

# **“Smoking kills” vs. “Smoking makes restless”: Effectiveness of different warning labels on smoking behaviour**

**Sabine Glock<sup>1,\*</sup>, Simone Maria Ritter<sup>2</sup>, Rutger Engels<sup>2</sup>, Ap Dijksterhuis<sup>2</sup>, Rick Bart van Baaren<sup>2</sup>,  
Barbara Caterina Nadine Müller<sup>2,3</sup>**

<sup>1</sup>LCMI Research Unit, University of Luxembourg, Luxembourg, Luxembourg

<sup>2</sup>Behavioural Science Institute, Radboud University Nijmegen, Nijmegen, The Netherlands

<sup>3</sup>Department of Psychology, Ludwig Maximilian University, Munich, Germany

## **Email address:**

sabine.glock@uni.lu (S. Glock), s.ritter@psych.ru.nl (S. M. Ritter), r.engels@pwo.ru.nl (R. Engels),

a.dijksterhuis@psych.ru.nl (A. Dijksterhuis), r.vanbaaren@psych.ru.nl (R. B. van Baaren), b.muller@psych.ru.nl (B. C. N. Müller)

## **To cite this article:**

Sabine Glock, Simone Maria Ritter, Rutger Engels, Ap Dijksterhuis, Rick Bart van Baaren, Barbara Caterina Nadine Müller. “Smoking Kills” Vs. “Smoking Makes Restless”: Effectiveness of Different Warning Labels on Smoking Behaviour. *Psychology and Behavioral Sciences*. Vol. 2, No. 5, 2013, pp. 181-187. doi: 10.11648/j.pbs.20130205.12

---

**Abstract:** Warning labels on cigarette packages rely on the negative health aspects of smoking. For smokers, however, smoking is related to positive as well as to negative outcomes. Positive smoking outcomes are shown to be crucial in activating smoking behaviour. Thus, this study compared current health warnings with warning labels contradicting positive outcomes. In a field study, 39 adult smokers were followed over a 5-day period to investigate the effect of the different types of warning labels on actual smoking behaviour. Our results provide evidence that smokers, who received warning labels contradicting positive outcome expectancies, smoked less than smokers, who received current health warnings. Thus, contradicting positive smoking outcomes on cigarette warning labels may be an effective tool in smoking prevention and intervention.

**Keywords:** Smoking, Cigarette Health Warnings, Outcome Expectancies, Cessation

---

## **1. Introduction**

What happens when a smoker experiences a very stressful event? Most likely, the stressful situation activates the urge to smoke, as smoking is believed to reduce stress [1]. This example illustrates the importance to research outcome expectancies, that is, people’s beliefs about the consequences of a particular behaviour and the influence of consequences on behaviour. Outcome expectancies play a crucial role in social cognitive theories, thus suggesting that they determine behaviour [2]. People engage in a certain behaviour when they expect it to result in positive outcomes or to avoid negative outcomes. Therefore people associate a particular behaviour with particular positive consequences and in turn, perform the behaviour to reach those positive consequences [3]. Outcome expectancies develop once the link between positive consequences and the behaviour has been established. The stronger this association, the more likely it is that outcome expectancies

automatically activate the behaviour [4]. This is especially true for addictive behaviours [5,6,7,8]. For example, research on alcohol use has shown that outcome expectancies affect drinking behaviour [9,10,11,12], and weakened positive outcome expectations seem to decrease alcohol consumption [13,14]. Similar findings were found for smoking, as outcome expectancies predict both intentions to smoke and actual behaviour [15]. In the present study, we explored whether these smoking-related outcome expectancies can be used on warning labels in order to influence long-term smoking behaviour.

Smoking is expected to have positive and negative consequences. Particularly when it comes to health consequences, expectancies are predominantly negative [16]. Health risk outcome expectancies are positively related to quitting motivations and smoking behaviour change [6]. Positive outcome expectancies mainly involve social reasons and mood management [16]. Smokers often use smoking to cope with stress and to improve their image by feeling cool or sexy through smoking [16]. These

positive outcome expectancies are more strongly associated with smoking than negative ones and are easily available due to automatic activation [8].

While positive outcome expectancies are not implemented in cigarette warning labels, health risk outcomes and their relation to the motivation to quit smoking are widely used. However, research on the effectiveness of health-related warning labels provided inconsistent results. There is empirical evidence that cigarette health warning labels are effective [17,18], particularly graphic warning labels have shown their effectiveness [19–24]. Smokers reported to smoke less [22], and reported a higher intention to quit [25] because of cigarette health warnings. However, the non-experimental design of these studies makes it impossible to draw firm conclusions about causes and effects of any observed change in smoking behaviour following new labeling laws, since these laws may be accompanied by higher tobacco taxes, advertising restrictions, general economic changes, or any other confounding factors [26,27]. Using experimental designs, a few studies did not provide evidence for the effectiveness of current cigarette health warnings [28–31]. Particularly, current textual and graphic warning labels were found to lead to defensive responses, thereby maybe resulting in unintended behavior. Moreover, graphic warning labels received more attention by smokers [32]; however, those smokers reported more positive cognitive thoughts after confrontation with graphic warnings [32]. This is in line with previous research which has shown, that smokers are unrealistic optimistic concerning the consequences of smoking for their own health [33]. Smokers perceived their own health risk as average even though they smoked at higher rates than the average smoker [34]. Thus, although smokers know about the health consequences of their behaviour and perceive a higher health-risk, they simultaneously deny that their risk is higher than this of an average smoker [35]. This phenomenon is part of a defensive optimism [36] that comes into play when smokers are confronted with threatening fear arousing messages. Fear appeals often lead to defensive responses and reduce the intention to change the behaviour [37]. Particularly, if smokers do not perceive high self-efficacy to change their behaviour [38], they might respond in a defensive way and might even smoke more than before confrontation with fear-arousing messages [38]. Current cigarette health warning labels can be considered fear appeals [31], thus trying to motivate people to engage in protective actions [39]. However, a recent meta-analysis on fear appeals only found one study which investigated the influence of fear appeals on smoking behaviour [38]. Thus, there is only sparse research investigating the influence of current warning labels on smoking behaviour.

Outcome expectancies also play a crucial role in comprehensive models of drug use [40]. Particularly, positive outcome expectancies are suggested to be more strongly linked to the behaviour [8,41]. It has been shown

that people experience extremely positive consequences of drug-use behaviour [42]. Negative outcome expectancies, in turn, are only weakly associated with the behaviour and it has been shown, for alcohol consumption, that people expect to drink more frequently and at higher rates to experience negative consequences [43] compared to their own drinking behaviour.

While negative outcome expectancies such as the health risks of smoking might contribute to the behaviour, positive outcome expectancies seem to activate the behaviour. For instance, smokers may smoke a cigarette because they believe smoking would relax them. Although positive outcome expectancies are crucial when starting, establishing, and maintaining smoking [44], and play a pivotal role after relapse [45], many of them are illusory. Smokers may feel that smoking is relaxing and improves their concentration, but instead, smoking increases blood pressure [46], and thus decreases relaxation and concentration. Even though these positive outcome expectancies are used to justify the behaviour, they are not yet considered when it comes to cigarette warnings.

Thus, the two kinds of outcome expectancies might be useful as warning labels. Negative outcome expectancies are already implemented in current health warnings, as negative outcomes mainly refer to the health-damaging aspects of smoking. The positive outcome expectancies might also be applied, as they entail the reasons why people smoke [16]. Because positive outcome expectancies refer to positive consequences of smoking, warning labels implementing positive outcomes should contradict those outcomes and turn them into negative. They should illustrate that those positive smoking outcomes do not exist.

A recent study has shown that warning labels contradicting positive alcohol-related outcomes expectancies have changed implicit attitudes toward alcohol into more negative ones [47], while warning labels focusing on health-damaging aspect of alcohol consumption resulted in more positive implicit attitudes [47]. Moreover, warning labels contradicting positive outcome expectancies lowered drinking intentions and the perception of positive alcohol-related outcome expectancies [47]. In line with this research, there is also a first support for the effectiveness of contradicting positive smoking outcome expectancies [48]. However, a control condition using current health-related cigarette warnings was missing in this research. Therefore, the aim of the present study was to investigate which kind of warning labels are more effective in affecting real smoking behaviour. The present study extends this line of research by testing the contradicting positive outcomes warning labels and their influence on smoking behaviour over a 5-day period in a naturalistic setting. We predicted that [1] smokers smoke less when confronted with cigarette warnings contradicting positive outcomes than smokers who were confronted with cigarette health warnings, and that [2] smokers smoke less than before when confronted with warnings contradicting positive outcomes.

## 2. Method

### 2.1. Participants and Design

Thirty-nine smokers (16 male) participated in this study; their age range was 21-73 ( $M = 36.85$ ,  $SD = 14.12$ ). All participants were daily smokers: 10.3% smoked 5-10 cigarettes/day, 17.9% 11-15 cigarettes/day, 35.9% 16-20 cigarettes/day, and 35.9% 20-50 cigarettes per day. Participants gave verbal consent to participate in this study, and were informed that they could stop participation at any

time. The two groups were checked for differing personal characteristics; no significant differences were found (Table 1).

Participants were recruited on the street by using flyers, and they had the possibility to win a 50 € coupon.

A 2 (warning labels: positive warnings vs. health warnings) x 6 (time: pre-measure vs. day 1 to 5) mixed design was used, with warning label as between-subjects factor, and time as within-subjects factor. The number of cigarettes smoked per day was the dependent variable.

**Table 1.** Mean Scores, standard deviations, and percentages on personal characteristics

	Positive Outcomes (N = 20)		Negative Outcomes (N = 19)		Effects
	Mean	Standard Deviation	Mean	Standard Deviation	
Age	38.10	14.80	35.52	13.65	$F(1,37) < 1$ , <i>n.s.</i>
Attempts to give up smoking	1.55	1.19	1.68	1.29	$F(1,37) < 1$ , <i>n.s.</i>
Intention to quit (yes answers)	15% (N = 3)		26% (N = 5)		$\chi^2(1) = .77$ , <i>n.s.</i>

### 2.2. Procedure and Materials

As a cover story, participants were told that this was a marketing study about the taste of cigarettes. One day before the experiment started, participants were asked to answer some questions concerning personal characteristics (sex, age, educational background), and information about their smoking behaviour (how long they smoked, how many cigarettes they smoked on average per day, attempts to give up smoking). Moreover, they were asked to indicate what brand of cigarettes they usually smoked. 17 people normally smoked a different cigarette brand than the brand they received in the current study (Marlboro red cigarettes). Participants received five cigarette packs, and a diary containing five short questionnaires for the following five days (Monday until Friday). These questions concerned whether participants read the message on the pack (yes/no-answer), and how many cigarettes they smoked during the day. Participants were asked to answer the questions every evening after their last cigarette of the day. Participants got the instruction to continue smoking as they were used to, and to use their own cigarettes, in case they smoked more than a pack a day.

In the health warnings condition, participants received cigarette packs with textual warning labels commonly used in Germany. Fifteen different warning labels were used. Each participant randomly received five different warnings on five different packs. In the positive warnings condition, these warning labels were replaced by warning labels contradicting social consequences and coping-related outcomes of smoking (as used in Glock, Unz, et al., 2012). For instance, we used arguments like “Smoking makes unpopular”, or “Smoking makes nervous”. We copied the

format of the health warning labels to create 15 packs with positive outcomes warning labels. The five packs each participant received contained five different warnings. Participants were randomly assigned to one of the two conditions.

On the last day of the study, participants were asked to answer some final questions. These addressed whether participants noticed something particular during the study, whether they had any ideas what the study was about, and whether they thought the manipulation had an influence on their smoking behaviour. After participants handed in the diary and the last questionnaire, they were thanked for their participation and debriefed.

### 2.3. Results

None of the participants indicated that they knew what the study was about, or that they thought that the messages on the packs affected their smoking behaviour.

First, we checked if participants had the impression that their smoking behaviour during the experiment differed from their normal smoking behaviour. A  $\chi^2$ -test was done to compare this score (yes/no-answers) between the two conditions (positive warnings vs. health warnings); no significant differences were found,  $\chi^2_1 = .76$ ,  $p = .382$ .

A 2 (warning labels: positive vs. health warnings) x 6 (time: pre-measure vs. day 1 to 5) mixed ANOVA with repeated measures on the last factor was conducted to test whether participants in the positive outcomes condition smoked less than participants in the health warnings condition. A linear effect was found between time and warning labels,  $F(1,37) = 5.74$ ,  $p = .022$ ,  $\eta^2_p = .13$  (see Table 2 for all means and one-sided simple effect tests).

**Table 2.** Smoking Behaviour as a function of warning labels

	Positive Outcomes (N = 20)		Negative Outcomes (N = 19)		Effects
	Mean	Standard Deviation	Mean	Standard Deviation	
Premeasure	18.50	6.22	21.42	8.73	$t(37)=1.21, p=.24$
Day 1	18.55	6.25	20.74	9.32	$t(37)=1.26, p=.20$
Day 2	17.65	6.94	22.84	14.06	$t(37)=1.47, p=.08, d=0.47$
Day 3	18.55	6.02	23.11	12.24	$t(37)=1.49, p=.07, d=0.47$
Day 4	17.20	6.55	23.00	10.94	$t(37)=1.76, p=.03, d=0.64$
Day 5	17.80	6.78	22.39	9.07	$t(37)=1.80, p=.04, d=0.58$

The positive and the health warnings group did not differ on the pre-measurement and on day one. A trend was observed for day two and three. On both days, participants in the positive warnings condition smoked less than participants in the health warnings condition. Furthermore, this trend was significant for day four and five, as participants in the positive warnings condition smoked less than participants in the health warnings condition.

There were no main effects for time,  $F < 1$ , n.s., or warning labels,  $F(1,37) = 2.39$ ,  $p = .131$ ,  $\eta^2_p = .06$ .

We examined whether participants in the positive warnings condition read the warning labels more often than participants in the health warnings condition, which was indicated every day by answering a yes/no-question. A sum score was calculated of how often participants in each group read the messages on the pack (yes-answer=1, no-answer=0). A (positive vs. health warnings) ANOVA was conducted with the sum score as dependent variable. Participants in the positive warnings condition read the messages more often during the five days ( $M = 3.10$ ,  $SD = 2.00$ ) than participants in the health warnings condition ( $M = 1.42$ ,  $SD = 1.54$ ),  $F(1,37) = 8.58$ ,  $p = .006$ ,  $\eta^2_p = .19$ . To control for this fact, we conducted a 2 (warning labels)  $\times$  6 (time) repeated measures ANCOVA, with the reading sum score as covariate. A linear effect was found for time,  $F(1,35) = 3.44$ ,  $p = .07$ ,  $\eta^2_p = .09$ . Furthermore, an interaction was found between time and the reading score,  $F(1,35) = 4.58$ ,  $p = .039$ ,  $\eta^2_p = .12$ . Most importantly, the interaction between warning labels and time was still marginally significant,  $F(1,35) = 3.03$ ,  $p = .09$ ,  $\eta^2_p = .08$ , suggesting that the effect is not solely based on the fact that participants read the messages more in the positive warnings group.

### 3. Discussion

This experimental study was conducted in a naturalistic setting to investigate the effectiveness of health warnings versus warning labels contradicting positive outcome expectancies in affecting daily smoking. The results show first evidence that smokers who received the contradicting warning labels smoked less than smokers who received the health warning labels. Thus, these results extend previous

research on the use of positive outcome expectancies as warning labels [48], as over the duration of five days, positive outcome warnings were more effective in influencing smoking behaviour than health warnings. However, smoking within the positive warnings group was not reduced, which might have several reasons.

First, Glock and colleagues [48] used a college sample and the positive outcomes, which were contradicted in the warnings, derived from a college aged sample. Therefore the mixed age non-college sample, used in the present study, might have held other positive outcome expectancies than the college aged smokers. Thus, future research should ask for outcome expectancies when taking non-college smokers into account to create warning labels that contradict positive outcome expectancies that are representative of the whole smoking population. Nevertheless, the present study provided first evidence for the positive warnings having more influence on smoking behaviour than the current health warnings.

Second, as smoking behaviour in the health warning labels group tended to increase from the pre-measurement to Day 5, it might also be that defensive responses have occurred. The questions in the diary might have directed the participants' attention toward the current health warnings, thus leading to a deeper processing of the warnings compared with their usual habit, which might not include looking and reading the warnings on the packs. Those fear arousing messages might indeed lead to higher smoking rates [38].

Two aspects should be pointed out: Firstly, despite the sample being rather small the study was conducted in a naturalistic setting. The participants lived and smoked as they were used to. The only exception was that they smoked cigarettes from the brand that was provided to them by the experimenter rather than their usual brand. Moreover, there were none of the artificial conditions that can often be encountered in experimental labs. Hence, the results approximate real smoking behaviour. Secondly, due to the sample not only including college aged participants but the age of the participants ranging up to 73 years, these findings might be more generally applicable than results from college aged smokers. Future research should further explore the effectiveness of warning labels contradicting

positive outcomes, as well as more experimental measures such as smoking-related cognitions or feelings related to the perception of warning labels.

Nevertheless, in interpreting the results, some limitations should be kept in mind. First, smoking behaviour was assessed via self-reports. This is critical, as smokers might tend to minimize the actual number of cigarettes smoked. Furthermore, self-reports are susceptible to biases through social desirability [49]. Future research should try to assess smoking behaviour more objectively via the instruction to bring back the packs and counting the remaining cigarettes or via observation of smokers' behaviours [50]. Second, our study is limited due to the applied methodology. This study was a field study with an experimental design. However, in order to ensure the naturalistic setting of the study, variables which can be controlled for in experimental settings did not remain under control. For instance, we did not know whether our participants experienced critical life-events during the five days. Those life-events might have contributed to the number of cigarettes they smoked. However, investigating the influence of warning labels over days does not allow experimentally controlling participants' environment. In addition, one could argue that our participants smoked more than usual because we provided them with free cigarette packs. However, these higher smoking rates should have been observable in both warning labels groups which participants have been randomly allocated to. Thus, in case that free packs increased the number of smoked cigarettes this fact could not have influenced our findings, as each experimental condition was prone to higher smoking rates.

Additionally, the contradicting warning labels are novel and smokers are not used to read about negative social and coping-related smoking outcomes. Although our analysis using the reading measure as a covariate did not substantially change our results, novel [51] and negative social information [52] are attention grabbing and more likely to be intensely processed than other information. This might contribute to the effectiveness of the new warning labels. However, significant differences only emerged after two days, implying that smoking habits overwhelm the effect of new warnings. Nonetheless, a study comparing warning labels contradicting positive alcohol-related outcome expectancies with health-related warning labels has shown that only the positive warning labels were able to influence college students in the intended direction [47]. Those warning label types have both been new for the participants, as there are no warning labels on alcoholic beverage containers introduced in Germany. Nevertheless, future research should consider prolonging the testing period in order to disrupt participants' habits, even though a habituation effect could emerge. Repeated exposure to the contradicting warning labels could tap into the question of whether their effectiveness is due their attention-grabbing power deriving from novelty [51] or from inherent negative social information [52]. Effectiveness due to inherent negative

social information would suggest that repeated exposure would contribute less strongly to losses than effectiveness due to novelty. Future research should also compare these new warnings with new health-related warning labels, thus ruling out the confounding novelty factor.

However, the use of positive outcome expectancies as warning labels seems to be valuable in changing the association between outcomes and behaviour, thereby influencing smoking behaviour. Thus, adding those warnings to current health warnings might be useful in smoking prevention and intervention. Current health warnings are important to inform smokers about their health risks [24], but they might lead to defensive responses [31,53] because they lack important messages to increase efficacy [38]. A combination of health and contradicting positive outcomes warning labels might be an appropriate way to create effective warning labels. As positive and negative outcome expectancies predict intentions to smoke and actual behaviour [6], informing smokers about the illusory content of these expectancies together with informing them about the health consequences suggests being an effective tool.

---

## References

- [1] T. B. Baker, T. H. Brandon, and L. Chassin, "Motivational influences on cigarette smoking", *Annual Review of Psychology*, vol.55, pp. 463–91, 2004
- [2] A. Bandura, "Social learning theory", Prentice Hall: Englewood-Cliffs, NJ, 1977.
- [3] H. Aarts and A. Dijksterhuis, "Habits as knowledge structures: Automaticity in goal-directed behavior." *Journal of Personality and Social Psychology*, vol. 78, pp. 53–63, 2000.
- [4] J. A. Bargh and M. J. Ferguson, "Beyond behaviorism: On the automaticity of higher mental processes", *Psychological Bulletin*, vol. 126, pp.925–945, 2000.
- [5] T. H. Brandon and T. V. Baker, "The smoking consequences questionnaire: The subjective expected utility of smoking in college students", *Psychological Assessment: A Journal of Consulting and Clinical Psychology*, vol. 3, pp. 484–490, 1993.
- [6] A. L. Copeland and T. H. Brandon, "Testing the causal role of expectancies in smoking motivation and behavior", *Addictive Behaviors*, vol. 25, pp. 445–449, 2000.
- [7] A. Jaffe A and M. M. Kilbey, "The cocaine expectancy questionnaire (CEQ): Construction and predictive utility", *Psychological Assessment*, vol. 6, pp. 18–26, 1994
- [8] B. C. Rather, M. S. Goldman, L. Roehrich L and M. Brannick, "Empirical modeling of an alcohol expectancy memory network using multidimensional scaling", *Journal of Abnormal Psychology*. vol. 101, pp. 174–183, 1992.
- [9] J. A. Cranford, R. A. Zucker RA, J. Jester J, L. I. Puttler and H. E. Fitzgerald, "Parental alcohol involvement and adolescent alcohol expectancies predict alcohol involvement in male adolescents", *Psychology of Addictive Behaviors*,

- vol. 24, pp.386–396, 2010.
- [10] M. S. Goldman, S. A. Brown, B. A. Christiansen and G. T. Smith, "Alcoholism and memory: Broadening the scope of alcohol-expectancy research", *Psychological Bulletin*, vol. 110, pp. 127–146, 1991
  - [11] M. S. Goldman, S. A. Brown and B. A. Christiansen, "Expectancy theory: Thinking about drinking". In: H. T. Blane and K. E. Leonard, editors, "Psychological theories of drinking and alcoholism" Guilford Press New York, pp. 181–226, 1987.
  - [12] A. W. Stacy AW, K. E. Widaman and G. A. Marlatt, "Expectancy models of alcohol use", *Journal of Personality and Social Psychology*, vol. 58, pp. 918–928, 1990.
  - [13] C. Lau-Barraco and M. E. Dunn, "Evaluation of a single-session expectancy challenge intervention to reduce alcohol use among college students", *Psychology of Addictive Behaviors*, vol. 22, pp. 168–175, 2008.
  - [14] M. E. Dunn, H. C. Lau and I. Y. Cruz, "Changes in activation of alcohol expectancies in memory in relation to changes in alcohol use after participation in an expectancy challenge program", *Experimental and Clinical Psychopharmacology*, vol. 8, pp. 566–575, 2000.
  - [15] T. H. Brandon, L. M. Juliano LM and A. C. Copeland, "Expectancies for tobacco smoking". In: I. Kirsch, editor, "How expectancies shape experience", American Psychological Association: Washington, DC, pp. 263–299, 1999.
  - [16] P. S. Hendricks and T. H. Brandon, "Smoking expectancy associates among college smokers". *Addictive Behaviors*, vol. 30, pp. 235–245, 2005.
  - [17] R. Borland and D. Hill, "Initial impact of the new Australian tobacco health warnings on knowledge and beliefs", *Tobacco Control*, vol. 6, pp. 317–325, 1997.
  - [18] M. C. Willemsen, "The new EU cigarette health warnings benefit smokers who want to quit the habit: Results from the Dutch Continuous Survey of Smoking Habits". *European Journal of Public Health*, vol. 15, pp. 389–92, 2005.
  - [19] R. Borland, H.-H. Yong, N. Wilson, G. T. Fong, D. Hammond, K. M. Cummings, et al., "How reactions to cigarette packet health warnings influence quitting: Findings from the ITC Four-Country survey". *Addiction*, vol. 104, pp. 669–675, 2009.
  - [20] R. Borland, N. Wilson, G. T. Fong, D. Hammond, K. M. Cummings, H.-H. Yong, et al., "Impact of graphic and text warnings on cigarette packs: Findings from four countries over five years", *Tobacco Control*, vol. 18, pp. 358–364, 2009
  - [21] D. Hammond, G. T. Fong, A. McNeill, R. Borland, and K. M. Cummings, "Effectiveness of cigarette warning labels in informing smokers about the risks of smoking: Findings from the International Tobacco Control (ITC) Four Country Survey", *Tobacco Control*, vol. 15, pp. 19–25, 2006.
  - [22] D. Hammond, P. W. McDonald, G. T. Fong, K. S. Brown, and R. Cameron, "The impact of cigarette warning labels and smoke-free bylaws on smoking cessation", *Canadian Journal of Public Health*, vol. 95, 201–204, 2004.
  - [23] M. O'Hegarty, L. L. Pederson, D. E. Nelson, P. Mowery, J. M. Gable and P. Wortley, "Reactions of young adult smokers to warning labels on cigarette packages", *American Journal of Preventive Medicine*, vol. 30, pp. 467–473, 2006.
  - [24] E. J. Strahan, K. White, G. T. Fong, L. R. Fabrigar, M. P. Zanna, and R. Cameron, "Enhancing the effectiveness of tobacco package warning labels: a social psychological perspective", *Tobacco Control*, vol. 11, pp. 183–190, 2002.
  - [25] D. Hammond D, G. T. Fong, P. W. McDonald, R. Cameron, and K. S. Brown, "Impact of the graphic Canadian warning labels on adult smoking behavior", *Tobacco Control*, vol. 12, pp. 391–395, 2003.
  - [26] G. Mahood, "Canada's tobacco package label or warning system: Telling the truth about tobacco product risks", World Health Organization: Geneva, Switzerland, 2004.
  - [27] J. Whittingham, R. A. C. Ruiter, F. Zimbile F and G. Kok, "Experimental pretesting of public health campaigns: A case study", *Journal of Health Communication*, vol. 13, pp. 216–229, 2008.
  - [28] D. M. Erceg-Hurn, and L. G. Steed, "Does exposure to cigarette health warnings elicit psychological reactance in smokers?", *Journal of Applied Social Psychology*, vol. 41, pp. 219–237, 2011.
  - [29] B. C. N. Müller, S. M. Ritter, S. Glock, R. B. van Baaren, R. C. M. E. Engels, and A. Dijksterhuis, "Smoking related warning messages formulated as questions influence short-term smoking behaviour". Manuscript submitted for publication, 2013.
  - [30] L.-E. Petersen, and F. Lieder, [On the effectivity of textual and graphical warning labels on cigarette packages]"Die Effektivität von schriftlichen und graphischen Warnhinweisen auf Zigarettenschachteln", *Zeitschrift für Sozialpsychologie*, vol. 37, pp. 245–258, 2006.
  - [31] S. Glock, and J. Kneer, "Are deterrent pictures effective? The impact of warning labels on cognitive dissonance in smokers", *Applied Psychology: Health and Well-Being*, vol. 1, pp. 356–373, 2009.
  - [32] P. Süssenbach, S. Niemeier, and S. Glock, "Effects of and attention to graphic warning labels on cigarette packages", *Psychology & Health*, Available from: <http://www.tandfonline.com/doi/abs/10.1080/08870446.2013.799161>, 2013.
  - [33] N. D. Weinstein, S. E. Marcus, and R. P. Moser, "Smokers' unrealistic optimism about their risk", *Tobacco Control*, vol. 14, pp. 55–59, 2005.
  - [34] A. Hahn, and B. Renner, "Perception of health risks: How smoker status affects defensive optimism", *Anxiety, Stress, and Coping*, vol. 11, pp. 93–112, 1998.
  - [35] C. McMaster, and C. Lee, "Cognitive dissonance in tobacco smokers", *Addictive Behaviors*, vol. 16, pp. 349–353, 1991.
  - [36] R. Schwarzer, "Optimism, vulnerability, and self-beliefs as health-related cognitions: A systematic overview", *Psychology and Health*, vol. 9, pp. 161–180, 1994.
  - [37] A. Good, and C. Abrahams, "Measuring defensive responses to threatening messages: A meta-analysis of measures", *Health Psychology Review*, vol. 1, pp. 208–229, 2007.
  - [38] G.-J.Y. Peters, R. A. C. Ruiter, and G. Kok, "Threatening

- communication: A critical re-analysis and a revised meta-analytic test of fear appeal theory" *Health Psychology Review*, Available from: <http://www.tandfonline.com/doi/abs/10.1080/17437199.2012.703527>, 2012.
- [39] R. W. Rogers, "Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection motivation", In: J. T. Cacioppo and R. E. Petty, editors "Social psychophysiology: A sourcebook", Guilford Press: New York, pp. 153–176, 1993.
- [40] S. T. Tiffany, "A cognitive model of drug urges and drug-use behavior: Role of automatic and nonautomatic processes", *Psychological Review*, vol. 97, pp. 147–168, 1990.
- [41] B. C. Leigh, A. W. Stacy. Individual differences in memory associations involving the positive and negative outcomes of alcohol use. *Psychology of Addictive Behaviors*. 1998;12:39–46.
- [42] C. K. Park, "Positive and negative consequences of alcohol consumption in college students", *Addictive Behaviors*, vol. 29, pp. 311–321, 2004.
- [43] K. Fromme, E. A. Stroot, and D. Kaplan, "Comprehensive effects of alcohol: Development and psychometric assessment of a new expectancy questionnaire. *Psychological Assessment*, vol. 5, pp. 19–26. 1993.
- [44] K. P. Mayhew, B. R. Flay, and J. A. Mott, "Stages in development of adolescent smoking", *Drug and Alcohol Dependence*, vol. 59, pp. 61–81, 2000.
- [45] S. L. Kenford, S. S. Smith, D. W. Wetter, D. E. Jorenby, M. C. Fiore, and T. B. Baker, "Predicting relapse back to smoking: Contrasting affective and physical models of dependence". *Journal of Consulting and Clinical Psychology*, vol. 70, pp. 216–227, 2002.
- [46] A. Gropelli, D. M. Giorgi, S. Omboni, G. Parati, and G. Mancina, "Persistent blood pressure increase induced by heavy smoking", *Journal of Hypertension*, vol. 10, pp. 495–449, 1992.
- [47] S. Glock, and S. Krolak-Schwerdt, "Changing outcome expectancies, drinking intentions, and implicit attitudes toward alcohol: A comparison of positive expectancy-related and health-related alcohol warning labels", *Applied Psychology: Health and Well-Being*, 2013.
- [48] S. Glock, D. Unz, and C. Kovacs, "Beyond fear appeals: Contradicting positive smoking outcome expectancies to influence smokers' implicit attitudes, perception, and behavior". *Addictive Behaviors*, vol. 37, pp. 548–551, 2012.
- [49] J. de Houwer, "What are implicit measures and why are we using them?" In: R. W. Wiers, and A. W. Stacy, editors, "The handbook of implicit cognition and addiction", Sage Publisher: Thousand Oaks, CA, pp. 11–28, 2006.
- [50] Z. Harakeh, R. C. M. E. Engels, R. B. van Baaren, and R. H. J. Scholte, "Imitation of cigarette smoking: An experimental study on smoking in a naturalistic setting", *Drug and Alcohol Dependence*, vol. 86, pp. 199–206, 2007.
- [51] P.M. Fisher, D. M. Krugman, J. E. Fletcher, R. J. Fox, T. H. Rojas, and P. M. Fischer, "An evaluation of health warnings in cigarette advertisements using standard market research methods: What does it mean to warn?" *Tobacco Control*, vol. 2, pp. 279–285, 1993.
- [52] F. Pratto, and O. P. John, "Automatic vigilance: The attention-grabbing power of negative social information", *Journal of Personality and Social Psychology*, vol. 61, pp. 380–91, 1991.
- [53] S. Glock, B. C. N. Müller, and S. Ritter, "Warning labels formulated as questions positively influence smoking-related risk perception", *Journal of Health Psychology*, vol. 18, pp. 252–262, 2013.