

Opinion piece

Implicit cognition and health psychology: changing perspectives and new interventions.

Reinout W. Wiers, University of Amsterdam

Wilhelm Hofmann, University of Würzburg & University of Amsterdam

One of the major perplexities in health psychology is why people so often engage in behaviors which harm their own health. How can this be, and what can we do about it? For a long time, psychologists embraced the idea that people lack the relevant information, how otherwise could their mental calculus lead them astray? The underlying assumption is that people are rational decision makers in general, and this should also apply when it comes to health-relevant behaviors. As many readers will have noticed, in broader areas of psychology, this assumption has been challenged, and many dual-process models have been proposed. For example, Strack and Deutsch (2004) proposed an influential model in which “rational” and “impulsive” processes jointly predict behavior. The rational system is roughly similar to the system proposed in the theory of reasoned action and related approaches; behavioral decisions are based on knowledge about facts and values. The impulsive system elicits behavior through associative links and motivational orientations. Importantly, the relative influence of both systems differs, both between people and within people. The reason is that the reflective system has a low capacity and is vulnerable to factors like fatigue, emotion, and to substances like alcohol. This, we believe, is a prime reason why many people know about health-risk of alcohol abuse, overeating, smoking, etc., when asked in a neutral context, and still perform these actions when tired, stressed or intoxicated (Hofmann, Friese & Wiers, 2008; Wiers, Houben, et al., 2010).

From our perspective, health behaviors are determined by at least two main factors: the strength of the relevant impulsive processes, and the strength of the relevant reflective processes. In the latter, there are different important aspects, including the *ability* to exert control over impulses, the *motivation* to exert such control, and the relevant beliefs or expected outcomes (Wiers et al., 2007; Wiers, Houben, et al., 2010). In the impulsive system, we distinguish between attentional processes (e.g., smokers often have an attentional bias for cigarette-related cues), memory associations including automatic evaluations, and automatically triggered action tendencies (e.g., a tendency to approach alcohol in heavy drinkers). Hence, if we want to best predict a health behavior, we



Professor Reinout W. Wiers

Department of Psychology, University of Amsterdam, Netherlands.

need an index of both the relevant impulsive processes and the relevant reflective processes. We further assume that the predictive power of both types of processes depends on the person and on the situation (including boundary conditions like fatigue, mood, and alcohol use, see Hofmann et al., 2008; Wiers et al., 2010).

With regard to differences *between* people, we hypothesized that individual differences in the capacity to control cognitive processes (executive control functions, with a central role for working memory) moderate the relative influence of impulsive vs. reflective processes on health behaviors. Specifically, we predicted that markers of associative processes (such as memory associations or automatic evaluations) would be more strongly related to health behaviors in people low in executive control, and that beliefs, expectancies and (explicit) attitudes would be more strongly related to health behaviors in people high in executive control (Wiers et al., 2007). We consistently found this pattern of results, using different measures (both for the relevant associative processes and for the relevant executive control processes), and for a variety of outcome measures, including alcohol use and misuse (Houben & Wiers, 2009; Thush et al., 2008), smoking (Grenard et al., 2008), aggression, sexual interest, eating behavior (Hofmann et al., 2008), and aggression after alcohol (Wiers et al., 2009). For example,

Opinion piece

Implicit cognition and health psychology: changing perspectives and new interventions.

automatically triggered associations predicted alcohol use and problems in youth with limited executive control capacity, whereas expected outcomes and attitudes were better predictors of alcohol use and problems in youth with relatively strong executive control (Houben & Wiers, 2009; Thush et al., 2008). It is also interesting to note that these findings were obtained both in adolescents with low levels of education (Grenard et al., 2008; Thush et al., 2008) and in university students (Hofmann et al., 2008; Houben & Wiers, 2009; Wiers et al., 2009).

In addition to differences between people, there are differences *within* the same person, across different situations or contexts that impact the ratio of impulsive to reflective processing (Hofmann et al., 2008). For instance, there is ample evidence that the reflective system is vulnerable for fatigue (or more specifically, ego depletion), and acute alcohol effects. A large literature shows that acute alcohol effects impair executive control functions and the impact of reflective processes on health behavior. This may be an important reason why, after a couple of drinks, “common sense sometimes goes out of the window” (to quote Tara MacDonald): the same student who knows about the risks of unprotected sex may do this very act after a couple of drinks (for an elaborated discussion, see Wiers, Houben et al., 2010). In addition to undermining the influence of the reflective system on (health) behavioral choices, in heavy drinkers, acute alcohol has the additional effect of eliciting further appetitive processes, including a desire for more alcohol (for a review, see Field, Schoenmakers & Wiers, 2008). Note that also the control over other behaviors may shift from primarily reflective to impulsive processing after a couple of drinks, including sexual behaviors, aggression, and unhealthy eating (see Hofmann & Friese, 2008; Wiers et al., 2010).

What can we do to promote health behaviors from the present perspective? Traditionally, health promoting interventions have primarily aimed at the reflective system, for example, by providing information about healthy behavioral alternatives or increasing motivation. The present perspective can generate new ways to promote health behaviors. Specifically, based on the findings reviewed, we suggest that health promotion approaches may work best if they simultaneously increase the effect of reflective processes *and* decrease or modify in a



Professor Wilhelm Hofmann

University of Würzburg, Department of Psychology, Germany.

University of Amsterdam, Department of Psychology, The Netherlands.

constructive way the influence of impulsive processes, at the *moment supreme*. There are different ways in which the latter could be done. First, new techniques are explored which aim at directly interfering with impulsive processing. For example, an attentional bias for alcohol can successfully be re-trained with positive effects on abstinence in alcoholic patients (Schoenmakers et al., in press), and can reduce problem drinking in community samples (Fadardi & Cox, 2009). Similarly, heavy drinkers' approach bias for alcohol can be re-trained, with (short term) decreased alcohol use as a consequence (Wiers, Rinck, et al., 2010). An alternative strategy is to generate associative processes that promote healthy rather than unhealthy choices. In other words, to try to let the associative processes (which will primarily guide our health behaviors in moments of weakness), steer us to the healthy alternative. This can be done, for instance, by forming implementation intentions, that is, if-then statements that are automatically activated through associative processes (e.g., “If the waiter asks me for a drink, I will order non-alcoholic beer”, for the driver or “If I have drunk an alcoholic drink, I will order a water next, for the moderate drinker who wants to prevent a binge). Implementation intentions can help us to choose the healthy behavioral alternative, as long as unhealthy habits are not too strong, which can be the case in addictive behaviors (Webb, Sheeran, & Luszczynska,

Opinion piece

Implicit cognition and health psychology: changing perspectives and new interventions.

2009).

In addition to the traditional ways to influence the reflective system, by providing information and by increasing motivation for healthy alternatives, there may also be ways to train executive control functions, so that the influence of the reflective system can be enhanced (and the influence of the impulsive system suppressed). This can be done either in a general way by training executive control capacity, as has successfully been done in hyperactive children (Klingberg et al., 2005), or in a more domain-specific way which we are exploring at the moment. In our view, both the more basic work on direct ways to influence impulsive and reflective processes in health behaviors as well as practical applications are exciting topics of new research. Interestingly, many of these approaches can be done over the Internet, which may give a new dimension to the emerging field of e-health interventions (which so far primarily aimed at reflective processes).

In summary, we have argued that health-relevant behaviors are predicted by the joint outcomes of impulsive and reflective processes. The relative influence of both varies across individuals as well as within individuals from situation to situation. This dynamic view may explain why many well informed and seemingly reasonable individuals (e.g., health psychologists), in certain situations (e.g., at a conference dinner), may engage in unhealthy or risky behaviors such as binge drinking or even dancing on tables. Interventions are now developed which aim to directly address both types of processes, and by doing so to promote health behavior in individuals and situations where impulsive processes easily lead to unhealthy behaviors.

References

- Fadardi, J. S., & Cox, W. M. (2009). Reversing the sequence: reducing alcohol consumption by overcoming alcohol attentional bias. *Drug and Alcohol Dependence*, 101, 137-145.
- Field, M., Schoenmakers, T., & Wiers, R. W. (2008). Cognitive processes in alcohol binges: a review and research agenda. *Current Drug Abuse Reviews*, 1, 263-279.
- Grenard, J. L., Ames, S. L., Wiers, R. W., Thush, C., Sussman, S., & Stacy, A. W. (2008). Working memory capacity moderates the predictive effects of drug-related associations on substance use. *Psychology of Addictive Behaviors*, 22, 426-432.
- Hofmann, W., & Friese, M. (2008). Impulses got the better of me: Alcohol moderates the influence of the impulsive vs. reflective system on eating behavior. *Journal of Abnormal Psychology*, 117, 420-427.
- Hofmann, W., Friese, M., & Wiers, R. W. (2008). Impulsive versus reflective influences on health behavior: a theoretical framework and empirical review. *Health Psychology Review*, 2, 111-137.
- Hofmann, W., Gschwendner, T., Friese, M., Wiers, R. W., & Schmitt, M. (2008). Working memory capacity and self-regulatory behavior: toward an individual differences perspective on behavior determination by automatic versus controlled processes. *Journal of Personality and Social Psychology*, 95, 962-977.
- Houben, K., & Wiers, R. W. (2009). Response inhibition moderates the relationship between implicit associations and drinking behavior. *Alcoholism: Clinical and Experimental Research*, 33, 626-633.
- Klingberg, T., Fernell, E., Olesen, P. J., Johnson, M., Gustafsson, P., Dahlström, K., et al. (2005). Computerized training of working memory in children with ADHD: a randomized, controlled trial. *Journal of American Academy for Child and Adolescent Psychiatry*, 44, 177-186.
- Strack, F., & Deutsch, R. (2004). Reflective and impulsive determinants of social behavior. *Personality and Social Psychology Review*, 8, 220-247.
- Thush, C., Wiers, R. W., Ames, S. L., Grenard, J. L., Sussman, S., & Stacy, A. W. (2008). Interactions between implicit and explicit cognition and working memory capacity in the prediction of alcohol use in at-risk adolescents. *Drug and Alcohol Dependence*, 94, 116-124.
- Webb, T. L., Sheeran, P., & Luszczynska, A. (2009). Planning to break unwanted habits: habit strength moderates implementation intention effects on behaviour change. *British Journal of Social Psychology*, 48, 507-523.
- Wiers, R. W., Bartholow, B. D., van den Wildenberg, E., Thush, C., Engels, R.C.M.E., Sher, K. J., Grenard, J., Ames, S. L., & Stacy, A. W. (2007). Automatic and controlled processes and the development of addictive behaviors in adolescents: A review and a model. *Pharmacology, Biochemistry and Behavior*, 86, 263-283.
- Wiers, R. W., Beckers, L., Houben, K., & Hofmann, W. (2009). A short fuse after alcohol: Implicit power associations predict aggressiveness after alcohol consumption in young heavy drinkers with limited executive control. *Pharmacology, Biochemistry and Behavior*, 93, 300-305.
- Wiers, R. W., Houben, K., Roefs, A., De Jong, P., Hofmann, W., Stacy, A. W. (2010). Implicit Cognition in Health Psychology: Why Common Sense Goes Out of the Window. In: B. Gawronski & K. Payne (Eds.). *Handbook of Implicit Social Cognition*. (pp. 463-488). NY: Guilford.
- Wiers, R. W., Rinck, M., Kordts, R., Houben, K., & Strack, F. (2010). Re-training automatic action-tendencies to approach alcohol in hazardous drinkers. *Addiction*, 105, 279-287.