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Varying cognitive targets and response rates to enhance the question-behaviour effect: An 8-arm Randomized Controlled Trial on influenza vaccination uptake

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ABSTRACT

Rationale: The question-behaviour effect (QBE) refers to the finding that survey questions about a behaviour can change that behaviour. However, little research has tested how the QBE can be maximized in behavioural medicine settings. The present research tested manipulations of cognitive targets (questions about anticipated regret or beneficence) and survey return rates (presence vs. absence of a sticky note requesting completion of the questionnaire) on the magnitude of the QBE for influenza vaccination in older adults.

Method: Participants ($N = 13{,}803$) were recruited from general practice and randomly allocated to one of eight conditions: control 1 (no questionnaire); control 2 (demographics questionnaire); intention and attitude questionnaire (with or without a sticky note); intention and attitude plus anticipated regret questionnaire (with or without a sticky note); intention and attitude plus beneficence questionnaire (with or without a sticky note). Objective records of subsequent influenza vaccination from general practice records formed the dependent variable.

Results: Intention-to-treat analyses indicated that receiving an influenza vaccination questionnaire significantly increased vaccination rates compared to the no questionnaire, $OR = 1.17$, 95% $CI = 1.01, 1.36$ and combined control conditions, $OR = 1.13$, 95% $CI = 1.01, 1.25$. Including the sticky note significantly increased questionnaire return rates, $OR = 1.25$, 95% $CI = 1.04, 1.50$. However, there were no differences in vaccination rates between questionnaires containing different cognitive targets, a sticky note or not, and no interactions. There were no significant differences in the per-protocol analyses, i.e. among respondents who completed and returned the questionnaires.

Conclusion: The QBE is a simple, low-cost intervention to increase influenza vaccination rates. Increasing questionnaire return rates or asking anticipated regret or beneficence questions in addition to intention and attitude questions did not enhance the QBE.

Asking questions about a behaviour can be sufficient to change that behaviour – a phenomenon termed the *question-behaviour effect* (QBE; Dholakia, 2010). Although the effect size is usually small ($d = 0.24$; Wood et al., 2016), the QBE is a low-cost intervention with high reach. The QBE could, therefore, form the basis of cost-effective interventions to promote health-related behaviours such as screening attendance and influenza vaccination (Conner et al., 2011) by including a questionnaire along with the invitation to participate. Although the effect is well established (Wood et al., 2016), relatively little research has tested how to maximize the QBE. The present research is novel in examining the impact of manipulating the cognitive targets (i.e., the particular questions asked in the survey) and the response rate to a

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questionnaire on the QBE. The test comprised an 8-arm Randomized Controlled Trial (RCT) with three levels of cognitive target (intention + attitude questions only or also including anticipated regret or beneficence questions), a manipulation of questionnaire response rate (a sticky note requesting participation, or not) compared to two control conditions (no questionnaire, demographics questionnaire) on influenza vaccination in older adults.

The QBE has also been called *measurement reactivity, self-erasing errors of prediction, self-generated validity*, the *mere measurement effect*, and the *self-prophecy effect* (Dholakia, 2010; Sprott et al., 2006) and been tested in various health behaviours. Most QBE studies test the impact of asking intention, self-prediction, and/or attitude questions (Wood et al., 2016). For example, Williams et al. (2006) showed that asking students about their intentions to exercise increased self-reported exercise rates from 14% to 26% two months later. Two main explanations for the QBE have been proposed (Dholakia, 2010). The attitude accessibility explanation assumes that completing behaviour-related questions activates the attitude underlying that behaviour; this enhanced accessibility of attitude, in turn, increases the likelihood that the person will perform the target behaviour. The cognitive dissonance explanation assumes that completing behaviour-related questions promotes dissonance that can be reduced by subsequently acting consistently with one's responses to the questions (i.e., by performing the behaviour that one has indicated one would perform).

In the present research, we tested whether supplementing intention/self-prediction and attitude questions with either anticipated regret or beneficence questions enhances the QBE. Such additional questions could enhance the accessibility of attitude towards the behaviour, or exacerbate cognitive dissonance in relation to the behaviour and so increase the QBE. Although the evidence concerning the impact of measuring anticipated regret on the QBE is mixed (Godin et al., 2010, 2014; Sandberg and Conner, 2009, 2011; Wood et al., 2016), there is evidence that including regret questions greatly enhances the QBE when participants complete and return the relevant questionnaire (Godin et al., 2010). Thus, anticipated regret questions were tested here both to add to the evidence base concerning anticipated regret, and to test potential interactions with a manipulation designed to increase response rates. The impact of including beneficence questions in enhancing the QBE has been little studied. Beneficence refers to doing good or demonstrating magnanimity, and has benefits both for the self and others. The desire to hold a favourable view of oneself is a powerful motive driving human behaviour (Sedikides and Strube, 1997), and Godin et al. (2014) observed that supplementing intention questions with positive self-image questions significantly increased the QBE for blood donation rates among lapsed donors (see also Ferguson et al., 2008). The present research thus tested whether including beneficence questions (tapping positive self-image plus benefit to self and others) in addition to intention/self-prediction and attitude questions increased the effectiveness of the QBE in relation to influenza vaccination.

It has been suggested that receiving a questionnaire about a behaviour may be a necessary, but not a sufficient, condition for engendering a QBE (Conner et al., 2011). The QBE may only occur among people who actually complete (and perhaps return) the questionnaire and have positive intentions about performing the behaviour – because only for these participants is the underlying attitude towards the behaviour activated or dissonance induced about not following through on one's stated intentions. This pattern of results was observed in studies of blood donation (Godin et al., 2008, 2010), cervical screening (Sandberg and Conner, 2009), health screening (Conner et al., 2011; study 1), and influenza vaccination in health professionals (Conner et al., 2011; study 2). An important but untested implication of this analysis is that increasing response rates to a questionnaire should increase the magnitude of the QBE. Although several techniques to promote questionnaire returns have been tested (see Dillman, 2000), one simple but effective approach is the sticky note technique (Garner, 2005). Across four studies, Garner (2005) showed that attaching a sticky note (with a simple, handwritten request to help) to the front of a questionnaire significantly increased questionnaire return rates by 22–44%. We therefore tested the impact of this technique to increase questionnaire return rates and enhance the magnitude of the QBE for influenza vaccination.

The target behaviour in the present study was influenza vaccination in older adults (aged 65 years and older). Vaccination programmes are an important means of protecting people against a variety of infectious diseases. Vaccination against influenza is commonly offered to "at risk" individuals (e.g., pregnant women, the elderly, and those aged six months to under 65 in clinical risk groups) on an annual basis to take account of variations in influenza strains across time. For example, in the UK, annual influenza vaccination is offered by General Practices to their patients aged 65 + years at their next birthday. To be effective at a population level, it is important that high vaccination rates are achieved (>75%; Public Health England, 2016). Research has examined the predictors of influenza vaccination (e.g., Johnson et al., 2011) and explored interventions to improve uptake (Ahmed et al., 2004; see Thomas et al., 2010 for a review). However, influenza vaccination rates in this age group remain below optimum levels, with 66.7% in USA (Centers for Disease Control, 2015) and 72.8% in UK (Department of Health, 2015) vaccinated in winter 2014/15, despite the increased risk of mortality associated with influenza in this age group. The present research tested the QBE as a simple (and potentially cost-effective) means to increase influenza vaccination rates among older adults. We tested the effects of three question sets with different cognitive targets (intentions + attitudes vs. anticipated regret + intentions + attitudes vs. beneficence + intentions + attitudes) crossed with an intervention designed to increase questionnaire return rates (presence vs. absence of a sticky note) against two control conditions (no questionnaire, demographics-only questionnaire). We used an RCT design with objective measures of vaccination and intention-to-treat analyses. The research is unique in manipulating both the cognitive targets specified in the questionnaire and the response rate to the questionnaire to enhance the magnitude of the QBE in a large sample, in a field setting, for an important health behaviour.

1. Method

1.1. Study population and sampling procedure

Using the effect size ($d = 0.13$) from Conner et al. (2011) study of the QBE and influenza vaccination, G*Power indicated that 1539 participants per condition would provide 95% power to detect a significant effect at an alpha of 0.05 using a two-tailed test. We recruited seven General Practices in northern England who were not taking part in a centralized influenza vaccination invitation scheme in Fall/Autumn 2012. The study population consisted of all patients in each practice eligible for an influenza vaccination that year by being age 65 years or over at their next birthday. Patients were randomized individually to one of eight conditions by the second author using a random number generator but were not blinded to condition. A total of 15 patients were excluded (12 not randomized; 3 no vaccination data) to leave a final sample of 13,803 (there were no significant differences between the two groups on sex, age, or previous influenza vaccination). A total of 5095 completed questionnaires (42.2%) were returned from 12,076 distributed (conditions 2–8). Fig. 1 details the randomization,