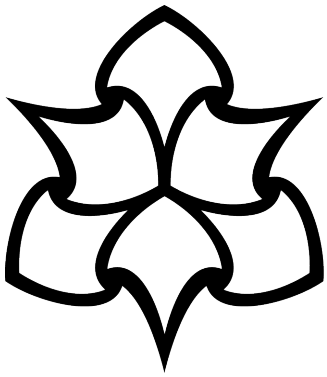

Abstract

Objective: When do people decide to do something about problematic health behaviours? Theoretical models and pragmatic considerations suggest that people should take action when they feel bad about their progress – in other words, when they experience negative progress-related affect. However, the impact of progress-related affect on goal striving has rarely been investigated.

Design and Methods: Study 1 (N = 744) adopted a cross-sectional design and examined the extent to which measures of progress-related affect were correlated with intentions to take action. Study 2 (N = 409) investigated the impact of manipulating progress-related affect on intentions and behavior in an experimental design.

Results: Study 1 found that, while engaging in health behaviours had the expected affective consequences (e.g., people felt bad when they were not eating healthily, exercising regularly, or limiting their alcohol consumption), it was feeling *good* rather than bad about progress that was associated with stronger intentions. Study 2 replicated these findings. Participants induced to feel good about their eating behaviour had marginally stronger intentions to eat healthily than participants led to feel bad about their eating behaviour.

Conclusion: The findings have implications for interventions designed to promote changes in health behaviour, as well as theoretical frameworks for understanding self-regulation.

Key words: Goals, affect, emotion, motivation, intentions.

Feeling bad about progress does not make people want to change their health behaviour

It is well established that physical inactivity, poor diet, and excessive alcohol consumption can have a substantive impact on health outcomes (Mokdad, Marks, Stroup, & Gerberding, 2004; Warburton, Nicol, & Bredin, 2006; World Health Organisation, 2014). Despite this information being relatively well known (Grunert, Wills, & Fernández-Celemín, 2010; Parmenter, Waller, & Wardle, 2000), a sizeable proportion of people do not meet recommended guidelines for healthy eating, physical activity, and alcohol consumption (Christian, Evans, Hancock, Nykjaer, & Cade, 2013; Davis et al., 2011). Perhaps even more worrying is that those who most need to change appear to be the least likely to do so (Davis et al., 2011; Loehr & Baldwin, 2014). A key issue, therefore, is when do people decide to do something about problematic health behaviours such as physical inactivity, insufficient intake of fibre, or consuming too much fat or alcohol?

One hypothesis, advanced by theoretical frameworks for understanding self-regulation (e.g., Control Theory, Carver & Scheier, 1982) is that people take action when they feel bad about their progress toward goals that they deem to be important. According to Carver (2003), affect constitutes the error signal within a feedback loop that is designed to minimize discrepancies between desired and current states. The prediction is that people will experience negative affect when their (rate of) progress toward a goal is relatively poor (compared to their desired rate of progress), whereas positive affect ensues when their (rate of) progress is better than expected or desired (for empirical demonstrations, see Carver, Lawrence, & Scheier, 1999; Mack, Kouali, Gilchrist, &

Sabiston, 2015; Moberly & Watkins, 2010). This prediction is also consistent with research that investigates how people think and feel about their behaviour (e.g., Fishbach, Eyal, & Finkelstein, 2010; O'Brien & Klein, 2017) and work that describes mood as providing information – for example, that positive moods suggest that things are going well and so decrease motivation (Martin, Ward, Achee, & Wyer, 1993). Assuming that people are motivated to reduce discrepancies (i.e., that achieving the desired state is important to them) then Control Theory suggests that the experience of negative affect should lead people to act in order to reduce the discrepancy.

This line of reasoning leads to two predictions: First, the extent to which people engage in health behaviours (or at least view themselves as doing so) will be associated with affect, such that engaging in health behaviours that serve goals that are deemed important (e.g., physical activity when the goal is to exercise regularly) is likely to be associated with positive feelings, while engaging in behaviours that compromise such goals (e.g., drinking alcohol when the goal is to limit alcohol consumption) is likely to be associated with negative feelings. Second, affect accruing from perceptions of goal progress will be associated with intentions to strive for the goal and subsequent goal-related action, such that negative affect (signalling poor progress toward health-related goals) will be associated with stronger intentions to take action and more substantive changes in behaviour.

Despite the popularity of Control Theory for understanding self-regulation (Johnson, Chang, & Lord, 2006) and for developing behaviour change interventions (Michie, Abraham, Whittington, McAteer, & Gupta, 2009), relatively little research has examined the central premise that affect associated with goal progress influences how

motivated people are to take action. Previous work has tended to investigate the effects of feedback on motivation (e.g., Fishbach, Eyal, & Finkelstein, 2010) or the effects of general affect on effort (e.g., Gendolla, 2012), rather than feelings associated with goal progress. This latter work supports the idea that poor progress and negative affect tend to increase effort (relative to better progress or positive affect), but the focus is on the effects of relatively diffuse, primed emotional states, rather than the effects of specific feelings about progress. There has also been scant research on behaviour(s) related to health, and reviews point to the challenges of making people actually feel unhappy enough to want to take action (e.g., Dolan & Kavetsos, 2012).

Furthermore, other work suggests that *positive,* rather than negative, affect might motivate action. For example, Custers and Aarts (2005) found that the motivation to strive for everyday goals could be increased by subliminally pairing that goal with positive affect (for similar findings, see Kuhl & Kazen, 1999; Kazen & Kuhl, 2005). Evidence also suggests that positive mood generally (Cameron, Bertenshaw, & Sheeran, 2015; Fishbach & Labroo, 2007) and positive goal-related affect (e.g., pride; Damian & Robbins, 2013; Mack et al., 2015) can be associated with stronger motivation to engage in health related goals, such as healthy eating or physical activity. Experiencing negative affect can also lead people to focus on mood repair, even when so doing compromises their long-term goals (Tice, Bratslavsky, & Baumeister, 2001). Taken together then, we currently do not have a clear answer to the question of when people are likely to decide to do something about problematic health behaviours such as insufficient physical activity, poor diet, or excessive alcohol consumption. The present research was therefore designed

to test the relation between the feelings that people have when they think about their progress toward key health goals and their subsequent intentions and action.

Study 1: Associations between goal progress, progress-related affect, and intentions

Study 1 adopted a correlational design and investigated the relationships between (i) goal progress and progress-related affect and (ii) progress-related affect and intentions to strive for the respective goal. These relationships were tested in relation to three health behaviours: eating healthily, engaging in physical activity, and reducing alcohol consumption. We focused on these behaviours due to their importance in shaping health-related outcomes (e.g., Warburton et al., 2006; World Health Organisation, 2014) and the substantial number of people who currently do not meet recommended guidelines for performance of the respective behaviour(s) (Christian et al., 2013; Davis et al., 2011). In each case, it was predicted that engaging in behaviours that compromise health goals (i.e., greater consumption of fat and alcohol, lower levels of physical activity and fibre intake) would be associated with negative affect; an effect that would be more pronounced among those who deem the respective goals to be important. It was also predicted that negative progress-related affect would be associated with stronger intentions to engage in healthy behaviours (e.g., to do more physical activity).

Method

Participants

A power calculation determined that we would need at least 550 participants to have 80% power to identify small effects (f^2 = .02) in a regression analyses with three predictor variables. N = 744 participants therefore completed an online questionnaire in

response to a request sent to a list of research volunteers at a large university in the UK (participants recruited in this way were offered the chance to win a £50 Amazon voucher) and an advert placed on the crowdsourcing platform 'Prolific Academic' (participants recruited in this way were paid £4 for their time). Participants were predominantly female (63.11%) and aged between 17 and 69 years (M = 25.88, SD = 9.16).

Questionnaire measures

Healthy eating was measured using the Dietary Instrument for Nutrition Education (DINE) questionnaire (Roe, Strong, Whiteside, Neil, & Mant, 1994). Participants were asked to report how much of different foodstuffs they typically consume each week and the information was used to compute intake of fibre and fat.

Levels of physical activity were measured using the short version of the International Physical Activity Questionnaire (IPAQ; Booth, 2000). Participants were asked to report the amount of time that they spent doing vigorous physical activities, moderate physical activities, and walking over the past week. This information was then used to compute an estimate of energy expenditure.

Alcohol consumption was measured using items from the General Lifestyle Survey (Office for National Statistics, 2013). These measures ask participants to recall which alcoholic drinks they have drunk over the last seven days and this information is then used to compute the total number of units consumed over the week.

Affect associated with goal progress was measured by adapting the Russell Affect Grid (Russell, Weiss, & Mendelsohn, 1989). Participants were asked to indicate how they feel about their progress with respect to each of the three goals (i.e., 'the extent to which you eat healthy foods / the amount of exercise you do / the amount of alcohol that you

drink') by clicking on a grid where the vertical dimension reflects levels of arousal (i.e., feelings of activation of energization) and the horizontal dimension reflects valence (i.e., negative or positive feelings). Levels of valence and arousal were calculated separately by converting the raw coordinates on the grid (where the x coordinate represents valence and the y coordinate represents arousal) into a score ranging from -4 to +4.

The importance of each of the respective goals was measured with a single item: 'It is important to me to eat healthy foods / exercise regularly / limit my alcohol consumption' (1 = Strongly disagree; 5 = Strongly agree).

The strength of participants' intentions to achieve each of the respective goals was measured with three items: 'I intend to / have decided to / want to eat healthy foods / exercise regularly / limit my alcohol consumption' (1 = Strongly disagree; 5 = Strongly agree; α = 0.84, 0.89, and 0.92, respectively).

Analysis

A series of multiple regressions and moderation analyses (using Hayes PROCESS macro, Hayes, 2013) were used to investigate the relationships between the perceived importance of the respective goal, current behaviour, progress-related affect, and subsequent intentions. Outliers (values > 3 *SD*s from the mean) were winsorised prior to analysis. For the moderation analyses the variables were standardised prior to analysis and the relationships are compared at low (1 *SD* below the mean), and high (1 *SD* above the mean) levels of the moderator.

Results

The relationship between engaging in health behaviours and affect

To test the hypothesis that engaging in health behaviours would be associated with affect (at least among those who deemed the respective goal to be important), we regressed the valence of affect associated with engaging in healthy eating, physical activity, and alcohol consumption on the extent to which participants engaged in each of these behaviours, the importance of the respective goal, and the interaction between engaging in each of the health behaviours and the importance of the respective goal.

Engaging in health behaviours reliably predicted affect associated with goal progress (βs = 0.24, -0.12, 0.27, and -0.13, for fibre intake, fat intake, physical activity, and alcohol consumption, respectively, ps < .01).In each case, 'healthy' behaviours (i.e., greater intake of fibre, lower intake of fat, higher levels of physical activity, and lower levels of alcohol consumption) were associated with positive affect, while less healthy behaviours (i.e., lower intake of fibre, greater intake of fat, lower levels of physical activity, and higher levels of alcohol consumption) were associated with negative affect.

The interaction between the perceived importance of the respective goals and engaging in relevant health behaviours on affect associated with goal progress did not significantly predict fibre intake (β = -0.05, p = .349) or physical activity (β = 0.10, p = .102), but was a marginally significant predictor of fat intake (β = -0.08, p = .079). As expected, simple slopes revealed no association between fat intake and progress related affect when the goal was not considered to be important or was only deemed to be moderately important (β = 0.02, p = .706; β = -0.06, p = .188; respectively). However,

when the goal of eating healthily was considered highly important, greater intake of fat was associated with negative progress related affect (β = -0.14, p = .027).

The interaction between the importance of limiting alcohol consumption and alcohol consumption also significantly predicted affect associated with progress toward the corresponding goal (β = -0.22, p < .001). As expected, simple slopes revealed that there was no association between alcohol consumption and progress-related affect when reducing alcohol consumption was not deemed to be important (β = 0.06, p = .279). However, when participants considered the goal of reducing alcohol consumption to be moderately or highly important, greater levels of drinking were associated with feeling bad about progress toward this goal (β s = -0.16 and -0.39, respectively, ps < .001).

Taken together, these findings suggest that engaging in health behaviours had the expected consequences on affect associated with goal progress (e.g., participants felt bad when they were not eating healthily, exercising regularly, or limiting their alcohol consumption, especially when they deemed the respective goals to be important).[1]

The relationship between affect and intentions

To test the hypothesis that affect associated with goal progress would be associated with intentions to pursue the focal goal, we regressed intentions on the valence of affect associated with goal progress. Affect associated with goal progress predicted intentions to engage in physical activity (β = 0.13, p < .001) and to eat healthily (β = 0.12,

[1] We also examined whether participants' age and gender influenced the relations of interest. These analyses (reported as supplementary materials) suggested that, for the most part, age and gender did not influence the effect of behavior on progress-related affect, or the effect of progress-related affect on intentions to take action. The only exceptions were (i) an interaction between gender and alcohol consumption on affect associated with thinking about the amount of alcohol consumed, and (ii) a marginally significant interaction between gender and affect associated with goal progress on intentions to reduce alcohol consumption.

$p < .001$), but not intentions to limit alcohol consumption ($\beta = -0.02$, $p = .460$). Contrary to our predictions, however, participants had stronger intentions to eat healthily and engage in physical activity when they felt good, relative to bad, about their goal progress.

Discussion

Study 1 found that, while engaging in health behaviours tended to have the expected affective consequences (e.g., people felt bad when they were not eating healthily, exercising regularly, or limiting their alcohol consumption), it was feeling *good* rather than bad about goal progress that was associated with stronger intentions to eat healthily and engage in physical activity in the future. The implication is that, in contrast to the predictions of Control Theory, the negative affect that appears to signal poor progress does not typically motivate people to take action. We note, however, that there was no relationship between progress-related affect and intentions to reduce alcohol consumption.

An important limitation of Study 1, however, is that it adopted a cross-sectional design and affect associated with goal progress was measured, rather than manipulated. It is therefore possible that people felt good about their progress *because* they intended to take action in the future (i.e., intentions drove affect, rather than vice versa). In order to address this concern, and provide an experimental test of the relation between affect associated with goal progress and motivation to take action, we conducted a second study that manipulated how people felt about their goal progress.

Study 2: The effect of manipulating progress-related affect on self-regulation

To investigate whether progress-related affect has a causal impact on subsequent intentions to act, Study 2 adopted an experimental design in which progress-related affect

was manipulated by asking participants to reflect on aspects of their eating behaviour about which they either felt positive and proud (a procedure that was designed to induce positive progress-related affect) or negative and guilty (designed to induce negative progress-related affect). We also measured behaviour in the wake of the manipulation to see whether manipulating progress-related affect led to changes in behaviour via the anticipated effects on motivation. Study 2 focused on eating healthily as Study 1 demonstrated that (i) engaging in behaviours pertaining to this goal were associated in predictable ways with progress-related affect, and (ii) affect was associated with intentions to eat healthily.

Method

Participants

A power calculation determined that at least 200 participants would be needed to provide 80% power to detect small effects (f = .10) in a factorial ANOVA with two between and two within-participant variables. Therefore, N = 409 participants who reported that they are currently trying to eat healthily were recruited via an email to a list of volunteers at a large university in the UK and asked to complete two online questionnaires, one week apart (participants were placed in a prize draw to win £50). The link to the first questionnaire randomly allocated participants to one of two conditions: Participants in the 'positive reflection' condition were invited to think about food choices that made them feel positive and proud, while participants in the 'negative reflection' condition were invited to think about food choices that made them feel negative and guilty. N = 27 participants did not report any food choices and so were excluded from subsequent analyses. Of the 392 participants who did report food choices in the first

questionnaire (M_{age} = 26.92, *SD* = 10.44, 78.74% female), *N* = 275 (70.15%) completed the second questionnaire one week later (M_{age} = 27.53, *SD* = 10.79, 80.81% female).

Baseline questionnaire

As in Study 1, *healthy eating* was measured using the Dietary Instrument for Nutrition Education (DINE; Roe et al., 1994).

The *importance of the focal goal* was measured with two items: 'It is important for me to eat healthily' (Strongly disagree = 1; Strongly agree = 7) and 'Eating healthily is one of my top priorities' (Strongly disagree = 1; Strongly agree = 7) (*r* = 0.64).

Manipulation of progress-related affect. Next, participants were asked to complete a task designed to manipulate progress-related affect. Participants in the positive reflection condition were asked to describe foods that they had eaten over the past week that made them feel positive and proud, while participants in the negative reflection condition were asked to describe foods that they had eaten over the past week that made them feel negative and guilty. Participants were then asked to reflect on why those choices made them feel the way that they did.[2]

Measures of affect and goal progress. Goal progress was measured with three items 'I currently do not eat as healthily as I would like' and 'I am making good progress towards my goal of eating healthily' (with the response format, 1 = Strongly disagree; 5 = Strongly agree) and 'In your opinion how close are you to attaining your goal of healthy

[2] To confirm the efficacy of this manipulation, we conducted a pilot study in which *N* = 39 participants were randomly allocated to one of the two conditions before affect associated with goal progress was measured using the Russell Affect Grid. As expected, participants who reflected on food choices that made them feel positive and proud reported feeling more positive when they thought about the extent to which they eat healthily (*M* = 2.53, *SD* = 1.12) than participants who reflected on food choices that made them feel negative and guilty (*M* = 0.92, *SD* = 1.61), $F(1, 37) = 13.08$, $p = .001$, $d = 1.16$.

eating' (1 = Very close; 5 = Very far; α = 0.77).

Affect associated with goal progress was measured using the Russell Affect Grid, as before. Participants were asked to indicate how they feel about the extent to which they eat healthy foods by clicking on a grid where the vertical dimension reflects levels of arousal and the horizontal dimension reflects valence.

Intentions to eat healthily over the next week were measured with three items 'I really want to eat healthily over the next week' / 'I intend to eat healthily over the next week' / 'I will try hard to eat healthily over the next week' (1 = Strongly disagree; 5 = Strongly agree; α = 0.85).

Follow-up questionnaire

One week later, participants completed the DINE again to assess the extent to which they had eaten healthily over the past week. Participants were then thanked and debriefed.

Analysis

Analysis of variance was used to investigate the effects of the manipulation on perceived goal progress, affect associated with goal progress, intentions to eat healthily and subsequent behaviour. Outliers (values > 3 *SD*s from the mean) were winsorised prior to analysis and the variables were standardised for the mediation analysis. Hayes' PROCESS macro (Hayes, 2013) was used to test whether the impact of the manipulation on affect was mediated by perceptions of goal progress. We also undertook a sequential mediation analysis (manipulation → progress-related affect → intention → behaviour) to test whether the manipulation influenced intentions and behaviour via its influence on progress-related affect (again using Hayes' PROCESS macro).

Results

Manipulation check

The effect of condition (positive vs. negative reflection) on perceived goal progress and affect associated with goal progress was assessed using MANOVA[3]. There was a significant multivariate effect of condition, $F(2, 340) = 3.35$, $p = .036$, partial $\eta^2 = .02$. Inspection of the univariate effects revealed a significant effect of condition on perceived goal progress, $F(1, 341) = 3.92$, $p = .049$, $d = 0.21$. Participants who described foods that they had eaten over the past week that made them feel positive and proud believed that they were nearer to achieving the focal goal ($M = 3.04$, $SD = 0.77$) than did participants who described foods made them feel negative and guilty ($M = 2.87$, $SD = 0.84$). There was also a significant effect of condition on progress-related affect, $F(1, 341) = 5.90$, $p = .016$, $d = 0.26$. Participants who described foods that they had eaten over the past week that made them feel positive and proud reported feeling more positive when they thought about the extent to which they eat healthily ($M = 1.07$, $SD = 2.04$) than did participants who described foods that made them feel negative and guilty ($M = 0.51$, $SD = 2.24$).

A mediation analysis was used to investigate whether the effect of the manipulation on progress-related affect was mediated by its effects on perceived goal progress. The findings supported this idea. Specifically, there was a significant indirect effect of condition on progress-related affect through perceived goal progress, $\beta = 0.11$,

[3] We did not investigate whether this relationship was moderated by the importance of the focal goal, as in Study 1, because all participants in Study 2 were trying to eat healthily and, therefore, likely deemed this goal to be important. In support of this idea, participants reported that it was important to them to eat healthily (7-point scale, $M = 6.00$, $SD = 1.04$) and that eating healthily was one of their top priorities (7-point scale, $M = 5.22$, $SD = 1.34$).

BCa CI [0.004, 0.222], which explained a relatively small, yet significant proportion of the variance, $R^2 = 0.011$, BCa CI [0.000, 0.036]. These analyses suggest that asking participants to reflect on recent food choices that either made them feel positive and proud or negative and guilty altered their perceptions of the extent to which they were making progress toward their goal of eating healthily that, in turn, shaped how they felt about their progress toward that goal.

The effect of progress-related affect on intentions

An ANOVA revealed that the effect of condition on intentions to eat healthily over the next week approached significance, $F(1, 376) = 3.73$, $p = .054$, $d = 0.20$. Participants who described foods that they had eaten over the past week that made them feel positive and proud reported marginally stronger intentions to eat healthily over the coming week ($M = 4.12$, $SD = 0.60$) than participants who described foods that they had eaten over the past week that made them feel negative and guilty ($M = 3.98$, $SD = 0.76$).

The effect of progress-related affect on behaviour

To investigate the effect of manipulating progress-related affect on subsequent behaviour, the amount of fibre and fat consumed at baseline and follow-up between the conditions was compared using two repeated measures ANOVAs. There was a main effect of time on the amount of fat consumed, $F(1, 270) = 23.06$, $p < .001$, $d = 0.23$. Participants reported consuming less fat at follow-up ($M = 21.31$, $SD = 8.58$) than at baseline ($M = 23.31$, $SD = 8.90$). However, there was no effect of condition on fat intake, $F(1, 270) = 1.39$, $p = .239$, $d = 0.10$, and no interaction between time and condition on fat intake, $F(1, 270) = 0.84$, $p = .361$, partial $\eta^2 = .003$. The effect of time, $F(1, 268) = 0.88$, $p = .348$, $d = .04$, condition, $F(1, 268) = 0.04$, $p = .843$, $d = .02$, and the interaction between

time and condition, $F(1, 268) = 0.48$, $p = .491$, partial $\eta^2 = .00$, on fibre intake were also non-significant.[4]

Does perceived progress influence behaviour via (changes in) progress-related affect and intentions?

Mediation analyses were conducted to test the proposed indirect effect of the manipulation on behaviour change via (changes in) progress-related affect and intentions to eat healthily. There was a significant indirect effect of condition on fat intake through progress-related affect and intentions to eat healthily, $\beta = -0.01$, BCa CI [-0.041, -0.001]. Participants who reflected on food choices that made them feel positive and proud experienced more positive progress-related affect, which led to stronger intentions to eat healthily, which led them to consume less fat over the following week (see Figure 1).

The indirect effect of condition on fibre intake, was similar, except that it seemed to bypass intentions. Specifically, there was a significant indirect effect of condition on fibre intake through progress-related affect, $\beta = 0.07$, BCa CI [0.018, 0.157]. Participants in the positive reflection condition experienced more positive progress-related affect, which in turn led them to consume more fibre over the following week (see Figure 2).

Discussion

Study 2 experimentally tested the impact of progress-related affect on intentions to eat healthily and subsequent behaviour. We manipulated progress-related affect by asking participants who were trying to eat healthily to reflect on recent food choices that either made them feel positive and proud or that made them feel negative and guilty. The manipulation had the anticipated effects on perceived goal progress and progress-related

[4] Age and gender did not affect the findings in Study 2 (see supplementary materials)

affect. Furthermore, participants who reflected on food choices that made them feel positive and proud subsequently reported marginally stronger intentions to eat healthily over the next week than participants who reflected on food choices about which they felt negative and guilty. These findings are consistent with those of Study 1 and support the idea that the negative affect that signals poor progress does not typically motivate people to take action. Rather, feeling *good* about goal progress seems to lead to stronger intentions to engage in eating healthily.

Study 2 also examined the effect of progress-related affect on behaviour. In contrast to the predictions of the Theory of Planned Behaviour (Ajzen, 1991), which posits a direct relation between intentions and behaviour, the (marginally significant) differences in intentions to eat healthily that we observed between the conditions did not translate into differences in eating behaviour over the coming week. To an extent this finding is intelligible and is consistent with the findings of previous interventions, which have successfully changed participants' intentions yet have not found a corresponding effect on behaviour (e.g., Irvine, Ary, Grove, & Gilfillan-Morton, 2004; for a review, see Webb & Sheeran, 2006). Having said that, manipulating perceived progress had a significant indirect effect on both fat intake and fibre intake. Specifically, feeling good about goal progress led to stronger intentions to eat healthily, which then reduced fat intake over the following week. The indirect effect of the manipulation on fibre intake did not go through intentions, but rather the evidence suggested that feeling good about goal progress directly influenced fibre intake over the following week. The different way in which goal progress influenced the two outcomes could be explained by what the participants were thinking of when they described their intentions to "eat healthily".

Given that intentions predicted fat but not fibre intake, it seems likely that the participants were thinking of the extent to which they intended to eat fatty foods (rather than fibre) when asked about their intentions to eat healthily. Taken together then, the findings suggest that intentions to eat healthily are associated with behaviour, but are also consistent with the substantive literature that attests to the difficulties that people have translating intentions into action (for reviews, see Sheeran, 2002; Sheeran & Webb, 2011; in press; Webb & Sheeran, 2006).

It is worth noting that we did not include a control condition in Study 2 in which participants were not asked to reflect on their food choices. As such, it is not possible to determine whether (i) positive affect makes people feel that they have made more progress, (ii) negative affect makes people feel that they have made less progress, or (iii) both. We suspect that both manipulations influenced goal progress, but research on the asymmetrical effects of positive and negative feedback and affect more generally (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001) would suggest that additional empirical studies incorporating a control condition that does not receive an intervention designed to influence progress-related affect would be valuable.

General Discussion

A correlational study and an experimental study investigated whether (i) affect signals goal progress and (ii) whether this resulting progress-related affect has an influence on goal striving. The findings of both studies supported the idea that, consistent with previous empirical research (e.g., Mack et al., 2015; Martin et al., 1993; Moberly & Watkins, 2010) and the predictions of Control Theory (Carver, 2003), affect is reliably associated with goal progress. However, the effect of progress-related affect on goal

striving appeared to contrast with the predictions of Control Theory. Instead of the negative affect that accrues from relatively poor progress motivating people to take action, it was positive affect that was associated with stronger intentions to take action. Study 1 demonstrated this using a correlational design. While poor progress toward the goals of eating healthily, engaging in physical activity, and limiting alcohol consumption was associated with negative progress-related affect, it was feeling good about progress that was associated with stronger intentions to pursue the three goals. Study 2 manipulated progress-related affect. The findings supported those of Study 1 to the extent that participants induced to feel positive about their goal progress tended to express stronger intentions to eat healthily relative to those who were led to feel negative about their goal progress. While there was no total effect of condition on healthy eating behaviour, this could be due to the oft-cited gap between intentions and action (for reviews, see Sheeran, 2002; Webb & Sheeran, 2006). Furthermore, there was an indirect effect of condition on fibre and fat intake in the direction that is consistent with Study 1. Specifically, feeling good about goal progress led participants to consume more fibre and led to stronger intentions to eat healthily, which then led participant to consume less fat.

Study 2 also found a significant change in fat intake from before to after the intervention, despite no interaction with condition. This suggests either (i) that simply asking individuals to reflect on their goal progress – either the good or the bad aspects of it – can promote ‘good’ outcomes over the following week or (ii) that being asked to complete the Dietary Instrument for Nutrition Education (DINE; Roe et al., 1994) at baseline may have called participants attention to the need to eat more healthily in the next week. Both of these suggestions are consistent with recent evidence that prompting

people to monitor their goal progress can promote changes in behaviour (Harkin et al., 2016), potentially because it overcomes people's tendency to bury their heads in the sand and avoid thinking about how they are doing (a phenomena that has been termed 'the ostrich problem', Webb, Chang, & Benn, 2013).

The present findings stand in contrast to theoretical perspectives which suggest that negative affect motivates people to address discrepancies between their current and desired (rates of) goal progress (e.g., Control Theory, Carver, 2003). Other evidence suggests that negative affect may prompt people to prioritise affect regulation over long-term health goals (i.e., when people feel bad, they engage in behaviours to make themselves feel better, such as eating cake; Tice et al., 2001), which may explain why participants in the present research intended to eat marginally less healthily when led to feel bad about their goal progress.

The finding that people intend to take action when they feel good about their progress was unexpected. However, other studies have found evidence that feeling good about progress can, under some circumstances, prompt goal-directed action. For example, Louro et al. (2007) manipulated both affect associated with progress toward the goal of losing weight and participants' perceptions of their progress toward the same goal. Louro et al. found an interaction between progress-related affect and how close participants were to achieving the respective goal (termed 'goal proximity') such that positive affect was associated with greater efforts directed at goal-striving (as we observed in our studies) only when the participants deemed themselves to be further from attaining their goal of losing weight. When the participants felt closer to achieving their goal, positive affect decreased efforts directed at goal striving, in line with control theory (Carver, 2003). In

short, whether participants deemed themselves to be near or far from achieving the desired outcome moderated the effect of progress-related affect on goal-striving. These findings suggest that participants in our studies may have felt a long way from achieving their goal(s) (e.g., of eating healthily) and point to the importance of measuring how close participants feel to attaining the respective goal in subsequent research.

Our findings also stand in apparent contrast to those of Fishbach and colleagues (e.g., Fishbach et al., 2010) who reported that positive feedback that is interpreted as reflecting good progress can lead to *decreases* in goal striving or a shift of focus toward a concomitant goal (consistent with the predictions of Control Theory). Our findings are more consistent with other findings that Fishbach and colleagues observe when people interpret feedback on their goal-directed actions as indicating their commitment to the goal (when this happens participants typically increase their efforts to attain the goal). Sadly, we did not measure perceived goal commitment in the wake of the manipulation in Study 2 (measures of the importance of the respective goal were taken prior to the manipulation) and so are not able to test whether the manipulation influenced commitment as well as perceived progress using the present data. However, Fishbach and colleagues' research points to the importance of considering the inferences that people draw from reflecting on their goal-directed actions and the need for further studies that (i) measure perceived commitment alongside perceived progress in the wake of manipulations such as that employed in Study 2, and (ii) independently manipulate perceived progress and commitment to examine their (independent and conjoint) effects on motivation and goal-directed action.

The finding that affect associated with goal progress can influence peoples'

intentions to take action, points to the potential of manipulating affect associated with goal progress as a route to promoting changes in health behaviour (for a review, see Cameron et al., 2015). However, Study 2 found that these changes in intentions did not directly translate into statistically significant changes in behaviour (although there was an indirect effect via changes in progress-related affect and intentions). From a practical perspective then, it is important to understand how people might be encouraged to maintain positive affect in the face of difficulties and / or poor progress. For example, people might be encouraged to contextualise behaving in ways that are inconsistent with their longer-term goals (e.g., drinking a high-fat milkshake when the goal is to diet, Herman & Mack, 1975) as a small mistake or slip, rather than as fundamentally undermining the effort to attain the goal (Webb, Sheeran, & Armitage, 2006).

Another potential strategy might be to encourage people to form implementation intentions (Gollwitzer, 1999) to support their intentions to take action. Implementation intentions are 'if-then' plans, which specify both a good opportunity to act (in the *if*-part of the plan) and a suitable response to that opportunity (in the *then*-part of the plan). Planning in this way has been shown to aid the translation of intentions to eat healthily into behaviour (Adriaanse, Vinkers, De Ridder, Hox, & De Wit, 2011; for a review, see Gollwitzer & Sheeran, 2006). As such, combining an intervention designed to encourage people to feel more positive about their progress toward a focal goal with a volitional intervention such as implementation intentions may have a positive effect on behaviour, as demonstrated for other combined motivational and volitional interventions (Harris et al., 2014; Milne, Orbell, & Sheeran, 2002).

Conclusion

Two studies provide support for the idea that perceived goal progress affects progress-related affect, which can then affect intentions to strive towards the focal goal. However, our findings also suggest that the self-regulatory consequences of these feelings may not facilitate goal attainment. Specifically, it appears that people are motivated to take action when they feel good, rather than bad, about their progress. In other words, they are least likely to be motivated to take action when they perhaps most need to. At the theoretical level, these findings have implications for theories of self-regulation such as control theory and, at the practical level, they suggest that interventions designed to promote changes in health-related behaviours (e.g., promote healthy eating) should consider inviting participants to focus on reasons why they might feel good, rather than bad, about their progress to date, especially if the participants still have a way to go to achieve the respective goal.

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Table 1

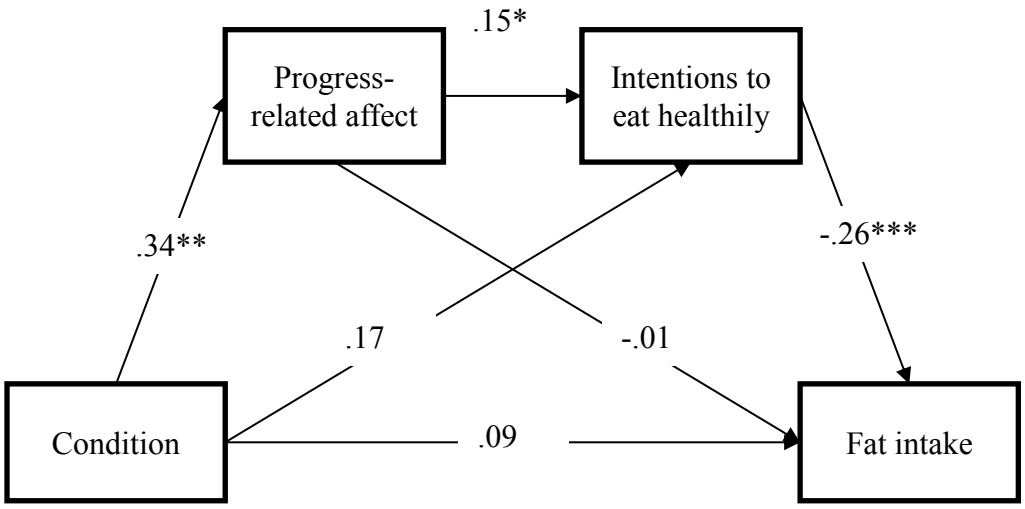
Self-Regulatory Outcomes by Condition and Time (Study 2)

Self-regulatory outcome	Positive reflection condition	Negative reflection condition	Univariate *F*
Perceived progress	3.06 (0.78)	2.86 (0.85)	5.23*
Progress-related affect	1.07 (2.04)	0.51 (2.24)	5.90*
Intentions to eat healthily	4.12 (0.60)	3.98 (0.76)	3.73^{+}
Fibre intake (baseline)	27.54 (11.04)	27.61 (11.26)	0.00
Fibre intake (follow-up)	27.37 (11.91)	26.52 (11.51)	0.35
Change in fibre intake	0.60 (9.09)	-0.49 (8.80)	1.00
Fat intake (baseline)	24.03 (9.07)	22.50 (8.66)	2.01
Fat intake (follow-up)	21.68 (7.92)	20.91 (9.22)	0.54
Change in fat intake	-2.36 (6.85)	-1.53 (6.60)	1.06

Note. $^{+}$ $p < .10$, * $p < .05$.

Figure 1

A Multiple Mediation Model Showing the Indirect Effect of Condition on Fat Intake

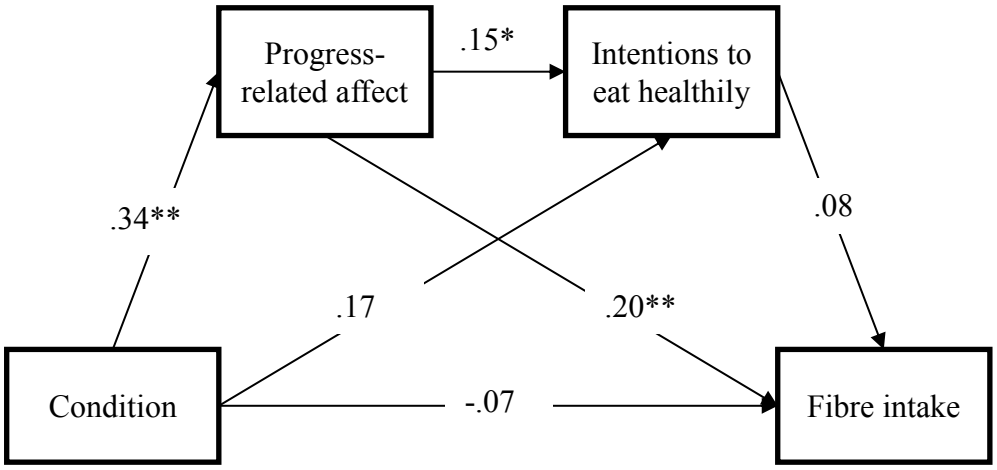


*$p < .05$, **$p < .01$, ***$p < .001$

Indirect effect through progress-related affect, β = -0.00, BCa CI [-0.062, 0.035].
Indirect effect through intentions, β = -0.05, BCa CI [-0.138, 0.020].
Indirect effect through progress-related affect and intentions, β = -0.01, BCa CI [-0.041, -0.001].

Figure 2.

A Multiple Mediation Model Showing the Indirect Effect of Condition on Fibre Intake



*$p < .05$, **$p < .01$, ***$p < .001$

Indirect effect through progress-related affect, $\beta = 0.07$, BCa CI [0.018, 0.157].
Indirect effect through intentions, $\beta = 0.01$, BCa CI [-0.006, 0.069].
Indirect effect through progress-related affect and intentions, $\beta = 0.00$, BCa CI [-0.001, 0.019].