THE ALLURE OF THE CREAM GATEAU: ATTENTIONAL AND RESPONSE BIAS TOWARDS HIGH CALORIE FOODS

Lutz, A. P. C.[1,2], Meule, A.[2], Kübler, A.[2], & Vögele, C.[1]

[1] INSIDE Research Unit, University of Luxembourg, Campus Walferdange, Route de Diekirch – B.P. 2, L-7220 Walferdange
[2] Department of Psychology I, University of Würzburg, Marcusstr. 9-11, 97070 Würzburg
Presenting author: annika.lutz@uni.lu

Objective: In our modern world of plenty, high calorie foods are ubiquitous, lurking at us from supermarket shelves and shop windows. Most people are aware of the fact that overconsumption of such foods may have adverse health consequences such as obesity or diabetes. But if we know that it isn't good for us, why do we still find it so very hard to resist that delicious looking slice of cream gateau displayed in the pastry shop?
Human eating behaviour is subject to a panoply of influencing factors of which active knowledge about nutrients and their effects is but the tip of the iceberg. The mere presence of high calorie food stimuli may influence our behaviour in ways that we are not even aware of; by automatically attracting our attention and eliciting approach behaviour, for instance. Consequently, the present study investigated participants' attentional processes when confronted with high-calorie food cues.
Method: Forty-seven female students without psychiatric condition or medication participated in the study and were asked to refrain from eating at least three hours before testing. They then performed the Affective Shifting Task, a variation of the go/no-go paradigm. For this task, participants were seated in front of a computer screen and presented with a rapid succession of photos of high calorie foods and of neutral objects. The task was divided into 16 blocks. In each block, participants were required to press a button either in response to the food stimuli or in response to the object stimuli while having to ignore stimuli of the other category, with the target category switching every other block. Measured dependent variables were reaction time, as well as commission and omission errors, in response to food and object cues. From these variables signal detection indices were calculated to infer the participants' ability to discriminate between targets and distractors and their overall tendency to respond to any stimulus.
Results: Participants responded faster to food cues as compared to object cues (see Table 1 and Fig. 1a). In addition, their overall tendency to respond was higher when food stimuli were the designated targets rather than objects (see Table 1 and Fig. 1c). Subjects were also better able to discriminate targets from distractors when food cues were the targets as opposed to object cues (see Table 1 and Fig. 1b).
Conclusions: Decreased reaction time in response to food cues indicates an attentional bias for these stimuli. Together with the apparently enhanced discrimination, this suggests a facilitated or preferential processing of food stimuli. High calorie foods seem to be singled out from a range of distractors fairly quickly and are immediately recognized for what they are.
Moreover, high calorie food cues also seem to have a disinhibitory quality, as attending to them increased the overall tendency to react.
In a real world setting, attentional bias and disinhibition combined might result in automatic approach tendencies, which the individual would have to inhibit in order to refrain from eating the symbolic slice of cream gateau. Individual pre-disposing factors such as an impulsive personality might impair the ability to stop the pre-potent eating behaviour and thus contribute to an overconsumption of high calorie foods, which in turn might elevate the risk for chronic diseases such as obesity and diabetes. If inappropriate compensatory behaviours are implemented by the affected individual, eating disorders such as bulimia nervosa might ensue.
Future research should focus on the link between the psychological processing of food cues and unhealthy or pathological eating behaviour, taking into account other influencing and pre-disposing factors, e.g. impulsive personality, and eventually converting the findings into novel treatment and prevention approaches.

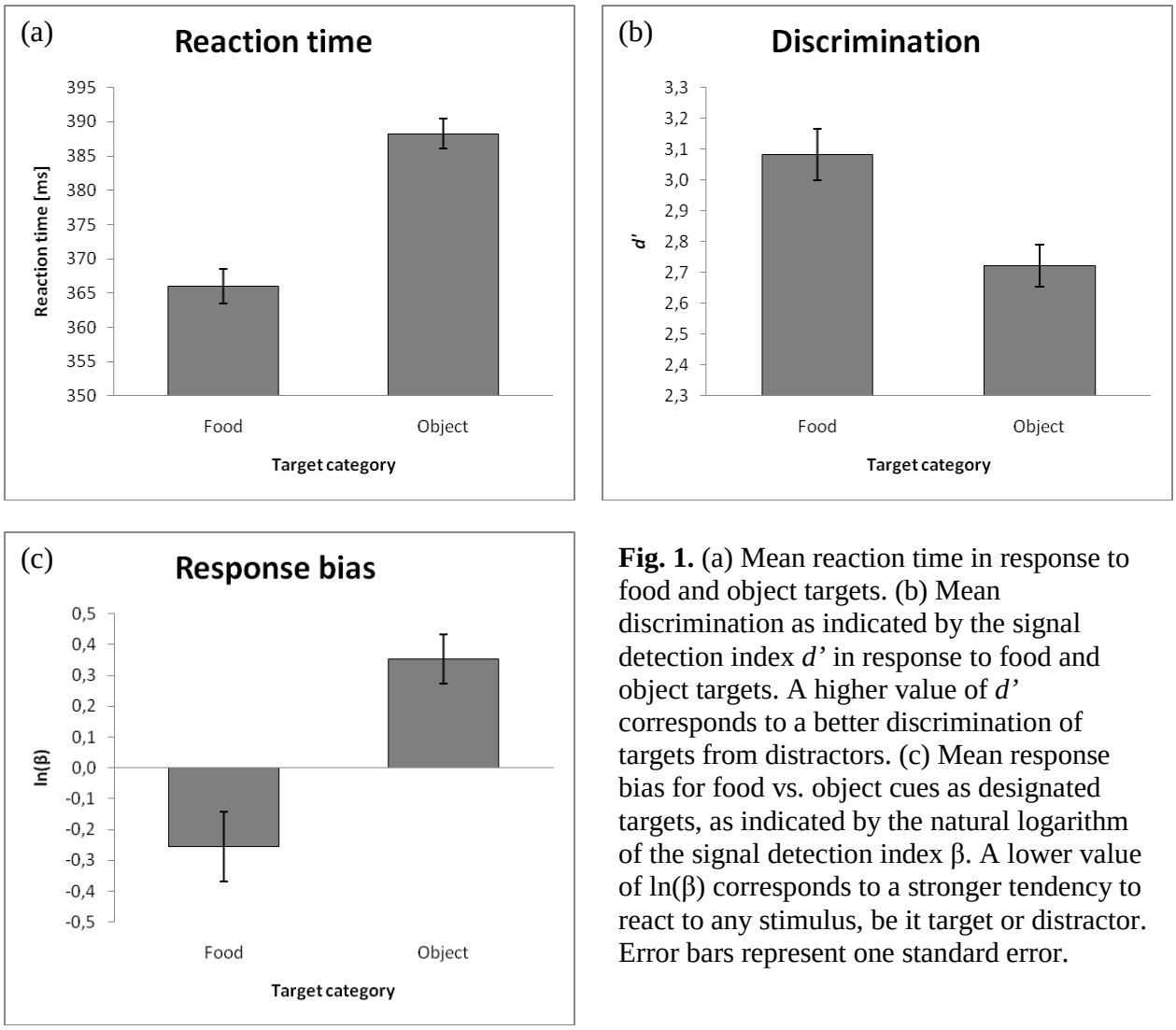

Fig. 1. (a) Mean reaction time in response to food and object targets. (b) Mean discrimination as indicated by the signal detection index *d'* in response to food and object targets. A higher value of *d'* corresponds to a better discrimination of targets from distractors. (c) Mean response bias for food vs. object cues as designated targets, as indicated by the natural logarithm of the signal detection index β. A lower value of ln(β) corresponds to a stronger tendency to react to any stimulus, be it target or distractor. Error bars represent one standard error.

Table 1. Means (*M*), standard deviations (*SD*), and *t*- and *p*-values for the comparison of responses to food and object targets. Separate comparisons were conducted for the following dependent measures: reaction time, discrimination *d'* and response bias ln(β). Two-tailed *t*-tests for paired samples were utilised for statistical analysis.

	Food targets		Object targets			
	M	*SD*	*M*	*SD*	$t_{(.05, 46)}$	*p*
Reaction time [ms]	366,01	16,98	388,27	15,16	-13,95	< .0001
Discrimination *d'*	3,08	0,57	2,72	0,47	3,83	< .001
Response bias ln(β)	-0,26	0,78	0,35	0,55	-5,63	< .0001