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Strengthening quitter self-identity: An experimental study

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Objectives: Smoking-related self-identity processes are important for smoking cessation. We examined whether quitter self-identity (i.e. identification with quitting smoking) could be strengthened through a writing exercise, and whether expected social support for quitting, manipulated through vignettes, could facilitate identification with quitting.

Design: Participants ($N = 339$ daily smokers) were randomly assigned to a 2 (identity: strengthened quitter self-identity vs. control) \times 3 (social support: present vs. absent vs. neutral control) between-participants design.

Main Outcome Measures: The main outcome was post-test quitter self-identity.

Results: Post-test quitter self-identity was not strengthened successfully. Only a small and marginally significant intervention effect was found on quitter self-identity, which did not generalise to positively influence quit-intention or behaviour. The social support manipulation did not facilitate quitter self-identity. Secondary content analyses showed that quitter self-identity was strengthened among participants who linked quitting smoking to their lifestyle, wanted to become quitters for health reasons, and whose reasons for becoming quitters included approach of positive aspects of quitting, but not among participants who linked quitter self-identity to their self-perceptions.

Conclusions: Results provide insight into the content of smokers' self-conceptualizations as quitters. Writing exercises should be improved and tested to eventually successfully strengthen quitter identities.

Keywords: smoking; identity; future selves; social support; writing exercise; vignettes

Introduction

People are motivated to act in line with their identity. According to PRIME theory, when people strongly identify with a behaviour as being part of the 'self', this is an important source of behaviour (West, 2006). In addition to identification with behaviours, people may base self-perceptions on group memberships (Tajfel & Turner, 1979, 1986; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987). Next to views of the self in the present (current selves), people form representations of who they might become

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(Markus & Nurius, 1986). These future self-conceptions may include views of ideal (wished for) and feared selves. Future selves are likely to mobilise behaviour that helps to achieve ideal selves and avoid feared selves. People are motivated to engage in behaviour that will lead them to become their ideal future self, and to avoid behaviour that will lead them to become their feared future self (Barreto & Frazier, 2012; Oyserman & James, 2011). Future selves may also shape the evaluation of a current identity, such that a current identity as a smoker may be evaluated more negatively in the light of, for instance, a feared future self as an ill continuing smoker than with reference to an ideal future self as an occasional smoker without health problems (Markus & Nurius, 1986).

Identity also plays an important role in smoking cessation. Cross-sectional and prospective quantitative research has shown that smokers with stronger quitter self-identities and non-smoker self- and group-identities are more likely to (intend to) quit, while smokers with stronger smoker self-identities are less likely to quit (Høie, Moan, & Rise, 2010; Meijer, Gebhardt, Dijkstra, Willemsen, & Van Laar, 2015; Meijer, Gebhardt, Van Laar, Kawous, & Beijk, 2016; Meijer, et al., 2018; Moan & Rise, 2005, 2006; Tombor, Shahab, Brown, Notley, & West, 2015; Tombor, Shahab, Brown, & West, 2013; Van den Putte, Yzer, Willemsen, & De Bruijn, 2009). In addition, qualitative work has shown that smoking may become increasingly less central to the way ex-smokers perceive themselves following a successful quit attempt (Brown, 1996; Luck & Beagan, 2015; Shadel, Mermelstein, & Borrelli, 1996; Vangeli & West, 2012). Evidence suggests that identification with non-smoking or quitting (future self) may be more important for smoking cessation than identification with smoking (current self) (Meijer et al., 2015, 2016, 2018). Furthermore, quitter identity may play a central role in the initial process of quitting smoking, as it can be a 'transitional identity' that helps smokers to become non-smokers (Vangeli & West, 2012).

Identity may be enhanced by social support, such that receiving social support may enable people to develop new identities (e.g. Amiot, Terry, Wirawan, & Grice, 2010; Gleibs, Haslam, Haslam, & Jones, 2011; Van Laar, Bleeker, & Ellemers, 2017; Van Laar, Bleeker, Ellemers, & Meijer, 2014; Walsh, Muldoon, Gallagher, & Fortune, 2015). For example, a qualitative study among ex-smokers suggested that 'a supportive family environment was most contributory to redefining smoking and the self as a non-smoker' (Brown, 1996, p. 419). Similarly, the social identity model of cessation maintenance (SIMCM: Frings & Albery, 2015) and the social identity model of recovery (SIMOR; Best et al., 2015) propose that the social environment plays a central role in facilitating identity change in the process of recovery from addiction. For example, SIMCM states that people who recover from addiction identify more easily with recovery (i.e. self-perception as someone in recovery) when their social environment supports their recovery, is a source of self-esteem and self-efficacy, and increases the accessibility of the recovery identity. These findings suggest that, in the context of smoking cessation, identification with quitting and non-smoking is easier when the quit attempt is supported by the social environment.

Current study

The current experimental study among daily smokers aimed to strengthen quitter self-identity (i.e. identity as someone who quits smoking), as well as expected social support for quitting (i.e. positive, negative and practical support) as a potential facilitating factor

of identification with quitting. Consistent with evidence suggesting that future selves are particularly important (Meijer et al., 2015, 2018), and that (temporary) identification with quitting may facilitate the transition from being a smoker to becoming a non-smoker (Vangeli & West, 2012), we manipulated quitter self-identity rather than non-smoker or smoker self-identity.

To our knowledge, no studies manipulating identities relevant to quitting have been published. Research on strengthening possible selves more generally showed that aspects of identity (e.g. related to physical exercise) can be enhanced through simple interventions such as imagining and writing about relevant possible selves, and these identities subsequently affect motivation, behaviour and well-being (King, 2001; Layous, Nelson, & Lyubomirsky, 2013; Murru & Ginis, 2010; Ouellette, Hessling, Gibbons, Reis-Bergan, & Gerrard, 2005; Oyserman, Destin, & Novin, 2015). For example, participants were asked to think about themselves in the future (e.g. as a healthy exerciser) and to respond in writing to a number of questions about this image (Layous et al., 2013; Ouellette et al., 2005). Moreover, imagining oneself as quitting smoking has been found to increase quit-intentions (Rennie, Harris, & Webb, 2014). As such, writing exercises may also be a promising tool to strengthen quitter identities.

Analysis of responses to such interventions is valuable, because the (types of) words that people use convey information about their thoughts, emotions and motivations, and can predict (health) outcomes (e.g. Pennebaker, Mayne, & Francis, 1997; Tausczik & Pennebaker, 2010). For example, among participants who wrote about trauma, use of positive relative to negative emotional words was associated with better physical and mental health outcomes (Pennebaker et al., 1997).

The current study aimed to strengthen quitter self-identity and expected support for quitting. We asked participants in the experimental condition of the identity manipulation to imagine and write about themselves as someone who is in the process of quitting smoking. Participants in the identity control conditions did the same exercise on a topic unrelated to quitting smoking (i.e. washing hands more often). Expected support for quitting was subsequently manipulated through vignettes (cf. Marigold, Cavallo, Holmes, & Wood, 2014; Mojaverian & Kim, 2012) describing that participants would (social support present) or would not (social support absent) receive support. The type of support that participants read about in the support present and support absent conditions was tailored to participants' individual preferences, given that people have individual preferences for the type of support that they find helpful (High & Solomon, 2014; Meijer et al., 2016), and that support which matches these preferences may be more beneficial (Rafaeli & Gleason, 2009). In the pre-test, participants indicated whether they preferred positive (e.g. complimenting on quitting), negative (e.g. pointing out negative consequences of smoking) or practical support for quitting smoking (e.g. participating in an activity that keeps participant from smoking), and the vignettes in the support absent and support present conditions were tailored to this preference (see Method). Those in the social support control condition read no support vignette.

We hypothesised that post-test quitter self-identity would be stronger in the experimental condition than in the control condition of the quitter self-identity manipulation (H1). Moreover, we hypothesised that post-test expected support for quitting would be stronger in the support present condition than in the support absent condition of the social support manipulation (H2). In addition, corresponding with research showing that identity may be facilitated by social support, we expected combined effects of the quit-

ter self-identity (experimental) and social support (present) manipulations on post-test quitter self-identity and post-test expected support, which we expected to be strongest in this combination of conditions (H3). Furthermore, we analysed the content of written responses to the manipulations to examine how smokers responded when they pictured themselves as quitters and imagined presence or absence of social support. Subsequently, we analysed which written responses were associated with strengthened quitter self-identity compared to pre-test levels of quitter self-identity, to examine what type of thoughts about being a quitter was important for identity change. Finally, we assessed whether changes in quitter self-identity and expected support generalised to post-test quit-intention, and changed smoking behaviour and quit attempts at 1-month and 6-month follow-up.

Method

Participants

Participants were recruited in the Netherlands from April to September 2014 for a study about smokers' experiences with smoking through a national newspaper ($n = 74$), previous research participation ($n = 68$), the researchers' social networks or other participants ($n = 47$), social media such as Facebook ($n = 46$), face-to-face recruitment at train stations ($n = 25$) and at a college of higher education ($n = 21$), and through other media (e.g. website about smoking for the general public www.rokeninfo.nl, $n = 58$). Participants who smoked daily at recruitment and were 18 years or older were eligible for participation in a four-wave longitudinal design. Participants who completed at least the pre-test and post-test measure (the first session) were included in the analyses. In total, 552 people met inclusion criteria and started the survey, of whom 339 completed the pre-test and post-test questionnaire (61%; $N = 339$, $n_{\text{lower-SES}} = 63$, $n_{\text{middle-SES}} = 108$, $n_{\text{higher-SES}} = 168$; $n_{\text{female}} = 217$). On average participants were 44.85 years old ($SD = 17.39$), smoked 15.71 cigarettes daily ($SD = 8.16$), and had been smoking for 26.75 years ($SD = 17.37$). Three gift coupons of € 100.- and six of € 50.- were distributed through a raffle.

Design and procedure

Participants were randomly assigned to a 2 (identity: strengthened quitter self-identity vs. control) \times 3 (social support: present vs. absent vs. control) between-participants design. The study employed a prospective design with four waves divided over three sessions: a pre-test (T0), which was directly followed by the experimental manipulations of quitter self-identity and social support, and a post-test immediately after the manipulations (T1); and 1-month (T2) and 6-month follow-ups (T3) (see Meijer et al., 2016 for pre-test findings). The procedure was approved by the University's Ethical Board. We pilot-tested the pre-test and post-test survey by means of a think aloud procedure and adapted the surveys accordingly.

The surveys were presented to participants using Qualtrics (www.qualtrics.com). Participants constructed a personally meaningful code number that allowed their responses to the T0, T1, T2 and T3 measurements to be matched anonymously. At pre-test, relevant control variables (i.e. pre-test quitter self-identity and quit-intention) were

measured. Participants were also asked to indicate the particular types of social support for quitting smoking they would most desire from the people who are important to them (see below). Quitter self-identity (vs. control) was then manipulated, followed by the social support manipulation (social support present vs. absent vs. control). The manipulations of quitter self-identity and social support were followed by manipulation checks for social support, and measures of post-test quitter self-identity and expected social support. Taken together, completion of the pre-test, experimental manipulations, and post-test measurement took on average 50 min. Participants were approached by email to fill out the follow-up questionnaires that assessed changed smoking behaviour and quit attempts.

Quitter self-identity manipulation

Participants in the strengthening quitter self-identity condition were asked to imagine being in the process of quitting smoking and to write down (through structured questions) all positive aspects that they thought about when thinking of themselves as a quitter. Next, participants were asked to write down the most important of these positive aspects. Similarly, participants in the control condition were asked to imagine washing their hands more often, to write down all positive aspects they thought about when thinking of themselves as washing their hands more often, and to write down the most important aspect of these (see Supplementary materials A for the full text of the manipulation).

Social support manipulation

The content of the vignettes in the social support manipulation was based on each participant's preference for particular types of social support. As part of this procedure, participants selected at pre-test which three types, from twenty pre-described types of social support for quitting smoking, they would most desire from the people important to them (see Meijer et al., 2016 for frequencies). The items were based on the Partner Interaction Questionnaire (Cohen & Lichtenstein, 1990). A principal component analysis showed three components in the data, reflecting positive support (e.g. 'Compliment me on not smoking'), negative support (e.g. 'Criticize my smoking if I would smoke') and a third practical support factor (e.g. 'Participate in an activity that keeps me from smoking'; see also Meijer et al., 2016). During the manipulation participants in the support present (absent) condition were presented with a tailored vignette describing that they would often (almost never) receive their three desired types of social support if they were in the process of quitting smoking. Participants in the social support control condition read a short story about the heart and blood circulation that did not involve social support. Participants in all conditions were then asked to write about how they would feel in the situation and how it would affect them (see Supplementary materials B for the full text of the manipulation).

Measures

The variables were measured in the order described below, except that post-test quitter self-identity was measured after the social support manipulation checks and expected support.

Pre-test (T0)

Background and control variables

Demographics. We asked participants' gender, age, highest attained educational level (socio-economic status), number of cigarettes smoked per day and number of years smoking.

Quit-intention. Following Dijkstra, Bakker, and De Vries (1997), participants were asked when (if at all) they intended to quit smoking: 'I intend to [1] 'quit within 1 month'; [2] 'quit within 6 months'; [3] 'quit within 2 years'; [4] 'quit within 5 years'; [5] 'quit within 10 years'; [6] 'quit sometime ever, but not within 10 years'; [7] 'always continue smoking, but less'; or [8] 'always continue smoking, and not less'. This variable was recoded such that higher scores indicated stronger quit-intention.

Quitter self-identity. We measured quitter self-identity at pre-test with seven items. We based three items on the four-item Abstainer Self-Concept Scale (Shadel & Mermelstein, 1996) to measure quitter self-identity, that is, 'I am able to see myself as a quitter', 'Quitting smoking belongs with "who I am"', and 'I feel at ease with the idea of being a quitter'. We adapted three items from the Smoker Self-Concept Scale (Shadel & Mermelstein, 1996): 'Quitting is part of my personality (or can be part of my personality)', 'Quitting is a large part of my daily life (or can be a large part of my daily life)' and 'Others can picture me as a quitter', and added 'I would like to be a quitter' (adapted from Tombor et al., 2013). Answer categories ranged from [1] 'strongly disagree' to [5] 'strongly agree' ($\alpha = .86$).

Post-test (T1)

Social support manipulation checks

Manipulation checks were measured among participants in the support present and absent conditions. To check whether participants read carefully, participants were asked what they had imagined [1] 'I received no support at all' – [7] 'I received much support'. Second, to examine whether participants successfully imagined the support situations, two items assessed *credibility of imagined social support*, that is, 'I can easily imagine the situation' and 'I find the situation credible' ($r = .65, p < .001$), [1] 'not at all' to [7] 'very much'.

Outcome variables

Quitter self-identity. Two items measured post-test quitter self-identity, that is, 'Quitting smoking within 6 months fits with who I am' and 'Quitting smoking within 6 months fits with how I want to live', [1] 'strongly disagree' – [5] 'strongly agree' (adapted

from Van den Putte et al., 2009), $r = .52$, $p < .001$. To prevent consistency bias and social desirability bias, different items were used compared to the pre-test. Given that the same measures for quitter self-identity were used in the control condition and the experimental condition, the condition comparison was on the same measure.

Expected social support. Expected support for quitting was assessed with three questions ($\alpha = .82$), for example 'If I would attempt to quit smoking, people around me will strongly support me', [1] 'completely disagree' – [7] 'completely agree'.

Quit-intention. See pre-test.

Follow-ups (T2 and T3)

Outcome variables

Changed smoking behaviour. Participants were asked whether, since one month ago (T2) and since half a year ago (T3), they smoked [1] 'much less' – [5] 'much more'.

Quit attempts. Quit attempts were assessed at 1-month (T2) and 6-month follow-up (T3) with the item 'Did you undertake a quit attempt of at least 24 h since you filled out the first questionnaire?'

Statistical analyses

We first conducted preliminary and main analyses to test the hypotheses, followed by secondary (qualitative) analyses of the written responses to the manipulations. We tested and found that assumptions of all analyses were met.

Preliminary analyses

We examined whether participants who completed the pre-test and post-test measures differed from those who did not, using one-way ANOVAs and Chi-square analyses. One-way ANOVAs and Chi-square test were then used to test for pre-test differences between experimental conditions to examine effectiveness of random assignment. Two 2-way ANOVAs were used for the manipulation checks, where we examined effects of the support manipulation (present/absent, not relevant for control) and identity manipulation (strengthened/control) on imagined support and credibility of support.

Main analyses for identity and social support

To examine whether post-test quitter self-identity was successfully strengthened, we performed an ANCOVA with the identity and support manipulations as independent factors, pre-test quitter self-identity as a covariate, and post-test quitter self-identity as dependent variable (H1, H3). To examine whether expected social support for quitting smoking was successfully strengthened, we performed an ANOVA with the identity and support manipulations as independent factors, and expected social support as dependent variable (H2, H3).

Secondary analyses for identity

We examined the content of written responses to the quitter self-identity manipulation and examined which responses were associated with increases in quitter self-identity. A coding scheme was developed to capture presence of relevant categories in the responses to the identity manipulation (see Supplementary materials C). Cohen's Kappa values were calculated for interrater agreement on a random subset of 20% of cases. We evaluated the interrater agreement based on the criteria by Landis and Koch (1977), that is, a Kappa of .01–.20 indicates slight agreement, .21–.40 fair, .41–.60 moderate, .61–.80 substantial, and .81–1.00 indicates (almost) perfect agreement. For dichotomous variables prevalence and bias indices were calculated, as these may effect (and explain) Kappa values.

We then performed hierarchical linear regression analyses among participants in the strengthened quitter self-identity condition to predict post-test quitter self-identity. Pre-test quitter self-identity was entered as a control variable in Step 1, and sets of related coded variables were added as Step 2 in four separate regression models (we could not include all predictors at once as this requires a larger sample). Specifically, we added links between quitting and identity in Model 2A, emotions related to smoking and quitting in a separate Model 2B, reasons to become a quitter in a separate Model 2C, and motivation of reasons to become a quitter in terms of approach or avoidance in a separate model 2D. Each set of predictor variables (e.g. emotions) was therefore controlled for pre-test quitter self-identity, but not for other sets of predictors (e.g. reasons). Only categories that were coded as present in responses of at least 10% of participants and had sufficient interrater reliability ($\kappa \geq .60$) were used in the regression analyses.

Secondary analyses for social support

We also examined the content of responses to the social support manipulation. The coding scheme to capture relevant categories in the responses to the social support manipulation was developed in the same way as was done for the identity manipulation (see Supplementary materials C).

Analyses for quit-intention and quitting behaviour

To examine whether the manipulations affected quit-intentions (T1) and changed smoking behaviour (T2, T3), we performed ANCOVAs with the identity and support manipulations as independent factors, and pre-test quitter self-identity as covariate (H4, H5). Finally, Chi-square analyses were performed to assess associations between the manipulation conditions and quit attempts (H4, H5).

Results

Attrition analyses

Attrition was not significantly related to the conditions of the identity manipulation ($\chi^2(1) = .51, p = .48, V = .04$) nor the social support manipulation ($\chi^2(2) = 2.92, p = .23, V = .09$), nor to gender and the number of cigarettes smoked daily. Participants

were significantly more likely to drop out if they were younger and had been smoking for fewer years (see Supplementary materials D).

Preliminary analyses

Pre-test differences

The conditions did not differ significantly in terms of age, years smoked and number of cigarettes smoked per day (see Supplementary materials E). However, we found marginally significant interactions between identity and support conditions on pre-test quitter self-identity ($p = .06$) and quit-intention ($p = .07$). Additional analyses of simple main effects showed that, within the support present condition, pre-test quitter self-identity ($F(1,318) = 6.18, p = .01, \eta_p^2 = .02$) and quit-intention ($F(1,318) = 4.28, p = .04, \eta_p^2 = .01$) were stronger in the strengthened quitter self-identity condition than in the control condition.

Compliance with instructions

Fifteen participants did not comply with instructions for the identity manipulation and were excluded from the main analyses. Of these, nine participants explicitly denied quitter identity (see Secondary analyses), whereas others wrote question marks or 'not applicable'. Participants who did not comply were significantly older, had been smoking longer, and had weaker quitter self-identities at pre-test than other respondents (see Supplementary materials F).

Manipulation checks for social support

Participants in the support present condition imagined stronger support and rated the vignette as more credible than participants in the support absent condition, such that the manipulation of social support was successful (see Table 1). No effects of the identity manipulation and no interactions between support and identity on imagined support or credibility were found.

Furthermore, while 26 participants in the support absent condition scored above the scale midpoint (indicating high social support imagined), and 12 participants in the support present condition scored below the scale midpoint (indicating low support imagined), results for post-test quitter self-identity, credibility of support and expected social support were similar when these participants were excluded from the analyses.

Quitter self-identity

Main analysis

A marginally significant effect of the quitter self-identity manipulation was found, such that participants in the strengthened quitter self-identity condition had stronger quitter self-identities at post-test than participants in the control condition (H1, see Table 1). Pre-test quitter self-identity was strongly and positively associated with post-test quitter self-identity ($b = .74, p < .001, \eta_p^2 = .42$). We found no significant differences in strength of post-test quitter self-identity between the conditions of the support manipula-

Table 1. Differences between experimental conditions on manipulation checks, quitter self-identity and expected social support (post-test): Two-way AN(C)OVAs ($N = 218-324$).

Manipulation condition		Mean (Standard deviation)			
Social support	Identity	Quitter self-identity	Imagined social support ^b	Credibility of social support ^b	Expected social support
Present	Quitter ($n = 44$)	3.57 (.77)	5.27 (1.58)	5.26 (1.18)	5.05 (1.25)
	Control ($n = 63$)	3.08 (.92)	5.32 (1.46)	5.13 (1.18)	5.29 (1.15)
	Total ($n = 107$)	3.28 (.89)	5.30 (1.50) ^c	5.19 (1.15) ^d	5.19 (1.19)
Absent	Quitter ($n = 48$)	3.17 (.91)	3.35 (1.82)	4.70 (1.47)	5.01 (1.11)
	Control ($n = 63$)	3.08 (.95)	2.94 (1.46)	4.58 (1.58)	4.80 (1.28)
	Total ($n = 111$)	3.12 (.93)	3.12 (1.63) ^c	4.63 (1.53) ^d	4.89 (1.21) ^e
Control	Quitter ($n = 58$)	3.32 (.84)			5.44 (1.25)
	Control ($n = 48$)	3.30 (.92)			5.42 (1.22)
	Total ($n = 106$)	3.31 (.87)			5.43 (1.23) ^e
Total	Quitter ($n = 150$)	3.34 (.85)	4.13 (1.88)	4.97 (1.34)	5.18 (1.22)
	Control ($n = 174$)	3.14 (.93)	4.27 (1.95)	4.86 (1.42)	5.15 (1.24)
			ANCOVA ^a		ANOVAs
Independent variable	Identity condition	Quitter self-identity	Imagined social support ^b	Credibility of social support ^b	Expected social support
	Support condition	$F(1,317) = 3.09, p = .08, \eta_p^2 = .01$	$F(1,214) = .75, p = .39, \eta_p^2 < .01$	$F(1,214) = .43, p = .51, \eta_p^2 < .01$	$F(1,318) < .01, p = .97, \eta_p^2 < .01$
	Identity*support interaction	$F(2,317) = 1.12, p = .33, \eta_p^2 = .01$	$F(1,214) = 100.04, p < .001, \eta_p^2 = .32$	$F(1,214) = 8.98, p < .01, \eta_p^2 = .04$	$F(2,318) = 4.94, p = .01, \eta_p^2 = .03$
		$F(2,317) = .25, p = .78, \eta_p^2 < .01$	$F(1,214) = 1.16, p = .28, \eta_p^2 = .01$	$F(1,214) < .01, p = .98, \eta_p^2 < .01$	$F(2,318) = .89, p = .41, \eta_p^2 = .01$

Notes: Significant differences between conditions are indicated by superscripts, with the same superscript indicating a difference at $p < .05$.

^aPre-test quitter self-identity was included as a covariate.

^bParticipants in the control condition of the social support manipulation did not answer this question.

tion and, in contrast to H3, no interaction between the identity and support manipulations. In sum, means on post-test quitter self-identity were in the hypothesised direction, although the effect was only marginally significant.¹

Secondary analyses: Analyses of written responses to the quitter self-identity manipulation

Content of responses to the identity manipulation. Interrater reliability of responses to the experimental condition of the quitter self-identity manipulation ranged from substantial to almost perfect for about two-thirds of the variables. Results showed that participants most often wanted to be quitters for health (84%), finances (56%), personal hygiene (35%) and physical condition reasons (30%; see Table 2). The majority of participants mentioned these reasons only with respect to the present (55%), and a substantial subgroup mentioned reasons relevant to the present as well as the future (22%). Moreover, half of participants mentioned reasons that were a combination of positive aspects of quitting (approach) and negative aspects of smoking (avoidance), although a substantial subgroup only mentioned approach reasons (30%). Emotions in relation to smoking and quitting were rarely mentioned. Those who did mention emotions wrote about negative smoking-related emotions (12%) or positive quitting-related emotions (7%). Almost half of participants (43%) made an explicit and positive link between quitting and their self-perception of the person they are (e.g. quitting fits with self-perception as being positive, determined, independent, brave, etc.), and almost half of participants (48%) explicitly linked quitting to their lifestyle (e.g. having a healthy and conscious lifestyle). A small number of participants (9%) explicitly denied a quitter self-identity (e.g. 'I am not someone who quits smoking') or self-labelled as smoker (e.g. 'I am a smoker').

Responses and strengthened quitter self-identity. Results showed that those with stronger pre-test quitter self-identities had stronger quitter self-identities after the manipulation (see Table 3, Step 1). Above the effect of pre-test quitter self-identity, quitter self-identity was strengthened among participants who linked quitting smoking to their lifestyle (e.g. healthy), but not among participants who linked quitting smoking to their self-perception as a person (e.g. determined; Model 2A). Furthermore, no effects of smoking-related negative emotions were found (Model 2B). Quitter self-identity was strengthened among participants who wanted to become a quitter for health reasons (Model 2C), but other reasons for becoming a quitter were not associated with strengthened identity. Finally, quitter self-identity was strengthened among participants whose reasons were approach-motivated, or both approach-motivated and avoidance-motivated (Model 2D). Quitter self-identity was not strengthened when reasons were only avoidance-motivated, that is, only reasons that included positive aspects of quitting were associated with strengthened quitter self-identity.

Table 2. Frequencies and interrater reliability of codes for quitter self-identity (experimental condition, $N = 165$).

Category	Subcategory	Code	Frequency (%)	Interrater reliability		
				κ	Prevalence	Bias
Reasons to become quitter	Content	Health	138 (83.6%)	.74***	.55	.09
		Finances	92 (55.8%)	.94***	.06	.03
		Personal hygiene	58 (35.2%)	1.00***	.38	.00
		Physical condition	50 (30.3%)	.90***	.61	.03
		Personal environment	32 (19.4%)	.87***	.72	.03
		Dependence	32 (19.4%)	.67***	.67	.03
		Own convenience	27 (16.4%)	.37***	.61	.21
		Example	20 (12.1%)	1.00***	.88	.00
		Social nuisance	20 (12.1%)	.71***	.61	.03
		Self-esteem	19 (11.5%)	.61***	.72	.03
		Social desirability	17 (10.3%)	.39*	.64	.06
		Social convenience	17 (10.3%)	.43*	.76	.00
		Time	12 (7.3%)	.47**	.88	.00
		Future motherhood ^a	3 (1.8%)			
		Outcast ^a	4 (2.4%)			
		Sleep ^a	1 (.6%)			
		Sex ^a	1 (.6%)			
Temporal orientation		Present	91 (55.2%)	.52***		
		Present + future	37 (22.4%)			
		Unclear	36 (21.8%)			
		Future	1 (.6%)			
Approach/avoidance motivation		Approach and avoidance	82 (49.7%)	.72***		
		Approach	50 (30.3%)			
		Unclear	18 (10.9%)			
		Avoidance	15 (9.1%)			
		Negative about smoking	20 (12.1%)	.87***	.73	.03
Emotions related to smoking and quitting		Positive about quitting	11 (6.7%)	-.04	.91	.03
		Negative about smoking	3 (1.8%)	.65***	.91	.03
		Negative about quitting ^a	2 (1.2%)			
		Link lifestyle	80 (48.5%)	.87***	.13	.06
Links between quitting and identity		Link self-perception	71 (43.0%)	.63***	.06	.13
		Denial quitter identity ^a	14 (8.5%)			

Note: κ = Cohen's kappa (calculated on data from the experimental condition).

* $p < .05$; ** $p < .01$; *** $p < .001$; ^aCalculation of reliability was impossible because codes were absent in the random subset for reliability analysis for 1 or 2 raters.

Table 3. Explaining post-test quitter self-identity by coding of written responses: Hierarchical linear regression analyses ($N = 165$).

Predictor		b(SE)	B	
Step 1	Pre-test quitter self-identity	.86 (.06)***	.74***	
Model 2A	Link self-perception	-.02 (.10)	-.22	
Model 2B	Link lifestyle	.32 (.10)**	.17**	
Model 2C	Smoking-related negative emotions	.12 (.15)	.04	
Model 2D	Reasons to become quitter	Health	.28 (.14)*	.11*
		Finances	-.02 (.10)	-.01
		Personal hygiene	.11 (.12)	.06
		Physical condition	.12 (.11)	.06
		Personal environment	-.10 (.15)	-.04
		Dependence	.04 (.13)	.02
		Example	-.16 (.16)	-.06
		Social nuisance	.26 (.15) ⁺	.09 ⁺
		Self-esteem	.10 (.16)	.03
		Avoidance	.05 (.21)	.02
Model 2D	Motivation of reasons	Approach	.38 (.17)*	.19*
		Avoidance and approach	.41 (.16)*	.22*

Notes: $R^2 = .55$ ($p < .001$) for Step 1; $\Delta R^2 = .03$ for Model 2A ($p = .01$); $\Delta R^2 = .00$ for Model 2B ($p = .45$); $\Delta R^2 = .03$ for Model 2C ($p = .28$); $\Delta R^2 = .03$ for Model 2D ($p = .03$).

⁺ $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$; ^aCompared to reference category ‘Unclear’.

Social support

Main analyses

In contrast to H2, a two-way ANOVA showed that expected support was not strengthened successfully by the social support manipulation (see Table 1). Tukey post hoc tests showed that expected support was less strong in the support absent condition than in the control condition ($p < .01$), but no significant differences were found between support absent and present ($p = .17$), or the support present and control conditions ($p = .32$). No effects of the identity manipulation and no interaction effect on expected support were found.

Secondary analyses: Analyses of written responses to the social support manipulation

We found four different responses in each condition (i.e. positive, negative, positive and negative, neutral/unclear responses; see Table 4). Interrater reliability was almost perfect for responses to the support manipulation ($\kappa = .88$, $p < .001$). Surprisingly, although about two third of participants showed expected responses (i.e. negative response to absence of support and positive response to presence of support), 12% responded positively to absence of support (e.g. they did not want support), and 13% responded negatively to presence of support (e.g. support irritated them). Seven participants who showed such unexpected responses responded incorrectly on the imagined support scale,

Table 4. Frequencies of responses to the social support manipulation.

Code	Frequency (%)		
	Support present	Support absent	Control
Positive response	70 (61.4%)	14 (12.2%)	72 (65.5%)
Negative response	15 (13.2%)	69 (60.0%)	11 (10.0%)
Mixed Response	20 (17.5%)	9 (7.8%)	5 (4.5%)
Neutral/unclear	9 (7.9%)	23 (20.0%)	22 (20.0%)

Table 5. Effects of the identity and social support manipulations on post-test quit-intention ($N = 324$), and changed smoking behaviour at 1-month ($N = 256$) and 6-month follow-ups ($N = 173$): ANCOVAs.

Manipulation condition		Means and standard deviations					
		Quit-intention (post-test)		Changed smoking behaviour (T2)		Changed smoking behaviour (T3)	
Social support	Identity	<i>N</i>	<i>M</i> (SD)	<i>N</i>	<i>M</i> (SD)	<i>N</i>	<i>M</i> (SD)
Present	Quitter	44	5.68 (1.81)	32	2.81 (.74)	16	2.63 (.96)
	Control	63	4.76 (2.44)	50	2.95 (.55)	36	2.53 (.81)
	Total	107	5.14 (2.24)	82	2.89 (.63)	52	2.56 (.85)
Absent	Quitter	48	5.02 (2.23)	35	2.80 (.58)	27	2.33 (1.00)
	Control	63	4.73 (2.06)	56	2.91 (.44)	40	2.58 (.84)
	Total	111	4.86 (2.13)	91	2.87 (.50)	67	2.48 (.91)
Control	Quitter	58	4.93 (2.11)	48	2.92 (.58)	33	2.82 (.81)
	Control	48	5.54 (2.12)	35	2.91 (.74)	21	2.62 (.87)
	Total	106	5.21 (2.13)	83	2.92 (.65)	54	2.74 (.83)
Total	Quitter	150	5.18 (2.08)	115	2.85 (.63)	76	2.61 (.93)
	Control	174	4.97 (2.24)	141	2.92 (.56)	97	2.57 (.83)
ANCOVAs ^a							
Independent variable		Quit-intention (post-test)		Changed smoking behaviour (1-month follow-up)		Changed smoking behaviour (6-month follow-up)	
Identity condition		$F(1,317) = .10$, $p = .75$, $\eta_p^2 < .01$		$F(1,249) = .94$, $p = .33$, $\eta_p^2 < .01$		$F(1,166) = .11$, $p = .75$, $\eta_p^2 < .01$	
Support condition		$F(2,317) = .43$, $p = .65$, $\eta_p^2 < .01$		$F(2,249) = .33$, $p = .72$, $\eta_p^2 < .01$		$F(1,166) = 1.59$, $p = .21$, $\eta_p^2 = .02$	
Identity*support interaction		$F(2,317) = 1.93$, $p = .15$, $\eta_p^2 = .01$		$F(1,249) = .12$, $p = .89$, $\eta_p^2 < .01$		$F(1,166) = 1.43$, $p = .24$, $\eta_p^2 = .02$	
Pre-test quitter self-identity		$F(1,317) = 162.98$, $p < .001$, $\eta_p^2 = .34$		$F(1,249) = 4.78$, $p = .03$, $\eta_p^2 = .02$		$F(1,166) = 7.10$, $p = .01$, $\eta_p^2 = .04$	

^aPre-test quitter self-identity was included as a covariate.

suggesting that they found it difficult to imagine the situation presented or did not read carefully. Moreover, 18% showed a mixed (positive and negative) response to support present, and 20% responded neutrally to support absent (e.g. it would not affect them). Finally, 10% responded negatively to the control condition (e.g. describing fear and stress in response to the story about blood circulation), but results were very similar when the analyses for post-test quitter self-identity, imagined support, credibility of support and expected support were repeated without these participants.

Table 6. Effects of the identity and social support manipulations on quit attempts at 1-month ($N = 256$) and 6-month follow-ups ($N = 173$): Chi-square tests.

Manipulation condition		n (% within condition)			
		Quit attempt (T2)		Quit attempt (T3)	
Social support	Identity	Yes	No	Yes	No
Present	Quitter	5 (16%)	27 (84%)	7 (44%)	9 (56%)
	Control	8 (16%)	42 (84%)	10 (28%)	26 (72%)
	Total	13 (16%)	69 (84%)	17 (33%)	35 (67%)
Absent	Quitter	2 (6%)	33 (94%)	7 (26%)	20 (74%)
	Control	5 (9%)	51 (91%)	12 (30%)	28 (70%)
	Total	7 (8%)	84 (92%)	19 (28%)	48 (72%)
Control	Quitter	4 (8%)	44 (92%)	9 (27%)	24 (73%)
	Control	3 (9%)	32 (91%)	5 (24%)	16 (76%)
	Total	7 (8%)	76 (92%)	14 (26%)	40 (74%)
Total	Quitter	11 (10%)	104 (90%)	23 (30%)	53 (70%)
	Control	16 (11%)	125 (89%)	27 (28%)	70 (72%)
		χ^2 statistic			
		Quit attempt (T2)		Quit attempt (T3)	
Association social support manipulation/quit attempts		$\chi^2(2) = 3.63, p = .16, V = .12$		$\chi^2(2) = .61, p = .74, V = .06$	
Association identity manipulation/quit attempts		$\chi^2(1) = .21, p = .64, V = .03$		$\chi^2(1) = .12, p = .73, V = .03$	

Quit-intention and quitting behaviour

We also tested for effects of the identity and social support manipulations on post-test quit-intention, and changed smoking behaviour and quit attempts at 1-month and 6-month follow-ups. In line with the small and marginally significant effects on quitter self-identity, we did not find such effects (see Tables 5 and 6). Specifically, ANCOVAs with pre-test quitter self-identity as a covariate showed no significant effects of the manipulations on post-test quit-intention, and 1-month or 6-month changed smoking behaviour. Chi-square tests showed no significant associations between the manipulations and quit attempts at 1-month follow-up, or between the manipulations and quit attempts at 6-month follow-up.

Discussion

This experimental study was the first to examine whether quitter self-identity could be strengthened through a writing exercise, and whether identification with quitting could be enhanced by expected social support for quitting smoking. The writing exercise that was used as a manipulation of quitter self-identity showed that quitter self-identity was not strengthened sufficiently among the entire group. However, given that previous work found small-to-medium-sized relations between identity and quit-intentions and quitting (e.g. Meijer et al., 2015), much stronger effects on quitter self-identity are needed to initiate actual smoking cessation. In line with this, the current writing exercise did not affect quit-intention or quitting behaviour. This calls for improvements in

the writing exercise. We further found that nine per cent of participants in the experimental condition did not comply with the instructions of the identity manipulation (e.g. denied quitter identity), suggesting that the approach may not fit a subgroup of smokers. The effect of the identity manipulation was not enhanced by social support (H3). Nevertheless, secondary analyses based on written responses to the writing exercise suggested that subgroups of participants may benefit more (see below).

Participants' written responses to the experimental condition of the quitter self-identity manipulation showed that participants most often wanted to become quitters to improve their health, financial circumstances, personal hygiene or physical condition. Reasons often were a combination of approaching positive aspects of quitting and avoiding negative aspects of smoking. Moreover, about half of participants linked quitting to their lifestyle (e.g. healthy lifestyle), and about half of participants linked quitting to the person they perceived themselves to be (e.g. self-perception as independent). Strengthened quitter self-identity at post-test was associated with an explicit link between quitting and lifestyle, health reasons for becoming a quitter, and reasons including approach of positive aspects of quitting. Approach of positive aspects of quitting likely is closely associated with the (positive) future self as a quitter, whereas negative aspects of smoking are likely related to the (negative) current self as a smoker, and possibly therefore less relevant for strengthening quitter self-identity. Interestingly and unexpectedly, we did not find that quitter self-identity was strengthened among participants who made an explicit and positive link between quitting and their self-perceptions (e.g. quitting fits self-perceptions as independent) compared to those who did not link quitting to their self-perceptions as a person.

The reasons for becoming a quitter found in the current study (e.g. health) correspond with reasons for quitting smoking more generally (e.g. McCaul et al., 2006). Moreover, our findings correspond with previous studies showing that identity can be strengthened through writing exercises (King, 2001; Layous et al., 2013; Murru & Ginis, 2010; Ouellette et al., 2005; Oyserman et al., 2015). We found that identity was strengthened among those who linked quitting to their lifestyle, but not among those who linked quitting to aspects of their self-perceptions, suggesting that identity might be strengthened indirectly through lifestyle. This corresponds with findings that changes in meaningful behaviours may enhance identification with non-smoking, for example when ex-smokers replaced smoking by gardening (Luck & Beagan, 2015). In addition, possible selves have been strengthened successfully by having participants imagine their future life rather than directly imagine their future identity (King, 2001; Layous et al., 2013; Murru & Ginis, 2010).

We were not successful in manipulating expected social support for quitting smoking, (H2), which prevented investigating whether expected support facilitated identification with quitting (H3). It is possible that participants at pre-test already might have had expectations of the social support that they would receive if they would quit, which were not much affected by the manipulation. Furthermore, whereas most participants responded as intended, a relatively large number of participants showed unintended responses (e.g. appreciation of absence of support), even though the received type of support was tailored to their preferences. Given that the vignettes were explicit about support, this can be explained by work showing that support can be unhelpful when the recipient is aware of receiving support (Bolger, Zuckerman, & Kessler, 2000). The authors suggest that being aware of receiving support may point attention toward the

problem, or harm self-esteem because it makes people aware of their inability to solve problems independently. Support that is unnoticed or not interpreted as support (i.e. invisible support) may be more beneficial (Bolger et al., 2000).

This study has limitations. First, examination of effects of the manipulations was complicated by marginally significant pre-test differences in quitter self-identity and quit-intention, and by diverse responses to the control condition of social support. Second, the effect of the quitter self-identity manipulation was small and marginally significant. It is possible that identity did change significantly on an implicit level (Lindgren, Neighbors, Gasser, Ramirez, & Cvencek, 2017), but implicit measures were not included in the current study. Furthermore, the manipulation did not benefit a subset of participants, which may also be a true representation of likely effects. Notably, no effects of the identity manipulation were found on quit-intention, changed smoking behaviour and quit attempts, showing that the exercise needs to be improved in order to facilitate identity change. Given that change in intention or behaviour is a process, it may be beneficial to repeat the exercise over time. Third, the absence of certain content in the written responses (e.g. health reasons) does not necessarily mean that this content was irrelevant for participants. Importantly, however, those aspects that participants did write about likely are most salient to them, and therefore most important for the current study. Fourth, social desirability may have played a role, although the online nature of the study may have given participants a sense of anonymity that could decrease the desire for positive self-presentation. For example, several participants indicated that they did not want to be a quitter or resisted complying with the instructions. Fifth, although previous work suggests that vignettes are a valid way to manipulate social support (Hainmueller, Hangartner, & Yamamoto, 2015; Marigold et al., 2014; Mojaverian & Kim, 2012), it is possible that the vignettes were not perceived as fully realistic by participants. Relatedly, the vignettes focused on the type of social support desired by participants, whereas in daily life participants may also be supported in ways that they do not find helpful. Nevertheless, in the current study some support was found for the use of writing exercises to strengthen quitter self-identity, and the study provided insight into smokers' conceptualizations of quitter identities, as well as their responses to imagined social support for quitting.

Although the writing exercise did not effectively increase quitter self-identity in the current study, we believe that the positive effects of writing and imaging exercises on identity, motivation and behavioural outcomes related to other types of behaviour, as found in previous work, provide sufficient ground to further explore this route (King, 2001; Layous et al., 2013; Murru & Ginis, 2010; Ouellette et al., 2005; Oyserman et al., 2015). The difference between previous findings and the current study may also indicate that smoking behaviour (i.e. an addiction) is more difficult to change than other types of behaviours, such as exercise. Future research is needed to investigate ways to make quitter self-identity strengthening exercises effective and beneficial for a larger group of smokers. For example, participants may spend more time thinking or writing about their mental images (King, 2001; Layous et al., 2013; Murru & Ginis, 2010; Ouellette et al., 2005), and more and more detailed questions (Murru & Ginis, 2010; Ouellette et al., 2005), more frequent writing exercises, or reminders may be used (King, 2001; Layous et al., 2013; Murru & Ginis, 2010; see Frattaroli, 2006 for similar findings regarding expressive writing more generally). Furthermore, an interesting route to explore is the inclusion of undesired possible selves, as desired selves are more

effective in success-likely contexts whereas undesired selves are more effective in failure-likely contexts (Oyserman et al., 2015). Given that smokers differ in their expectations of quit success (e.g. Hendricks et al., 2014), different selves may benefit different smokers. It may also be beneficial to strengthen both desired (i.e. quitter) and undesired (i.e. continuing smoker) identities within the same person, as this will facilitate strategies to both approach the desired future identity and avoid the undesired future identity (Oyserman & James, 2008). Relatedly, contrasting desired and undesired future selves, or desired future selves and undesired current selves may facilitate change (cf. Oettingen, 2012). Finally, people differ in their preferences for verbal or visual processing (e.g. Mayer & Massa, 2003), such that writing exercises may benefit some people more than others. People with a stronger visual preference are expected to respond better to a visually oriented exercise, in which they would, for example, draw or select pictures that fit with their new identity, rather than write about their new identity (Mizock, Russinova, & DeCastro, 2015; Mizock, Russinova, & Shani, 2014). It has been suggested that people with lower socio-economic status prefer visual information over verbal information (Stanczyk, Bolman, Muris, & de Vries, 2011), such that identity interventions involving visual material may be more effective for lower socio-economic status smokers and ex-smokers. Future work should explore what works best for whom, taking into account potential moderators such as future time perspective (Strathman, Gleicher, Boninger, & Edwards, 1994), self-concept clarity (McElwee & Haugh, 2010), and processing preference (Mayer & Massa, 2003).

Notwithstanding the limitations, this study was the first attempt to experimentally strengthen quitter self-identity and to manipulate expected support for quitting among daily smokers. Results provide insight into the content of smokers' self-conceptualizations as quitters. In addition, the findings point to potential negative effects of social support for quitting smoking among subgroups of smokers. To overcome some of the limitations, suggestions were made for the improvement of writing exercises on quitter identity. In sum, our findings provide important building blocks for future research into strengthening identities relevant to smoking cessation.

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Supplemental data

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analysis. Some of the measures described here are also reported in Meijer et al. (2016a). That paper focuses solely on the pre-test measures, and does not examine the manipulations and post-test measures which are the focus of the current paper.

Note

1. Results for post-test quitter self-identity were very similar when we also controlled for pre-test quit-intention in addition to pre-test quitter self-identity (identity manipulation ($F(1,315) = 3.34, p = .07, \eta_p^2 = .01$). Given that the original variable caused a violation of the assumption of homogeneity, we categorised quit-intention into strong (within one to six months), intermediate (within two to ten years) and weak quit-intention (later than 10 years, or continue smoking) for this particular analysis.

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