

Self-Persuasion in Media Messages: Reducing Alcohol Consumption Among Students With Open-Ended Questions

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Self-persuasion (self-generation of arguments) is often a more effective influence technique than direct persuasion (providing arguments). However, the application of this technique in health media communications has received limited attention. In two experiments, it was examined whether self-persuasion can be successfully applied to antialcohol media communications by framing the message as an open-ended question. In Experiment 1 ($N = 131$) cognitive reactions to antialcohol posters framed either as open-ended questions or statements were examined. In Experiment 2 ($N = 122$) the effectiveness of this framing to reduce actual alcohol consumption was tested. Experiment 1 demonstrated that exposure to an antialcohol poster framed as an open-ended question resulted in more self-generated arguments for drinking less alcohol and more favorable message evaluations than framing the same message as a statement. Experiment 2 showed that the self-persuasion poster did not affect the choice to consume alcohol but did reduce alcohol consumption for individuals who chose to drink any alcohol, compared with a direct persuasion poster or no intervention. Together, the results demonstrated the potential of self-persuasion in persuasive media messages for interventions aimed at alcohol consumption reduction specifically and for health communication in general.

Keywords: self-persuasion, framing, health communication, alcohol

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Alcohol has been causally linked to over 60 types of disease and trauma (Corrao, Bagnardi, Zambon, & La Vecchia, 2004; Rehm et al., 2003) and is currently ranked as the third highest contributor to disease and mortality worldwide (World Health Organization, 2014). Despite extensive media education and persuasion interventions, alcohol consumption is still rising on a global level (World Health Organization, 2014). Because research has consistently shown that knowledge about the harmful effects of alcohol is extremely high (Ringold, 2002), the main problem appears to be the ineffectiveness of antialcohol media interventions to change behavior (Wakefield, Loken, & Hornik, 2010). The goal of the current study is to solve this incongruence between knowledge and behavior by introducing an alternative media persuasion strategy to reduce alcohol consumption: the use of open-ended questions to trigger self-generation of arguments: in other words, the application of self-persuasion to antialcohol media messages.

Persuasive media messages aimed at reducing alcohol consumption primarily consist of direct forms of persuasion (i.e., providing factual information or statements indicating that people should reduce their alcohol consumption). These direct methods, however, are mainly ineffective (Wakefield et al., 2010). One of the main reasons for this is that individuals recognize the persuasive intent of the communications (cf., Aronson, 1999, 2007; Dillard & Shen, 2005). The message may therefore be experienced as a threat to their freedom to choose. As a consequence, individuals may experience reactance (Brehm, 1966), resulting in rejection of the message or even an increase of the unwanted behavior in an attempt to restore freedom of choice (Ringold, 2002).

An alternative to conventional direct persuasion methods is the “self-persuasion technique.” Rather than providing individuals with arguments or statements, they are asked to generate arguments themselves. By doing so, the target of persuasion creates the means of influence her/himself (e.g., Briñol, McCaslin, & Petty, 2012; Maio & Thomas, 2007). This technique is considered to be more effective than direct persuasion for three main reasons. First, individuals mentally detect, and correct for, internally generated information to a lesser extent than externally provided information (e.g., Mussweiler & Neumann, 2000; Wilson & Brekke, 1994). Second, reactance is not activated in response to self-generated arguments because they do not restrict freedom of choice. Third, when individuals generate arguments, they tend to come up with reasons that they find the most compelling (Briñol et al., 2012; Greenwald & Albert, 1968; Slamecka & Graf, 1978). For these

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reasons, self-persuasion as a persuasive technique seems to hold great promise for application in media interventions. Not only do self-persuasive messages have the potential to bypass corrections and reactance responses, by instructing individuals to generate arguments they are effectively tailoring the most convincing message for themselves. The question, therefore, is: how can self-persuasion be applied to persuasive health media communications?

Applying Self-Persuasion in Media Messages: Instruction Versus Open-Ended Questions

The origins of self-persuasion as a compliance-inducing technique can be traced back to research on attitude change resulting from role playing (Janis & King, 1954). When individuals were instructed to present arguments in favor of various topics (i.e., movie theaters, meat supply, and cold cure) in an informal talk, this “role playing” resulted in greater attitude change than passively listening to the same talk. The effectiveness of such self-persuasion tasks is evident from the growing line of research that replicated this finding in a variety of contexts, such as forced military service (King & Janis, 1956), smoking (Elms, 1966), politics (Watts, 1967), undergraduate education (Greenwald & Albert, 1968), importance of empirical research (Friedrich, 1990), and clean local environment (Damen, Müller, van Baaren, & Dijksterhuis, 2015) to change attitudes, as well as smoking behavior (Müller et al., 2009) and tipping behavior (Bernritter, van Ooijen, & Müller, 2017). Over time, self-persuasion techniques have become easier to apply in interventions for two main reasons. First, it was found that self-persuasion occurs not only by role-playing but also in writing tasks (i.e., Bernritter et al., 2017; Damen et al., 2015; Friedrich, 1990; Greenwald & Albert, 1968; Müller et al., 2009; Watts, 1967), showing that the presence of an audience is not required for self-persuasion to occur. Second, the key factor of the persuasive effects has become clearer, changing from concepts such as “improvisation” (Janis & King, 1954; King & Janis, 1956), “fantasy ability” (Elms, 1966), and “improvised arguments” (Greenwald & Albert, 1968), to simply self-generation of arguments (e.g., Müller et al., 2009). Combined, these studies show that attitudes and behavior can be successfully modified by having individuals generate their own arguments.

Constant throughout this line of research, however, remains that the self-persuasion tasks all require the *instruction* to generate arguments for its effects to occur. This requirement seems to indicate that the self-persuasion method is not applicable in a media context, especially for traditional media messages in the form of persuasive print or TV messages. That is, individuals will follow instructions in a laboratory, but in a real-life setting they are unlikely to disrupt their ongoing activities to generate arguments in favor of or against an issue when exposed to a media message instructing them to do so. Nevertheless, research has found a new way of applying the self-persuasion-technique to overcome this problem.

Recent research has shown that, rather than *instructing* individuals to generate arguments for a certain position, it is also possible to *trigger* self-generation of arguments, by providing a question in persuasive messages (e.g., “Why is it good to stop smoking?”; Glock, Müller, & Ritter, 2013; Müller et al., 2016). The authors assumed that reading the question should elicit argument generation in line with the question in the message receiver, effectively

resulting in self-persuasion (e.g., attitude and behavioral change in line with the generated arguments). Glock et al. (2013) demonstrated that formulating warning labels on cigarette packages as open-ended questions resulted in higher smoking-related risk perception compared with warning labels formulated as statements. Müller et al. (2016) expanded these results on a behavioral level by demonstrating that smokers refrained from smoking longer after seeing a TV clip containing questions about “why smoking is bad” compared with statements providing the arguments. Finally, a recent pilot study by Krischler and Glock (2015) showed that formulating alcohol warning labels as closed questions (e.g., “Do you really want alcohol to help you test your limits?”) resulted in higher negative alcohol related outcome expectancies compared with no warning labels. Warning labels formulated as statements had no influence on participants.

This new application of self-persuasion not only has produced promising results, it also seems a very applicable strategy for media campaigns: for example, persuasive poster, TV, or social media messages. Research on this new self-persuasion method in media messages, however, is limited (for the exceptions, see Glock et al., 2013; Krischler, & Glock, 2015; Müller et al., 2016). In order to fully test the effectiveness of the method in persuasive media messages, there is therefore a need to first explore the as yet untested cognitive responses to self-persuasive media messages, and to subsequently test their effectiveness at a behavioral level. In the current study, both questions are addressed in two experiments. The goal of Experiment 1 was to test whether framing of persuasive antialcohol messages (i.e., posters) as open-ended questions resulted in self-generation of arguments “why to drink less alcohol” and more favorable message evaluations indicative of lower reactance to the message. The goal of Experiment 2 was to test whether the poster was successful in reducing actual alcohol consumption. Importantly, the current studies aim to replicate earlier findings in the self-persuasion field in a new and easy to apply form in an important applied field: that is, providing persuasive posters to reduce alcohol consumption. Thus, not only do we try to replicate and validate earlier findings from a lab setting, an important goal in itself, given the often low replication rates. Current findings could also have important implications for current mass media interventions designed to make people drink less alcohol.

Experiment 1

The aim of Experiment 1 was to examine whether self-persuasion can be successfully applied to media communications in the form of an antialcohol poster by framing the message as an open-ended question. This framing should result in more self-generation of arguments and more favorable message evaluations (more positive message judgment, lower recognition of persuasive intent, and lower experienced negative affect), indicative of less reactance to the message. As a subgoal, the role of message wording (i.e., self-references and “forcefulness” of language) in these effects was also examined. Based on the definition of the Oxford dictionaries (<https://www.oxforddictionaries.com/>), the wordings “should” (meaning to be advised to do something), “have to” (meaning be obliged to do something), and “it is better” (meaning that it is more desirable to do something) were used to investigate differences in perceived forcefulness. Based on reac-

tance theory (Brehm, 1966) it was expected that less forceful language and the absence of self-references would be perceived to restrict freedom of choice to a lesser extent, resulting in lower recognition of persuasive intent and lower experienced negative affect.

Method

Participants and design. One hundred thirty-three participants were tested, however, two of them did not complete the main task (i.e., the thought-listing task) and were therefore excluded from all analyses. Both participants were in the self-persuasion “it is better” message-framing condition. Their exclusion did not change any of the results. The remaining 131 individuals (100 women; 31 men) ranged in age from 18 to 60 years ($M = 22.31$, $SD = 4.35$), and participated in the experiment for course credit or a €5 reward. They were recruited at the university and randomly assigned to one of six conditions in a 2 (persuasion technique: self-persuasion vs. direct persuasion) \times 3 (message wording: you should vs. you have to vs. it is better) between-subjects design with number of generated pro- and counterarguments, message judgment, recognition of persuasive intent, and experienced negative affect as the dependent variables. Self-reported attitudes and behavioral intentions toward limiting future alcohol consumption measures (adopted from Keer, van den Putte, Neijens, & de Wit, 2013) were also completed. However, because no differences between conditions were found, these measures are not reported in the current article. Details about the measurements, results, and conclusion are available as online supplemental materials. The experiment was approved by the university ethics committee.

Procedure and materials. The experiment was comprised of several computer tasks and was conducted at a cubicle laboratory. Upon arrival participants were informed that the goal of the experiment was to pretest materials for a future experiment and that, therefore, the researchers were interested in their opinions about a poster. After obtaining informed consent they were seated in front of a computer and asked to follow the instructions on screen.

The first task was a thought-listing task. Participants were exposed to one of six antialcohol posters for 10 s, and were subsequently asked to report all thoughts they had while viewing it out loud into a microphone for 30s, from which the number of pro- and counterarguments that were generated were assessed. After this task, participants answered several questions assessing the remaining dependent variables (message judgment, recognition of persuasive intent, and experienced negative affect), control variables (frequency of alcohol consumption over the past four weeks and intensity of alcohol consumption in the previous week), and demographics (age, gender, native language, and country of birth). After completion, participants were thanked, rewarded, debriefed, and dismissed.

Stimulus materials. Participants were exposed to one of six antialcohol posters varying in message wording: (a) a self-reference using the wording “you should,” (b) a self-reference using the wording “you have to,” or (c) no self-reference using the wording “it is better,” and persuasion technique: either framed as an open-ended question (i.e., the self-persuasion versions, e.g., “Why do you have to drink less alcohol?”) or as a statement (i.e.,

the direct persuasion versions, e.g., “You have to drink less alcohol!”). All six posters had an identical layout: A black frame against a white background with the message text centered both vertically and horizontally. The posters had an image size of 720×960 pixels and were displayed in the center of the computer screen with a resolution of $1,920 \times 1,080$ pixels (96 dpi). Pictures of the posters including the original wording in Dutch are available in the online supplemental materials.

Argument generation. In order to analyze the responses to the thought-listing task, all verbalizations were transcribed and subsequently grouped into segments representing “thoughts” by defining meaningful units. Meaningful units referred to verbalizations containing one line of reasoning, one specific argument, or one statement (Blackwell, Galassi, Galassi, & Watson, 1985). As a first step, all meaningful units were coded as either relevant or irrelevant by three independent coders (Krippendorff’s α ranged from¹ = .27 to .71; $M\alpha = .61$; $SD = .31$). Discrepancies were resolved via three-way discussion. Next, in order to assess whether or not the posters succeeded in triggering argument generation, a second round of coding followed in which all relevant meaningful units were coded as either a proargument, a counterargument, or no argument via the same procedure (i.e., two independent coders; Krippendorff’s α ranged from² = .54 to .93; $M\alpha = .79$; $SD = .14$). Subsequently, two scales were created: one consisting of the summed proarguments ($M = 1.19$, $SD = 1.76$), and one consisting of the summed counterarguments ($M = .05$, $SD = .26$).

Message judgment. Judgment of the poster was measured by having participants indicate how well 11 words in randomized order described the poster on a 7-point scale ranging from 1 (*completely not*) to 7 (*completely*). Example items were: “believable,” “interesting,” and “irritating” (adopted from Keer et al., 2013). A total scale was constructed by averaging the scores of the 11 items (Cronbach’s alpha = .84, $M = 4.06$, $SD = .98$).

Recognition of persuasive intent. Recognition of persuasive intent of the posters was measured by having participants indicate their agreement to four statements in randomized order on a 7-point scale ranging from 1 (*completely disagree*) to 7 (*completely agree*). Example items were: “the poster tried to make a decision for me” and “the poster tried to manipulate me” (adopted from Dillard & Shen, 2005). A total scale was constructed by averaging the scores on the four items (Cronbach’s alpha = .82, $M = 3.48$, $SD = 1.40$).

Experienced negative affect. Experienced negative affect was measured as an indication of reactance to the posters. Participants indicated on a 7-point scale ranging from 1 (*completely not*) to 7 (*completely*) and in randomized order the extent to which they felt four emotions: “irritated,” “aggravated,” “annoyed,” and “angry” (adopted from Dillard & Shen, 2005). A total scale was constructed by averaging the scores on the four items (Cronbach’s alpha = .91, $M = 2.47$, $SD = 1.39$).

¹ All Krippendorff’s $\alpha < .27$ were based on more than six meaningful units (few participants had more than seven separate meaningful units) and are therefore omitted from the statistics reported. Including them results in Krippendorff’s α ranging from $-.11$ to $.71$; $M\alpha = .44$; $SD = .31$).

² All Krippendorff’s $\alpha < .54$ were based on more than six meaningful units (few participants had more than seven separate meaningful units) and are therefore omitted from the statistics reported. Including them results in Krippendorff’s α ranging from $.00$ to 1.00 ; $M\alpha = .66$; $SD = .36$).

Alcohol consumption frequency. In order to control for the effects of previous alcohol consumption behavior, frequency of alcohol consumption over the past four weeks was measured using four questions (one for each of the preceding four weeks; e.g., “On how many days did you drink alcohol in the past week?”; adopted from Engels & Knibbe, 2000). For each participant, the mean over these four items was calculated as an indication of the frequency of previous alcohol consumption (Cronbach’s alpha = .89, $M = 2.96$, $SD = 1.49$).

Alcohol consumption intensity. In order to control for the effects of intensity of previous alcohol consumption behavior, amount of alcohol consumed in the previous week was measured using four questions: during weekdays and in the weekend, inside and outside the home (e.g., “How many glasses of alcohol did you consume in the past week, during weekdays, at home?”; adopted from Engels, Knibbe, & Drop, 1999). For each participant, the sum of these four items was calculated as an indication of intensity of previous alcohol consumption ($M = 8.75$, $SD = 12.68$).

Results and Discussion

Descriptive statistics. For both the alcohol consumption frequency and intensity measurements, 18% of participants reported no alcohol consumption in the week(s) prior to the experiment. Table 1 provides the means and standard deviations of all measurements in this experiment. Because the two measures of alcohol consumption (frequency and intensity) did not correlate significantly with any of the dependent measures (self-generation of arguments, message judgment, recognition of persuasive intent, and experienced negative affect; all $ps > .10$), they were not included as covariates in the main analyses.

Randomization checks showed no significant differences between conditions for any of the control variables (i.e., alcohol consumption frequency, alcohol consumption intensity, age, gender, native language, county of birth), indicating successful randomization.

Main analyses. A 2 (persuasion technique: self-persuasion vs. direct persuasion) \times 3 (message wording: you should vs. you have to vs. it is better) between-subjects multivariate analysis of variance (MANOVA) on all dependent variables (number of proarguments generated, number of counterarguments generated, message judgment, recognition of persuasive intent, and experienced negative affect) yielded a main effect for

persuasion technique, $F(5, 121) = 9.24$, $p < .01$, partial $\eta^2 = .28$. The main effect for message wording and the interaction between persuasion technique and message wording were both nonsignificant, $F(10, 244) = 1.55$, $p = .12$, partial $\eta^2 = .06$ and $F(10, 244) = 1.36$, $p = .20$, respectively.

Argument generation. The MANOVA yielded a main effect for persuasion technique on number of proarguments generated, $F(1, 125) = 39.99$, $p < .01$, partial $\eta^2 = .24$, indicating that the self-persuasion poster versions resulted in significantly more generated arguments ($M = 2.03$, $SD = 2.05$) compared with the direct-persuasion versions ($M = .34$, $SD = .76$). The main effect for message wording and the interaction between persuasion technique and message wording were both nonsignificant, $F(2, 125) = 2.34$, $p = .10$ and $F(2, 125) = 1.28$, $p = .28$, respectively. For number of counterarguments generated, the main effect for persuasion technique, the main effect for message wording and the interaction effect of persuasion technique and message wording were all nonsignificant, $F(1, 125) = 1.01$, $p = .32$; $F(2, 125) = .78$, $p = .46$ and $F(2, 125) = .34$, $p = .71$, respectively.

Message judgment. The MANOVA yielded a main effect for persuasion technique on message judgment, $F(1, 125) = 6.42$, $p < .01$, partial $\eta^2 = .05$, indicating that the self-persuasion poster versions resulted in significantly more positive message judgment ($M = 4.28$, $SD = .80$) compared with the direct-persuasion versions ($M = 3.84$, $SD = 1.10$). The main effect for message wording as well as the interaction between persuasion technique and message wording were both nonsignificant, $F(2, 125) = 2.00$, $p = .14$ and $F(2, 125) = 1.92$, $p = .15$, respectively.

Recognition of persuasive intent. The MANOVA yielded a main effect for persuasion technique on recognition of persuasive intent, $F(1, 125) = 5.99$, $p = .02$, partial $\eta^2 = .05$, indicating that the self-persuasion poster versions resulted in significantly less recognition of persuasive intent ($M = 3.20$, $SD = 1.34$) compared with the direct-persuasion versions ($M = 3.78$, $SD = 1.41$). The main effect for message wording was a nonsignificant trend, $F(2, 125) = 2.58$, $p = .08$, partial $\eta^2 = .04$. Bonferroni post hoc comparison indicated a nonsignificant trend difference between the “you have to” and “it is better” wording ($p = .08$), with the “you have to” wording ($M = 3.80$, $SD = 1.50$) resulting in higher recognition of persuasive intent compared with the “it is better” wording ($M = 3.14$, $SD = 1.35$). The interaction between persua-

Table 1
Experiment 1 Sample Means and Standard Deviations by Condition

Persuasion technique	Self-persuasion						Direct persuasion						Total	
	“You should” ($n = 22$)		“You have to” ($n = 22$)		“It is better” ($n = 22$)		“You should” ($n = 22$)		“You have to” ($n = 21$)		“It is better” ($n = 22$)		($n = 131$)	
Message wording	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
No. proarguments	1.36	1.76	2.18	2.09	2.55	2.20	.27	.63	.24	.63	.50	.96	1.19	1.76
No. counterarguments	.09	.29	.05	.21	.09	.29	.09	.43	.00	.00	.00	.00	.05	.26
Message judgment	4.25	.79	4.29	1.00	4.30	.61	3.88	1.31	3.41	.89	4.21	.93	4.06	.98
Persuasive intent	3.30	1.21	3.65	1.48	2.65	1.17	3.77	1.39	3.94	1.53	3.63	1.36	3.48	1.40
Negative affect	1.92	.80	2.51	1.61	1.95	1.02	2.94	1.76	2.88	1.47	2.65	1.25	2.47	1.39
Alcohol consumption frequency	2.81	1.41	3.00	1.16	3.33	2.00	3.06	1.59	2.46	1.22	3.10	1.41	2.96	1.49
Alcohol consumption intensity	10.14	16.68	10.41	12.39	10.45	14.38	7.91	11.21	6.61	13.03	6.91	6.32	8.75	12.68

sion technique and message wording was nonsignificant, $F(2, 125) = .74, p = .48$.

Experienced negative affect. The MANOVA yielded a main effect for persuasion technique on experienced negative affect, $F(1, 125) = 8.58, p < .01$, partial $\eta^2 = .06$, indicating that the self-persuasion poster versions resulted in significantly less experienced negative affect ($M = 2.13, SD = 1.21$) compared with the direct-persuasion versions ($M = 2.82, SD = 1.49$). The main effect for message wording as well as the interaction between persuasion technique and message wording were both nonsignificant, $F(2, 125) = .95, p = .39$ and $F(2, 125) = .63, p = .53$, respectively.

Conclusion. The aim of Experiment 1 was to examine whether self-persuasion can be successfully applied to media antialcohol posters by framing the message as a question. Persuasive antialcohol messages framed as questions resulted in self-generation of arguments why to drink less alcohol, whereas similar messages framed as statements did not. Furthermore, messages framed as questions resulted in more positive message judgment, less recognition of persuasive intent, and less experienced negative affect compared with the statement counterparts, indicative of lower evoked reactance. Message wording did not affect argument generation, message evaluations or reactance to the messages. This could be due to participants not perceiving the difference in forcefulness between the three wordings. However, as the common definition is very clear cut, we doubt that differences in forcefulness were not perceived. The aim of Experiment 2 was to examine whether a self-persuasion poster from Experiment 1 was more effective to reduce actual alcohol consumption compared with both its direct persuasion counterpart and a control condition (i.e., no poster).

Experiment 2

Given the often small correlation between attitudes and behavior in risky and socially undesirable behaviors (e.g., Fazio & Towles-Schwen, 1999) in Experiment 2 the effectiveness of the posters developed in Experiment 1 to change actual alcohol consumption behavior were tested. It was expected that an open-ended question would reduce alcohol consumption compared with a statement poster and no poster. It was further expected that a statement poster would produce a reactance effect, effectively increasing alcohol consumption compared with no poster.

Method

Participants and design. Based on an a priori estimation of statistical power of $(1 - \beta) = .8$ and a slightly conservative estimated effect size Cohen's $f = .30$ (derived from the effect size Cohen's $f^2 = .14$ found by Müller et al., 2016), a minimum of 111 participants was required for this experiment. One hundred twenty-six participants were tested, however, four influential cases were identified based on Z scores >1.96 on the main outcome measurement (i.e., pure ml of alcohol consumed) and after closer inspection dropped from the analyses: two were removed from the control condition for drinking hard liquor during the 1-hr ad libitum drinking session (hard liquor was present in the room, but not intended nor introduced as an option for drink choice). Another two were removed from the self-persuasion condition because after entering the bar lab, they both stated that they intend to drink

“as much free drinks as possible.” They actively searched for more alcohol after drinking all beer present next to the set-up, which reflects very different intentions than all other participants, and suggests that they did not follow instructions of the experiment thoroughly. The remaining 122 participants (98 women and 24 men) ranged in age from 18 to 34 years ($M = 20.57, SD = 2.38$) and participated for course credit or a €15 reward.

Participants were recruited at the university and were eligible to participate if they were older than 18 years (the legal drinking age in the Netherlands) and consumed alcohol. The participants were randomly assigned to one of three conditions in a between-subjects design: a self-persuasion condition (i.e., an antialcohol poster framed as a question present in the room), a direct-persuasion condition (i.e., an antialcohol poster framed as a statement), or a control condition (i.e., no poster). The dependent variable was milliliters of pure alcohol consumed during a 1-hr ad libitum drinking session. Self-reported attitudes- and behavioral intentions toward limiting future alcohol consumption measures (adopted from Keer et al., 2013) were also completed, however, because no differences between conditions were found, these measures are not reported in the current article. Details about the measurements, results, and conclusion are available as online supplemental materials. The experiment was approved by the university ethics committee.

Procedure and materials. The experiment took place in an interaction room outfitted as a bar (Müller et al., 2009) between 16:00 and 21:00 hr (i.e., three timeslots of 90 min each, with the self-persuasion condition, direct-persuasion condition, and control condition rotated each day to ensure equal time of day testing distribution for each condition). Participants arrived at the bar lab in dyads because drinking typically occurs in a social setting (e.g., Christiansen, Vik, & Jarchow, 2002). After informed consent was obtained, they were first told the cover story that the goal of the experiment was “to examine the effects of different environments on the judgment of movie clips” and that in this case, that setting was a bar. The participants were then told that “to further simulate the setting” they are free to take as much and whatever kind of drinks they liked from a refrigerator (containing beer, wine, soda, and water) present in the bar lab.

After this explanation, the experimenter started a 1-hr DVD that displayed five clips (i.e., short films that did not contain any alcohol-related content about a failed robbery, falling in love, a college lecture, an expert meeting, and a missed phone call) on a TV present in the room, behind which the posters were displayed. After each clip, a black screen was displayed for 5 min during which the participants were instructed to answer bogus questions (i.e., assessing both their own as well as their coparticipant's attitudes) about the clip they just viewed. During this 1-hr ad libitum drinking session all drinks consumed were registered.

After the drinking session, the participants were taken to separate cubicles to complete additional questionnaires assessing the control variables (i.e., frequency of alcohol consumption over the past 4 weeks, intensity of alcohol consumption in the previous week), manipulation checks (i.e., poster exposure), and demographics (i.e., age, gender, native language, and country of birth) on a computer. Finally, the participants were thanked, rewarded, debriefed, and dismissed.

Stimulus materials. The posters used in this experiment were adopted from Experiment 1. Because no main effects for message

wording was found, the you-have-to framing using a self-reference (i.e., “Why do you have to drink less alcohol?”/“You have to drink less alcohol!”) was selected for two reasons: (a) this framing was most forceful and therefore less ambiguous in expressing the importance of reducing alcohol consumption, and (b) the self-reference increased the likelihood that individuals will generate arguments to convince themselves, which should increase the persuasiveness of the message for individuals with positive attitudes toward drinking (Briñol et al., 2012). The size of the posters was A2 and they were displayed, clearly visible, behind the TV on which participants watched the movie clips.

Alcohol consumption. The main outcome measurement in this experiment is total alcohol consumption during the 1-hr ad libitum drinking session in the bar lab. Participants’ choice of drinks (i.e., beer, wine, soda or nothing), number of drinks, and the total number of milliliters consumed (for each type of drink) were measured. If participants did not finish their final drink, the remaining volume in milliliters was subtracted from the total consumption. Finally, the total amount of pure alcohol consumed (in milliliters) was calculated by multiplying the volume of beer and/or wine consumed (in milliliters) with the percentage of alcohol in the drinks (i.e., .050 and .125, respectively; $M = 12.21$, $SD = 13.28$).

Alcohol consumption frequency. Frequency of previous alcohol consumption was measured identically to the measurement employed in Experiment 1 (Cronbach’s $\alpha = .85$, $M = 1.98$, $SD = 1.19$).

Alcohol consumption intensity. Intensity of previous alcohol consumption was measured identically to the measurement employed in Experiment 1 ($M = 10.79$, $SD = 12.19$).

Manipulation check. Successful poster exposure was checked via a funnel debriefing with the following questions: (a) “Did you see a poster in the bar-lab?” (b) “What was the poster about?” and (c) “What exactly was on the poster?” Seventy-three of the 82 participants (89%) in the experimental conditions reported spotting the posters; 57 (70%) were able to correctly recall the exact message wording.

Analysis strategy. The effects of persuasion technique (i.e., self-persuasion vs. direct persuasion) on alcohol consumption was tested with a form of multilevel regression analysis. Because individuals were tested in dyads, the data had a nested structure. Therefore, possible nonindependence of the data had to be corrected to avoid underestimation of the standard errors and incorrectly finding a significant effect (i.e., to avoid a Type I error). In other words, dyad level variance needed to be separated from individual level variance, while testing effects on the individual level only. To take the nested structure of the data into account in this way, the statistical software Mplus 6.12 (Muthén & Muthén, 2010) was used, employing the TYPE = COMPLEX procedure.

A large proportion of participants (41.8%) chose not to consume any alcohol during the experiment. The main outcome variable, milliliters of pure alcohol consumed, therefore contained a meaningful spike at the value zero, violating the assumption of a normal distribution. In order to correctly analyze the data, the original research question was separated into two subquestions: (a) “Does persuasion technique affect the choice to consume alcohol (yes vs. no)?” and (b) “Does persuasion technique affect alcohol consumption for individuals who chose to consume any alcohol?”

The first question was answered by examining the effects of condition (i.e., persuasion technique) on the choice to consume alcohol (yes vs. no) for the complete sample with multilevel probit regression analysis. The main effects for persuasion technique were tested by dummy coding condition (0 = control). The analysis was repeated while controlling for the influence of the control variables (i.e., previous alcohol consumption frequency, previous alcohol consumption intensity, age, and gender) by entering them as covariates. These steps were repeated with the self-persuasion condition as the reference condition in order to compare the self-persuasion condition with the direct persuasion condition.

The second question was answered by creating a subsample comprising only those participants who chose to consume alcohol. This subsample was subjected to a multilevel regression analysis with milliliters of pure alcohol consumed as the outcome variable. The analysis was repeated while controlling for the influence of the control variables (i.e., previous alcohol consumption frequency, previous alcohol consumption intensity, age, and gender) by entering them as covariates. Finally, these steps were again repeated with the self-persuasion condition as the reference condition to be able to compare the self-persuasion condition with the direct persuasion condition.

Results and Discussion

Descriptive statistics. One participant reported drinking no alcohol on any day in the past 4 weeks prior to the experiment and 9% of participants reported having consumed zero glasses of alcohol in the week prior to the experiment. The dependent measure milliliters of pure alcohol consumed correlated significantly with previous alcohol consumption frequency, $r(120) = .42$, $p < .01$, and previous alcohol consumption intensity, $r(120) = .32$, $p < .01$. Therefore, both measures were added as covariates in the main analyses. Table 2 displays the means and standard deviations of previous alcohol consumption frequency and intensity by condition.

Randomization was unsuccessful for age, $F(2, 119) = 3.17$; $p = .046$. A Games-Howell post hoc comparison showed a nonsignificant trend difference between the self-persuasion condition and the control condition ($p = .072$), indicating that participants were

Table 2
Experiment 2 Sample Means and Standard Deviations by Condition

Measurement	Self-persuasion ($n = 38$)		Direct persuasion ($n = 44$)		Control ($n = 40$)		Total ($n = 122$)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Alcohol consumption frequency	2.13	1.14	1.66	1.16	2.18	1.22	1.98	1.19
Alcohol consumption intensity	10.89	10.00	8.24	9.68	13.53	15.74	10.79	12.19

slightly younger in the self-persuasion condition ($M = 20.08$, $SD = .38$ and $M = 21.32$, $SD = .35$, respectively). No differences were found for all other comparisons ($p > .201$). For all remaining control variables (i.e., gender, previous alcohol consumption frequency, previous alcohol consumption intensity, time of day, and day of the week) randomization was successful (all $ps > .05$).

Of all the participants, 41.8% did not consume any alcohol. The intraclass correlation for drinking within the dyads was .85, indicating high similarity of alcohol consumption within the dyads.

Main analyses.

Choice to drink alcohol. The multilevel probit regression analysis of persuasion technique (i.e., self-persuasion vs. direct persuasion) on the choice to consume alcohol (1 = yes; 0 = no), did not yield a significant main effect for the self-persuasion poster ($b = .08$, $p = .83$), nor for the direct-persuasion poster ($b = -.20$, $p = .60$) compared with the control condition (reference group). Repeating the analysis including all control variables as covariates yielded a main effect for previous alcohol consumption frequency ($\beta = .44$, $p = .001$). Repeating the analysis including only previous alcohol consumption frequency as a covariate did not yield a significant main effect for the self-persuasion poster ($\beta = .05$, $p = .74$), nor, for the direct-persuasion poster ($\beta = .03$, $p = .84$) compared with the control condition. The effect of previous alcohol consumption frequency was significant ($\beta = .56$, $p < .001$; $R^2 = .31$).

The multilevel probit regression analysis of persuasion technique (i.e., direct persuasion vs. control) on the choice to consume alcohol (1 = yes; 0 = no), did not yield a significant main effect for the direct-persuasion poster ($b = -.13$, $p = .46$), nor for the control condition ($b = -.04$, $p = .83$) compared with the self-persuasion poster (reference group). Repeating the analysis including all control variables as covariates again yielded a main effect for previous alcohol consumption frequency ($\beta = .44$, $p = .001$) only. Repeating the analysis including only previous alcohol consumption frequency as a covariate did not yield a significant main effect for the direct-persuasion poster ($\beta = -.02$, $p = .91$), nor for the control condition ($\beta = -.05$, $p = .74$) compared with the self-persuasion condition. The effect of previous alcohol consumption frequency was significant ($\beta = .56$, $p = .000$; $R^2 = .31$).

Alcohol consumption for participants who chose to drink any alcohol. The multilevel regression analysis of persuasion technique (i.e., self-persuasion vs. direct persuasion) on alcohol consumption (i.e., milliliters of pure alcohol consumed) for participants who consumed any alcohol, yielded a significant main effect for the self-persuasion poster ($b = -6.70$, $p = .035$), but not for the direct-persuasion poster ($b = -2.23$, $p = .52$) compared with the control condition (reference group). Repeating the analysis including all control variables as covariates, yielded a main effect the self-persuasion poster ($\beta = -.31$, $p = .031$) and a nonsignificant trend for previous alcohol consumption intensity ($\beta = .20$, $p = .052$). Repeating the analysis including only previous alcohol consumption intensity as a covariate again yielded a significant main effect for the self-persuasion poster ($\beta = -.35$, $p = .009$) but not for the direct persuasion poster ($\beta = -.10$, $p = .548$) and yielded a significant main effect for previous alcohol consumption intensity ($\beta = .25$, $p = .012$; $R^2 = .155$).

The multilevel regression analysis of persuasion technique (i.e., direct persuasion vs. control) on alcohol consumption (i.e., milliliters of pure alcohol consumed) for participants who consumed

any alcohol yielded a nonsignificant trend for the direct-persuasion poster ($b = 4.47$, $p = .095$), and a significant main effect for the control condition ($b = 6.69$, $p = .035$) compared with the self-persuasion poster (reference group). Repeating the analysis including all control variables as covariates yielded a nonsignificant trend for the direct persuasion poster ($\beta = .24$, $p = .061$), a significant main effect for the control condition ($\beta = .31$, $p = .032$), and a nonsignificant trend for previous alcohol consumption intensity ($\beta = .20$, $p = .052$). Repeating the analysis including only previous alcohol consumption intensity as a covariate yielded a significant main effect for the direct persuasion poster ($\beta = .25$, $p = .047$), a significant main effect for the control condition ($\beta = .35$, $p = .009$), and a significant main effect for previous alcohol consumption intensity ($\beta = .25$, $p = .012$; $R^2 = .155$). Table 3 displays an overview of the means and standard deviations of milliliters of pure alcohol consumed by condition for the subsample of only participants who consumed any alcohol during the experiment and Figure 1 for the box plot. Retaining the four excluded participants results in finding nonsignificant trends only (Table 4).

Conclusion. The aim of Experiment 2 was to examine whether the selected self-persuasion poster from Experiment 1 was effective to reduce actual alcohol consumption compared with a direct persuasion poster or no poster. Results demonstrate that only for participants who chose to drink, the presence of a self-persuasion poster in the room reduced their alcohol consumption compared with a direct persuasion or no poster condition. A self-persuasive antialcohol poster did not affect the choice whether or not to consume alcohol, but, it did reduce alcohol consumption for individuals who choose to drink alcohol compared with a direct persuasion poster, or no poster. There were no differences in alcohol consumption between the direct persuasion and no poster conditions, indicating that the direct persuasion posters did not produce a reactance effect.

General Discussion

The main goal of this research was to test whether self-persuasion can be successfully applied to media communications by framing the message as an open-ended question. Two experiments provided support that this is indeed possible and effective. Experiment 1 showed that framing antialcohol messages as open-ended questions triggered the generation of arguments for why to drink less alcohol and resulted in more favorable evaluations of the message, indicative of lower reactance responses. Experiment 2 showed that exposure to a poster with a message framed as an

Table 3

Experiment 2 Means and Standard Deviations of Milliliters of Pure Alcohol Consumed by Condition for the Complete- and Subsample (i.e., Only Participants Who Consumed Any Alcohol)

Condition	Complete sample			Subsample		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Self-persuasion	38	11.99	10.46	24	18.98	6.11
Direct persuasion	44	12.26	13.38	23	23.45	8.70
Control	40	15.41	15.46	24	25.68	11.40
Total	122	13.21	13.28	71	22.69	9.31

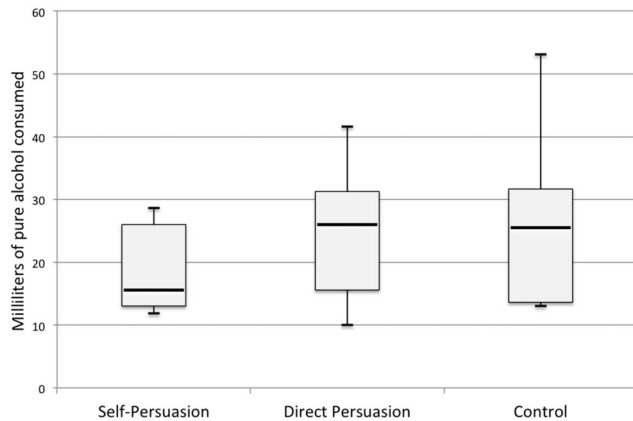


Figure 1. Box plot of milliliters of pure alcohol consumed by condition for the subsample (i.e., only participants who consumed any alcohol).

open-ended question did not affect the choice to consume alcohol, but did reduce alcohol consumption for participants who chose to consume any alcohol compared with exposure to a poster framed as a statement or a no-poster condition. Combined, the experiments support the idea that antialcohol messages framed as open-ended questions trigger self-generation of arguments for why to drink less alcohol, which subsequently reduces actual alcohol consumption for young adults who choose to consume alcohol.

The results from the current experiments add to the literature on the effectiveness of applying self-persuasion in health communications. To our best knowledge, Experiment 1 is the first study to empirically test and confirm that framing persuasive media messages as open-ended questions results in self-generation of arguments in line with the question. These findings support the idea that questions *trigger* argument generation, which has not been explicitly tested up to this point (Glock et al., 2013; Krischler & Glock, 2015; Müller et al., 2016). Additionally, Experiment 1 expands the existing literature by showing indications of lower reactance responses to messages employing self-persuasion compared with direct persuasion, supporting the idea that messages framed as an open-ended question evoke less reactance, which had also not been explicitly tested (Glock et al., 2013; Krischler & Glock, 2015; Müller et al., 2016). Taken together, these findings provide support for the hypothesized underlying mechanism of self-persuasion through question framing in persuasive media messages, providing a missing link to connect theory with experimental studies targeting behavioral change (Glock et al., 2013; Müller et al., 2016).

The effect of the posters on alcohol consumption found in Experiment 2 further corroborates self-persuasion research by showing that self-persuasion techniques applied to media messages can successfully modify actual behavior on a previously untested topic (alcohol) and in a new form (printed media messages). Note that the manipulation was simple but effective. The only difference between conditions was the presence of a poster containing a question or a statement. The effect size was small, as is typical in media effects research (e.g., Snyder et al., 2004; Valkenburg & Peter, 2013). Nonetheless, participants who chose to consume alcohol in the self-persuasion condition consumed about half a beer less compared with drinkers in the other condi-

tions (who consumed almost 2 beers on average). The application of self-persuasive antialcohol messages on a large scale, such as in mass media, might therefore have actual tangible benefits in the real world.

At a behavioral level specifically, the results from Experiment 2 closely match the findings by Müller et al. (2016), which showed that persuasive health messages framed as questions did not affect the choice to engage in the behavior addressed (i.e., smoking), but did affect the extent to which the behavior was engaged in (i.e., increases abstinence from smoking). In the current study, failure to affect the choice to consume alcohol in Experiment 2 may have been the result of the selected message wording: “Why do you have to *reduce* your alcohol consumption?” rather than, for example, “Why do you have to *stop* consuming alcohol?” Future research could explore whether the latter wording is successful in changing the choice to engage in the advocated behavior.

None of the control variables were related to any of the cognitive reactions to the antialcohol messages in Experiment 1. Only frequency of alcohol consumption predicted the choice to consume alcohol, and the number of alcoholic drinks consumed in the week prior to the experiment predicted alcohol consumption for individuals who chose to drink any alcohol, in Experiment 2. That is, individuals who reported more frequent alcohol consumption in the weeks prior to the experiment were more likely to consume alcohol during the drinking session, and similarly, individuals who reported higher alcohol consumption in the week prior to the experiment also consumed more alcohol during the drinking session. The absence of other relations between these variables is likely a result of two limitations of the current study sample. First, the current sample consisted mainly of light drinkers. It is possible that light and heavy drinkers are affected to a different extent by self-persuasion media messages. On the one hand, it is possible that light drinkers are affected less, simply because their initial response to self-persuasive posters might be “that does not apply to me,” resulting in rejection of the message. Adding to this, Briñol et al. (2012) showed that individuals will put more effort into generating arguments to convince themselves for a counterattitudinal position, resulting in greater self-persuasion. Light drinkers are more likely to have positive attitudes toward limiting alcohol consumption, which should result in less effortful argument generation and therefore less self-persuasion. On the other hand, it is possible that heavy drinkers might be affected less because they

Table 4
Multilevel Regression Analysis: Standardized Regression Coefficients Predicting Milliliters of Pure Alcohol Consumed for Participants Who Chose to Consume Alcohol Including All Outliers in Study 2

Variable	β	SE	R ² change	p
Step 1				
Self-persuasion (dummy)	-.27	.16		.088
Direct persuasion (dummy)	-.22	.14	.07	.101
Step 2				
Self-persuasion (dummy)	-.27	.15		.062
Direct persuasion (dummy)	-.19	.12		.121
Alcohol consumption amount	.32*	.15	.10	.031

Note. Total R² = .17; n = 75. Significant results in bold.

* p < .05.

respond more defensively to the messages (Lieberman & Chaiken, 1992) and are more likely to exhibit reactance behavior (Ringold, 2002). Second, the current samples consisted mainly of women. Because research has consistently shown that women consume less alcohol compared with men (e.g., Wilsnack, Vogeltanz, Wilsnack, & Harris, 2000), the people in the current samples might have been less susceptible to the self-persuasion messages because they felt they are not applicable to them or they put less effort into generating arguments to convince themselves. Unfortunately, exploration of gender effects was not possible due to the low number of male participants. Future research should focus on recruiting a more mixed sample, both in terms of light and heavy drinkers as well as men and women, to assess possible differences in the effectiveness of self-persuasive media messages.

The cognitive reactions, and subsequent behavioral effects, to the media messages are tested in two separate experiments, which combined suggest that argument generation mediates the effects of the self-persuasion posters on reduced alcohol consumption. However, it was decided to not directly test this mediation in one single experiment to avoid any interference effects. That is, measuring the process of generating arguments would make the process more salient, which would likely result in inflated behavioral effects. For future research, however, it could be valuable to explicitly test the mediation, having established that behavior is affected when exposure to the posters occurs naturally. In addition, other possible underlying processes (e.g., a possible increase in self-awareness) could be investigated with such a design.

Further limitations of the current research pertain to the ecological validity of Experiment 2. In this experiment, participants' drinking behavior was observed in a bar setting while they were watching short movies. Even though this highly controlled setting ensured minimal effects of possible confounding factors to protect the internal validity of the experiment, of course the cover story task itself (i.e., watching movies), is not something people typically do in a bar. This point, combined with the unavoidable fact that participants are aware that they are being tested, might have affected overall drinking behavior for all participants. Though the relative effectiveness of the posters on reducing alcohol consumption within this setting should be unaffected, ideally both limitations will be addressed in future research by examining the effects of the posters in a real-life setting, for example, a bar or restaurant, on natural drinking behavior. By doing so, repeated exposure to the messages could be investigated as well to see possible influences of long-term planned behavior (e.g., Gawronski & Bodenhausen, 2006; Glock, Klapproth, & Müller, 2015). Given that in the current study no effects on explicit measures were found, by doing so it would also be possible to test differential effects on more implicit and explicit measures.

Of more pressing concern, however, aiming to understand more about how the application of self-persuasion in media interventions is most effective to change behavior, future research should first focus on the effects of message elaboration. In Experiment 2 attention was not deliberately directed to the posters; however, they were visible to participants at all times during the drinking session. Participants therefore had ample opportunity to elaborate on the message, which should result in more generated thought (Clarkson, Tormala, & Leone, 2011) and therefore more self-generated arguments. Based on research on attitude formation,

more arguments should increase the persuasiveness of the message (Chaiken, 1980; Maddux & Rogers, 1980; Petty & Cacioppo, 1984; also see Briñol et al., 2012). In other words, self-persuasive media messages should be more effective under conditions of greater message elaboration, and therefore might not be effective in mass media, because message elaboration there is typically low. There are, however, two reasons why these messages could very well be more effective under conditions of low message elaboration. First, research has shown that generating few arguments can actually be more persuasive than generating many (e.g., Müller, van Someren, Gloudemans, van Leeuwen, & Greifeneder, 2017). Generating few arguments is easier than generating many, resulting in feelings of fluency due to experienced ease of retrieval of the arguments, which, in turn, results in more persuasion. Second, under conditions of high message elaboration, it becomes increasingly likely that the message receivers will generate counterarguments for the behavior suggested in conjunction with arguments in line with the question (e.g., Clarkson et al., 2011; Petty, Cacioppo, & Heesacker, 1981), effectively decreasing the persuasiveness of the message. Examining these two possibilities will provide insight into the optimal conditions for self-persuasive media interventions to be effective.

Finally, despite the fact that the goal of the current experiments was to examine whether self-persuasion could be applied in persuasive media messages, it is worth noting that self-persuasion strategies could be applied in other forms. An interesting possibility, for example, could be interventions on social media that ask users to generate and post arguments why certain behavior is bad or good. Such interventions might even be more persuasive because expressing the arguments online (i.e., publicly) should motivate the author to behave in line with the arguments to appear consistent to others (see the principle of commitment and consistency; Cialdini, 2009). Another possibility would be to incorporate argument generation as a behavioral change strategy in a more clinical context: for example, in conversations between patients and providers (e.g., motivational interviewing; Suarez & Mullins, 2008).

In sum, the current experiments provided compelling support that self-persuasion might be a viable and powerful persuasion strategy to be applied in health communication interventions. Not only did self-persuasive media messages appear to be more effective than conventionally used direct persuasion, they seem to produce lower reactance responses in Experiment 1 as well, potentially reducing, or even avoiding, boomerang effects of health communication interventions. Self-persuasion is likely not an applicable persuasion strategy for all types of behavior, however. Message receivers should have knowledge about potentially harmful effects of the behavior addressed to be able to generate arguments why they should not do it. If this is not possible, persuasion will not occur or might even backfire. Alongside educational interventions therefore, the specific self-persuasion method under investigation in the current research can be directly applied to media interventions aiming to reduce alcohol consumption among young adults, or be adopted and translated to target interventions targeting other behaviors in the domain of health communication and social marketing, such as promoting healthy eating, condom use, or energy conservation.

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