change. To understand this, we consider Binders' (2008, 2012) MORCA that integrates practice theory and psychological insights.

INTEGRATING PRACTICE THEORY AND PSYCHOLOGY

Binder (2008, 2012) developed the MORCA using the insights provided by Bourdieu's (1977, 1990) concept of habitus, James' (1890) work on habits, and Wittgensteinian insights that assert that rules are step-wise (Sharrock & Dennis, 2008). This model argues these

[15] The provision of recycling boxes involved a change in the environment/context in which behavior occurred.

[16] As this chapter primarily addresses psychological aspects of practice, there was not the scope to examine the physical and organizational ones. For an analysis of these aspects, see, for example, Shove (2003).

concepts are central to understanding how practices recruit practitioners, why these practices foster path-dependency, and under what circumstances they may change. As we have already considered how habitual behavior can be modified, we focus on habitus and rule-following as these are more closely aligned with the concerns of psychology and, more importantly, provide a means by which the "formidable challenge" (Michie et al., 2007, p. 249) of behavior change can start to be addressed. This is important for both theorists and practitioners concerned with behavior change.

According to Bourdieu (1977; 1990), individuals' habitus comprises unconscious predispositions (i.e., those that are habitual) used in everyday life. These lead to people acting in particular ways (i.e., according to the local practices appropriate, for example, for one's gender, 'race', or class) and, thus, help individuals survive and 'fit' their cultural milieu. As such, practices are, as are habits, acquired through socialization and more formal learning. Further, they are self-reproducing. For example, although there are a variety of genders, heteronormativity dominates and reproduces itself in each generation.

Binder (2008, 2012) argued that because socialisation and learning requires considerable effort, practices are valued. Thus, for those who have recently acquired a practice, either through formal teaching or more informal socialization processes, this investments would be wasted if the practice were discarded. Similarly, those who socialize or teach legitimate their valued practices by perpetuating them. Specifically, not only is there 'safety in numbers' (i.e., practices define descriptive norms) but also there is a 'truth' that comes from consensus and this also creates trust in the practice. Further, by definition, practices are 'safe' routines that are an emergent deploying of 'rules' for behaving 'correctly' (i.e., they define the injunctive norm).

Not only do these rules ensure that one engages in the 'appropriate' behavior but also their step-wise nature provides a 'knowing what to do next'. This facilitates the flow of a practice. Thus, the MORCA argues that, as long as situations remain constant, the aconscious 'flow' of practices continues uninterrupted because the next step is 'safe'. However, when individuals perceive that the situation in which practices are enacted has changed (i.e., an aspect of a practice is about to change, or seems to have or has changed), the practitioner shifts from an *aconscious* 'business as usual' to being attentive and primed to react (i.e., agentive). For example, the 'appearance' or correction of information regarding an injunctive norm can change behavior (e.g., Reid & Aiken, 2013) because the social nature of practices means that we are open to a 'correction'.

Due to the aconscious expression of practices and their inherent value, the MORCA specifies that individuals respond to perceived likely or actual change in one of three ways (Binder, 2008, 2012). First, when confronted with likely change they may do nothing. Thus, the default response is to maintain the flow of practice enactment (i.e., path-dependency). This occurs if the practitioner can 'manage' the change because the material, psychological, and organizational (e.g., the formal and/or informal policy and procedures that govern practice enactment) aspects that *enable* the practice are still effectively in place. For example, information may cause a practitioner to momentarily consider their practice, but this alone is unlikely to be effective.

Second, if there is a change to a practice aspect or aspects that affords an 'improvement' to a practice, a practitioner will likely incorporate the change and modify the practice. This is a step-wise innovation. A perceived or actual change has been incorporated into the practice and this adapted practice is habituated. Third, in contrast, if the practice is threatened or

negated by change, it will be defended (because it is valued) and individuals will act to have change 'reversed' (i.e., to restore aspects to what they were and, thereby, reinstate the particular enabler). If this is not possible, the practice must either be modified (i.e., practice adaption) or a new one has to be developed. Such changes in practice require 'a leap of faith' as there is no guarantee that a 'change' in this system of practice aspects will have the desired causal effective. Furthermore, while a practice is in transition, until it is re-habituated, there are opportunities for further modifications as it is 'open' to evaluation rather than being automatically deployed.

This lack of re-habituation explains why 'one-off' interventions do not have long term effects (e.g., Nolan et al., 2008) because the behavioral aspect of the practice has not been (re)habituated. In contrast, when interventions redefine practices through changes of their material, psychological, and organizational aspects, this will have an effect on behavior. For example, when individuals become aware that the psychological aspects of a practice have changed (e.g., by being asked to form implementation intentions), the material aspects have changed (e.g., the environment in which their practices are enacted has changed), and when with the organizational aspects have changed (i.e., the particular policies and procedures that are 'relevant' to the practice are somehow different) change will be much more likely (e.g., Holland et al., 2006). Practices, thus, are normative but not determinant in that they can adapt to changes in the relationships defined by their aspects.

The MORCA explains both successful and resisted changes that occurred when a tool, designed to help builders select more sustainable building materials required for use in a master-planned community, was developed (Binder, 2008). This process was driven by the historical and material underpinnings of the practices builders and stakeholders bought to the problem of creating a 'sustainability showcase' (Binder, 2008). The MORCA also explains the responses of the residents of Melbourne, Australia, to water restrictions necessitated by on-going drought conditions (Binder & Boldero, 2012). In both situations, existing practices were modified. For example, builders substituted more sustainable for less stainable materials (Binder, 2008). Similarly, to achieve an aspirational target of using 155 litres of water per person per day, Melburnians, for example, swapped old showerheads for free efficient ones, collected grey water for use in the garden using a bucket placed in the shower, and/or used a free 'timer' in the shower so they would know when four minutes had expired (Binder & Boldero, 2012). Interestingly, the target was met relatively quickly (within six months) and, despite the programme being discontinued and water storage levels being high, Melburnians continue to use less than 155 litres each per day, indicating that water use practices have evolved.[17]

Both these examples illustrate the utility of modifying the material, organizational, and psychological aspects of practices. The change in Melbourne's water consumption was partly achieved by physical changes, including giving residents free showerheads and timers. The timers also served to disrupt norms regarding showering. A new descriptive norm was promoted through information (i.e., that a 4-minute shower was adequate) and this was materially addressed by providing the timer. This, then, was a strategy that addressed norms but it also provided instant feedback to a person showering of their 'appropriate' water

[17] See http://www.melbournewater.com.au/content/water_storages/water_report/ weekly_water_ report.asp. A similar programme, implemented in South East Queensland, Australia, was equally successful (Walton & Hume, 2011).

consumption. Similarly, the example of the 'sustainability showcase' shows how an organizational factors *afforded* change in practice by the states land development agency believing that it was its role to lead innovation in the land development sector (Binder 2008). Furthermore, this led to a change in practice in other professions, for example, those of the builders. This broader analysis of behavior calls for a commensurate broadening of research into behavior change and the development of multidisciplinary programs designed to effect change for greater health and environmental outcomes.

Taken together, these examples demonstrate that when situations change, if individuals are provided with effective ways of changing, habitual behavior/practices change occurs. This also suggests how apparently 'non-negotiable' practices can change. The MORCA shows that while threatened change may induce defensiveness, there, nevertheless, is the potential for a change in practice where a 'benefit' can be 'demonstrated'. Thus, a perceived 'improvement' to a practice can lead to voluntary change. This suggests why policies based in economics (i.e., 'carrot and stick' policies) can sometimes work. However, the MORCA provides a greater range of potential strategies for change practitioners to use.

SUMMARY AND CONCLUSION

This chapter has discussed the utility of TPB for changing behavior, specifically that which is likely to ameliorate some of the pressing problems regarding the health of individuals and of the planet. Our review of the results of the meta-analyses that have considered both correlational studies and interventions based in the theory indicates that the proposed relationships between attitudes, subjective norms, intentions, PBC, and behavior are found and that interventions that modify intentions lead to behavior change. However, these interventions lead to relatively small changes in behavior (i.e., they are not particularly effective) and behavior change remains a 'challenge' (Michie et al., 2007). Evidence also indicates that behavior can be changed by providing individuals with information about descriptive and injunctive norms, although whether this leads to sustained change is not known. It is likely that in the absence of other changes to other practice aspects this would be unlikely.

The relative lack of effectiveness of interventions based in TPB lies in the fact that many of the behaviors of interest are not only habitual, making them resistant to TPB-based interventions (e.g., Webb & Sheeran, 2006), but also because they are behavioral aspects of practices. We have argued that the resistance to changing these particular behaviors can be understood using the MORCA (Binder, 2008, 2012). This model argues that practices exist and are transmitted between individuals (i.e., practitioners) because they allow us to function effectively (i.e., they are useful). Further, it argues that practices are enacted aconsciously unless there is a 'change' in their material, organizational or psychological aspects.

Thus, the MORCA, like TPB, argues that changing psychological aspects (e.g., injunctive and descriptive norms) have the potential to change behavior. Further, it suggests that both injunctive and descriptive norms can be 'powerful' behavior change agents because they provide information about our practices and, thus, resonate with our 'innate' sense of 'could' and 'should' as these are 'naturally' valued. Similarly, when individuals are encouraged to form implementation intentions, this also suggests what is valued.

Although it would be tempting to argue that the relative ineffectiveness of psychological approaches to behavior change is simply because we have not developed a comprehensive theory, we argue that this is not the case. Rather, by predominately focusing on the individual and neglecting the material and organizational, psychology 'fits' within a neo-liberal view that individuals have the 'freedom' to 'choose' to engage in health and environmental behaviors should they 'wish'. TPB 'fits' with this view. As a result, it has become a predominant model guiding behavior change interventions (e.g., Sniehotta et al., 2014) and its use to guide interventions can be considered a disciplinary 'practice'. Psychology, and its practices, along with all other professional and academic practices, can be considered from the perspective of practice theory and the MORCA. These practices are aconsciously enacted and valued by their practitioners (Schön 1992). However, we argue that the practice of using TPB for interventions needs modifying so that additional ways that change can be effected are considered. This necessarily invovles widening our focus to consider the material and organisational aspects of practices.

The MORCA has additional benefits when considering behavior change. It highlights the boundedness of potential change. Individuals are 'locked in' and committed to existing practice. As such, any change in practice is, by definition, political because this likely engenders defensiveness. Similarly, the model provides insight into why we are so resistant to changing habitual behaviors – they are part of our valuable practices and this creates path-dependency.

In summary, we cannot escape the fact that individuals enact behavior but they do not determine it. The 'problems' of lifestyle health issues and our impact on the environment are more holistically seen from the perspective of social practices as being 'determined' not only by psychological factors but also by material and organizational ones. Thus, these 'problems' are enabled by systemic constraints and opportunities (i.e., the material and organizational aspects of our practices). Further, how they are perceived is subject to these constraints. From this viewpoint, substantial behavior change is not possible without changing as many practice aspects as we can. Thus, behavior change is a multi- if not tran-disciplinary problem. We need research examining how the material, organizational, and psychological conditions that enable our survival and ability to flourish (i.e., our practices) can be transformed. This then needs to be used to develop programs that enable these transformations to take place if we are to improve the health of individuals and of the planet.

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