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Title: The role of desire, duty and intention in predicting attempts to quit smoking

Running head: Desire, duty & intention in quitting smoking

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Conflict of interest: Robert West undertakes research and consultancy for the following developers and manufacturers of smoking cessation treatments; Pfizer, J&J, McNeil, GSK, Nabi, Novartis and Sanofi-Aventis. Robert West also has a share in the patent of a novel nicotine delivery device.

The role of desire, duty and intention in predicting attempts to quit smoking

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Abstract

Aims: Motivation to quit smoking predicts quit attempts, though little is known about the role played by its different aspects. This study assessed the predictive value of desire, duty and intention to quit, three different aspects of motivation.

Design: A longitudinal study was conducted involving a nationally representative sample of smokers assessed at baseline and three and six months later. Baseline assessment took place by face-to-face computer-assisted interviews; follow-up assessments by postal questionnaires.

Setting: England.

Participants: From April 2008 to June 2009, a total of 5593 adult smokers were recruited; 1263 were followed up at 3 months and 1096 at 6 months.

Measurements: Three dichotomous measures of motivation to quit (wanting to quit, believing one ought to quit, intention to quit soon) were taken at baseline. Whether a subsequent quit attempt was made was recorded at three- and six-month follow-up.

Findings: More smokers believed they ought to quit smoking than wanted to or intended to soon (38,9%, 29,4% and 23,5% respectively). Desire and intention were independent predictors of quit attempts at both follow-ups, whereas combining them did not add predictive value and duty was not a predictor. While the predictive value of desire or

intention alone disappeared when accompanied by duty, their combination was robust against its negative effect.

Conclusion: Desire and intention independently positively predict quit attempts while duty appears to mitigate their effect. It would be worth monitoring all three aspects of motivation when evaluating the impact of smoking cessation interventions on motivation to quit.

Keywords: Smoking cessation, motivation, desire, duty, intention

Background

Smoking cessation campaigns often focus on creating a sense of ‘duty’, a belief that one ought to quit for the sake of one’s health, the health of one’s family or because smoking is in some sense ‘bad’. However, there is little empirical evidence to suggest that instilling such beliefs results in behaviour change. A new theory of motivation, PRIME theory, provides a theoretical basis for understanding how different aspects of the motivational system might be expected to influence behaviour. According to PRIME theory multiple levels of motivation can be discerned: basic ‘impulses and inhibitions’ as direct responses to immediate stimuli, ‘motives/desires’ (feelings of want and need relating to an imagined future), ‘evaluations’ (beliefs about what is good or bad) and ‘plans’ (intentions regarding future actions) (1, 2). PRIME theory argues that attempts to quit occur when at a given moment feelings of desire to quit exceed a competing desire to continue smoking, while evaluations such as beliefs about duty do not play a role in generating quit attempts, unless they result in the smoker desiring to quit (1, 2). Indeed smokers themselves appear to believe that an unambivalent desire to quit is necessary for a quit attempt to have the potential to succeed (3). Wanting to quit smoking (motive-level), has been well established as a predictor of quit attempts, as has intention to quit in the near future (plan-level) (4-6). However, PRIME theory predicts that intention would only influence quitting behaviour if accompanied by a want or need to quit, as beliefs about duty (evaluation-level) and intention are hypothesized to only influence quitting behaviour through desire (1, 2). There appears to be no research to date differentiating these three aspects of motivation, though disentangling the roles they play could be useful

in identifying optimal markers of motivation to quit and in ultimately designing effective interventions to promote quitting behaviour.

In 2007, 21% of all adults aged 16 and over in England reported that they were smoking (7). Of these smokers, the majority (67%) recognized the (health) benefits of quitting smoking and expressed a wish to stop (7, 8), as has been found in other western countries (9). However, it is unknown whether these national figures represent smokers who specifically want to quit smoking, smokers who believe they ought to, or both. As several countries, such as Great Britain, Ireland and the Netherlands, have adopted a national smoking ban in public places, public norms are shifting towards non-smoking (10) and smokers are likely to believe that they ought to quit, even though they might not want to. This may lead to an overestimation of the percentage of smokers genuinely motivated to quit smoking when measures are used that do not make a distinction between these different motivational aspects. This overestimation of the percentage of smokers wanting to quit might lead to a misunderstanding of the effectiveness of smoking cessation interventions.

The present study concerned the extent to which different aspects of motivation to quit smoking play a role in predicting quit attempts. It aimed to determine the prevalence of intention, desire and beliefs about duty to quit smoking when smokers had the opportunity to answer all three questions simultaneously and to examine the predictive value of each of these aspects of motivation for quit attempts in the succeeding three and six months. It was hypothesized that fewer smokers would report a desire to quit smoking than found in previous studies, as within the present study smokers were given the opportunity to distinguish between their intention to quit, their desire and feelings of duty

to quit. In addition, it was hypothesized that a desire to quit smoking would be predictive of future quit attempts, while duty and intention would only have an influence through desire.

Making an attempt to quit is an essential step in the process of smoking cessation. The success of a quit attempt, however, is a different matter. A quit attempt's success is mostly predicted by the extent to which a smoker is addicted to nicotine and motivation appears not play an important role in whether or not permanent abstinence is achieved (1, 11). Therefore, the present study only focussed on the influence of motivation on quit attempts, not on its influence on the success of these attempts.

Methods

Sample and procedure

The study was part of the Smoking Toolkit Study (www.smokinginengland.info), a series of monthly surveys intended to provide up-to-date information about smoking and smoking cessation patterns in England(12). The surveys were conducted by the British Market Research Bureau using a random location sampling design, with initial random selection of grouped output areas, stratified by ACORN characteristics

(www.caci.co.uk/acorn/acornmap.asp, archived at

<http://www.webcitation.org/5mcwEK4wN>) and region. Subsequently, trained

interviewers held face-to-face computer assisted interviews with one member of each household, based on quotas taking into account the likelihood of the household member being at home (e.g., age, gender, part time working). All smokers who agreed to be

re-contacted were sent postal follow-up questionnaires three and six months after the baseline assessment.

Data used were collected from April 2008 until June 2009. In total, 5593 smokers were interviewed at baseline, of which 1263 (22.6%) and 1096 (19.6%) completed the three-month and six-month follow-up questionnaires respectively. Eight-hundred and twenty four (824; 14.7%) respondents completed both follow-up questionnaires.

Baseline measurement

Three socio-demographic variables were measured at baseline: gender, age and social group.

Smoking behaviour was measured by one item asking ‘Which of the following best applies to you?’ (I smoke cigarettes (including hand rolled) every day; I smoke cigarettes (including hand rolled), but not every day; I do not smoke cigarettes at all, but I do smoke tobacco of some kind (e.g., pipe or cigar); I have stopped smoking completely in the last year; I stopped smoking completely more than a year ago; I have never been a smoker (i.e., smoked for a year or more), Don’t Know). Only those respondents indicating that they smoked cigarettes (including hand rolled) every day or not every day, were included in the present study. Respondents were asked to report how many cigarettes per day (or per week or month for non-daily smokers) they usually smoked.

Severity of nicotine dependence was measured by the Fagerström Test for Nicotine Dependence (FTND) (13), resulting in scores ranging from 0 (not addicted) to 10 (highly addicted).

The three measures of motivation were assessed using dichotomous items with which the respondent could either agree or disagree, i.e. desire was measured with the item 'I want to stop smoking'; duty with 'I ought to stop smoking'; and intention with 'I intend to stop smoking soon'. Subsequently, these three measures were combined into one composite variable, 'Type of motivation' whereby all possible combinations were converted into a single variable. Dichotomous measures were used rather than scale measures to simplify completion for the respondents but also, importantly, because it would not have been possible to devise response scales that were equivalent for the three concepts. That is, one can ask about the strength of 'want' but not about the strength of 'ought'. The closest one could come to the latter would be asking about the strength of the 'belief that one ought', but arguably that is not the same thing. This might have biased the results in favour of our hypothesis. To avoid this, dichotomous measures were used.

Follow-up measurement

At three and at six months follow-up respondents were asked to report quit attempts in the past year using the question: 'How many serious attempts to quit smoking have you made in the last 12 months? By serious attempt I mean you decided that you would try to make sure you never smoked again. Please include any attempt that you are currently making.' Those reported having made at least one quit attempt were then asked how long ago the quit attempt had started (In the last week; more than a week up to a month; more than 1 month and up to 2 months; more than 2 months and up to 3 months; more than 3 months and up to 6 months; more than 6 months and up to a year; can't remember).

These two questions were used to assess quit attempts made in the past three months for the three-month follow-up and in the last six months for the six-month follow up.

Statistical analysis

First, descriptive analyses were carried out to determine the sample's characteristics and to calculate the percentages of respondents reporting each type of motivation to quit. Thereafter, a comparison was made between those followed-up and those lost to follow-up after three and six months. In addition, tetrachoric correlations were calculated between the three different types of motivation and the frequency of each possible combination of the different types of motivation to quit was determined.

Secondly, multiple logistic regression analyses were conducted to investigate whether self-reported measures of motivation and our main outcome measures, i.e. whether a quit attempt had been undertaken since baseline measured at both follow-up points, differed by socio-demographic and/or smoking variables. In these analyses the three different motivational measures and the main outcome measures functioned as dependent variables and socio-demographic and smoking variables measured at baseline as independent variables. Those variables that came out as predictors of both motivation and quit attempts were included as covariates in subsequent analyses.

Thirdly, simple logistic regression analyses were carried out to assess bivariate associations between the three different types of motivation and quit attempts at both follow-up moments. Multiple logistic regression analyses with all three types of motivation entered simultaneously were conducted to determine the unique predictive power of each type of motivation. Lastly, to investigate the predictive validity of each

potential combination of motivational aspects, the influence of 'Type of motivation' on quit attempts at three- and six-month follow-up was assessed using multiple logistic regression analyses.

Data were analyzed using SPSS 15.0.

Results

Sample characteristics

Table 1 shows the characteristics of the baseline sample. In table 2 a comparison is made between the samples followed up and those lost to follow-up with regard to their baseline characteristics. As is shown, compared with those who completed the three-month and six-month follow-up questionnaires, those lost to follow up were slightly younger, more likely to be male and smoked slightly less cigarettes per day.

In addition, table 1 shows that the most commonly reported type of motivation to quit was duty (39.0%) with desire and intention being less frequent (29.3% and 23.5% respectively). Desire, duty and intention were moderately associated with each other, as is shown in table 3. The odds of reporting an intention to quit were 5.93 (95% CI 4.48-7.85) greater in those that expressed a desire to quit compared with those that did not and 1.86 (95% CI 1.43-2.42) greater in those that reported a sense of duty to quit compared with those that did not. The odds of reporting a desire to quit were 2.41 (95% CI 1.88-3.09) greater in those that felt it their duty to quit compared with those that did not.

Differences in motivation and behaviour by socio-demographic and smoking variables

Results from the logistic regression analyses carried out to investigate whether self-reported dichotomous measures of motivation differed by socio-demographic and/or smoking variables indicate that the older respondents were, the less likely they were to report an intention to quit smoking soon (OR=.98; 95% CI .98-.99) and a desire to quit smoking (OR=.99; 95% CI .99-.99), but the more likely they were to report a sense of duty to quit (OR=1.00; 95% CI 1.00-1.01). Female respondents were more likely than male respondents to report a desire to quit (OR=1.14; 95% CI 1.01-1.28) and feelings of duty to quit (OR=1.22; 95% CI 1.11-1.33). Respondents with lower social grades were less likely to report a desire to quit, an intention to quit and a sense of duty to quit (OR=.94; 95% CI .90-.98; OR=.90; 95% CI .86-.94; OR=.84; 95% CI .81-.87 respectively) than respondents with higher social grades. The more cigarettes respondents reported they smoked per day, the more likely they were to report a sense of duty to quit (OR=1.01; 95% CI 1.00-1.02), but the less likely they were to report a desire to quit (OR=.99; 95% CI .98-1.00) and an intention to quit smoking soon (OR=.99; 95% CI .98-1.00). In addition, the more addicted to nicotine, the less likely respondents were to report an intention to quit smoking soon (OR=.96; 95% CI .93-.99).

None of the socio-demographic or smoking variables predicted whether respondents reported having made a quit attempt at three-month follow-up. One variable predicted whether they made a quit attempt during the six-month follow-up period: the number of cigarettes smoked per day, i.e. the more cigarettes one smoked daily, the less likely he or she would be to make a quit attempt (OR=.99; 95% CI .97-1.00). This variable was thus included as a covariate in subsequent regression analyses concerning quit attempts at six-month follow-up.

Predictive power of the three types of motivation regarding attempts to quit smoking

In separate logistic regression analyses with each measure of motivation entered on its own, desire and intention to quit both predicted quit attempts at three and six months follow-up, whereas duty did not (Table 4). In a logistic regression in which desire, intention and duty were entered together, desire and intention independently predicted attempts to quit at three and six months while duty was negatively associated with quit attempts (Table 5).

Figure 1 shows the percentages of smokers in each category of the ‘Type of motivation’ composite measure who reported to have made a quit attempt during the three- and six-month follow up period, respectively. Those who reported that they felt it their duty to quit were no more likely to attempt to quit than those who did not report any motivation to quit at baseline. Those who reported an intention to quit soon or a desire to quit were approximately twice as likely to try to quit compared with those reporting a sense of duty to quit, as were those who reported both an intention and a desire to quit. Reporting a sense of duty to quit smoking reduced the likelihood of quitting in those who reported also either a desire or an intention to quit, but not in those who reported both desire and intention to quit (Table 6).

Discussion

Duty was the most commonly reported motive for quitting smoking. However, both desire and intention were significant independent predictors of quit attempts, while duty was not. If duty accompanied reported desire or intention to quit, it even mitigated the

predictive power of either the other motivational aspect. Combining intention and desire did not add predictive power compared with either of the two alone, but did prevent duty from undermining it.

The finding that duty did not predict quit attempts is in line with predictions from PRIME theory. However, the fact that duty mitigated the effect of desire and intention was not predicted. Based on these findings, the theory may need to be modified to include a negative association between duty and behaviour. This would be consistent with previous research suggesting that a sense of autonomy is important for health behaviour change and a sense of external pressure is potentially counter-productive (14, 15). This is what would be predicted by Self-Determination Theory (SDT) which proposes that extrinsic motivation (in this case, duty might be considered an extrinsic type of motivation) often undermines the positive effect of intrinsic motivation (in this case desire and potentially also intention) (16). Another possibility is that the findings reflect the questionnaire format used. If a smoker is asked at the same time whether s/he wants or intends to quit smoking and whether s/he feels s/he ought to quit, some smokers might interpret 'ought' as 'I ought, but do not want/intend'. This could potentially be tested by physically separating the items from each other in the questionnaire.

Moreover, that intention appeared to predict quit attempts independently from desire was not expected based on PRIME theory either. Perhaps the speculation in the theory that intention only has an influence on behaviour through desire needs to be reconsidered. Instead, it may be that intention has a direct positive influence on behaviour. It may be that in some sense 'commitment' to something that one has decided to do carries an autonomous motivational value that goes beyond the desire that led to

that commitment in the first place. However, it is also possible that ‘commitment’ does, as PRIME theory suggests, have its influence on behaviour through a momentary desire to quit smoking, but that this process is not revealed until the very moment at which it unfolds. The finding that intention did not add predictive value when combined with desire suggests that this might be the case. However, this again is something that requires further research. It would be interesting to examine, for example, to what extent intention and desire predict ‘planned’ and ‘unplanned’ quit attempts (17).

From a practical point of view, the findings suggest that interventions aimed at promoting quit attempts need to go beyond creating the belief that smokers ought to quit smoking and make them want to quit and/or intend to quit smoking in the near future. Further research is needed into what specific types of strategies can generate a desire or intention to quit while minimising a residual sense of duty. In addition, the results suggest that it is helpful to measure all three aspects of motivation (desire, duty and intention) simultaneously when evaluating smoking cessation interventions.

The study had a number of limitations. First of all, it suffered from relatively high drop-out rates when comparing these rates with other population studies (4, 18). Drop-out occurred both at baseline where 10% of baseline respondents were unwilling to be re-contacted and at follow-up through non-response to questionnaires, either as a result of change of address or failure to return the questionnaire. However, despite the low follow-up rate, only small differences were found between the baseline sample and the samples followed up at three and six months respectively, and it is difficult to conceive of a plausible mechanism that could link the low response rates to the specific pattern of results obtained. Secondly, some degree of recall bias may have occurred when

respondents had to report quit attempts at follow-up. Failed quit attempts tend to be forgotten and the sooner they fail the quicker they are forgotten (19, 20). However, the process by which this type of bias could have led to the results obtained is unclear. And that the same pattern of results was found with self-reported quit attempts over two different time periods (three and six months) suggests that forgetting did not play a role. Thirdly, dichotomous measures of motivation were used. The reason for doing this has been explained in the methods section. Again, although this may have reduced the predictive power of all the variables (21, 22), it is not clear how this would have reduced the predictive power of duty more than of desire or intention. Moreover, it is worth mentioning that our dichotomous measure of desire performed similarly in predicting quit attempts to scale measures previously used in the literature (8, 18, 23), so it is not clear whether in this case dichotomisation did impair prediction. Nevertheless, it would be useful to determine whether the results presented here could be replicated with continuous measures of motivation.

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Table 1. Sample characteristics at baseline

	N=5593
Age, mean (SD)	41.7 (16.2)
Male, percent (N)	47.6 (2660)
Social grade, percent (N) ^a	
AB	10.2 (572)
C1	21.7 (1216)
C2	24.5 (1371)
D	19.1 (1066)
E	24.5 (1368)
Number of cigarettes smoked per day, mean (SD)	13.5 (8.6)
Tried to quit in the past year, percent (N)	36.0 (2008)
FTND score, mean (SD)	3.3 (2.3)
Respondents reporting each type of motivation, percent (N)	
No motivation	40.3 (2254)
Intention	23.5 (1315)
Desire	29.3 (1641)
Duty	39.0 (2179)
Respondents with each combination of motivational types, percent (N)	
Duty only	19.9 (1114)
Desire only	9.4 (523)
Intention only	7.1 (398)
Desire & duty	6.9 (387)
Intention & duty	3.3 (186)
Desire & intention	4.3 (239)
Desire, intention & duty	8.8 (492)

Note: n.a. = not applicable ; ^aAB=higher and intermediate professional/managerial;

C1=supervisory, clerical, junior managerial/administrative/professional; C2=skilled

manual workers; D=semi-skilled and unskilled manual workers; E=on state benefit,

unemployed, very low paid workers.

Table 2. A comparison of those followed up and those lost to follow-up after three and six months

	Followed up after		Lost to follow-up	
	3 months (N=1263)	after 3 months (N=4330)	6 months (N=1096)	after 6 months (N=4497)
Age, mean (SD)	45.5 (15.5)	40.6 (16.2)	47.6 (14.9)	40.3 (16.2)
Male, percent (N)	42.4 (536)	49.1 (2124)	43.7 (479)	48.5 (2181)
Social grade, mean (SD) ^a	2.7 (1.4)	2.8 (1.3)	2.8 (1.3)	2.7 (1.3)
Number of cigarettes smoked per day, mean (SD)	14.0 (8.6)	13.3 (8.6)	14.5 (9.0)	13.3 (8.5)
Tried to quit in the past year, percent (N)	35.7 (451)	36.0 (1557)	35.3 (386)	36.2 (1622)
FTND score, mean (SD)	3.4 (2.3)	3.3 (2.3)	3.4 (2.3)	3.3 (2.3)

Note: significant differences between the samples ($p < .05$) are depicted in bold ; ^aFor these analyses, social grade was considered a continuous measure ranging from 1 (lowest social grade) to 5 (highest social grade).

Table 3. Tetrachoric correlations between the three different measures of motivation

	Desire to quit	Intention to quit	Duty to quit
Desire to quit	-	.341**	.204**
Intention to quit	.341**	-	.143**
Duty to quit	.204**	.143**	-

Note: Tetrachoric correlations are equivalent to Pearson correlations except that they involve dichotomous data; * $p < .05$; ** $p < .01$; *** $p < .001$

Table 4. Bivariate associations of the three motivational measures with quit attempts made at three- and six-month follow-up

	Quit attempts - 3 months		Quit attempts - 6 months	
	OR	95% CI	OR	95% CI
Intention to quit smoking soon	2.50***	1.87-3.35	2.04***	1.44-2.90
Number of cigarettes smoked per day	n.a.	n.a.	.99	.97-1.01
Gender	n.a.	n.a.	n.a.	n.a.
Desire to quit smoking	2.14***	1.61-2.83	2.08***	1.49-2.89
Number of cigarettes smoked per day	n.a.	n.a.	.99	.97-1.01
Gender	n.a.	n.a.	n.a.	n.a.
Duty to quit smoking	.81	.61-1.07	.90	.66-1.22
Number of cigarettes smoked per day	n.a.	n.a.	.99	.97-1.01
Gender ^a	n.a.	n.a.	n.a.	n.a.

Table 5. Independent predictive value of the three motivational measures regarding quit attempts made at three- and six-month follow-up

	Quit attempts - 3 months		Quit attempts - 6 months	
	OR	95% CI	OR	95% CI
Intention to quit smoking soon	2.15***	1.57-2.96	1.97***	1.43-2.71
Desire to quit smoking	1.81***	1.33-2.48	1.69**	1.24-2.31
Duty to quit smoking	.64**	.47-.86	.71*	.54-.96
Number of cigarettes smoked per day	n.a.	n.a.	.99	.98-1.01
Gender ^a	n.a.	n.a.	n.a.	n.a.

Note: n.a. = not applicable; *p<.05; **p<.01; ***p<.001; ^aMale respondents formed the reference category.

Table 6. The predictive value of type of motivation regarding quit attempts made at three- and six-month follow-up

	Quit attempts - 3 months		Quit attempts - 6 months	
	OR	95% CI	OR	95% CI
No motivation (reference)	1.00	-	1.00	-
Duty only	.70	.45 – 1.07	.79	.53 – 1.17
Desire only	2.49***	1.54 – 4.05	2.26**	1.37 – 3.74
Intention only	2.94***	1.77 – 4.90	3.27***	1.93 – 5.53
Desire & duty	1.00	.55 – 1.82	1.51	.90 – 2.55
Intention & duty	1.09	.49 – 2.43	1.38	.70 – 2.74
Desire & intention	2.64**	1.48 – 4.71	2.26*	1.15 – 4.42
Desire, intention & duty	3.01***	1.93 – 4.70	2.46***	1.55 – 3.88
Number of cigarettes smoked per day	n.a.	n.a.	1.00	.98 – 1.01
Gender ^a	n.a.	n.a.	n.a.	n.a.

Note: *p<.05; **p<.01; ***p<.001 ; ^aMale respondents formed the reference category.

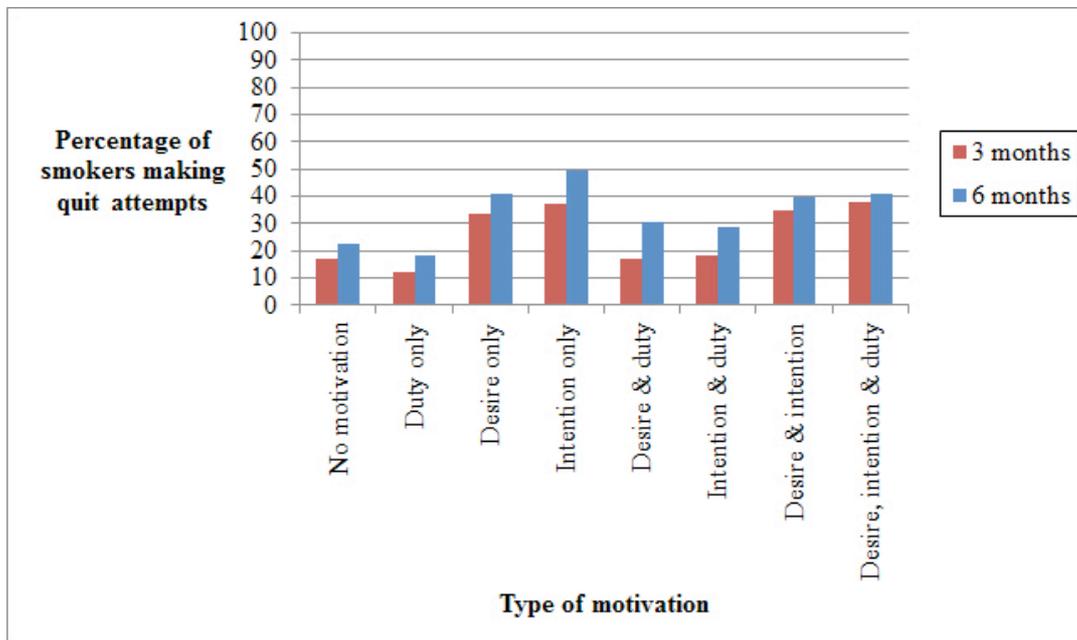


Figure 1. The percentages of smokers who reported having made a quit attempt during the three- and six-month follow-up periods according to their type of motivation to quit at baseline