Implicit Measures of Motivation: Convergent, Discriminant and Predictive Validity

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Two implicit measures of motivation were developed to measure incentive salience (‘wanting’) towards food. Both measures were validated against explicit measures, implicit measures of evaluation (‘liking’), and behaviour. The motivational IAT-RF was always superior to the motivational IAT, with high predictive validities and clearly distinguishable from implicit measures of evaluation.

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EXTENDED ABSTRACT
The incentive salience theory (Berridge, 1996, 2009; Berridge & Robinson, 1995, 2003) and the differentiation between two neurophysiological separate reward components – motivational wanting (incentive salience of the reward) and evaluative liking (hedonic pleasure associated with the reward) – provides an elegant account for food reward, at least in animal studies. The rather counterintuitive idea that it is sometimes possible to “want” something that is not “liked” or the other way around has inspired many scholars in developing different measures to disentangle both components of food reward in man. Recently, that movement has been criticised as unnecessary and impossible (Havermans, 2011), whereas others replied that it is possible to distinguish both components in human (Finlayson & Dalton, 2012). In the past decade different, rather implicit motivational measures were developed (e.g., Ebstein et al., 2003; Finlayson, King, & Blundell, 2008; Giesen, Havermans, & Jansen, 2010), however, none completely tested under “fair” conditions (i.e., stimuli that do not evoke different social desirability; implicit measures for wanting and liking components).

The aim of this research was to develop and validate implicit measures of motivation that could meet that criticism and that could finally be used as valid measures in consumer research. Therefore, we started out with two existing implicit measures – the implicit association test (IAT; Greenwald, McGhee, & Schwartz, 1998) and a recent published procedural variation, the recoding free IAT (IAT-RF; Rothermund, Teige-Mocigemba, Gast, & Wentura, 2009). The latter test is argued to prevent recoding strategies of the IAT; however, its predictive validity has only been examined in one further study (Houben, Rothermund, & Wiers, 2009). Both paradigms were originally designed to measure the relative strength of associations between two evaluative (e.g., positive, negative) and two target concepts (e.g., two products) to finally assess implicit attitudes. In order to develop measures of implicit motivation both paradigms needed slight modifications. Hence, the two opposing evaluative concepts were replaced with two motivational tendencies (approach, avoidance) and consequently both implicit motivation tests shall be named M-IAT and M-IAT-RF to address this modification. Furthermore, two target products were chosen that would create strong preferences but that would not evoke biases through social desirability or self-presentation. Therefore, we decided on wine gum and liquorice – both belonging to the same product category, are equally unhealthy, sized, priced, and nevertheless, only differ in sensory dimensions. The final four concepts were represented by verbal and visual stimuli and reaction-times were recorded as dependent variables. Three studies were conducted.

The aim of Study 1 was to test and validate both measures, whereas Study 2 focused specifically on the discriminant validity of motivational versus evaluative versions of both paradigms. The M-IAT-RF was further validated with different stimuli material in Study 3. All three studies included explicit measures of wanting and liking (visual analogue scales) and a relative behavioural preference was measured as a predictive validation criterion. In Study 1 and 3 this was based on unobtrusive observation of the amount of target products consumed during the session. In Study 2 it was based on simple choices of the two products.

Study 1. 132 native Danish speakers were tested in a two-group between-subjects design (M-IAT vs. M-IAT-RF) with random allocation. The experimental sessions were divided into three parts: first a pre-test (paper-pencil), then the computer-based implicit motivation test (either M-IAT or M-IAT-RF), and finally a post-test (paper-pencil). All experimental sessions were held individually. Difference scores were calculated from reaction-times in the same way as is usually done in IAT studies (Greenwald et al., 1998; Greenwald, Nosek, & Banaji, 2003). In addition, a latent-difference bifactor model was fitted to the log-transformed, error-corrected reaction-times to obtain a more stringent psychometric representation of the measures. The model was a refined version of the model used by Blanton, Jaccard, Gonzales, and Christie (2006), separating the latent true difference in implicit motivation from common method-variance. The model fit was excellent for both implicit tests. The M-IAT-RF was highly predictive of behaviour (D-score: r = .32; latent-true-difference: β = .58) and showed strong convergent validity with explicit measures of wanting (D-score: r = .29; latent-true-difference: β = .54). Furthermore, its discriminant validity with explicit measures of liking was satisfactory (D-score: r = .19; latent-true-difference: β = .37). In comparison, the M-IAT was also strongly related to explicit measures of wanting (D-score: r = .50; latent-true-difference: β = .53) but only weakly related to behaviour (D-score: r = .24; latent-true-difference: β = .26). Its discriminant validity with respect to explicit measures of liking was only partially satisfactory (D-score: r = .48; latent-true-difference: β = .50).

Study 2. To test the discriminant validity of implicit measures of motivation (M-IAT and M-IAT-RF) versus implicit measures of evaluation (E-IAT and E-IAT-RF that are commonly used in attitude research), a two-group between-subjects design with random allocation was used. Participants (N = 181) either completed two IATs (M-IAT and E-IAT) or two IAT-RFs, respectively. Test order was counterbalanced between subjects. The discriminant validity of the IAT-RF procedures was excellent. The D-score calculated from the M-IAT-RF did not correlate significantly with the D-score calculated from the E-IAT-RF (r = .23, n.s.). Furthermore, the M-IAT-RF was predictive of behaviour (D-score: r = .28; latent-true-difference: β = .70) whereas the E-IAT-RF was less (D-score: r = .26; latent-true-difference: β = .47). In comparison, the discriminant validity of the IAT procedures was less satisfactory (r = .40, p < .01) and both IATs were also not predictive of behaviour.

Study 3. To further validate the M-IAT-RF different stimulus material was applied in Study 3 (N = 40): wine gum and liquorice were replaced by broader concepts of fruit and chocolate and the behavioural criterion was based on the consumed amount of offered fruit (pieces of banana, apple, and grapes) and chocolate (milk, dark, and hazelnut). Corroborating the result of Study 1 and 2, the M-IAT-RF procedure was highly predictive of behaviour, and showed strong convergent as well as satisfying discriminant validities.

Taken together, it is possible to develop implicit measures of motivation with convergent validities that were as high as those commonly found for implicit measures of evaluation (for a meta-analysis, see Greenwald et al., 2009) and excellent psychometric characteristics. Remarkable, the recently published and slightly modified M-IAT-RF was always superior to the M-IAT, with high predictive validities and clearly distinguishable from implicit measures of evaluation.
REFERENCES