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Encouraging bigger-picture thinking in an intervention to target multiple obesogenic health behaviours

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Abstract

Research has shown that use of the third-person perspective to visualise a behaviour results in increased motivation to engage in the behaviour relative to the first-person perspective. This effect is claimed to operate in part because the third-person perspective leads the individual to "see the bigger picture", linking the visualised behaviour to broader goals and identities. Reasoning that this effect could be harnessed to encourage engaging in multiple behaviours that serve the same broader goal, the present study manipulated the visual perspective participants used to imagine themselves exercising, and assessed effects on cognitions and behaviour related to both exercising and healthy eating. Baseline exercise levels were measured and explored as a moderation effect. As predicted, it was found that for participants who engaged in more exercise at baseline, visualising exercise using the third-person perspective resulted in them reporting stronger intentions to exercise and taking more leaflets showing local exercise classes. For those who engaged in less exercise at baseline, there was no effect of perspective. In terms of eating, there was a main effect of perspective, such that participants who imagined themselves exercising using the third-person perspective ate significantly less chocolate than those who used the first-person perspective, irrespective of baseline exercise levels. These results suggest that use of third-person perspective visualisation can be used to encourage engagement in multiple behaviours that serve the same broad goal, which may serve as an intervention technique that will be especially helpful for health outcomes with multiple contributing behaviours, such as obesity and overweight.

Word count: 247

KEYWORDS: visual imagery, imagery perspective, promotion of healthy behaviour, obesity, multiple health behavior change

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Obesity and overweight remain a serious problem and are no longer restricted to the developed world, now occurring also in low and middle income countries, adding to existing problems of infectious disease and undernutrition and resulting in a "double burden" of disease (WHO, 2016). Obesity and overweight are multifaceted issues with a wide range of determining factors, and therefore behaviour change scientists should aim to create interventions that tackle not just one, but multiple predictive behaviours such as exercise and eating habits. One strategy that helps target these predictive behaviors is to visualize oneself in engaging them (e.g., Knäuper et al., 2011). Further, research has shown that visualising behaviours using the more distanced perspective of an observer helps to "see the bigger picture" and thereby link the visualised behaviour to broader goals (Vasquez & Buehler, 2007; Libby & Eibach, 2011; Kross & Grossmann, 2012), with the potential to result in behaviour change across multiple domains. The present research aims to investigate whether this effect can be utilised in a brief visualisation intervention, resulting in beneficial behaviour change in two behaviours predictive of obesity: physical activity and eating.

It is common for individuals to imagine themselves engaging in positive behaviours that might take place in the future. Past research has demonstrated that visualising oneself engaging in a behaviour increases the likelihood of actually engaging in that behaviour in the future (e.g., Gregory, Cialdini & Carpenter, 1982; Knäuper et al., 2011). A growing body of evidence highlights the role of perspective used in visual imagery. As long as the visualised behaviour is not one that would be difficult for the individual to enact (see Rennie, Harris & Webb, 2016), individuals are more likely to be motivated to engage

(Vasquez & Buehler, 2007) and to actually engage in a behaviour (Libby, Shaeffer, Eibach, & Slemmer, 2007; Rennie, Harris & Webb, 2016) when it has been previously visualised from a *third-person* perspective compared to a *first-person* perspective. With the first-person perspective, the individual sees the event from their own perspective, exactly as if they were actually experiencing the event. In contrast, with the third-person perspective the individual sees the event from the perspective of an observer, viewing themself in the image as well as their surroundings, thereby allowing them to "see the bigger picture". This effect has been observed for a number of different behaviours, such as studying (Vasquez & Buehler, 2007) and voting (Libby, Shaeffer, Eibach, & Slemmer, 2007) as well as health behaviours such as fruit and vegetable consumption and physical activity (Rennie, Harris & Webb, 2016).

It has been demonstrated that the third-person perspective gives individuals a relatively distanced view on the self and the visualised behaviour, leading them to think about their broader goals and identities related to the visualised behaviour (for a review see Libby & Eibach, 2011). For example, Vasquez and Buehler (2007) found that participants who used the third-person perspective to imagine themselves studying subsequently described what they visualised in a more abstract, decontextualised, and meaningful way (e.g., "being the best I can be"). This more abstract understanding of the visualized behaviour subsequently translated into increased motivation to study. In contrast, participants who used the first-person perspective to imagine themselves studying subsequently described the what they visualised in more concrete terms (e.g., "doing an assignment"), which was not as motivating. Relatedly, Libby et al. (2007) showed that using the third-person perspective to visualise voting changed individuals' self-perceptions as

voters, and this mediated the effect of perspective on actual voting behaviour. They argued that the third-person perspective was effective because it led participants to think of themselves as the type of person who would engage in the voting behaviour. Rennie and colleagues (2016) used a similar argument to explain why third-person perspective is more effective in motivating individuals to engage in easy behaviours but not difficult behaviours. They argued that the abstract and meaningful visualisation associated with the third-person perspective increases motivation to perform easy behaviours, but for more difficult behaviours a more concrete and detailed visualisation (as associated with the first-person perspective) becomes more important in guiding behaviour.

One important consequence of third-person perspective visualisations has yet to be tested: If participants think about the visualised behaviour on an abstract level, any motivation this induces should generalise to other similar behaviours that serve the same goal. That is, participants in Vasquez and Buehler's (2007) study who visualised themselves studying using the third-person perspective, and thus tended to describe the visualised behaviour in terms of "being the best I can be", might be expected not only to study for their chosen academic task, but also to attend lectures more reliably, and spend more time reading around their chosen subject. Participants who visualised themselves studying using the first-person perspective, and thus tended to describe their behaviour as, for example, "doing an assignment", would not be expected to experience the same effect. No research has yet tested whether the effect of perspective on motivation and behaviour extends to other related behaviours, but findings from the goal-setting literature support this idea. For example, research examining the relationship between broader superordinate goals and smaller subgoals has shown that when people focus on the broader superordinate goal

(e.g., keeping in shape), success in attaining one subgoal (e.g., completing an exercise class) has a favourable effect on pursuing related subgoals (choosing a healthy meal option), whereas when the focus is on subgoal attainment, achieving one subgoal has a counterproductive effect on pursuit of related subgoals (Fishbach, Dhar & Zhang, 2006). Similarly, the compensatory carry-over action model (Lippke, 2014) implicates higher-level goals (e.g., to change bodyweight) in the motivation of multiple complimentary health behaviours that serve this same higher goal (physical activity and nutrition). Therefore, the present research examined whether visualising exercise using the more distanced third-person (vs. first-person) perspective resulted in a "contagion effect", whereby participants were not only more motivated to exercise, but also to restrain from eating unhealthy snack foods, given that both serve the same superordinate goal of maintaining weight. For a problem like obesity, with a myriad of contributing behavioural factors, it is essential to understand how these different contributing behaviours interact. This is particularly important in order to prevent a situation where increases in a beneficial behaviour result in compensatory increases in a detrimental behaviour (e.g., King, Hopkins, Caudwell, Stubbs & Blundell, 2008).

To test these predictions, we asked participants to imagine themselves exercising using either the first- or third-person perspective. We targeted women only in this study as attending an exercise class — our target behavior — was thought to be more frequently taken up (and hence easier to imagine oneself in) by women than men. We subsequently measured motivation to exercise using self-report items and a behavioural measure (taking exercise related leaflets). To test the contagion effect, participants were given the opportunity to snack on chocolate. We weighed the remaining chocolate as an index of

consumption. It was predicted that the third-person perspective would result in stronger motivation to exercise, more exercise-related behaviour, and less chocolate consumption. We also explored level of experience with the visualised behaviour (level of baseline exercise) as a potential moderator of the effect of visual perspective on motivation to engage in the visualised behaviour. This moderation prediction is based on research showing that if the visualised behaviour is difficult to carry out, the increased detail afforded by the first-person perspective that has been shown to aid in planning (see Rennie, Uskul, Adams & Appleton, 2014) is more useful than the more abstract third-person perspective, so for difficult behaviours the third-person perspective is not more effective in motivating action (Rennie et al., 2016). We reasoned that lack of experience with the visualised behaviour presents the same conditions as a difficult visualised behaviour, so expected the third-person perspective to be effective to a lesser extent for those with less experience with the visualised behaviour.

Method

Participants

Participants were 82 female undergraduate students (M_{age} = 20.15, *SD* = 1.61, 92% British) approached in different undergraduate classes to take part in a study on visual imagery on a voluntary basis and were invited to sign up for the study. Existing research on the effects of perspective on health behaviour has found large effects (*d* = 0.75) of perspective on behaviour (Rennie et al., 2016), and so we expected effects of at least medium magnitude. For detecting medium effects using regression analyses with three predictors and significance tests at Alpha = .05, Cohen (1992) suggests a sample size of 76.

Materials and Procedure

After completing a consent form and providing demographic information indicating their gender, age, and ethnicity, participants were asked to report on their current exercise behaviour by indicating how many hours of exercise they carried out per week. They then read that they would be asked to imagine themselves engaging in a particular action in the future and to answer questions about what they were picturing in their mind's eye. At this point participants were randomly assigned to either the first or third-person perspective condition and, following Libby et al. (2007), received the following first-person or third-person visualisation instructions [third-person wording in parentheses]:

> You should picture doing the action from a first-person [third-person] visual perspective. With the first-person [third-person] visual perspective you see the event from the visual perspective you [an observer] would have if the event were actually taking place. That is, you are looking out at your surroundings through your own eyes [you see yourself in the image, as well as your surroundings].

Participants were then instructed to picture themselves taking part in an exercise class in a sports hall with no mirrors[1] with their eyes closed. When they had the image in mind, they were first asked to complete a manipulation check question by responding to the following question: "As you're picturing it right now, do you see the scene from the visual perspective you [an observer] would have if the event were actually taking place?" (yes or no). All participants passed the perspective manipulation check.

Intentions were assessed with two items (r = .98) that were averaged to form an intention score: "I intend to attend an exercise class in the next two weeks" (1: *strongly disagree* to 7: *strongly agree*) and "How likely is it that you will attend an exercise class in the next two weeks?" (1: *not at all likely* to 7: *extremely likely*).

Finally, participants were invited to join the second experimenter in a different room, who then gave participants the opportunity to take exercise-related leaflets -- produced by the university gym-- advertising a variety of exercise classes available on campus and to help themselves from a bowl of chocolates. Participants were then debriefed before leaving the room. Once the participant had left, the experimenter noted the number of leaflets taken by the participants as a behavioural indicator of motivation to exercise and weighed how much chocolate was left in the bowl used as an indicator of amount of chocolate consumed.

Results

To examine the role of perspective taken in imagining exercise behaviour and past exercise experience on intentions to exercise in the future, the number of exercise-related leaflets taken, and the amount of chocolate consumed, we conducted a series of hierarchical multiple regressions, in which perspective (first = -1, third-person = 1) and baseline exercise (standardised) were entered in the first step, and the perspective x baseline exercise interaction term (calculated by multiplying the two terms together) was entered in the second step. This analysis allowed us to test whether the effects of perspective are moderated by baseline exercise.

Self-Report Measure: Intentions

In the regression with intentions as the criterion variable, the first step explained a significant amount of variance, R^2= .38, $F(2, 78) = 6.49$, p = .002, with baseline exercise emerging as a significant predictor, (β= .38, p = .001), but not perspective (β= .04, p = .67). The inclusion of perspective x baseline exercise interaction term in the second step, which was significant and positive (β = .27, p = .021), led to a significant increase in the amount of

variance explained in intentions to exercise (ΔR^2 = .06, F_{change} (1, 77) = 5.52, p = .021). As shown in Figure 1, simple slopes analysis revealed that for those reporting higher baseline exercise the third-person perspective resulted in significantly higher intentions than the first perspective, (β= .32, p = .042), whereas, for those reporting lower baseline exercise, perspective had no significant effect (β= -.23, p = .14).

Behavioural Measures

The first step of the hierarchical multiple regression analysis with the number of leaflets taken as the criterion variable explained a significant amount of variance, R^2 = .08, F(2, 78) = 3.33, p = .04, with perspective emerging as a significant predictor, (β= .28, p = .012), but not baseline exercise (β= .05, p = .68). The main effect of perspective indicated that the third-person perspective resulted in more leaflets being taken (M = 1.24, SD = 1.46) than did the first-person perspective (M = 0.54, SD = 0.90). At step two the significant perspective x baseline exercise interaction term (β= .28, p = .024) significantly improved the model as a whole, ΔR^2 = .06, F_{change} (1, 77) = 5.29, p = .024. As shown in Figure 2, simple effects analysis revealed that, as with intentions, the third-person perspective resulted in significantly more leaflets being taken among those with greater baseline exercise, β= .56, p = .001, but not among those with lower baseline exercise, β= .00, p = .99.

For the amount of chocolate consumed, both baseline exercise (β= .26, p = .015) and perspective (β= -.25, p = .022) emerged as significant predictors in step 1 which explained a significant amount of variance, R^2 = .13, F (2, 78) = 6.02, p = .004. The main effect of perspective revealed that use of the third-person perspective while imagining exercise resulted in more restraint, or, more specifically, less chocolate eaten (M = 8.59 grams, SD = 8.37) than the first perspective (M = 14.46 grams, SD = 13.04). As predicted, the addition of

the perspective x baseline exercise interaction term in the second step did not contribute significantly to the overall variance explained, $\Delta R^2 = .02$, $F_{change}(1, 77) = 1.62$, $p = .21$.

Discussion

This study introduces an effective social cognitive tool to induce multiple health behaviour change by examining the effectiveness of taking a third-person versus first-person perspective when imagining a future positive health behaviour. We show that, under certain conditions, imagining exercise using a third-person (compared to a first-person) perspective leads to a higher level of motivation to exercise and a greater likelihood of taking exercise-related leaflets. This finding adds to previous work where such an effect was shown in relation to behaviours such as voting (Libby et al., 2007) and academic achievement (Vasquez & Buehler, 2007) and to the emerging literature on the effects of visual perspective in imagining future health behaviours (Rennie et al., 2014; Rennie et al., 2016). This finding also contributes to the literature on imagery and exercise behaviour, that proposes imagery use as a determinant of exercise behaviour (Hall, 1995; Gammage, Hall, & Rogers, 2000), by introducing the role of perspective in imagery as an important moderating variable in increasing motivation to exercise.

This study presents a first demonstration that imagining engaging in a healthy behaviour (exercise) from a third-person perspective leads to a change in a behaviour (consuming chocolate) other than that was initially imagined (exercise), but that is related to the broader goals induced by the adoption of a third-person perspective (i.e., being a healthy person, maintaining weight). Thus, findings point to a 'contagion' effect such that imagining engaging in a healthy behaviour from a third-person perspective also increased

restraint (by making participants using the third-person perspective ate nearly half as much chocolate as those using the first perspective) when presented with unhealthy snacks immediately following testing. This is a valuable finding from an applied point of view, particularly given that interventions to increase engagement in a healthy behaviour (e.g., exercise) can sometimes inadvertently lead to compensatory increases in unhealthy behaviours (e.g., increased food intake; see King et al., 2008).

This study explored how perspective interacted with past experience with the imagined behaviour in its effect on motivation and behaviour. Findings point to an important boundary condition to the effect of visual perspective in imagery: use of the third-person perspective to visualise an action results in more motivation and behaviour change, but only for individuals who had more experience with the visualised behaviour. This adds to research showing that the difficulty of the visualised behaviour also moderates the effect of perspective on motivation and behaviour (Rennie et al., 2016). Future research is needed to examine conditions (e.g., completing a goal-setting task [see Strecher et al., 1995]) that could render third- person visualisations equally effective for all participants, regardless of baseline exercise levels. It should be noted that this moderation effect was limited to exercise, and did not extend to eating behaviour. While it is conceivable that a more concrete mental representation might be more effective in motivating action to engage in that particular behaviour under certain conditions, a concrete representation is by its nature behaviour-specific, and as such should not result in a contagion effect for any behaviour not part of the original imagery, under any condition.

Future research should aim to test the contagion effect induced by the third-person perspective in different behavioural domains; perhaps visualising eating more fruit and

vegetables using a third-person perspective might also lead to reduced consumption of saturated fat. Other techniques that lead to bigger-picture thinking could also be investigated for contagion effects. In the goal-setting research described above (Strecher et al., 1995), participants were encouraged to focus on the superordinate goal via simple priming techniques, for example by embedding goal-relevant words ("slim", "figure") in a sentence scrambling task or simply by clipping the questionnaire to a hardcover book entitled "Fitness and Health" (vs. to a phonebook in the control group). This demonstrates the minimal conditions necessary to shift focus onto the bigger picture and suggests a variety of techniques could be used in this same way. Of course, generalisations can not be drawn from the present research in which the sample was limited to female undergraduate students. Further research should aim to test the findings in more diverse samples.

Overall, current findings suggest the potential of using third-person perspective as a behaviour change technique in the health domain. Participants who had more experience with the visualised behaviour and who used the third-person perspective to imagine themselves exercising not only took more leaflets about exercise, but also consumed approximately half as much chocolate. It is notable that such a small qualitative difference in the visualisations of behaviours can have significant effects on subsequent enaction of the visualised behaviour, but also of behaviours not included in the original visualisation. Thus, this research opens possibilities for thinking about simple and brief intervention techniques that tackle the whole range of behaviours associated with overeating and obesity.

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Footnotes

[1] It was specified that the hall should have no mirrors because mirrors would have cancelled out the perspective manipulation (the self would be visible even when using the 1st-person perspective, in the form of a reflection in the mirror).

Figures

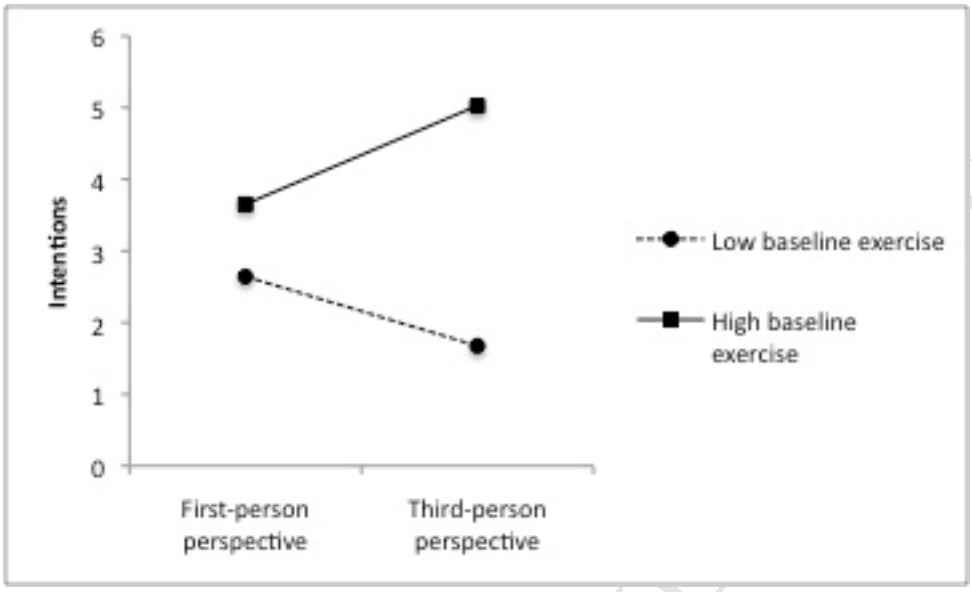

Figure 1. Intentions to exercise as a function of perspective and baseline exercise: Significant perspective x baseline exercise interaction effect.

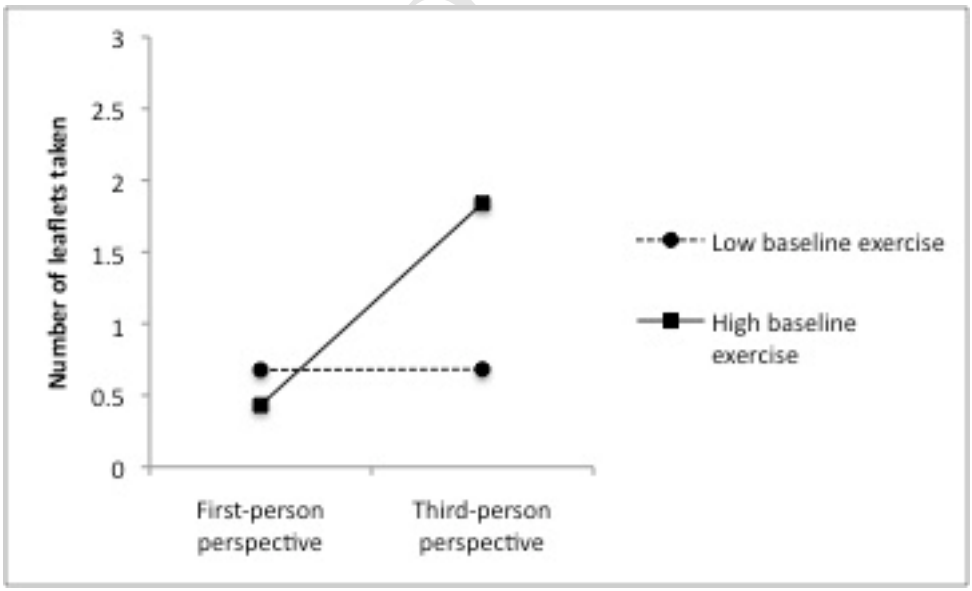

Figure 2. Number of exercise-related leaflets taken as a function of perspective and baseline exercise: Significant perspective x baseline exercise interaction effect.