Helping on social media: self-persuasion and question–behavior effects

Steen, T. van; Müller, B.C.N.; Li, S.; Loman, J.G.B.; Buijzen, M.

Registered Report

Helping on Social Media

Self-Persuasion and Question–Behavior Effects

Tommy van Steen[1], Barbara C. N. Müller[2], Shuang Li[3,4], Jeroen G. B. Loman[5], and Moniek Buijzen[2,6]

[1]Institute of Security and Global Affairs, Leiden University, The Netherlands
[2]Behavioural Science Institute, Radboud University, The Netherlands
[3]Institute of Governance, Shandong University, PR China
[4]School of Politics and Public Administration, Shandong University, PR China
[5]Department of Communication Science, University of Amsterdam, The Netherlands
[6]Erasmus School of Social and Behavioural Sciences, Erasmus University Rotterdam, The Netherlands

Abstract: Direct persuasion (i.e., providing people with arguments in favor of a certain behavior) can activate resistance in the receiver and, thus, result in a hampered influence attempt. More promising techniques to influence people's behavior are self-persuasion (SP; i.e., asking people to generate arguments themselves) and the question–behavior effect (QBE; i.e., asking people to predict their future behavior), which can be easily implemented in social media settings. As both rely differently on message elaboration and focus on different outcomes, we investigated whether SP or QBE is more effective in a social media setting to increase helping behavior. In a between-subjects design, participants viewed an online Facebook group related to United World Schools and either (a) read arguments regarding helping others (direct persuasion), (b) provided arguments regarding helping others (SP), or (c) stated whether they intended to help others (QBE), while their message elaboration was assessed. We hypothesized that both SP and QBE would positively impact attitudes and levels of helping behavior compared to the direct persuasion condition. Additionally, we hypothesized that QBE and SP are equally effective in changing behavior, but that SP is more effective than QBE in changing attitudes toward helping, especially when participants strongly elaborate on their own arguments regarding the positive aspects of helping. Results showed no evidence of SP and QBE influencing attitudes toward helping and helping behavior. For behavioral intentions, some, albeit limited, evidence was found that SP and QBE can have an effect.

Keywords: self-persuasion, question–behavior effect, social media intervention, helping, behavioral change

Online communities can serve as platforms to attempt to influence people's behavior. For example, it is possible to profile Facebook accounts in order to affect people's actions by tailoring intervention messages (Matz et al., 2017), e-health initiatives are deployed to reach wider audiences (e.g., Duffecy et al., 2013), and fidelity of online interventions is tested (Murray et al., 2015). While designing online interventions and applying existing behavioral change techniques in different settings is useful, there is a need to *compare* existing techniques in these new settings. These comparisons not only inform the applicability of techniques and the scalability of interventions beyond lab settings, but also increase our understanding of underlying mechanisms, since factors specific to online platforms such as public comments can affect the effectivity of behavior change techniques. As a first step in this direction, the current study compares two techniques that are especially suitable for such an online context and compare them with a classic direct persuasion method.

Often in the domain of mediated communication, traditional methods of persuasion such as direct persuasion (i.e., providing arguments or statements in favor of a certain behavior) are used as the basis to elicit changes in attitude and behavior (Crano & Prislin, 2006). As an example of a direct persuasion message, people would be told that it is good to go to the gym. However, this direct technique has been shown to be rather ineffective (Aronson, 1999), meaning that no or only small changes in attitudes, intentions, and behavior are achieved. The reason is that when arguments are provided, people often try to correct for this persuasion attempt (Mussweiler & Neumann, 2000). Furthermore, people might feel that their freedom to choose is threatened, leading to psychological reactance (Brehm, 1966). As a response, they engage in self-guarding strategies, such as resisting the suggested behavior or even increasing the unwanted behavior, a so-called boomerang effect (e.g., Crawford et al., 2002). The current study investigates which techniques can be used to avoid these self-guarding

strategies. Two alternatives are discussed: the *self-persuasion-technique* (SP) and the *question–behavior effect* (QBE).

When applying SP, one asks people to generate arguments themselves instead of providing them with arguments, thus the target of the influence attempt is creating the means for the person to influence herself or himself (e.g., Bernritter et al., 2017; Maio & Thomas, 2007; Müller et al., 2009; Müller et al., 2017). For example, people would be asked to generate reasons to go to the gym. The SP technique has been found to be more effective than direct persuasion for three main reasons. First, providing information leads to self-guarding strategies such as correcting for given information (e.g., Mussweiler & Neumann, 2000; Wilson & Brekke, 1994). With SP, the likelihood that self-guarding strategies are activated decreases because people do not mentally detect internally generated information and thus cannot correct for it. Second, when people generate their own arguments, they come up with the most compelling reasons for them (e.g., Greenwald & Albert, 1968). Third, people prefer to be consistent in their behavior (Cialdini, 1993). Thus, generating arguments in favor of a certain behavior increases the probability that they act accordingly. Research on SP has found that providing open questions can trigger self-generation of arguments (e.g., Glock et al., 2013; Müller et al., 2016). This research showed that when people are presented with an open question, they start to think about possible answers (Loman et al., 2018), which influences attitudes and behavior, eliminating the necessity to write down the arguments for SP to work. Overall, these effects were found with small-to-medium sample sizes between 20 participants (e.g., Müller et al., 2009; Müller et al., 2016) and 65 participants per condition (e.g., Bernritter et al., 2017), and medium-effect sizes between $\eta_p^2 = .07$ ($d = .54$; e.g., Damen et al., 2015) and $f = .3$ ($d = .60$; e.g., Müller et al., 2016). The SP technique thus seems to be a very applicable strategy to be used in the form of (online) mass media advertisements.

The second alternative, the QBE, involves merely asking people questions about their behavior (Sprott, Spangenberg, Block, et al., 2006). To stay with the gym example, people would be asked how likely it is that they will go to the gym in the coming week. These questions often take the form of asking people to predict their future behavior, which then influences this behavior (e.g., Levav & Fitzsimons, 2006; Obermiller & Spangenberg, 2000). This technique is widely examined and shows robust, small changes in behavior ($d = .26$; Wood et al., 2016). Beyond its value as a behavioral change technique, the existence of this effect also raises methodological questions (McCambridge, 2015; McCambridge & Kypri, 2011), since many researchers rely on asking people questions about their behavior as an outcome variable of some experimental manipulation. Therefore, improving our understanding of QBE not only leads to improved behavioral change interventions, but also shines light on possible unintended effects of asking people questions about their behavior in a research setting. QBE is theorized to be the result of dissonance processes taking place, in which participants make future behavior predictions in line with social desirable behaviors, and act upon these predictions to maintain consistency between their questionnaire responses and future behavior (e.g., Spangenberg et al., 2012). Whereas SP has been applied in both public and private settings, QBE is mostly investigated in private settings, where participants complete a questionnaire with attitude, intention, and/or prediction questions in a printed format (e.g., Chapman, 2001; van Steen & Joinson, 2018), through completing an online form (e.g., Cioffi & Garner, 1998), or in a personal conversation with the researcher (e.g., Sherman, 1980). These all involve a level of private commitment, where participants expect that only the researcher will be able to link answers to specific individuals rather than making public announcements. However, because research on commitment shows that publicly stated commitment increases the likelihood of behaving in the stated manner (e.g., Burn & Oskamp, 1986), implementing QBE in a public setting such as social media might increase its effectiveness.

Both SP and QBE rely on influencing participants' thought processes to alter behavior, and both can easily be implemented in media campaigns. However, there are fundamental differences between the two techniques: SP focuses on arguments to (not) perform a behavior but does not explicitly state, or ask for, a conclusion as to what the participant will do in the future. Furthermore, a certain amount of elaboration seems necessary to be able to generate arguments, which is not always likely in a social media setting. In line with this, research has shown that high message elaboration results in more thoughts generated (Clarkson et al., 2011). QBE does the opposite by focusing on explicitly stating whether the participant will perform this outcome behavior, while ignoring the reasons people might have to make this prediction. Elaboration in those studies is low, unless attitudes and personal values are surveyed explicitly before the prediction question is presented (Van Kerckhove et al., 2009).

The Current Study

The current study is the first pilot to directly compare two conceptually related social influence techniques: SP and QBE. In our study, we address the question of whether SP or QBE is more effective when implemented in a social media setting (i.e., Facebook) to increase helping behavior, and we investigate the possible mediating role of message elaboration. Participants produce their own arguments on

why helping is good (SP condition) or are asked about their future helping behavior (QBE condition). One control condition is added in which participants are presented with arguments on why helping is good (direct persuasion condition) before assessing the dependent variables measuring helping intentions and behavior and attitudes toward helping.

SP is an effective influence technique as people come up with the most compelling reasons for them (e.g., Greenwald & Albert, 1968) that are based on their own values rather than on social desirability, which plays a role for QBE (Wood et al., 2016). On the basis of this work, we formulated the following expectation:

Hypothesis 1 (H1): SP will lead to more positive attitudes toward helping compared with QBE.

QBE often takes the form of asking people directly to predict their future behavior, which then influences this behavior (e.g., Levav & Fitzsimons, 2006; Obermiller & Spangenberg, 2000). This technique shows robust, small changes in behavior, and is moderated by social desirability (Wood et al., 2016). Therefore, we assume that the effectiveness of QBE is improved when it comes to behavioral intentions and future behavior. On the basis of this work, the following hypotheses are formulated:

Hypothesis 2 (H2): No differences between SP and QBE are expected regarding behavioral intentions (i.e., intention to provide an email address and intention to like the Facebook page).

Hypothesis 3 (H3): No differences between SP and QBE are expected regarding behavioral outcomes (i.e., willingness to donate raffle tickets and number of raffle tickets donated).

Although SP and QBE rely on influencing participants' thought processes to alter behavior, there are fundamental differences between the two techniques: For SP, a certain amount of elaboration seems necessary in order to be able to generate arguments (Clarkson et al., 2011), while QBE does the opposite by focusing on explicitly stating whether the participant will perform this outcome behavior. Overall, elaboration in these studies was low. On the basis of this work, we formulated the following expectation:

Hypothesis 4 (H4): Message elaboration will mediate the attitudinal effect of SP and QBE.

Lastly, given that both SP and QBE are shown to be more effective than traditional forms of persuasion (e.g., Chapman, 2001; Müller et al., 2009), we expect that:

Hypothesis 5 (H5): Both the SP and the QBE conditions will lead to more positive attitudes toward helping, stronger behavioral intentions to help, and more helping behavior, compared with the direct-persuasion condition.

Method

Participants and Design

Participants were students at Radboud University, and members of Prolific, a panel where people can take part in online research. Due to budgetary constraints, first the university participants were recruited, who had a period of 6 weeks to complete the study online in exchange for 0.5 course credit. Then, Prolific was used to test additional participants, who were paid £2 for taking part, until the required number of participants per condition was reached. Participants were randomly assigned to one of three conditions in a between-subjects design: an SP condition, a QBE condition, or a direct-persuasion condition. Earlier studies used comparable procedures (e.g., Loman et al., 2018). Using G*Power (Faul et al., 2009), based on an a priori estimation of statistical power of $(1 - \beta) = 0.8$ and smallest effect size of interest (SESOI) of Cohen's $d = 0.25$ for the comparison between SP and QBE for the planned ANOVAs, a minimum of 199 participants per condition was required for this experiment. The SESOI is based on a recent meta-analysis of the QBE, which found an effect size of Cohen's $d = 0.26$ (Wood et al., 2016), and our expectation that SP will be more effective in changing attitudes, and equally effective in changing behavioral intentions and behavior. In addition, an additional power analysis for a fixed-N design was performed (https://tellmi.psy.lmu.de/felix/BFDA_app/). Using the default priors, assuming an effect size of $d = 0.25$, a selection criterium of 5, and a probability of 0.8, 340 participants per group would be needed.

A total of 1,030 participants ($M_{age} = 25.54$, $SD = 7.76$) completed the study, of whom 29.4% identified as male, 68.5% as female, 1.7% as other, and 0.3% of the participants preferred not to say. Participants were relatively evenly distributed across the three conditions: $N_{Direct\ Persuasion} = 341$, $N_{QBE} = 350$, $N_{SP} = 339$, with most participants coming from the Prolific panel ($N = 759$; $N_{Direct\ Persuasion} = 252$, $N_{QBE} = 256$, $N_{SP} = 251$). The suspicion probe showed that participants generally felt that the study was aimed at showing United World Schools (UWS) in a positive light, and more broadly that helping others should be encouraged. None of the participants directly mentioned the direct-persuasion message, the QBE, or SP tasks as attempts to influence behavior, apart from some participants noting that the Facebook group only showed positive messages about UWS. In the SP condition, participants submitted an average of 1.67 arguments ($SD = 0.90$), with an

average quality score after averaging the codings of two independent raters of 2.80 (*SD* = 1.30). The materials for this study can be found on https://doi.org/10.17605/OSF.IO/7N69Z.

Procedure

On the landing page of the study, participants completed a consent procedure. They were informed that they would read some information and complete a set of questionnaires, that participation is anonymous, and that they could withdraw from the study at any time without negative consequences. Participants were provided with contact details of the research team in case they had any further questions. After participants consented to taking part, the study started.

The participants were presented with screenshots from a private Facebook group of UWS, an organization devoted to the education of children living in the world's poorest regions. The Facebook group provided general information about the work and goals of UWS. UWS was chosen as it is an existing charity that we assumed participants were not familiar with, and thus it was unlikely participants had prior attitudes toward this charity that could affect the results. We chose an existing charity for two reasons: First, it seemed more ethical to provide information of an organization that really exists, making it not necessary to lie to participants about the organization and their activities. Secondly, a practical reason was that information about the charity (i.e., operations, goals, contact) did not have to be made up by the researchers. The page had some initial content present from confederates who were members of the private group, identical for all participants so as to give participants the impression that the private group was genuine. Participants were asked to interact with the page by assessing or submitting content, depending on the condition. Participants were: (a) asked to create, write down, and submit arguments for the question, "Why is it good to support UWS?" (the SP condition); (b) asked to indicate whether they predict they would support UWS in the future (the QBE condition) by answering a typical QBE-style question, "Will you support UWS?" [yes/no] (e.g., Sherman, 1980; Spangenberg et al., 2003; Sprott, Spangenberg, Knuff, et al., 2006); or (c) were informed about this "media campaign" and asked to read the posts of others that contain arguments to help, without interacting with the page (the direct persuasion condition). The arguments for the direct persuasion condition were selected from a pool of arguments from earlier research on helping that were rated as strong arguments (Müller et al., 2017). In addition, as done in earlier research (e.g., Bernritter et al., 2017), a clear call for action was added to the direct persuasion condition, stating, "Help UWS!" on the Facebook page.

After completing the task, participants completed the outcome measures. These measures consisted of (a) behavioral intention questions regarding leaving their email address and liking the UWS Facebook page, and (b) an objective behavioral measure in which participants received seven raffle tickets for a prize lottery among all participants (they could choose to use all seven tickets or donate [part of] the tickets to the UWS charity), (c) an attitude measurement, and (d) a message elaboration measure. The last two measures were collected after the behavioral measure to avoid a confounding influence. Subsequently, they completed a set of demographic questions and a suspicion probe about the goal of the experiment. Finally, they were thanked for their participation, paid, and debriefed. Ethical approval for the study was sought and received from Radboud University.

Measurements

Mediator

Message Elaboration

Participants completed a message elaboration measure (Reynolds, 1997), which consists of 12 items and has a high internal reliability (Cronbach's α = .94). The items related to the message they received (i.e., reading task, question to create arguments, or the QBE question). An example item is: "While reading the task, were you distracted by other thoughts not related to the task?" All items were answered using a 7-point Likert scale ranging from 1 = *disagree* to 7 = *agree*. In the direct persuasion condition, "task" was changed to "reading task" so we could include the direct persuasion condition in the main analyses.

Dependent Variables

As dependent variables, we used two measures of behavioral intentions, one objective behavioral outcome, and one attitude measure. Since the goal of the techniques is to influence behavior, our focus was on the objective behavioral outcome measure. However, including the attitude and behavioral intention measures helps paint a more complete picture of the influence of SP and QBE techniques.

Email address (dichotomous): As the first behavioral intention outcome measure, participants were asked whether they wanted to provide their email address (*yes/no*) to receive more information about how they can help UWS. Research has shown that providing an email address signals trust in the receiving party (see, e.g., Treiblmaier & Chong, 2011).

Like the UWS page (dichotomous): Participants are asked whether they would "like" the UWS page on their Facebook profile (*yes/no*) as the second behavioral intention outcome measure. Previous research has shown that a like on

Facebook is a suitable tool to show one's endorsement and support (see, e.g., Levorashka et al., 2016).

Donation (continuous): Participants were provided with seven raffle tickets, which they could use to win €50. They were informed that all participants received these tickets and that they could decide to donate (a part of) these tickets to UWS. We registered whether or not participants donated at all. In addition, the number of tickets donated to UWS is the objective behavioral outcome measure. Previous research has shown that raffle ticket allocation is a suitable tool for investigating helping behavior (see, e.g., Müller et al., 2014).

Attitude toward helping (continuous): Attitudes toward helping were measured using adjusted versions of the Attitude Toward Helping Others (AHO) and Attitude Toward Charitable Organizations (ACO) scales (Webb et al., 2000). The scales consist of four and five 5-point items, respectively, ranging from 1 = *strongly disagree* to 5 = *strongly agree*. This measure is a suitable tool for investigating attitudes toward helping, both in student populations as well as when testing the general public (all α values > .79; Webb et al., 2000). We adjusted the questionnaire in such a way that its focus was on helping UWS in particular. An example item is: "People should be willing to help UWS."

Covariates

Several variables that have been shown to influence the effectiveness of SP and QBE were included as covariates to be able to investigate possible effects.

Number of arguments and quality: We coded whether participants follow instructions in the SP condition (e.g., do not write arguments, write off-topic arguments, or argue that helping is not good). Two independent blind raters counted the number of arguments, whether the arguments were according to the instruction, and argument strength (ranging from 1 = *very weak argument* to 7 = *very strong argument*). In addition, raters evaluated the strengths of the arguments provided in the direct-persuasion condition.

Former helping behavior: Participants were asked whether they volunteer or work for a good cause in their free time (if so, how many hours per month), and whether they regularly donate money to NGOs or other charities (if so, how much per month). Previous research has shown that prior involvement in the requested behavior influences the effectiveness of SP interventions (Bernritter et al., 2017).

Reactance: Although SP leads to less reactance than direct persuasion (Loman et al., 2018), we like to control for the fact that participants might feel reactance because they are instructed to come up with and write down arguments in the SP condition. Therefore, participants completed a reactance questionnaire assessing perceived threat of freedom and anger (Dillard & Shen, 2005). A total of eight items measured perceived threat of freedom and anger on a 5-point Likert scale ranging from 1 = *totally disagree* to 5 = *totally agree*.

Prior knowledge of UWS: To check our assumption that participants would not have prior knowledge of, and attitudes toward, UWS, we added the *yes/no* question, "Did you know UWS prior to taking part in this study?"

Demographics: Demographic measurements included age, gender, education level, income, and native language (see Loman et al., 2018).

Suspicion probe: In an open-ended funnel debriefing (based on Loman et al., 2018), participants were asked to indicate what they think the goal of the experiment was.

Preregistration Analysis

SPSS 24 was used to conduct ANOVAs and logistic regressions on the demographic variables and the covariates to check whether the randomization was successful (as done in Loman et al., 2018) and to conduct the main analyses. JASP 0.8.6 (JASP Team, 2018) was used to run Bayesian statistical analysis to further strengthen our conclusions about significant and nonsignificant effects (with the latter being especially important for H2 and H3). Additional, the possible influence of the mediator was examined with mediation analyses using Hayes's (2013) PROCESS.

Participants who were aware of the goal of the experiment were excluded from the sample. Participants who correctly stated the research question in the suspicion probe were excluded from further analysis. Cronbach's α values were calculated for the attitude measure, and if acceptable (i.e., > .70), a mean score of the attitude measure was calculated. If necessary, items were deleted to reach an acceptable α value. Before conducting the main analyses, we checked whether necessary assumptions (i.e., normality, outliers, and homogeneity of variances) were met, and a randomization check on all covariates was conducted. If the randomization was not successful, the variable in question was included in the main analysis as covariate. If applicable, analyses with and without covariates are reported, as inclusion of covariates can lead to distorted results (see de Boer et al., 2015). Note that this is only possible for covariates that are administered in all three conditions.

A significance level of α = .05 was adopted for all ANOVAs, logistic regressions, and mediation analyses. Relevant effect sizes and 95% confidence intervals were calculated. By adding Bayesian hypothesis testing, the probability of the observed data given the null hypothesis (H0) was compared with the probability of the observed data given the alternative hypothesis (H1; cf. Wagenmakers, 2007). The Bayes factor (BF01) is a ratio of these probabilities and is commonly interpreted as the weight of evidence

supporting the null versus the alternative hypothesis (e.g., Wagenmakers, 2007; Wagenmakers et al., 2008): For Bayes factors, our interpretation relied on Wagenmakers et al. (2011): BF_{01} of 1/30–1/10 suggesting strong evidence for H_1, BF_{01} of 1/10–1/3 suggesting substantial evidence for H_1, BF_{01} of 1/3–1 suggesting anecdotal evidence for H_1, BF_{01} of 1 suggesting no evidence, BF_{01} of 1–3 suggesting anecdotal evidence for H_0, BF_{01} of 3–10 suggesting substantial evidence for H_0, and BF_{01} of 10–30 suggesting strong evidence for H_0. To interpret the strength of evidence as indicated by the Bayes factor, it is common practice to adhere to the Kass and Raftery (1995) classification scheme.

Two one-factorial between-subject ANCOVAs were conducted with condition (SP vs. QBE vs. direct persuasion) as between-subjects factor, and attitude toward helping and donation (i.e., amount of lottery tickets) as dependent variables (H1 & H3 & H4 & H5). Bonferroni corrections were applied, and post hoc analyses were performed if the main effect was significant. Furthermore, three logistic regressions were conducted to investigate the influence of condition on the three dichotomous outcome variables: whether participants intend to provide their email address, whether participants intend to like the UWS page, and whether they donate any raffle tickets at all (H2 & H3 & H5). Lastly, Bayesian statistical inference was conducted for all analyses to test the probability of the observed data given the null hypothesis (H_0) being correct compared to the probability of the observed data given the alternative hypothesis (H_1; cf. Wagenmakers, 2007). H1, H4, and H5 are rejected if $p > .05$, the 95% CI includes 0, and the BF_{01} shows anecdotal evidence at best.

Results in which p values and BF_{01} contradict each other (i.e., p values suggesting there is an effect while BF_{01} supports H_0 or vice versa) were interpreted with caution. Furthermore, anecdotal evidence from BF_{01} was treated with caution.

Changes to the Preregistered Analysis Plan

Instead of SPSS 24, SPSS 26 was used for the inferential statistics. JASP version 0.14.1, not 0.8.6, was used for the Bayesian statistics.

Results

Preregistered Randomization Checks and Assumption Tests

All relevant covariates and demographics showed successful randomization, meaning there were no significant differences between the various conditions for the following variables: former helping behavior, reactance, prior knowledge of UWS, age, and self-identified gender (all $p > .18$). The number of arguments and quality were not assessed, as these were only measured for participants in the SP condition. In terms of assumptions for the outcome measures, the assumption of normality was not met across the continuous outcomes. However, analysis of variance procedures are known to be robust to violations of normality (e.g., Schmider et al., 2010), therefore analyses were conducted as planned. The attitude scale showed a good internal consistency (Cronbach's $\alpha = .89$), and thus we calculated the mean score of the attitude measure to be used in the main analysis. Two ANCOVAs were conducted for attitude and number of raffle tickets donated as dependent variables, condition as independent variable, and former helping behavior, reactance, and prior knowledge of UWS as covariates.

Preregistered Main Analyses

Attitude

To test H1 and H5, an ANCOVA for attitude was conducted that showed a significant effect of two covariates on attitudes: a positive effect for volunteering experience, $F(2, 1{,}023) = 27.07$, $p < .001$, $\eta_p^2 = .026$, and a negative effect for reactance, $F(2, 1{,}023) = 138.56$, $p < .001$, $\eta_p^2 = .120$, but no effect for prior knowledge of UWS was found, $F(2, 1{,}023) = 0.11$, $p = .72$, $\eta_p^2 = .000$. There was also no main effect of condition on attitudes, $F(2, 1{,}023) = 0.92$, $p = .40$, $\eta_p^2 = .002$, and exploratory pairwise comparisons did not show significant differences (all $p > .19$), hence there is no evidence that self-persuasion or the QBE effect positively influenced attitudes compared to the direct-persuasion condition (H1). In line with this, a Bayesian ANOVA showed strong evidence for the null-hypothesis of no effect of the intervention on attitudes ($BF_{01} = 16.90$). See Table 1 for an overview of the aggregate statistics for all outcome variables.

Table 1. Aggregate statistics

Condition	Attitudes *M* (*SD*)	Number of raffle tickets donated *M* (*SD*)	Donating any raffle ticket (yes/no) %	Liking the Facebook page %	Provide email address %
Direct persuasion	3.98 (0.66)	4.04 (2.57)	83.9%	61.3%	24.0%
Self-persuasion	4.07 (0.67)	3.90 (2.61)	81.6%	63.4%	33.1%
Question–behavior effect	4.02 (0.52)	3.82 (2.52)	82.0%	69.1%	28.9%

Table 2. Logistic regressions

Predictor	*B*	*SE*	Exp(*B*)	95% CI lower	95% CI upper
Providing email address for more information					
Condition (reference category: direct persuasion)					
Self-persuasion	0.413*	0.174	1.511	1.076	2.124
Question–behavior effect	0.249	0.175	1.283	0.909	1.809
Reactance	−0.372***	0.097	0.690	0.571	0.833
Prior knowledge of UWS	−0.505	0.352	0.600	0.303	1.202
Prior volunteering	0.353*	0.160	1.423	1.039	1.949
Liking UWS Facebook page					
Condition (reference category: direct persuasion)					
Self-persuasion	0.045	0.163	1.046	0.760	1.440
Question–behavior effect	0.334*	0.165	1.396	1.010	1.930
Reactance	−0.562***	0.086	0.570	0.481	0.675
Prior knowledge of UWS	0.749*	0.346	2.114	1.074	4.162
Prior volunteering	0.38*	0.164	1.462	1.060	2.016
Donating raffle tickets					
Condition (reference category: direct persuasion)					
Self-persuasion	−0.241	0.210	0.786	0.520	1.187
Question–behavior effect	−0.156	0.210	0.856	0.567	1.291
Reactance	−0.667***	0.103	0.513	0.420	0.628
Prior knowledge of UWS	−0.409	0.359	0.664	0.329	1.343
Prior volunteering	0.802***	0.235	2.230	1.407	3.533

Note. UWS = United World Schools. *$p < .05$; **$p < .01$; ***$p < .001$.

Providing Email Address

Testing H2 and H5, a logistic regression with condition and the three covariates included as predictors of whether participants intended to provide an email address for more information as dependent variable showed no main effect of condition on whether they decided to provide their email address ($W = 5.69$, $p = .058$). In this case, the comparison between the direct persuasion condition and the SP condition suggests that SP positively affects the decision to provide an email address ($B = 0.413$, $p = .017$) while no QBE effect was found ($B = 0.249$, $p = .156$). Furthermore, the pattern of the covariates remained the same, with a significant negative effect of reactance ($B = -0.372$, $p < .001$), and a significant positive effect of prior volunteering ($B = 0.353$, $p = .028$).

Liking Facebook Page

Testing H2 and H5, another logistic regression, using the same predictors but with intending to like the UWS Facebook page as dependent variable again showed no effect of condition on intent to like the Facebook page ($W = 4.75$, $p = .093$). The comparison between the direct-persuasion condition and the QBE condition suggests that QBE positively affects the intent to like the Facebook page ($B = 0.334$, $p = .043$), whereas SP does not ($B = 0.045$, $p = .78$). Furthermore, the pattern of the covariates is similar to the logistic regression on donating any raffle tickets, with a significant negative effect of reactance ($B = -0.562$, $p < .001$), and a significant positive effect of prior volunteering ($B = 0.380$, $p = .021$). For the full logistic regression models, see Table 2.

Raffle Tickets

Testing H3 and H5, the ANCOVA for number of raffle tickets donated showed weak significant effects for all three covariates: volunteering experience, $F(1, 1{,}015) = 5.91$, $p = .015$, $\eta_p^2 = .006$, reactance, $F(1, 1{,}015) = 28.51$, $p < .001$, $\eta_p^2 = .027$, and prior knowledge of UWS, $F(1, 1{,}015) = 7.57$, $p = .006$, $\eta_p^2 = .007$. However, no main effect of condition on number of raffle tickets donated was found, $F(2, 1{,}015) = 0.85$, $p = .43$, $\eta_p^2 = .002$, and exploratory pairwise comparisons did not show significant differences (all $p > .75$), suggesting that neither self-persuasion nor the QBE improved helping behavior compared to the direct-persuasion condition. In line with this, a Bayesian ANOVA showed strong evidence for the null hypothesis of no effect of the intervention on number of raffle tickets donated ($BF_{01} = 45.73$). Models run without the covariates (i.e., regular ANOVAs) did not show a different pattern for the main effects of condition on attitudes and number of raffle tickets donated.

A logistic regression with condition and the three covariates included as predictors of whether participants donated raffle tickets at all showed no effect of condition ($W = 1.343$, $p = .51$). Of the covariates, reactance and prior volunteering did show a significant effect. Reactance was negatively

associated with donating any raffle tickets ($B = -0.67$, $p < .001$), whereas prior volunteering was positively associated with donating at least one ticket (B = 0.802, $p < .001$).

As there was no effect of intervention conditions on attitude, the preregistered mediation analysis with task elaboration as mediator to test H4 could not be tested. However, we explored the underlying path a bit further by running an ANOVA to determine whether condition affected task elaboration, with results showing that it did, $F(2, 1{,}027) = 4.70$, $p < .01$, $\eta_p^2 = .009$. Pairwise comparisons revealed only a higher level of elaboration in the SP condition ($M = 4.18$) compared to the direct persuasion condition ($M = 4.07$, $p = .01$), showing a small effect ($d = 0.22$). Furthermore, we calculated the correlation between task elaboration and attitude ($r = .065$, $p = .038$), suggesting that there the predictive value of elaboration on attitude is limited.

Discussion

The current study is a first pilot to directly compare two conceptually related social influence techniques, SP and QBE. In our study, we addressed the question of whether SP or QBE is more effective when implemented in a social media setting to increase helping behavior and investigated the possible mediating role of message elaboration. No significant differences were found between conditions on attitude, number of raffle tickets donated, or whether participants donated tickets at all. The suggested mediating role of message elaboration could not be tested. Furthermore, effects approaching significance on willingness to like the Facebook page and provide an email address were found. Concluding, this first comparison suggested that the two techniques tested, SP and QBE, are not more effective than classic direct persuasion.

Intervention Effects

We found no significant effect of either intervention (SP or QBE) on attitudes, and thus there was no support for H1 that SP will lead to more positive attitudes compared to QBE. The Bayesian ANOVA showed strong support for the null hypothesis of no effect.

Furthermore, there was no effect of either intervention on helping by donating more raffle tickets, or any raffle tickets at all. This supports H3 of no difference in effectiveness between QBE and SP. The null finding for number of raffle tickets donated was strongly supported by the Bayesian analysis.

For the other two outcome measures, participants "liking" the Facebook page and entering their email address to be sent more information about UWS, there was some evidence suggesting that SP and QBE might have had an effect. Compared to the direct-persuasion condition, participants in the SP condition were more likely to provide an email address and participants in the QBE condition were more likely to intend to like the UWS Facebook page. However, the evidence was limited. The main effect of condition on the outcome variable was nonsignificant in both logistic regressions, meaning we should interpret these findings with caution. We conclude that there was some support for H2, stating no differences between QBE and SP on these measures, as there were no main effects of condition.

The mediation model that was hypothesized (H4) could not be tested as there was no effect of condition on attitudes. Hence, there was no support for this hypothesis. H5, stating that both QBE and SP would outperform the direct persuasion condition on all outcome measures, was not supported. For all outcome measures, the main effect of condition was not significant, and for the continuous outcome measures, the null hypothesis of no effect was strongly supported by Bayesian analyses.

Covariates

The covariates included in the models suggest that reactance might play a negative role in deciding if and how to help, whereas previous volunteering had a positive effect on the dependent variables. This is not surprising as previous research has shown past behavior to be one of the best predictors for future behavior (e.g., Ajzen, 2011). Similarly, reactance can lead to boomerang effects (e.g., Kim et al., 2017), meaning that people perform behaviors that are opposite of what is asked for in an intervention. While prior volunteering experience cannot be influenced, focusing on reactance could be a fruitful approach. Future research might first focus on investigating a potential causal link between reactance and helping, and then design methods to overcome resistance by reducing reactance.

Limitations

Three limitations to our study must be noted. First, we conducted an online study with screenshots of Facebook and, thus, no real interaction via social media took place. This could have limited the strength of the manipulations, and reduced believability compared to real-life social media interaction, which might have led to more noise and weaker effects. Due to feasibility constraints, we choose this approach as the first necessary step and we greatly encourage people to perform experiments that make use of actual social media platforms.

Second, we used a largely unknown charity. While baseline helping levels were relatively promising, the fact that UWS is not well known could have led to insecurity

or doubt in participants about whether to help. A future replication study with a better-known organization might show different findings, as participants might then be more convinced to help or have better arguments on why they should help.

Third, recently null results for SP were found more often, supporting the current findings that SP might not be as effective as previously thought (e.g., Li et al., 2019; Li, van Baaren, et al., 2020; Loman et al., 2019). Research has shown that certain boundary conditions, such as agency (Damen et al., 2015), online versus offline settings (Li, van Baaren, et al., 2020; Li, van Halen, et al., 2020), or compatibility with previously held attitudes (Briñol et al., 2012) affect the effectiveness of SP. We did not collect data on these factors and were therefore unable to investigate their role.

Conclusion

We did not find evidence that SP or QBE lead to a significant improvement in helping behavior compared to a direct-persuasion attempt. While there is some evidence that simple behaviors, such as liking a Facebook page and providing contact details, could be influenced this way, the question remains of whether this translates to later improvements in helping behavior. However, the clear link between reactance and the various behavioral outcomes suggests this might be a fruitful avenue for future research. If reactance can be reduced, this might lead to improved levels of helping. The current study is one of the few that directly compares different influence techniques. The study informs the applicability of techniques and the scalability of interventions beyond lab settings, and increases our understanding of underlying mechanisms, since factors specific to online platforms such as public comments can affect the effectivity of behavior-change techniques.

References

Ajzen, I. (2011). The theory of planned behaviour: Reactions and reflections. *Psychology and Health, 26*(9), 1113–1127. https://doi.org/10.1080/08870446.2011.613995

Aronson, E. (1999). The power of self-persuasion. *American Psychologist, 54*(11), 875–884. https://doi.org/10.1037/h0088188

Bernritter, S. F., van Ooijen, I., & Müller, B. C. N. (2017). Self-persuasion as marketing technique: The role of consumers' involvement. *European Journal of Marketing, 51*(5/6), 1075–1090. https://doi.org/10.1108/EJM-04-2015-0213

Brehm, J. W. (1966). *A theory of psychological reactance*. https://doi.org/10.1002/hrdq.20027

Briñol, P., McCaslin, M. J., & Petty, R. E. (2012). Self-generated persuasion: Effects of the target and direction of arguments. *Journal of Personality and Social Psychology, 102*(5), 925–940. https://doi.org/10.1037/a0027231

Burn, S. M., & Oskamp, S. (1986). Increasing community recycling with persuasive communication and public commitment. *Journal of Applied Social Psychology, 16*(1), 29–41. https://doi.org/10.1017/CBO9781107415324.004

Chapman, K. (2001). Measuring intent: There's nothing "mere" about mere measurement effects. *Psychology & Marketing, 18*(8), 811–841. https://doi.org/10.1002/mar.1031

Cialdini, R. B. (1993). *Influence: Science and practice* (3rd ed.). Harper Collins.

Cioffi, D., & Garner, R. (1998). The effect of response options on decisions and subsequent behavior: Sometimes inaction is better. *Personality and Social Psychology Bulletin, 24*(5), 463–472. https://doi.org/10.1177/0146167298245002

Clarkson, J. J., Tormala, Z. L., & Leone, C. (2011). A self-validation perspective on the mere thought effect. *Journal of Experimental Social Psychology, 47*(2), 449–454. https://doi.org/10.1016/j.jesp.2010.12.003

Crano, W. D., & Prislin, R. (2006). Attitudes and persuasion. *Annual Review of Psychology, 57*(1), 345–374. https://doi.org/10.1146/annurev.psych.57.102904.190034

Crawford, M. T., McConnell, A. R., Lewis, A. C., & Sherman, S. J. (2002). Reactance, compliance, and anticipated regret. *Journal of Experimental Social Psychology, 38*(1), 56–63. https://doi.org/10.1006/jesp.2001.1481

Damen, T. G. E., Müller, B. C. N., van Baaren, R. B., & Dijksterhuis, A. (2015). Re-examining the agentic shift: The sense of agency influences the effectiveness of (self)persuasion. *PLoS One, 10*(6), Article e0128635. https://doi.org/10.1371/journal.pone.0128635

de Boer, M. R., Waterlander, W. E., Kuijper, L. D. J., Steenhuis, I. H. M., & Twisk, J. W. R. (2015). Testing for baseline differences in randomized controlled trials: An unhealthy research behavior that is hard to eradicate. *International Journal of Behavioral Nutrition and Physical Activity, 12*(1), 1–8. https://doi.org/10.1186/s12966-015-0162-z

Dillard, J. P., & Shen, L. (2005). On the nature of reactance and its role in persuasive health communication. *Communication Monographs, 72*(2), 144–168. https://doi.org/10.1080/03637750500111815

Duffecy, J., Sanford, S., Wagner, L., Begale, M., Nawacki, E., & Mohr, D. C. (2013). Project onward: An innovative e-health intervention for cancer survivors. *Psycho-Oncology, 22*(4), 947–951. https://doi.org/10.1002/pon.3075

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*(4), 1149–1160. https://doi.org/10.3758/BRM.41.4.1149

Glock, S., Müller, B. C., & Ritter, S. M. (2013). Warning labels formulated as questions positively influence smoking-related risk perception. *Journal of Health Psychology, 18*(2), 252–262. https://doi.org/10.1177/1359105312439734

Greenwald, A. G., & Albert, R. D. (1968). Acceptance and recall of improvised arguments. *Journal of Personality and Social Psychology, 8*(1, Pt. 1), 31–34. https://doi.org/10.1037/h0021237

Hayes, A. (2013). *Introduction to mediation, moderation, and conditional process analysis*. Guilford Press. https://doi.org/978-1-60918-230-4

JASP Team. (2018). *JASP* (Version 0.8.6) [Computer software].

Kass, R., & Raftery, A. (1995). Bayes factors. *Journal of the American Statistical Association, 90*(430), 773–795. https://doi.org/10.1080/01621459.1995.10476572

Kim, S. Y., Levine, T. R., & Allen, M. (2017). The intertwined model of reactance for resistance and persuasive boomerang. *Communication Research, 44*(7), 931–951. https://doi.org/10.1177/0093650214548575

Levav, J., & Fitzsimons, G. J. (2006). When questions change behavior: The role of ease of representation. *Psychological*

Science, 17(3), 207–213. https://doi.org/10.1111/j.1467-9280.2006.01687.x

Levorashka, A., Utz, S., & Ambros, R. (2016). What's in a like? Motivations for pressing the like button. In *Proceedings of the Tenth International AAAI Conference on Web and Social Media (ICWSM 2016)* (pp. 623–626). http://www.aaai.org/ocs/index.php/ICWSM/ICWSM16/paper/view/13022/12812

Li, S., Ritter, S. M., Bi, C., van Baaren, R., & Müller, B. C. N. (2019). Does smokers' self-construal moderate the effect of (self-) persuasion on smoking? *Health Psychology Bulletin, 3*(1), 21–37. https://doi.org/10.5334/hpb.17

Li, S., van Baaren, R. B., & Müller, B. C. N. (2020). The influence of culture and close others on the effectiveness of (self)-persuasion. *Journal of General Psychology, 149*(2), 139–168. https://doi.org/10.1080/00221309.2020.1803193

Li, S., van Halen, C., van Baaren, R. B., & Müller, B. C. N. (2020). Self-persuasion increases healthy eating intention depending on cultural background. *International Journal of Environmental Research and Public Health, 17*(10). https://doi.org/10.3390/ijerph17103405

Loman, J. G. B., Müller, B. C. N., Oude Groote Beverborg, A., van Baaren, R. B., & Buijzen, M. (2018). Self-persuasion in media messages: Reducing alcohol consumption among students with open-ended questions. *Journal of Experimental Psychology: Applied, 24*(1), 81–91. https://doi.org/10.1037/xap0000162

Maio, G. R., & Thomas, G. (2007). The epistemic-teleologic model of deliberate self-persuasion. *Personality and Social Psychology Review, 11*(1), 1–22. https://doi.org/10.1177/1088868306294589

Matz, S. C., Kosinski, M., Nave, G., & Stillwell, D. J. (2017). Psychological targeting as an effective approach to digital mass persuasion. *Proceedings of the National Academy of Sciences*, 201710966. https://doi.org/10.1073/pnas.1710966114

McCambridge, J. (2015). From question-behaviour effects in trials to the social psychology of research participation. *Psychology & Health, 30*(1), 72–84. https://doi.org/10.1080/08870446.2014.953527

McCambridge, J., & Kypri, K. (2011). Can simply answering research questions change behaviour? Systematic review and meta analyses of brief alcohol intervention trials. *PLoS One, 6*(10), Article e23748. https://doi.org/10.1371/journal.pone.0023748

Müller, B. C. N., Ritter, S. M., Glock, S., Dijksterhuis, A. P., Engels, R. C. M. E., & Van Baaren, R. B. (2016). Smoking-related warning messages formulated as questions positively influence short-term smoking behaviour. *Journal of Health Psychology, 21*(1), 60–68. https://doi.org/10.1177/1359105314522083

Müller, B. C. N., van Baaren, R. B., Ritter, S. M., Woud, M. L., Bergmann, H., Harakeh, Z., … Dijksterhuis, A. (2009). Tell me why... The influence of self-involvement on short term smoking behaviour. *Addictive Behaviors, 34*(5), 427–431. https://doi.org/10.1016/j.addbeh.2008.12.016

Müller, B. C. N., van Baaren, R. B., van Someren, D., & Dijksterhuis, A. (2014). A present for Pinocchio: On when non-biological agents become real. *Social Cognition, 32*(4), 381–396.

Müller, B. C. N., van Someren, D. H., Gloudemans, R. T. M., Van Leeuwen, M. L., & Greifeneder, R. (2017). Helping made easy: Ease of argument generation enhances intentions to help. *Social Psychology, 48*(2), 113–121. https://doi.org/10.1027/1864-9335/a000293

Müller, B. C. N., van Steen, T., Li, S., Loman, J. G. B., & Buijzen, M. (2022). *Materials for "Helping on social media: Self-persuasion and question-behavior effects"*. https://doi.org/10.17605/OSF.IO/7N69Z

Murray, G., Leitan, N. D., Berk, M., Thomas, N., Michalak, E., Berk, L., … Kyrios, M. (2015). Online mindfulness-based intervention for late-stage bipolar disorder: Pilot evidence for feasibility and effectiveness. *Journal of Affective Disorders, 178*, 46–51. https://doi.org/10.1016/j.jad.2015.02.024

Mussweiler, T., & Neumann, R. (2000). Sources of mental contamination: Comparing the effects of self-generated versus externally provided primes. *Journal of Experimental Social Psychology, 36*(2), 194–206. https://doi.org/10.1006/jesp.1999.1415

Obermiller, C., & Spangenberg, E. R. (2000). Improving telephone fundraising by use of self-prophecy. *International Journal of Nonprofit and Voluntary Sector Marketing, 5*(4), 365–372. https://doi.org/10.1002/nvsm.126

Reynolds, R. A. (1997). A validation test of a message elaboration measure. *Communication Research Reports, 14*(3), 269–278. https://doi.org/10.1080/08824099709388670

Schmider, E., Ziegler, M., Danay, E., Beyer, L., & Bühner, M. (2010). Is it really robust? Reinvestigating the robustness of ANOVA against violations of the normal distribution assumption. *Methodology, 6*(4), 147–151. https://doi.org/10.1027/1614-2241/a000016

Sherman, S. J. (1980). On the self-erasing nature of errors of prediction. *Journal of Personality and Social Psychology, 39*(2), 211–221. https://doi.org/10.1037/0022-3514.39.2.211

Spangenberg, E. R., Sprott, D. E., Grohmann, B., & Smith, R. J. (2003). Mass-communicated prediction requests: Practical applicaton and a cognitive dissonance explanation for self-prophecy. *Journal of Marketing, 67*(3), 47–62. https://doi.org/10.1509/jmkg.67.3.47.18659

Spangenberg, E. R., Sprott, D. E., Knuff, D. C., Smith, R. J., Obermiller, C., & Greenwald, A. G. (2012). Process evidence for the question-behavior effect: Influencing socially normative behaviors. *Social Influence, 7*(3), 211–228. https://doi.org/10.1080/15534510.2012.694024

Sprott, D. E., Spangenberg, E. R., Block, L., Fitzsimons, G. J., Morwitz, V., & Williams, P. (2006). The question–behavior effect: What we know and where we go from here. *Social Influence, 1*(2), 128–137. https://doi.org/10.1080/15534510600685409

Sprott, D. E., Spangenberg, E. R., Knuff, D. C., & Devezer, B. (2006). Self-prediction and patient health: Influencing health-related behaviors through self-prophecy. *Medical Science Monitor, 12*(5), 85–92. http://ukpmc.ac.uk/abstract/MED/16641888

Treiblmaier, H., & Chong, S. (2011). Trust and perceived risk of personal information as antecedents of online information disclosure: Results from three countries. *Journal of Global Information Management, 19*(4), 76–94. https://doi.org/10.4018/jgim.2011100104

Van Kerckhove, A., Geuens, M., & Vermeir, I. (2009). *The effect of sequential self-predictions on behavior change*. Working Paper.

Van Steen, T., & Joinson, A. N. (2018). Self-affirmation and goal difficulty as moderators of the question-behaviour effect. *Journal of Theoretical Social Psychology, 2*(3), 76–84. https://doi.org/10.1002/jts5.21

Wagenmakers, E.-J. (2007). A practical solution to the pervasive problems of *p* values. *Psychonomic Bulletin & Review, 14*(5), 779–804. https://doi.org/10.3758/BF03194105

Wagenmakers, E.-J., Lee, M., Lodewyckx, T., & Iverson, G. J. (2008). Bayesian versus frequentist inference. In H. Hoijtink, I. Klugkist, & P. A. Boelen (Eds.), *Bayesian evaluation of informative hypotheses* (pp. 187–207). https://doi.org/10.1007/978-0-387-09612-4_9

Wagenmakers, E. J., Wetzels, R., Borsboom, D., & van der Maas, H. L. J. (2011). Why psychologists must change the way they analyze their data: The case of psi: Comment on Bem (2011). *Journal of Personality and Social Psychology, 100*(3), 426–432. https://doi.org/10.1037/a0022790

Webb, D. J., Green, C. L., & Brashear, T. G. (2000). Development and validation of scales to measure attitudes influencing

monetary donations to charitable organizations. *Journal of the Academy of Marketing Science, 28*(2), 299–309. https://doi.org/10.1177/0092070300282010

Wilson, T. D., & Brekke, N. (1994). Mental contamination and mental correction: Unwanted influences on judgments and evaluations. *Psychological Bulletin, 116*(1), 117–142. https://doi.org/10.1037/0033-2909.116.1.117

Wood, C., Conner, M., Miles, E., Sandberg, T., Taylor, N., Godin, G., & Sheeran, P. (2016). The impact of asking intention or self-prediction questions on subsequent behavior: A meta-analysis. *Personality and Social Psychology Review, 20*(3), 245–268. https://doi.org/10.1177/1088868315592334

History
Received May 10, 2018
Revision received March 3, 2022
Accepted March 8, 2022
Published online June 1, 2022

Authorship
Tommy van Steen and Barbara C. N. Müller contributed equally to this manuscript and therefore share first authorship.

Publication Ethics
Ethical approval for the study was sought and received from Radboud University.

Open Data
The authors are willing to share their data, analytics methods, and study materials with other researchers. The materials for this study can be found on https://doi.org/10.17605/OSF.IO/7N69Z (Müller et al., 2022).

Funding
We received funding for this project from the European Association of Social Psychology (EASP) in the form of a "Preregistered Research Grant".

ORCID
Tommy van Steen
https://orcid.org/0000-0002-5805-4664

Tommy van Steen
Leiden University, The Netherlands
Turfmarkt 99 Room 4.03
2511 DP The Hague
The Netherlands
t.van.steen@fgga.leidenuniv.nl

Tommy van Steen (PhD) is Assistant Professor in Cybersecurity Governance at the Institute of Security and Global Affairs at Leiden University, The Netherlands. His research interests include cybersecurity behavior of end-users, behavioral change, nudging, cyberpsychology, and organizational cybersecurity behavior.

Barbara C. N. Müller (PhD) currently works as an associate professor at the Communication & Media Department of the Behavioural Science Institute, Radboud University Nijmegen, The Netherlands. Her research focus is on human/agent interactions, how interactions with artificial agents can be improved and used to facilitate behavior change.

Shuang Li (PhD) is Assistant Professor at the Institute of Governance, Shangdong University (Qingdao), China. Her research interests lie in persuasion and behavioral change, environmental psychology, and cultural psychology.

Jeroen Loman (PhD) works at the Department of Persuasive Communication (Communication Science) at the University of Amsterdam, The Netherlands.

Moniek Buijzen (PhD) is Professor of Communication and Behavioural Change at the Erasmus University Rotterdam and at Radboud University, The Netherlands. In her research she investigates how to harness the potential of digital media technology to improve young people's well-being while minimizing potential risks.