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(10) G/7 - drugs & or tobacco

(11) blank/doesn't say, pg 951

(12) att (1), pg 952

(13) att (1), pg 952

(14) Not (0), pg 951 but inferred

(15) Self-ref (1), pg 951, but inferred

(16) mill. (0), pg 952

(17) words (0), pg 952 & 960

(18) one (1), pg 952

(19) 2

(20) 1

(21) 0

(22) 0

(23) 0

(24) same (0)

(25) same (0)

(26) sd - (4), p 952

(27) sd - (4), p 952

(28) con - (5.5), p

(29) spec - (3), p

(30) spec (3), p

(31) comp (2), p 952

(32) Not (0), p 949 ← inferred

(33) dual (2), p 952 ✓

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**ADDICTIVE
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Implicit and explicit attitudes toward smoking in a smoking and a nonsmoking setting[☆]

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Abstract

To test whether global smoking attitudes may be a driving factor in smoking behavior, Experiment 1 assessed smoking associations with the Implicit Association Test (IAT). Although smokers' attitudes ($N=24$) were less negative than those of nonsmokers ($N=24$), both displayed negative associations with smoking. To test whether these findings may be an artifact of measurement setting and/or the indirect measure that was used, Experiment 2 assessed attitudes in a smoking ($N=20$) or a nonsmoking setting ($N=20$) using the IAT and an Affective Simon Task. In both settings, negative attitudes emerged, suggesting that global (implicit) attitudes may be a moderating rather than a driving factor in smoking behavior.

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1. Introduction

Several theorists have argued that people's attitudes may be an important determinant of unhealthy behaviors, like smoking (e.g., Ajzen, 2001). From such a perspective, one would

[☆] The experiment reported in this paper was conducted at the Department of Medical, Clinical, and Experimental Psychology, Maastricht University, The Netherlands.

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yield a different response (Bouton, 2002). An (learned) association with contextual cues may thus define the relevance of an attitude and thereby the accessibility of that particular attitude (see also Dols, van den Hout, Kindt, & Willems, 2002 for an application of this rationale on craving). In line with this, it has been shown that participants who were deprived of nicotine and exposed to smoking cues generated more positive characteristics of smoking within a fixed time span than smokers in a noncued condition (e.g., Sayette & Hufford, 1997). Following this, it might well be that the previously found negative attitude towards smoking may have been due to the actual measurement setting. Inasmuch as it is clearly prohibited to smoke in a lab, smoking-relevant attitudes may not have been triggered and/or rendered inaccessible (see for a similar argument for alcohol Wall, McKee, Hinson, & Goldstein, 2001).

To explore these important issues, two experiments were designed. As a first step, Experiment 1 aimed to assess whether the findings of Swanson et al. (2001) were replicable in a Dutch student sample. Experiment 2 was designed to explore to what extent the type of measurement instrument and the setting in which attitudes were assessed may have influenced the previous results. One way to circumvent the interpretational problems associated with the contrast category used in the IAT is to use a neutral contrast (cf. De Houwer, 2002; de Jong, Pasman, Kindt, & van den Hout, 2001; de Jong, van den Hout, Rietbroek, & Huijding, 2003). Therefore, we adapted the IAT accordingly. Another strategy would be to use a nonrelative measure of automatic associations rather than the IAT. Therefore, we supplemented the IAT with the Affective Simon Task (AST; De Houwer & Eelen, 1998, for a description, see below). To assess the influence of measurement setting, attitudes were assessed in a neutral lab setting, comparable to the ones used in previous research, and a naturalistic smoking setting. We expected smokers to display positive attitudes toward smoking on both indirect measures and that more positive implicit attitudes would emerge (i.e., are more accessible) in the naturalistic smoking setting than in the nonsmoking lab setting.

2. Experiment 1

2.1. Method

2.1.1. Participants

Twenty-four smoking (15 female) and 24 nonsmoking (17 female) students from Maastricht University (mean age=21.2, S.D.=2.0) participated in return for a chocolate bar. One participant's data were discarded because of his ex-smoking status.

2.2. Materials

2.2.1. Implicit association test

The IAT is a computerized reaction time task that measures to what extent two target categories are associated with two attribute categories. Participants were instructed to sort

stimulus words as fast as possible to the appropriate superordinate category using the P or the Q on a keyboard. The target categories were smoking and exercise, and the attribute categories were pleasant and unpleasant. Each category consisted of 10 exemplar stimuli (see Appendix A). The IAT consisted of five phases: (1) practice sorting target stimuli to the target categories (smoking vs. exercise); (2) practice sorting attribute stimuli to the attribute categories (pleasant vs. unpleasant); (3) critical combined sorting of all stimuli to both the target and the attribute categories; (4) practice sorting target stimuli with reverse response requirements; (5) critical combined sorting with reversed response requirements for the target. In general, responses tend to be faster when the two categories that share a response key in the combined phases are somehow associated than when they are not. The difference in reaction times (RTs) between phase 3 and 5 reflects whether smoking is associated more strongly with pleasant or unpleasant, relative to the extent to which exercise is associated with either attribute category.

After an incorrect response, the word 'fault' appeared on the screen until the correct answer was given. A 3000-ms response window was used, after which an error was registered. A 250-ms stimulus interval was used. All 10 exemplar stimuli of each category were presented four times in each block. The target–attribute combinations that shared response keys were counterbalanced (i.e., block order) as well as the sequence of target and attribute stimuli presentation.

2.2.2. Semantic differential

Participants completed a set of eight semantic differential items for each target concept (smoking and exercise) as an explicit attitude measure. Each item consisted of a polar-opposite adjective pair divided on a seven-point scale (see also Swanson et al., 2001). The pairs were good–bad, healthy–unhealthy, sexy–unsexy, pleasant–unpleasant, harmless–harmful, sociable–unsociable, ugly–glamorous, and calming–stressful.

2.3. Procedure

Participants were tested individually. They started with the semantic differentials and then completed the IAT.

3. Results

3.1. Implicit association test

For the two critical phases, mean reaction times (RTs) are shown in Fig. 1. A 2 Concept (smoking, exercise) \times 2 Smoking status (smoker, nonsmoker) ANOVA showed a main effect for Concept, $F(1,30)=125.9$, $p<.01$, indicating that, relative to exercise, participants associated smoking overall stronger with negative attributes than with positive attributes. Meanwhile, as can be seen in Fig. 1, a significant interaction between Smoking status and Concept, $F(1,30)=11.4$, $p<.01$, showed that this negative association with smoking was significantly weaker for smokers than for nonsmokers. To get an idea of the strength of

attitudes toward smoking might be important for smoking behavior as a moderating factor. That is, smokers' relatively positive attitudes toward smoking may provide less inhibiting force against other factors that promote smoking behavior.

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Appendix A. Stimulus words for the Implicit Association Test in Experiments 1 and 2 and the Affective Simon Task

17	IAT	Pleasant:	Kindness*, peace*, talent*, success*, joy, sunshine, good, party, warmth, love
		Unpleasant:	Assault*, war*, junk*, failure*, abuse, brutal, filth, bad, slime, vomit
		Smoking:	Tobacco*, smoking*, nicotine*, cigarette*, cigar, smokers, Marlboro, rolling tobacco, ashtray, lighter
		Exercise:	Swimming, diving, sports, aerobics training, running, biking, tennis, athletics, exercise
AST Phase 1	Writing*: Positive:		Page, ink, letter, writing
			Embrace, congratulation, party, friend, joke, gift, friendship, lover, kiss, beauty
AST Phase 2	Negative		Murder, mutilation, strangulation, carrion, slaughter, rape, fracture, execution, threat, disaster
			Cigarette, ashtray, butt, filter cigarette, cigar, lighter, smoker, smoke room
AST Phase 3	Writing: Positive:		Magazine, newspaper, ballpoint, letter, author, text, page, paper
			Friend, vacation, summer, flower, present, wish, rainbow, butterfly
		Negative:	Infection, sadist, corpse, disease, war, funeral, exam, virus

Note: * indicates words that are used in the IAT of Experiment 2.

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