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DOI

[10.1080/08870446.2017.1307371](https://doi.org/10.1080/08870446.2017.1307371)

Publication date

2017

Document Version

Final published version

Published in

Psychology & Health

License

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[Link to publication](#)

Citation for published version (APA):

de Graaf, A., van den Putte, B., Nguyen, M.-H., Zebregs, S., Lammers, J., & Neijens, P. (2017). The effectiveness of narrative versus informational smoking education on beliefs, attitudes, and intentions of low educated adolescents. *Psychology & Health*, 32(7), 810-825. <https://doi.org/10.1080/08870446.2017.1307371>

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The effectiveness of narrative versus informational smoking education on smoking beliefs, attitudes and intentions of low-educated adolescents

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(Received 10 February 2016; accepted 8 March 2017)

Objective: This study tests the effectiveness of narrative versus informational smoking education on smoking beliefs, attitudes and intentions of low-educated adolescents.

Design: A field experiment with three waves of data collection was conducted. Participants ($N = 256$) were students who attend lower secondary education. At the first and third waves, they completed a questionnaire. At the second wave, 50.8% of the participants read a smoking education booklet in narrative form and 49.2% read a booklet in informational form. After reading, all participants also completed a questionnaire at wave 2.

Main outcome measures: Beliefs about negative consequences of smoking, attitudes towards smoking and intentions to smoke were measured.

Results: Repeated measures analyses with time as a within-subjects factor and condition as a between-subjects factor showed that beliefs about smoking were more negative at Wave 2 compared to Wave 1, irrespective of condition. However, attitudes towards smoking were more positive at Wave 3 compared to Wave 1 when participants had read the narrative version.

Conclusion: These results show that narrative smoking education is not more effective than informational smoking education for low-educated adolescents and can even have an unintended effect for this target group by making attitudes towards smoking more positive.

Keywords: school-based health education; narrative; smoking prevention

Even though the prevalence of smoking in Western countries has decreased over the past decades (World Health Organization, 2012), a disparity in smoking behaviour between groups with higher and lower levels of education can be identified. People with lower levels of education smoke more than their higher educated counterparts (Garrett, Dube, Trosclair, Caraballo, & Pechacek, 2011; Pampel et al., 2014). In the Netherlands, this disparity can already be seen among adolescents. Of 12- to 16-year olds in the lowest levels of secondary school, 7.4% smoke daily, compared to 0.7% of this age group

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in the highest level of secondary school, which is a significant difference (Ter Bogt & Van Dorsselaer, 2014). One of the ways to address this issue early is to educate adolescents about smoking in secondary schools, which is an efficient way to reach large groups of adolescents (Dobbins, DeCorby, Manske, & Goldblatt, 2008). However, several researchers suggest that the often used informational health education, which uses facts and arguments to educate recipients about the dangers of unhealthy behaviours, is possibly too difficult for disadvantaged groups (Kreuter et al., 2010; Murphy, Frank, Chatterjee, & Baezconde-Garbanati, 2013). Therefore, informational smoking education may be ineffective for low-educated adolescents, who are most at risk of this unhealthy behaviour.

An alternative to informational smoking education is the use of narratives (Green, 2006; Murphy et al., 2013). A narrative is defined as: 'a representation of connected events and characters that has an identifiable structure, is bounded in space and time, and contains implicit or explicit messages about the topic being addressed' (Kreuter et al., 2007, p. 222). In contrast to informational messages that include factual evidence and logical reasoning to support a claim (Kreuter et al., 2007; Lemal & Van den Bulck, 2010), narratives focus on specific characters and events in a particular setting (De Graaf, Sanders, & Hoeken, 2016). This makes narratives more concrete and personal, as opposed to informational messages, which are more abstract and general (Lemal & Van den Bulck, 2010).

Narrative communication has the potential to educate recipients about health issues and increase their acceptance of health messages embedded in the narrative (Green, 2006; Moyer-Gusé, 2008; Slater & Rouner, 2002). Several scholars suggest that narratives may be especially effective for disadvantaged target groups, such as groups with low educational attainment (Kreuter et al., 2010; Murphy et al., 2013). Thus, the use of narratives may be a promising strategy for educating low-educated adolescents about smoking and could contribute to reducing disparities between social groups (Murphy et al., 2013). Given narrative's potential, our study tests whether the use of narratives makes smoking education more effective at changing low-educated adolescents' beliefs, attitudes and intentions towards smoking, than informational smoking education.

Smoking education in secondary schools

Previous research has tested the effectiveness of school-based smoking education programmes for general populations of adolescents in secondary school. In this research area, several reviews have been done that synthesise the results of multiple relevant studies. Ranney et al. (2006) conducted a review of research on population- and community-based factors that influence smoking prevention and cessation among youth. They identified school-based smoking prevention programmes as one of the factors that contributed to a decrease in tobacco use in adolescents. Dobbins et al. (2008) have reviewed available evidence on school-based smoking prevention and concluded that smoking prevention interventions in secondary schools are effective at reducing smoking prevalence, reducing smoking initiation and reducing intentions to smoke. Although a review of long-term effects (Wiehe, Garrison, Christakis, Ebel, & Rivara, 2005) showed no effects of smoking education programmes over periods of one year or more after the intervention, the available evidence indicates that school-based smoking programmes are effective at reducing smoking at least in the short-term, and it is likely that

these effects can be sustained if the intervention efforts are maintained over several school years (Dobbins et al., 2008).

To our knowledge, very few studies test the effectiveness of school-based smoking education programmes for the target group of low-educated adolescents specifically (see Chatrou, Maes, Dusseldorp, & Seegers, 1999 for an exception that found no effects of the smoking prevention programme). However, it has been posited by several researchers that health education which uses an informational format, is less effective for disadvantaged, low-educated groups, because it is more difficult for them to understand abstract arguments and logical reasoning (Kreuter et al., 2010; Murphy et al., 2013). Therefore, our study compares informational smoking education to an alternative strategy that may be more comprehensible and more effective for low-educated adolescents: the use of narrative.

Narrative versus informational health education

Narratives may have potential advantages over informational texts in educating low-educated adolescents about smoking for several reasons. First, narratives may facilitate the processing of information (Kreuter et al., 2007, 2010). Narratives are a primary way we learn information from early childhood on, without any training, which makes it a natural and familiar way to comprehend messages compared to informational texts, which are processed less naturally (Graesser, Olde, & Klettke, 2002; Kreuter et al., 2010). The type of processing that narratives typically elicit has been termed 'transportation' or 'narrative engagement'. These terms refer to a process in which recipients' mental resources are focused on the narrative (Busselle & Bilandzic, 2008; Green & Brock, 2000). This means that attention is fully captured by the narrative, that emotional responses are evoked by the narrative, and that vivid mental imagery of the narrative is formed. In line with the natural, less complex nature of this type of processing, Slater (1997) notes that recipients often become more automatically engaged or transported in a narrative than in expository informational texts. Because low-educated adolescents have less processing capacity (Hunt, 2004), the reduced complexity of processing narratives in this way may be especially beneficial for this group (Kreuter et al., 2007).

Transportation can lead to persuasive effects on beliefs, attitudes and intentions, through the emotions and images that are part of this type of processing (Green, 2006; Green & Brock, 2002). Because emotions can be a strong basis for attitudes (Fabrigar & Petty, 1999), the emotions evoked by a narrative may influence the attitudes they touch upon (Green, 2006). The mental imagery that is part of transportation has also been suggested to function as a motivator of effects, because beliefs can be closely linked to images (e.g. an image of a drunk-driving accident clearly conveys that drinking and driving is bad). In addition, concrete, specific images that were formed during reading the narrative are more memorable. Thus, these images are easily recalled when a relevant judgement is made (Green & Brock, 2002; Zillmann, 2006).

Several previous studies have compared narrative to informational health education among disadvantaged groups that show similarities to low-educated adolescents. McQueen, Kreuter, Kalesan, and Alcaraz (2011) conducted a study among low-income African-American women, of whom 67% had a high-school education or less. Their results showed that a narrative video, in which health education was provided through

narratives of breast- cancer survivors, elicited more transportation than a content-equivalent informational video. Increased transportation in turn was related to beliefs and attitudes towards breast cancer more consistent with the message. In addition, Larkey, Lopez, Minnal, and Gonzalez (2009) recruited Latina women in the United States, of whom 87% had a high-school education or less. Their results showed that a storytelling intervention on colorectal cancer, in which a story was read to participants by a health educator from a script, led to higher intention to screen for colorectal cancer than a non-narrative risk tool. Unfortunately, transportation was not measured in this study. Finally, Murphy et al. (2013) targeted Mexican American women with a film on cervical cancer screening. In this study, transportation was measured. The results showed that these women had more knowledge about cervical cancer and more positive attitudes towards screening after watching the narrative film than after watching the non-narrative, informational film. In addition, transportation into the narrative film was related to knowledge. On the basis of these studies, we expect similar results for low-educated adolescents.

H1: Transportation (i.e. attention, emotion and imagery) mediates effects of narrative smoking education on beliefs, attitudes and intentions towards smoking, such that narrative smoking education elicits more transportation than informational smoking education, which in turn makes beliefs, attitudes and intentions towards smoking more negative.

Another reason why narratives are expected to be more effective than informational smoking education is by reducing resistance to the message (Kreuter et al., 2007; Moyer-Gusé, 2008). Narratives may overcome low-educated adolescents' resistance against anti-smoking messages by reducing counterarguing and increasing acceptance of the message (Dal Cin, Zanna, & Fong, 2004; Moyer-Gusé, 2008). Compared to informational texts that include explicit messages (e.g. smoking is bad for your health), narratives typically include more subtle, implicit messages (e.g. my uncle got sick and died from smoking). Claims and arguments need to be inferred from the events and actions of characters. Such claims and arguments are less likely to be counterargued, because it is harder to refute a character's specific experience than general expository information (Dal Cin et al., 2004; Green & Brock, 2002). In addition, implicit messages likely make it less clear to readers of narratives that the text is intended to influence them compared to explicit, informational messages (Dal Cin et al., 2004; Green, 2006). A lack of awareness of persuasive intent has been shown to lower resistance against acceptance of the message and result in less counterarguing (Petty & Cacioppo, 1986; Quinn & Wood, 2004).

In addition, it has been suggested that narratives not only decrease negative thoughts about the implicit message, but can also increase positive thoughts about this message, especially when characters are liked (Dal Cin et al., 2004). When liked characters choose actions and experience events as a consequence, recipients likely have thoughts in line with this chain of events, which support the implicit claims and arguments embedded in the narrative content and can thus be termed pro-arguing. It is important to note that pro-arguing refers to thoughts which are positive in the sense that they are in line with the message, even though they need not necessarily have a positive valence. For instance, pro-arguing of smoking education materials consists of negative thoughts about smoking, because the message of smoking education is that smoking is

bad. Such thoughts which are in line with the message increase the overall favorability of thoughts regarding the message, which can be seen as a sign of reduced resistance (Wegener, Petty, Smoak, & Fabrigar, 2004). In turn, the less resistance recipients experience, the more accepting they become of the message (Dal Cin et al., 2004; Petty & Cacioppo, 1986). Therefore, our second hypothesis is:

H2: Reduced resistance (i.e. less counterarguing and more pro-arguing) mediates effects of narrative smoking education on beliefs, attitudes and intentions towards smoking, such that narrative smoking education elicits less resistance than informational smoking education, which in turn makes beliefs, attitudes and intentions towards smoking more negative.

Method

Overview

A field experiment with a 2 (between: narrative versus informational) \times 3 (within: Wave 1, Wave 2, Wave 3) design was conducted. At Wave 1, baseline measures were collected for beliefs, attitudes and intentions towards smoking. In addition, background information, such as demographics, was measured. At Wave 2, which took place approximately four weeks after Wave 1, participants were exposed to a smoking education booklet with either a narrative text or an informational text. Immediately after reading the educational booklet, beliefs, attitudes and intentions were measured again. In addition, transportation (i.e. attention, emotion and imagery) and reduced resistance (i.e. less counterarguing and more pro-arguing) were measured at Wave 2. At Wave 3, which took place approximately four weeks after Wave 2, beliefs, attitudes and intentions were measured again.

Participants

Participants were high-school students in the second year of the lowest levels of secondary education in the Netherlands. We included pre-vocational schools and selected classes within these schools in which most students received additional support to obtain a diploma (*Leerwegondersteunend Onderwijs [Supported Education]*, LWOO). In addition, we selected practical schools, which prepare students for low-skilled jobs for which no diploma is needed (*Praktijkonderwijs [Practical Education]*, PrO). For students to get accepted to this type of education, they have to meet several criteria. First, students at LWOO should have an IQ-score between 75 and 90. Students at PrO should have an IQ-score between 60 and 75. Second, for both types of education students should be behind multiple years in primary-school skills, like reading and mathematics (Rijksoverheid, n.d.a, n.d.b).

Materials

Two versions of printed smoking education materials were constructed, based on existing materials from the 'Healthy School and Drugs' programme, produced by the Trimbos Institute, the Dutch national institute for mental health and addiction.

This programme is used in 75% of Dutch secondary schools (Malmberg et al., 2014). Adaptations of the material were produced in cooperation with the designers of the Trimbos Institute who developed the original materials. The adapted materials contained short texts in either narrative form or informational form about consequences of smoking, like shortness of breath and addiction. In the narrative condition, this information was embedded in a story about three adolescents, who experienced these consequences of smoking (e.g. Jayden – who smokes – stops after playing soccer for 5 minutes, because he is short of breath). In the informational condition, the same consequences were presented in the form of general facts (e.g. if you smoke, you will get short of breath). Because a narrative adds background and detail to the information, the narrative version was longer (589 words) than the informational version (300 words). We have kept the information about smoking in the booklets as comparable as possible by including all the consequences of smoking that were mentioned in the informational version in the narrative version (and no more consequences than that).

We have randomly assigned complete classes to the narrative or the informational condition by means of a sealed envelope procedure. During the randomisation procedure 26 identical looking envelopes were prepared, half of which contained the name of one of the conditions and the other half the name of the other condition. These envelopes were shuffled thoroughly and one envelope was assigned to each of the classes without knowing which condition it contained. Thus, all students in the same class were exposed to either the narrative or the informational smoking education booklet. This was done to avoid students noticing the different versions. Participants in both conditions received a booklet with one of the versions of the texts. In addition, the booklets contained pictures and exercises, like circling words that were associated with smoking. This was done because these exercises were part of the original Trimbos' materials, thus increasing ecological validity.

Procedure

The study was conducted in a classroom setting. A researcher gave instructions for answering the questionnaire to the participants. It was emphasised that answers would be handled anonymously and that the students should fill in the questionnaire individually. Then, the researcher handed out the questionnaires to the students. The questionnaire at Wave 1 took approximately 20 min to complete. At Wave 2, participants read a booklet about smoking education in either narrative or informational form. Immediately after reading the booklet, participants filled out the questionnaire. The total procedure at Wave 2 took approximately 30–40 min. The procedure at Wave 3 was the same as at Wave 1. Questionnaires from the different waves were merged on the basis of the students' birth date combined with the class they were in (and sometimes their gender). It was expected that they would reliably be able to remember this code. The researchers in the class noted that the dates would not be connected to the students' names. In the few cases where there were two students in one class with the same birth date (and gender), the researchers provided an extra code that was easy to remember.

Two weeks prior to the study, parents received a letter in which they were informed about the topic and goal of the study. If they did not want their child to participate in the study, they could hand in a signed form at the school. In this case, the child did not

participate in the study. This passive consent procedure was approved by the institutional review board of the university with which the researchers are affiliated.

Measures

Beliefs, attitudes and intentions towards smoking were measured as persuasion variables. Beliefs were measured by seven items, for example 'Smoking can damage your lungs', measured on a four-point scale ranging from *no, definitely not* to *yes, definitely*. Research has shown that it is best to use four response options in questionnaires for children (Borgers, Hox, & Sikkels, 2004). The beliefs scale was composed by taking the mean of the items (Cronbach's α T1 = .62, T2 = .70, T3 = .75). Attitude was measured with five items, following the stem 'I find smoking ...' measured on a four-point scale ranging from, for example, *very negative* to *very positive*, or *very unwise* to *very wise*. The attitude scale was composed by taking the mean of the items (Cronbach's α T1 = .85, T2 = .89, T3 = .91). Finally, intention was measured with three items, for example 'Do you plan to smoke in the next month?', measured on a four-point scale ranging from *no, definitely not* to *yes, definitely*. The intention scale was composed by taking the mean of the items (Cronbach's α T1 = .95, T2 = .94, T3 = .95). All items in the questionnaire contained no difficult words or complex grammatical constructions in Dutch (De Leeuw, Borgers, & Smits, 2004).

Three dimensions of transportation were measured: attention to the text, emotion and imagery. All items were measured on a four-point scale ranging from *no, not at all* to *yes, very much*. Attention to the text was measured with two items, such as: 'My attention was completely focused on the text' (Pearson's $r = .66$). The attention scale was composed by taking the mean of the two items ($M = 3.01$, $SD = .86$). Emotion was measured with one item, namely: 'The text evoked emotions in me' ($M = 1.45$, $SD = .75$). Finally, imagery while reading the booklet was measured with one item, namely: 'While I was reading the text, I saw before my eyes what was described in the text' ($M = 2.18$, $SD = 1.02$). One-item measures were used to limit the length of the questionnaire in light of the limited attention span of our adolescent target group (Borgers, De Leeuw, & Hox, 2000).

Two dimensions of resistance to the message were measured. First, counterarguing the anti-smoking message while reading the booklet was measured with one item, namely: 'While I was reading the text, I thought of the positive sides of smoking' ($M = 1.51$, $SD = .78$). Second, pro-arguing the anti-smoking message while reading the booklet was measured with one item, namely: 'While I was reading the text, I thought of the negative sides of smoking' ($M = 2.51$, $SD = 1.10$).

As an indication of identification with the characters in the narrative version, we included two questions about identification with the characters for this condition only, for instance 'I liked Jayden, Marco and Sharon' (based on Murphy et al., 2013). The mean score for the scale of two items (Cronbach's $\alpha = .73$) was 2.51 ($SD = .86$) on a four-point scale, indicating a level of identification around the midpoint of the scale. Because these questions were only answered by the participants who had read the narrative version, no comparisons could be made for identification.

Finally, background variables were measured like gender, age and experience with smoking.

Results

Participant characteristics

At Wave 1, 326 second year students, recruited from 14 high schools (7 LWOO; 7 PrO) in The Netherlands, participated in the study. Of these students, 292 (89.6%) participated again at Wave 2. At Wave 3, 256 students (78.5% of students in Wave 1) who had completed the two prior waves also completed the final questionnaire. The main reason for participants dropping out was due to absence on the day of data collection at the school because of illness or gaining work experience. The final sample for analysis thus consisted of 256 participants. Approximately half of these participants (50.8%) were assigned to the narrative condition and the other half (49.2%) were assigned to the informational condition.

Of the final sample, 152 were boys (59.4%) and 112 attended PrO (43.8%). The mean age of the participants was 14.3 (SD = 0.55), ranging from 13 to 16 years at the beginning of this study. A majority consisting of 179 students (71.3%) was born in The Netherlands themselves as well as both their parents. The largest group of other students (7.6%) had origins in Morocco or Turkey. With regard to religion, 108 students (42.2%) reported that they were not religious, while the largest groups of other students were Christian (36.5%) and Muslim (12.9%). At Wave 1, 213 (83.2%) students reported that they had not smoked cigarettes in the past month, while the remaining students (15.6%) smoked an average of 4.22 (SD = 6.34) cigarettes per day on 12.90 (SD = 13.00) days in the past month.

Participants who dropped out at Wave 2 or Wave 3 did not significantly differ from participants who remained in the sample on gender ($\chi^2(1) = 3.06, p = .080$) and age ($t(320) = 1.79, p = .075$), and there was no difference in the number of days they had smoked in the last month before Wave 1 ($t(319) = -.34, p = .73$). In addition, the number of participants who dropped out did not significantly differ between conditions ($\chi^2(1) = 1.46, p = .29$), indicating that the version of the smoking education booklet did not influence the dropout rate. Also, no indications of selective attrition based on participant characteristics were found. We conducted logistic regressions predicting dropout from participant characteristics, condition and their interactions (gender: $\chi^2(3) = 4.47, p = .22, R^2 = .014$ (Cox & Schnell); age: $\chi^2(3) = 4.70, p = .20, R^2 = .014$ (Cox & Schnell); number of days smoked: $\chi^2(3) = .91, p = .82, R^2 = .003$ (Cox & Schnell)). Results showed no interaction between gender and condition ($B = -.54, S.E. = .55, p = .32$), no interaction between age and condition ($B = .48, S.E. = .46, p = .29$) and no interaction between number of days they had smoked in the last month and condition ($B = -.009, S.E. = .045, p = .84$) on dropout.

Main analyses

Prior to addressing the hypotheses, we first tested whether narrative smoking education is more effective than informational smoking education on making beliefs, attitudes and intentions towards smoking more negative among low-educated adolescents. We conducted repeated measures analyses with time as a within-subjects factor (Wave 1, Wave 2, Wave 3), and condition (narrative, informational) as a between-subjects factor. Table 1 presents mean scores and standard deviations for beliefs, attitudes and intentions by time and condition. To establish an effect of condition in a repeated measures design, it is necessary to test the interaction between time wave and condition, because we expect

Table 1. Mean scores and standard deviations for beliefs, attitudes and intentions by time and condition.

	Narrative	Informational
Beliefs T1	3.55 (.36)	3.60 (.34)
Beliefs T2	3.63 (.40)	3.72 (.35)
Beliefs T3	3.57 (.44)	3.66 (.38)
Attitude T1	1.41 (.53)	1.36 (.49)
Attitude T2	1.48 (.62)	1.33 (.56)
Attitude T3	1.54 (.70)	1.34 (.54)
Intention T1	1.51 (.81)	1.31 (.64)
Intention T2	1.52 (.81)	1.38 (.75)
Intention T3	1.55 (.81)	1.40 (.75)

Note: Bold script indicates a significant difference between waves.

that the difference between time waves is greater in the narrative condition (more negative beliefs, attitudes and intentions towards smoking after reading this version) than in the informational condition. A repeated measures analysis showed no interaction effect between time and condition on beliefs ($F(2, 250) = .28, p = .75$). This means that we found no difference between conditions in the effect over time on beliefs. The main effect of time wave was significant ($F(2, 250) = 9.06, p < .001, \eta^2 = .068$), such that beliefs at Wave 2 were slightly more negative than beliefs at Wave 1, whereas beliefs at Wave 3 did not differ from either Wave 2 or Wave 1. However, this was not dependent on whether the narrative or informational version was read.

For attitude, a significant interaction between time and condition emerged ($F(2, 250) = 3.15, p = .044, \eta^2 = .025$), which means that a difference was found between the conditions in the effect over time. Pairwise comparisons showed that, contrary to expectations, in the narrative condition, attitudes towards smoking were slightly more positive at Wave 3 compared to Wave 1 ($p = .017$), whereas attitudes at Wave 2 did not differ from either wave. In the informational condition, there were no differences between the waves. The analyses showed no main effect of time waves ($F(2, 250) = 1.37, p = .18$).

Finally, a repeated measures analysis showed neither an interaction effect of time and condition ($F(2, 248) = .53, p = .59$) nor a main effect of time wave on intention to smoke ($F(2, 248) = 1.67, p = .19$).¹

To test H1 that transportation mediates effects of narrative (vs. informational) smoking education on beliefs, attitudes and intentions towards smoking, it first needs to be established whether there is an effect of the narrative education on transportation (i.e. attention, emotion and imagery). *T*-tests revealed that no differences were found between the narrative and the informational version for attention ($t(249) = .49, p = .62$), emotion ($t(249) = .065, p = .98$) and imagery ($t(250) = .96, p = .34$). Therefore, hypothesis 1 is rejected.

To test H2 that reduced resistance mediates effects of narrative (vs. informational) smoking education on beliefs, attitudes and intentions towards smoking, we first need to establish whether there is an effect of the narrative education on reduced resistance (i.e. less counterarguing and more pro-arguing). A *t*-test showed no difference between

the narrative and the informational version for counterarguing ($t(250) = .40, p = .69$). However, we did find a difference between the versions for pro-arguing ($t(246) = 3.08, p = .002, \eta^2 = .035$). Contrary to expectations, the narrative smoking education ($M = 2.27, SD = 1.08$) evoked less pro-arguing than the informational smoking education ($M = 2.69, SD = 1.09$). Therefore, hypothesis 2 is rejected.

Additional post hoc analyses

Additional analyses were conducted in order to assess whether the unexpected effect of condition on pro-arguing may be responsible for the unexpected effect on attitude. In line with the repeated measures analysis for attitude presented above, t -tests show significant differences between the participants in the narrative condition and the participants in the informational condition at Wave 2 ($t(252) = 2.13, p = .038$) and Wave 3 ($t(252) = 2.62, p = .012$) (and not at Wave 1 ($t(252) = .96, p = .34$)). Participants who had read the narrative had more positive attitudes towards smoking at T2 and T3 than participants who had read the informational booklet (see Table 1 for means and standard deviations). To test the possibility that these effects on participants' attitude towards smoking are explained by the effect of condition on pro-arguing, bootstrapping procedures were performed using the INDIRECT macro developed by Preacher and Hayes (2008) to assess whether condition had an indirect effect on attitude through pro-arguing. This analysis showed that the indirect effect through pro-arguing is significant, though small, for attitude at Wave 2 ($B = -.04, SE = .02, 95\% CI = [-.0830, -.0123]$) and Wave 3 ($B = -.02, SE = .01, 95\% CI = [-.0637, -.0034]$).

Discussion

Conclusion

This study aimed to compare the effectiveness of narrative and informational smoking education on smoking beliefs, attitudes and intentions of low-educated adolescents. Our results indicate that narratives are not more effective than informational texts on these outcomes. Although beliefs seem to have been influenced by the smoking education booklets because at the immediate posttest, beliefs were slightly more negative than at baseline, this effect did not differ between the conditions (narrative or informational). For attitudes, an unexpected effect of the narrative condition was found. Participants' attitudes towards smoking were more positive four weeks after reading the narrative version, compared to baseline. Even though this effect is small, it can be seen as a boomerang effect, because smoking education is intended to make attitudes towards smoking more negative. Neither version had an effect on the intention to smoke. Thus, it can be concluded that narratives either have no advantage over informational smoking education or even a small disadvantage by having an effect contrary to the intended effect of smoking education on low-educated adolescents.

Hypothesis 1 about transportation as a mediator of narrative (vs. informational) smoking education on beliefs, attitudes and intentions towards smoking, is rejected because we found no effect of the narrative version on transportation. Hypothesis 2 about reduced resistance as a mediator of effects of narrative (vs. informational) smoking education on beliefs, attitudes and intentions towards smoking, is also rejected

because the narrative version did not reduce resistance. Contrary to expectations, the results show that the narrative version evoked less pro-arguing or fewer thoughts in line with the anti-smoking message. Because of the unexpected effect on pro-arguing, combined with the unexpected effect on attitudes, we did additional analyses to test whether pro-arguing may be responsible for the effect on attitudes. These analyses show that the indirect effect through pro-arguing on smoking attitudes is indeed significant. This means that the narrative condition resulted in less pro-arguing, which in turn led to more positive attitudes towards smoking.

Explanations

Several potential explanations can be identified why pro-arguing was lower during reading the narrative version, even though these results are contrary to suggestions in the literature (Dal Cin et al., 2004). First, the narrative education booklets contained longer texts than the informational booklets. The narrative texts may have taken up so much of the adolescents' processing resources (which are already limited) that they did not have any capacity left to think of points in line with the message. Second, the context of the smoking-education may have confused participants. This was a school-based activity in which they might not expect narratives. If they were thinking about the reasons for the use of narratives, they may have had less capacity left for pro-arguing.

A further potential explanation of our findings could be that our target group of low-educated adolescents may respond differently to narratives than other groups. Although processing narratives is a natural and easy way to process information (Graesser et al., 2002; Kreuter et al., 2007), it may be harder to infer a persuasive message from narrative content, than from an informational text which explicitly mentions the message. This seems contrary to the previously mentioned research on disadvantaged groups in the United States, who also have a low educational attainment. For instance, research with underserved African American women showed that narratives from breast-cancer survivors were more effective than an informational approach (McQueen et al., 2011). However, an explanation of these findings is that disadvantaged groups in the United States often come from traditions with a rich oral storytelling history (McQueen et al., 2011; Murphy et al., 2013). This is an important difference compared to our target group of low-educated adolescents in the Netherlands, who do not have a storytelling tradition, which likely makes stories less resonant for them.

An explanation of the difference in beliefs at the second wave compared to baseline could be that participants may have been exposed to other smoking prevention interventions in the course of the two months between these two measurement times. Research has shown an association between noticing anti-tobacco information and smoking-related attitudes and intentions (Springvloed et al., 2015). However, this explanation is less plausible for the effect that we found on attitude, because this effect was only present for the narrative condition. It is unlikely that only participants in the narrative condition noticed other interventions and participants in the informational condition did not.

Limitations

Limitations of the present study include the variation in length of the materials. The narrative version used more words than the informational version to convey the same information, because the narrative needed to describe specific characters and details of what happened. This is part of the characteristic features of narrative and is hard to control in an experiment without constructing unnatural narratives. Also, it is not possible to extend the informational version without adding new information or introducing a dose effect by repeating the same information. Another limitation is that students were divided over the conditions by their class, so that they would not be able to notice the different versions of the smoking education booklets. However, comparison of the baseline measures showed no significant differences between the participants in both conditions before receiving the smoking education. In addition, the choice to offer the intervention 4 weeks after baseline is a limitation of our research design. If we had provided the intervention directly after baseline, we would have been able to more confidently attribute the difference between time waves on beliefs (that was present for both the narrative and the informational version) to exposure to the materials. It is possible that students were influenced by other anti-tobacco information in the four weeks between baseline and the intervention, whereas if we had provided the intervention directly after baseline, it would have been unlikely that other factors had influenced these results. However, we made the choice of providing the intervention 4 weeks after baseline to make it less likely that participants remembered their baseline answers at the immediate follow-up measurement. Similarly, the final measurement was done 4 weeks after the intervention. This choice was made again to limit recall of previous answers and because we considered four weeks to be a reasonable period to expect short-term effects after a single exposure.

Other limitations can be found in the measures that we used. Because of the limited number of questions we could ask our participants, we used one-item measures for components of transportation (e.g. imagery) and resistance (e.g. counterarguing). Therefore, results using these measures should be interpreted cautiously. In addition, the item to assess the emotional component of transportation did not include the valence of the emotion. This was based on the original transportation scale (Green & Brock, 2000), but results could be different if valence is taken into account. Some of the processing variables, like attention, may not have been easily accessible for self-report. The allocation of attention to a text is usually only noticed when attention is disrupted, for instance by inconsistencies in the text or by activity going on around them (Busselle & Bilandzic, 2009). Therefore, other methods of measuring attention, like secondary task reaction times or physiological measures may be more valid (see Sukalla, Bilandzic, Bolls, & Busselle, 2016). Finally, it is possible that adolescents may not be completely honest about a sensitive topic like smoking. To minimise socially desirable answers, participants did not write their names on the questionnaires and it was emphasised that their answers were handled anonymously.

Future research

In addition to taking into account these limitations, future research should extend our study in several ways. First, to explore the possibility that it is too hard for low-educated adolescents to infer implied messages from narratives, it would be

interesting to compare narratives with implicit and explicit claims. Explicit claims have been shown to improve understanding and acceptance of a narrative message in a university student sample (Moyer-Gusé, Jain, & Chung, 2012). Perhaps the benefits of such narratives would translate to our target group as well. Also, the effect of integrating informational and narrative smoking education should be studied. Even though both strategies in isolation have limited effects on low-educated adolescents, combining them, for instance by adding personal stories of adolescents to more general information about smoking, may reinforce effects of both (Zillmann, 2006).

In sum, our study showed that narrative smoking education was not more effective than informational smoking education for low-educated adolescents and can even have unintended effects contrary to the goal of smoking prevention. These results indicate that we should be careful with using narratives for adolescents who attend lower secondary education because they may not be especially beneficial for this specific group.

Acknowledgements

We would like to thank the schools and their students who participated in this study. We would like to thank Moniek Buijzen for her feedback on an earlier version of this paper.

Disclosure statement

All other authors declare to have no conflicts of interest.

Funding

This work was supported by the NWO, Nederlandse Organisatie voor Wetenschappelijk Onderzoek [grant number 321-89-001]. The funding source had no involvement in the selection of participants, questionnaire, items, analysis, conclusions or writing of the text.

Conflict of interest statement

Jeroen Lammers is affiliated to Trimbos Institute, which develops the 'Healthy School and Drugs' programme. The materials used in this study are based on the materials from this programme. Bas van den Putte holds a chair in health communication that is sponsored by Trimbos Institute. The terms of this arrangement have been reviewed and approved by the University of Amsterdam in accordance with its policy on objectivity in research.

Note

1. All analyses that are reported were carried out without including covariates. Inclusion of whether students had ever smoked and whether they had smoked in the past month as covariate did not alter results.

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