

keynote article

Health cognitions, affect and health behaviors

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Exploration of the psychological determinants of health behaviors has been an important focus of health psychology for a number of years. The thoughts and feelings that an individual has about a health behavior, or health cognitions, have received particular attention (Conner & Norman, 1996, 2005). In part this has been justified as a search for modifiable determinants of health behavior that can be targeted in interventions to improve health outcomes. Models such as the Theory of Planned Behavior, Health Belief Model, and Protection Motivation Theory have been widely used in this way (Conner & Norman, 2005). These models suggest that the thoughts and feelings I have now about a behavior will predict whether I perform that behavior in the future (partly because they inform my current decision or intention to perform that behavior and partly because that decision plus those thoughts and feelings impact on performance of the behavior when the opportunity to act presents itself). For example, the TPB suggests behavior is determined by intentions which are in turn determined by attitudes, subjective norms, and perceived behavioral control. Intentions here tap the plans or decision to act. Attitudes tap the overall evaluation of the behavior, while subjective norms tap perceptions of the reactions and the behavior of important others. Perceived behavioral control measures the perceived degree of control or confidence the individual has over performing the behavior. Prospective tests of the TPB have shown it to adequately predict a wide range of health behaviors (McEachan et al., 2011).

However, models like the TPB are firmly grounded in the cognitive tradition and focus on

cognitive influences at the expense of affective influences. Research has long highlighted their failure to adequately account for the role of affect (e.g., Manstead & Parker, 1995; van der Pligt et al., 1998). Yet, despite there being a long established distinction between, for example, cognitive and affective attitudes (e.g., Abelson, Kinder, Peters, & Fiske, 1982; Trafimow & Sheeran, 1998), it is only recently that there have been moves to reflect such distinctions in the structure of the TRA/TPB. For example, Ajzen and Fishbein (2005) recently noted that when measuring attitudes within the TRA/TPB researchers should tap both cognitive and affective components (see also Conner & Sparks, 2005).

A distinct body of research has conceptualized the role of affect in a different way. The measures used in such research are usually labelled anticipated affect to distinguish them from the affective attitudes described above. The two types of affective evaluations can be distinguished in three important ways. First, work on anticipated affect tends to focus on the affect that is expected to follow after performance or non-performance of a behavior rather than that expected to occur while the behavior is being performed. Second, anticipated affect measures tend to focus on what Giner-Sorolla (2001) describes as self-conscious emotions (e.g. regret, guilt), whereas affective attitudes tend to focus on hedonic emotions (e.g., enjoyment, excitement). Third, research on anticipated affect has tended to examine the negative affect (particularly associated with non-performance of the behaviour) while affective attitudes tend to focus on positive affect.

The present paper examines the role of affective influences on health behaviors in the context of models such as the Theory of Planned Behavior that include other established determinants of behavior. In turn the roles of affective attitudes, anticipated affect, and the joint effects of affective attitude and anticipated affect are examined. In each case both correlational and experimental data is presented. Within the correlational and experimental data exemplar primary studies (mainly conducted at Leeds) are presented along with meta-analytic summaries of the general literature. In addition, where the literature permits, the focus is on prospective studies and those employing objective measures of health behavior.

Affective attitudes

The relative importance of affective and cognitive attitudes in predicting the performance of health behavior is nicely illustrated in a study by Lawton et al. (2009). In this study a sample of members of the general public completed questionnaires tapping components of the TPB in relation to a range of different health behaviors and two months later self-reported their intentions to perform these behaviors and actual performance of the behaviors over the past two months. Importantly, respondents completed single item semantic differential measures of both affective and cognitive attitudes. Affective attitudes were tapped by how 'not enjoyable-enjoyable' the behavior might be and cognitive attitudes were tapped by how 'harmful-beneficial' the behavior might be expected to be. Comparisons of the simple correlations showed that compared to cognitive attitudes, affective attitudes were stronger predictors of intentions (10 out of 14 behaviors) and behavior (13 out of 14 behaviors). Importantly, when both types of attitude were simultaneously entered the beta weight for affective attitude was significantly

stronger than the beta weight for cognitive attitudes when predicting intentions (7 out of 14 behaviors) and behavior (9 out of 14 behaviors). This pattern was replicated by Lawton et al. (2007) but using multiple-item measures of affective and cognitive attitude (based on sets of beliefs) and objective measures of behavior for the behaviors of exceeding the posted speed limit in an adult sample of drivers and smoking initiation in an adolescent sample.

Several meta-analyses of correlational studies have confirmed the importance of affective attitudes in predicting intentions and behavior. For example, reviews of studies of physical activity have shown affective attitudes to have medium sized effects on behavior in both adult ($r = .39$, $k = 83$; Rhodes et al., 2010) and adolescent ($r = .26$, $k = 56$; Nasuti & Rhodes, 2013) samples. These are comparable to broader reviews of the TPB and physical activity that used mixed measures of attitudes (McEachan et al., 2011; attitude-behavior: $r = .30$, $k = 101$). A more recent review (Conner et al., in preparation) reported the more relevant comparison of studies that included both cognitive and affective attitude measures across a range of health behaviors. Again affective attitudes were found to be more strongly related to intentions (affective attitudes: $r = .45$, $k = 13$; cognitive attitudes: $r = .41$, $k = 13$) and behavior (affective attitudes: $r = .29$, $k = 13$; cognitive attitudes: $r = .25$, $k = 13$) although the differences were modest.

In general the correlational data to date appears to be strongly supportive of the importance of affective attitudes in determining both intentions and action for various health behaviors. The data would appear to suggest that affective attitudes are generally at least as strong as cognitive attitudes and in some cases considerably stronger correlates of intentions and behavior. The findings (Lawton et al., 2009)

also support a direct impact of affective attitudes on behavior even when controlling for intentions suggesting that affective attitudes may influence behavior directly and indirectly through intentions. However, to be considered useful targets for interventions designed to change health behaviors we need experimental studies that show affective attitudes can be readily changed and that such changes impact on behavior.

Fortunately there have been a number of experimental studies showing the value of targeting affective attitudes. For example, Sirriyeh et al. (2010) showed that receiving a daily affective text message (i.e., physical activity is enjoyable) over a two week period compared to a cognitive (i.e., physical activity is beneficial) or a combined message was sufficient to significantly increase self-reported physical activity. Conner et al. (2011) also looked at physical activity in two studies testing a written message presented as a leaflet targeting affective outcomes with a more traditional message targeting cognitive outcomes and a no message control. In both studies, self-reported physical activity was highest in the affective message condition at follow-up (3 weeks post-baseline) and this difference remained significant after controlling for baseline physical activity. Importantly, changes in affective attitudes were shown to partially mediate the changes in physical activity supporting a causal role of affective attitude change. The second study also showed the affective intervention to be more effective for particular groups of individuals, i.e., those high in need for affect. It would be useful to confirm these effects with objectively assessed physical activity.

Meta-analyses of experimental studies would also appear to support the idea that changing affective attitudes can be a useful way to change health behavior, although the reported

effect sizes tend to be small. In relation to physical activity reviews by Rhodes and colleagues (Rhodes et al., 2010; Nasuti & Rhodes, 2013) showed interventions targeting affective attitudes were associated with small to medium sized effects on behavior ($d = .35$, $k = 25$; 95% CI [.23, .48]). Other soon to be published reviews across a broader range of health behaviors suggest similar sized effects. For example, Maki et al. (2013) recently reported that studies changing overall attitudes about health behaviors were associated with small to medium effects on intentions ($d = .37$, $k = 47$) and behavior ($d = .20$, $k = 55$) with other reviews from the same group across larger samples of behaviors suggesting similar sized effects for studies changing affective attitudes.

Anticipated affect

Anticipated affect (or self-conscious affect) has also received attention as a determinant of intentions and action in relation to health behaviors. A particular focus of attention has been anticipated regret (although anticipated guilt has also received attention). One example of a correlational study in this area is that by Conner et al. (2006). This study looked at the role of anticipated regret (e.g., I would feel depressed if I smoked this term) in the context of the TPB on smoking intentions and objectively assessed smoking in a sample of adolescents. Anticipated regret showed a strong correlation with intentions ($r = .55$) and a small to medium correlation with behavior ($r = .23$). In regressions to predict intentions, anticipated regret remained significant when controlling for other TPB variables (attitudes, norms, perceived behavioral control). However, in regressions to predict behavior, anticipated regret did not remain significant when controlling for other TPB variables (intentions, attitudes, norms, perceived behavioral control). Meta-analyses of similar studies that measured regret and TPB variables (Sandberg & Conner, 2008) revealed

similar findings: a strong effect of anticipated regret on intentions ($r = .47$, $k = 25$; 95% CI [.19, .74]); a small to medium effect on behavior ($r = .28$, $k = 8$; 95% CI [.06, .50]). Regressions indicated anticipated regret was a significant predictor of both intentions and behavior when controlling for TPB variables, however only the impact on intentions remained significant when also controlling for past behavior. Overall the correlation findings for anticipated regret suggest that it may have a small to medium effect on behavior and that this effect may be partially mediated by intentions. However, to be considered a useful target for interventions to change health behaviors we need experimental studies to show that anticipated affect can be readily changed and that such changes impact on behavior.

Experimental studies targeting anticipated affect have been less commonly reported. In part this may be attributable to the difficulty of changing how much regret or guilt an individual anticipates experiencing. One way round this problem is to manipulate how much the individual's attention is drawn to potential anticipated affect. For example, we can compare groups who receive and complete versus are not exposed to anticipated affect questions. A number of studies have shown this 'question-behavior effect' for anticipated regret for behaviors such as condom use (Richard et al., 1996) and blood donation (Godin et al., 2008). Sandberg and Conner (2009) specifically looked at the effect of including such anticipated regret questions in relation to a sample of women invited for cervical screening. Women were randomly allocated to simply receive a normal invitation for screening, to receive a normal invitation plus complete a TPB questionnaire about screening, or to receive a normal invitation plus complete a TPB questionnaire about screening that included anticipated regret questions. Intention to treat analyses indicated

that screening attendance as measured by medical records showed higher attendance in the two TPB conditions (26%) compared to the no questionnaire condition (21%). Among those who completed and returned the questionnaire (and were therefore definitely exposed to the regret questions) attendance was considerably higher in the TPB plus regret condition (65%) compared to the TPB only condition (44%). Further analyses showed this was mainly due to changes in attendance among those with high intentions to attend for screening. A similar set of findings were reported for objectively assessed exercise (sports centre use) by Sandberg and Conner (2011). Importantly, this study showed that this effect of measuring regret on behavior was probably mediated by intentions. Only when the anticipated regret questions preceded the intention question was a significant effect on behavior observed. Meta analytic reviews of the limited number of experimental studies available suggest a small to medium sized effect of anticipated affect on health behavior (Conner et al., in preparation: $d = .29$, $k = 6$; 95% CI [.12 to .46]).

Affective attitudes plus anticipatory affect

The research presented above supports a small but significant role for both affective attitudes and anticipated affect on intentions and action for health behaviors. However, it leaves open the question of their simultaneous effects. Perhaps both tap the same affective influence on intentions and behavior or perhaps the two represent independent influences on intentions and behavior. Only a limited number of studies have addressed this question.

Among the correlational studies available to assess this issue Conner et al. (2013) looked at the role of cognitive and affective attitudes alongside anticipated affect in predicting intentions and action for blood donation in a large sample of blood donors. Confirmatory

factor analysis showed that measures of affective attitude, cognitive attitude, anticipated negative affective reactions and anticipated positive affective reactions could be distinguished. This supports the idea that in measurement terms we can distinguish between affective attitudes and anticipated affect. Predictive validity was examined by regression. Regressions indicated that it was cognitive attitude and both types of anticipated affective reactions that were predictive of intentions (along with perceived behavioral control from the TPB); while it was just anticipated negative affective reactions that were predictive of donation behavior (along with intentions and perceived behavioral control from the TPB). However, a weakness of this study was that the focal behavior, blood donation, may not be particularly affectively driven compared to other health behaviors such as physical activity. A fuller test might compare the effects of affective attitudes and anticipated affect across a range of health behaviors.

Such a 'fairer test' was what was attempted by Conner et al. (in preparation). This study used data from a sample of the general public across a range of health behaviors and measured both affective attitudes and anticipated affect along with other components of the TPB. Rather than reporting effects for each individual behavior this study used multi-level modelling to compare the effects across all behaviors simultaneously while controlling for the repeated measures aspect of the data. Regression analyses showed both affective attitude and anticipated affect (an anticipated regret measure) to be simultaneous significant predictors of both intentions and behavior when controlling for the effects of other TPB variables. Anticipated affect was a slightly stronger predictor of intentions, while affective attitudes were slightly stronger predictors of behavior.

Meta analytic reviews of the limited number of studies (Conner et al., in preparation; $k = 15$) that have measured both affective attitudes and anticipated affect reveal a somewhat similar pattern. There is only a small to medium sized relationship between affective attitudes and anticipated affect ($r = .38$, $k = 15$), although compared to anticipated regret affective attitudes tend to be more strongly correlated with both intentions ($r = .45$ vs. $.44$, $k = 15$) and behavior ($r = .29$ vs. $.28$, $k = 15$).

When we turn to experimental studies the available empirical evidence is even more limited and precludes any useful meta-analytic review. Indeed, only Wardle et al. (2003) appear to have designed an intervention to change both affective attitudes and anticipated affect. This study focused on colorectal screening using flexible sigmoidoscopy and compared a standard leaflet with one that targeted barriers and positive expectations in a large sample of adults (and designed to change both affective attitudes and anticipated regret). The study produced small to medium sized changes in both affective attitude ($d = .38$) and anticipated affect ($d = .36$) but only small effects on intentions ($d = .18$) and very small effects on behavior ($d = .07$). These values are smaller than those we noted earlier when reporting reviews of experimental studies changing just affective attitudes ($d = .31$ to $.37$ for intentions; $d = .20$ to $.35$ for behavior) or just anticipated affect ($d = .27$ for intentions; $d = .29$ to $.30$ for behavior). Clearly further experimental studies are required before we can draw any definitive conclusions about the value of targeting both affective attitudes and anticipated affect as a means to produce health behavior change.

Conclusions

The existing literature would suggest that when trying to change intentions and behavior there is value in focusing on affective influences

on health behavior probably in conjunction with other more widely studied influences (e.g., perceived behavioral control/self-efficacy, cognitive attitudes, norms). Affective influences probably have both direct effects on behavior, effects mediated by intentions, and also effects on the intention-behavior relationship (e.g., Keer et al., 2013). There is good evidence from both correlational and experimental studies to support a focus on either affective attitudes or anticipated affect, although the effect sizes on behavior change may only be in the small to medium range. The impact on long-term behavior change is a further focus that could benefit research examining different types of affective influence. The overlap between affective attitudes and anticipated affect would be another useful area on which to focus. Current evidence would suggest the two are only modestly correlated. In addition, the evidence concerning the value of jointly targeting affective attitude and anticipated affect in order to change health behavior is weak. Further experimental studies in this area would be particularly valuable. We need to know more about whether one construct can be changed without changing the other and the impact of changing one or both on observed behavior change. A final useful area for research is potential moderators. A range of moderators might be usefully explored including differences between behavior (e.g., risk behaviors versus protection behaviors) and individual factors (e.g., need for affect, need for cognition). ■

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