



## Research report

It's my party and I eat if I want to. Reasons for unhealthy snacking<sup>☆</sup>

Aukje A.C. Verhoeven<sup>a,\*</sup>, Marieke A. Adriaanse<sup>a</sup>, Emely de Vet<sup>b</sup>, Bob M. Fennis<sup>c</sup>,  
Denise T.D. de Ridder<sup>a</sup>

<sup>a</sup> Department of Clinical and Health Psychology, Utrecht University, PO Box 80 140, 3508 TC, Utrecht, The Netherlands

<sup>b</sup> Strategic Communication Chairgroup, Wageningen University & Research Centre, PO Box 8130, 6700 EW, Wageningen, The Netherlands

<sup>c</sup> Department of Marketing, University of Groningen, PO Box 72, 9700 AB, Groningen, The Netherlands



## ARTICLE INFO

## Article history:

Received 10 June 2014

Received in revised form 2 September 2014

Accepted 19 September 2014

Available online 23 September 2014

## Keywords:

Unhealthy snacking

Eating behavior

Diet

Reasons

Community sample

## ABSTRACT

Investigating the reasons that people give for unhealthy snacking behavior is important for developing effective health interventions. Little research, however, has identified reasons that apply to a large audience and most studies do not integrate multiple factors, precluding any conclusions regarding their relative importance. The present study explored reasons for unhealthy snacking among a representative community sample. Participants ( $N = 1544$ ) filled out the newly developed Reasons to Snack inventory assessing an elaborate range of motives at baseline and 1-month follow-up. Exploratory and replication factor analyses identified six categories: opportunity induced eating, coping with negative emotions, enjoying a special occasion, rewarding oneself, social pressure, and gaining energy. The highest mean scores were obtained for enjoying a special occasion and opportunity induced eating. Regression analyses with participant characteristics as independent variables and each category of reasons as dependent variables showed differences for age. For all reasons except to enjoy a special occasion, younger people reported a higher score. Women indicated a higher score than men on coping with negative emotions, enjoying a special occasion and gaining energy. People who diet to a stronger extent reported a higher score for snacking because of social pressure, to reward oneself and to cope with negative emotions, with the latter also being related to a higher BMI. Finally, a higher education was associated with enjoying a special occasion. Future health interventions could allocate more attention to diminishing unhealthy snacking with regard to the six identified categories, specifically focusing on enjoying a special occasion and opportunity induced eating.

© 2014 Elsevier Ltd. All rights reserved.

## Introduction

Many people consume a lot of palatable but unhealthy snacks (Forslund, Torgerson, Sjöström, & Lindroos, 2005; Piernas & Popkin, 2010). Unhealthy snacks typically are high in energy density and contain large amounts of ingredients such as sugar and fat. Consequently, unhealthy snacking behavior is a major contributor to the increased prevalence of overweight and obesity (Forslund et al., 2005; Piernas & Popkin, 2010). The need for effective interventions supporting people in limiting their unhealthy snack intake is therefore urgent. However, in order to do so, more knowledge concerning why people snack unhealthily is required, as reasons for this behavior are not straightforward. To illustrate, in contrast to unhealthy snacking, meals typically are well-defined moments induced by clear cues such as 'it is mealtime' or 'feeling hungry' (Cleobury

& Tapper, 2014; Tuomisto, Tuomisto, Hetherington, & Lappalainen, 1998). For unhealthy snacking behavior such direct motives seem to be less pronounced and psychological motives presumably play a large role in this behavior (Cleobury & Tapper, 2014). A better understanding of why people snack unhealthily is therefore warranted. The present study explored the psychological motives people provide for consuming unhealthy snacks among a large and representative community sample.

Investigating the reasons people give for unhealthy snacking is important in at least three ways. For one, on a personal level, many health interventions require people to tailor the intervention technique to their personal circumstances. Strategies like action and coping planning (e.g., Adriaanse, De Ridder, & De Wit, 2009; Gollwitzer, 1999), proactive coping strategies (e.g., Kroese, Adriaanse, Vinkers, Van de Schoot, & De Ridder, 2014), and mental contrasting techniques (e.g., Oettingen, Pak, & Schnetter, 2001) require that participants tailor the strategy to their individual snacking situation to anticipate and identify the triggers for the undesired behavior. In order for these strategies to be effective, it is essential that the personally relevant reason for unhealthy snacking is identified (Adriaanse et al., 2009). In addition, such intervention techniques

<sup>☆</sup> Acknowledgments: This work was supported by ZonMw [grant number 200120003].

\* Corresponding author.

E-mail address: [aukje.verhoeven@gmail.com](mailto:aukje.verhoeven@gmail.com) (A.A.C. Verhoeven).

are effective only if the cues are formulated clearly and specifically (De Vet et al., 2011; Hagger & Luszczynska, 2014). Providing participants in this kind of interventions with an overview of reasons that are applicable to a large audience could facilitate the specification of one's personal trigger for unhealthy snacking and benefit intervention effectiveness. However, in order to do so, more research is needed to identify relevant triggers.

Secondly, on a more general level, it is important to determine the relative importance of different reasons for unhealthy snacking behavior in order to establish priorities for health interventions. So far, limited research has been devoted to provide an integrative overview of reasons for unhealthy snack consumption in a representative community sample in order to determine which motives are relatively most important. Yet, the implications for health interventions might differ depending on the reason that is targeted (Cleobury & Tapper, 2014). For example, if most people indulge in unhealthy snacking in response to the availability of appetitive foods, rather than as a way to cope with negative affect, a focus on stimulus control is expected to be more effective than interventions aimed at coping with stressful events. Examining the relative frequency of different reasons is therefore required.

Finally, in previous research, different factors have been identified that contribute to the consumption of unhealthy foods, including social pressure and social norms (e.g., Hermans, Larsen, Herman, & Engels, 2008; Stok, De Ridder, De Vet, & De Wit, 2014), coping with negative emotions like stress or sadness (Sproesser, Schupp, & Renner, 2014; Van Strien, Frijters, Bergers, & Defares, 1986), experiencing positive affect (e.g., Evers, Adriaanse, De Ridder, & De Witt Huberts, 2013), eating for external or environmental cues (e.g., Cleobury & Tapper, 2014; Prinsen, De Ridder, & De Vet, 2013), and the availability of tempting foods (e.g., Lowe et al., 2009). Typically, however, these studies were conducted in isolation from one another, focusing exclusively on one or only a few factors, precluding any conclusion about the relative importance of the separate reasons. Similarly, with regard to the assessment of reasons for eating behavior, some instruments are available that tap into a few specific motives. For example, the Three-Factor Eating Questionnaire (Stunkard & Messick, 1985) and the Dutch Eating Behavior Questionnaire (Van Strien et al., 1986) include some items or subscales that could be used to address reasons for unhealthy snacking. Yet, the items in such measures are usually generated by researchers, rather than bottom-up provided by participants themselves, and therefore do not necessarily reflect their inherent motives. In addition, none of these measures was designed to assess a wide range of motives and, consequently, there is a lack of understanding regarding the relative importance.

To date, some studies are available that combined different reasons for eating in general, focusing on the totality of eating behavior (including the consumption of healthy and unhealthy foods, as well as main meals and snacks). Steptoe, Pollard, and Wardle (1995), for example, developed an elaborate questionnaire measuring motives for food choices and showed that food is mostly taken because it is sensory appealing (e.g., it smells or tastes good). Furthermore, Renner and colleagues (Renner, Sproesser, Strohbach, & Schupp, 2012) made an inventory assessing a comprehensive range of motives for eating and showed that liking for the food was the predominant reason for food consumption. Tuomisto et al. (1998) found among an obese sample that people most often initiate eating because it is mealtime or because of a regular lifestyle. Finally, Jackson and colleagues (Jackson, Cooper, Mintz, & Albino, 2003) examined four distinct reasons for eating based on a model that applies to alcohol use and showed that motivations for eating are largely comparable, namely, to cope with negative affect, to be social, to comply with others' expectations, and to enhance pleasure. Nevertheless, each of these studies regarded eating behavior in general, examining reasons for both desirable (i.e., healthy) and

undesirable (i.e., unhealthy) food consumption, making it difficult to infer relevant conclusions for behavior change interventions targeting unhealthy snack intake. As especially unhealthy snack consumption (rather than meal consumption or healthy food intake) are potentially problematic (Piernas & Popkin, 2010), more research is needed focusing on unhealthy snacking behavior. To the best of our knowledge, only in one study (Cleobury & Tapper, 2014) among overweight and obese people, the findings were interpreted separately for meals, healthy snacks, and unhealthy snacks. These indeed suggest that different motives influence different types of eating behavior. While reasons for main meals mostly related to hunger or time of the day, and healthy snacks were also mostly consumed because of hunger, unhealthy snacks were most frequently consumed because they looked or smelled very tempting. Moreover, next to the focus on eating behavior in general, the majority of these studies recruited highly educated samples (i.e., Cleobury & Tapper, 2014; Jackson et al., 2003; Renner et al., 2012). When aiming to develop effective health interventions targeting a large audience, it is essential to include a sample which is more comparable to the general population at large.

The present study seeks to fill several voids identified in the previous research highlighted above. More specifically, we aim to explore the main reasons people report for unhealthy snacking using a broad range of motives among a large and representative community sample. Although identifying reasons for unhealthy snacking behavior seems a critical issue, the existing literature does not provide in a systematic examination of such reasons among a representative community sample. The present research aims to fill this gap in three ways. First, a Reasons to Snack inventory was developed to assess the reasons people provide for their unhealthy snacking behavior and it was examined whether distinct categories in reasons for unhealthy snacking can be identified. Second, it was examined which types of reasons are most frequently reported for consuming unhealthy snacks. Finally, it was explored whether differences exist in the reported reasons based on participant characteristics including gender, education, Body Mass Index (BMI), age, and dieting.

## Method

### Participants

This study draws on data of the LISS (Longitudinal Internet Studies for Social Sciences) panel of CentERdata, a large Internet survey panel which is based on a true probability sample of households drawn from the population register by Statistics Netherlands (De Vos, 2010). Initially, 2098 members of the LISS panel were randomly selected and invited to participate in the study. Of these, 1709 completed the first questionnaire (response rate: 82%) and were approached for the second questionnaire. The second questionnaire, 1 month later, was completed by 1547 respondents (74% of total).

A drop-out analysis was conducted to examine whether study completion (participants who finished both questionnaires vs. those who completed the first questionnaire only) could be predicted by baseline study variables (see *Questionnaire*), using a logistic regression analysis. Study completion was used as a dependent variable and gender, age, marital status, education, and BMI (kg/m<sup>2</sup>) were entered as predictor variables. The model was found to be significant  $\chi^2(5, N = 1705) = 62.89, p < .001$  (Cox & Snell  $R^2 = .036$ ; Nagelkerke  $R^2 = .078$ ). Gender, marital status, and education were not found to be significant ( $p$ 's  $> .33$ ). Study completion was predicted by age,  $p < .001$ , OR = 1.03 (95% CI = 1.02–1.04), and BMI,  $p < .001$ , OR = 0.98 (95% CI = 0.98–0.99). Study completers were found to be older ( $M = 51.99, SD = 17.56$ ) and to have a lower BMI ( $M = 29.28, SD = 16.46$ ) compared to participants who did not complete the study (age:  $M = 42.93, SD = 16.12$ ; BMI:  $M = 39.35, SD = 28.90$ ).

Three participants were excluded from the analyses because they indicated unlikely high caloric intake from unhealthy snacks (over 3400 kcal from unhealthy snacks on one single day, corresponding to an intake of more than 8 SD above the mean). This resulted in a final sample consisting of 1544 participants, of whom 45.1% were male, with a mean age of 51.95 years ( $SD = 17.55$ , range: 16–90), and a mean BMI of 25.67 ( $SD = 4.55$ , range: 16.85–57.80).<sup>1</sup> Of these participants, 1.8% was underweight (BMI < 18.50), 45.0% had a healthy weight (BMI: 18.50–25.00), 35.5% was overweight (BMI: 25.00–30.00), 12.9% was considered obese (BMI > 30), and for 4.9% information to compute BMI was missing. Furthermore, 34.7% had a low level of education (elementary school or lower general secondary education), 34.3% finished a middle education level (intermediate vocational education, higher general secondary education or pre-university education) and 30.8% held a diploma in higher education (higher vocational education or university), 0.2% was missing. Most participants were married (58.5%), 25.4% had never been married, 10.3% was divorced, and 5.8% was a widow(er).

### Design and procedure

The study adopted a prospective within-subjects design, with two measurements separated by 1 month. Participants of the LISS Panel were approached to join a large Internet survey on snacking behavior. Respondents who agreed to participate completed the survey online. Demographic variables (including gender, age, marital status, education, and weight and height used to calculate BMI) were retrieved from the LISS database which is updated each year (4 months before the current data collection). Participants were asked to fill out a baseline measurement which was part of a larger questionnaire,<sup>2</sup> including the Reasons to Snack inventory and dieting status. One month later, participants were approached again and requested to fill out the follow-up questionnaire. The follow-up measurement included the Reasons to Snack inventory to examine its stability over time, and caloric intake from unhealthy snacks in order to relate reasons for unhealthy snacking to unhealthy snacking behavior. After completing the study, participants were debriefed and thanked.

### Questionnaire

#### Reasons to snack inventory

In order to measure reasons for unhealthy snacking, first, an extensive item pool was derived from reasons that have been identified in previous studies that assessed reasons for unhealthy snacking (including published and unpublished data, total  $N = 525$ ), resulting in 78 different reasons. Thirteen items were omitted because they consisted of overlapping meanings and 10 items were excluded because they referred to vague cues that are not considered actual specific reasons for snacking (such as 'winter'). The remaining 55 items were supplemented with 18 items retrieved from a study by Jackson et al. (2003) that included a range of psychological motivations to eat unhealthily, and five items that were added by the authors in order to suit a broader audience rather than merely a student population (e.g., 'being with colleagues'). This resulted in 78 items.

Second, to further specify possible reasons for unhealthy snacking, a preliminary version of this inventory was administered in a

pilot study among a community sample recruited via the Netherlands Nutrition Centre ( $N = 365$ ). Participants were asked 'If you take an unhealthy snack, how often is this. . .', followed by the 78 items (e.g., 'to comfort yourself?') on a 7-point scale from 1 (*never*) to 7 (*always*). An open ended question was also administered to obtain additional reasons. Based on this pilot study, items that were reported infrequently ( $M \leq 2$ ,  $N = 17$ ) were excluded for the final Reasons to Snack inventory. From the remaining 61 items and the additional answers to the open ended question, items were excluded if that item (1) correlated excessively high with other items, signaling redundancy ( $r > .85$ ; e.g. 'as a way to deal with sad feelings' or 'as a way to cope with negative emotions'), (2) covered overlapping meanings (e.g., 'because it's a special or traditional part of some social occasion or celebration' or 'because it belongs to a festivity'), and (3) did not have a clear meaning (e.g., 'it is psychological'). This resulted in a final questionnaire comprised of 35 items (29 from the preliminary version and six based on responses from the open ended question).

The final Reasons to Snack inventory assesses the reasons people hold to eat unhealthy snacks with 35 items, e.g., 'If you take an unhealthy snack, how often is this. . . 'to comfort yourself?' or 'to celebrate a special occasion with friends, family, or your partner?'. The items were presented in random order and answers were rated on 7-point scales from 1 (*never*) to 7 (*always*). An 'unhealthy snack' was defined as all foods consumed between the three main meals (breakfast, lunch, dinner) containing high amounts of unhealthy ingredients like fat and sugar.

**Dieting.** Whether participants were dieting was administered at baseline with one question, i.e., "Currently, I am following a diet" on a scale from 1 (*totally disagree*) to 7 (*totally agree*).

**Caloric intake.** Caloric intake was included to examine whether the reasons for unhealthy snacking were related to unhealthy snack consumption, and was administered at follow-up. Participants indicated what kind of snacks they consumed and the amount of that snack taken on the day before the study, using a list of snacks that are commonly consumed. This list of snacks has been developed with a certified dietician and has been validated in previous studies (e.g., [Adriaanse et al., 2009](#)). Also, an option 'other' was provided. Additionally, it was asked how typical yesterday's snack consumption was for their normal eating pattern. Caloric intake from unhealthy snacks was calculated by multiplying each reported snack with the average amount of calories that snack contains, multiplied by the amount of that snack taken. Averages were derived from the [Dutch Nutrition Centre \(2014\)](#).

### Data analyses

Data were analyzed using SPSS software version 20.0. Caloric intake from unhealthy snacks was positively skewed and square root transformation was conducted to improve normal distribution. After transformation, 10 outliers were identified on caloric intake (>3 SD above the mean). As excluding these outliers did not affect the results, findings for the complete sample will be described.

### Results

#### Descriptive statistics and correlations

Descriptive statistics and correlations of the variables under study are presented in [Table 1](#). On average, participants indicated dieting to a low to moderate extent and consumed 368 kcal ( $SD = 344$ ) from unhealthy snacks on 1 day at the 1 month follow-up, which was perceived as moderately typical for their unhealthy snacking behavior ( $M = 3.25$ ;  $SD = 1.98$ ). Older participants and dieters reported a lower caloric intake. Gender, education, and BMI were not associated with caloric intake.

<sup>1</sup> Excluding underweight (BMI < 18.5) and morbidly obese participants (BMI > 40.0) does not affect the results.

<sup>2</sup> The questionnaire also assessed habit strength, intention to consume fewer unhealthy snacks, and self-concordance (intrinsic and extrinsic motivation) to consume fewer unhealthy snacks. Results regarding these variables are beyond the scope of the present paper but available upon request.

**Table 1**  
Correlation, means, and standard deviations of the variables under study.

	(1)	(2) <sup>c</sup>	(3)	(4) <sup>c</sup>	(5) <sup>c</sup>	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Caloric intake (1)	–												
Gender <sup>a,b,c</sup> (2)	–.01	–											
Age (3)	–.07*	–.10**	–										
Low education (4) <sup>b,c</sup>	.02	.06*	.21**	–									
Middle education (5) <sup>b,c</sup>	.00	.01	–.16**	–.53**	–								
BMI (6)	–.02	–.10**	.22**	.12**	–.01	–							
Dieting (7)	–.06*	.08**	.04	.01	.00	.30**	–						
Special occasion (8)	.16**	.18**	–.08**	–.05	–.03	.01	.05*	–					
Opportunity induced (9)	.25**	.04	–.44**	–.10**	.04	–.04	.00	.38**	–				
Gaining energy (10)	.09**	.16**	–.34**	–.09**	.02	–.08**	.05	.46**	.45**	–			
Reward (11)	.19**	.13**	–.33**	–.06*	.00	–.03	.10**	.41**	.58**	.45**	–		
Social pressure (12)	.18**	.09**	–.14*	.00	–.05	.03	.13**	.50**	.46**	.37**	.55**	–	
Negative emotions (13)	.17**	.23**	–.29**	–.04	–.01	.13**	.20**	.31**	.45**	.36**	.63**	.54**	–
M (SD)	368 (344)		51.95 (17.55)			25.67 (4.55)	2.92 (1.92)	4.10 (1.42)	3.51 (1.43)	3.27 (1.60)	2.52 (1.39)	2.33 (1.13)	2.16 (1.39)

Note. All measures except caloric intake were assessed at baseline.

<sup>a</sup> 1 = male; 2 = female.<sup>b</sup> Dummy coded.<sup>c</sup> Spearman's rho is displayed.\* Correlation is significant at the .05 level ( $r > .051$ ; two-tailed).\*\* Correlation is significant at the .01 level ( $r > .077$ ; two-tailed).**Table 2**

Reasons to Snack inventory. (Items in bold are included in the subscales.)

If you consume an unhealthy snack, how often do you eat. . .	Loading	Mean	SD
<i>To enjoy a special occasion</i>			
<b>As a way to celebrate a special occasion with friends, family, or a loved one</b>	<b>.89</b>	<b>4.44</b>	<b>1.69</b>
<b>Because it is a party or a birthday</b>	<b>.88</b>	<b>4.74</b>	<b>1.67</b>
<b>Because it's a special or traditional part of some social occasion or celebration</b>	<b>.70</b>	<b>3.50</b>	<b>1.89</b>
<b>Because you are with friends</b>	<b>.59</b>	<b>3.72</b>	<b>1.71</b>
Because you are drinking coffee or tea	.50	3.64	1.81
Because you are having a day off	.43	3.38	1.77
<i>Opportunity induced eating</i>			
<b>Because you are watching television</b>	<b>.74</b>	<b>3.09</b>	<b>1.72</b>
<b>Because you are watching a movie</b>	<b>.66</b>	<b>2.99</b>	<b>1.80</b>
<b>Because the food tastes so good</b>	<b>.65</b>	<b>3.64</b>	<b>1.85</b>
<b>Because you really crave tasty food</b>	<b>.62</b>	<b>4.31</b>	<b>1.68</b>
Because tasty food is close by	.61	3.15	1.78
Because you see or smell tasty food	.56	3.23	1.75
Because you are relaxing	.55	3.30	1.70
Because you really could not resist the temptation of the food	.52	3.08	1.77
Because you are enjoying the moment	.42	3.56	1.78
<i>To gain energy</i>			
<b>Because you really need to eat something, otherwise you would faint</b>	<b>.87</b>	<b>3.34</b>	<b>1.86</b>
<b>To gain energy</b>	<b>.77</b>	<b>3.19</b>	<b>1.77</b>
<i>To reward oneself</i>			
<b>As a reward because you have worked very hard</b>	<b>.64</b>	<b>2.60</b>	<b>1.65</b>
<b>As a reward for having done something that you're proud of or feel good about</b>	<b>.64</b>	<b>2.46</b>	<b>1.59</b>
<b>Because you deserve it</b>	<b>.63</b>	<b>2.67</b>	<b>1.66</b>
<b>Because you finished a project</b>	<b>.61</b>	<b>2.35</b>	<b>1.50</b>
Because you worked hard	.58	2.74	1.65
Because you are having a nice day	.53	2.77	1.60
Because you feel good or are in a good mood	.47	2.84	1.64
<i>Because of social pressure</i>			
<b>Because you don't want to stand out or be different from others who are eating</b>	<b>.75</b>	<b>1.92</b>	<b>1.27</b>
<b>To please your mother or someone else who wants you to eat</b>	<b>.72</b>	<b>2.13</b>	<b>1.41</b>
<b>Because you feel like you can't say 'no'</b>	<b>.68</b>	<b>2.29</b>	<b>1.48</b>
<b>Because the food was offered to you and you feel like you could not refuse it</b>	<b>.68</b>	<b>2.99</b>	<b>1.65</b>
<i>To cope with negative emotions</i>			
<b>As a way to deal with sad feelings</b>	<b>–.92</b>	<b>2.18</b>	<b>1.55</b>
<b>As a way to comfort yourself</b>	<b>–.89</b>	<b>2.13</b>	<b>1.52</b>
<b>To deal with disappointment</b>	<b>–.89</b>	<b>2.07</b>	<b>1.46</b>
<b>Because you feel tense</b>	<b>–.88</b>	<b>2.28</b>	<b>1.56</b>
Because you feel bored	–.52	2.49	1.64
Because you are tired	–.48	2.16	1.43

On average, participants mostly indicated that they consume unhealthy snacks because it is a party or a birthday ( $M = 4.74$ ;  $SD = 1.67$ ), as a way to celebrate a special occasion with friends, family, or a loved one ( $M = 4.44$ ;  $SD = 1.69$ ), and because they really crave tasty food ( $M = 4.31$ ;  $SD = 1.68$ ), see [Table 2](#).

### Categories in reasons for unhealthy snacking

#### Factor analysis

An exploratory factor analysis was conducted to examine whether the reasons for unhealthy snacking can be classified into different categories. The 35 items of the Reasons to Snack inventory were entered and an Oblimin rotation was used as the factors were expected to correlate ([Steptoe et al., 1995](#)). Standardized factor loadings were extracted using the pattern matrix. The factor analysis indicated six components with an Eigenvalue above 1. One item did not load on any factor (i.e., 'Because I was coming home'; factor loadings  $< .40$ ) and was therefore excluded. All other items loaded on



one single factor (factor loadings  $> .40$ ). The factors and the corresponding items are displayed in Table 2. The first factor concerned *opportunity induced eating* consisting of nine items, e.g., 'Because tasty food is nearby'. The second factor concerned *coping with negative emotions*, including six items, e.g., 'To cope with negative feelings'. *To enjoy a special occasion* was the third factor with six items, e.g., 'Because it is a party or birthday celebration'. The fourth factor included seven reasons concerning *to reward oneself*, e.g., 'As a reward because you have worked very hard'. The fifth factor concerned motives *because of social pressure*, consisting of four items, e.g., 'Because you got it offered and could not say 'no''. The final factor held a physiological motive, rather than a psychological reason, namely *to gain energy*, including two items, e.g., 'To gain energy'. To create a concise questionnaire and equivalent factors, each psychological category was reduced to a maximum of four items. Items with the highest factor loading were included (in line with Renner et al., 2012), see Table 2.

#### Stability and consistency

To examine whether the different categories in reasons for unhealthy snacking were stable over time a replication factor analysis (Osborne & Fitzpatrick, 2012) was conducted using the Reasons to Snack inventory assessed at follow-up (1 month later). Similar to the original exploratory factor analysis, the 35 items were entered using an Oblimin rotation employing the pattern matrix to extract standardized factor loadings. The analysis showed a similar structure with the same six factors. Again, the same item did not load on any factor (factor loadings  $< .40$ ). In addition, except for one item (i.e., 'Because you are drinking coffee or tea'; factor loadings  $< .40$ ), all items loaded on the same single factor (factor loadings  $> .40$ ). The analyses thus showed good stability.

In addition, the correlations between the four-item subscales of the Reasons to Snack inventory at the first and second wave were assessed. The results showed significant correlations between all subscales ranging from  $r = .60$  to  $r = .77$ , all  $p < .001$ , indicating good test–retest reliability. The internal consistency of the psychological subscales were examined by addressing Cronbach's alphas, which ranged from  $\alpha = .78$  to  $\alpha = .93$ , indicating good internal reliability for all subscales. The subscale regarding gaining energy (consisting of two items) had a satisfactory internal correlation,  $r = .55$ ,  $p < .001$ .

#### Relative importance of types of reasons

The mean scores for the categories in reasons for unhealthy snacking are presented in Fig. 1. A repeated measures ANOVA was conducted to examine differences between the reported frequencies of the reasons, using the six types of reasons as within subject variables. A main effect of reasons was found,  $F(5, 7715) = 838.69$ ,  $p < .001$ ,  $\eta_p^2 = .35$ . Post hoc analyses with Bonferroni corrections indicated that all reasons differed from each other (all  $p$ 's  $< .001$ ). Overall, the highest mean score was observed for the category regarding enjoying a special occasion, followed by opportunity induced eating. Participants also reported consuming unhealthy snacks in order to gain energy and to reward oneself. Social pressure and coping with negative emotions received relatively lower scores. All categories were related to caloric intake from unhealthy snacks, ranging from  $r = .09$  to  $r = .25$ , all  $p$ 's  $\leq .001$ , indicating that all reasons were relevant but rather weakly related to caloric intake from unhealthy snacks.

#### Differences based on participant characteristics

To examine the influence of participant characteristics on the reasons for unhealthy snacking, six separate hierarchical regression analyses were conducted with each reason as a dependent

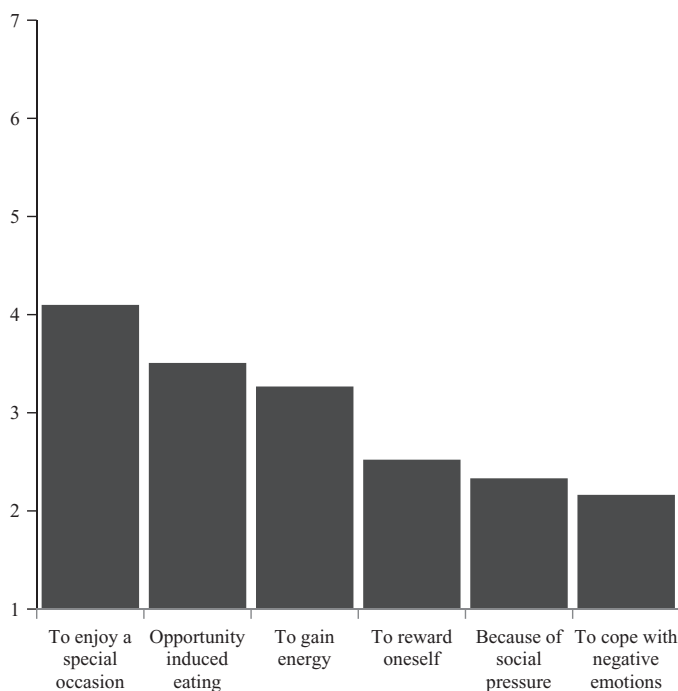


Fig. 1. Reason for unhealthy snacking (measured at baseline), means per category (based on the four-item subscales).

variable. The analyses were controlled for caloric intake from unhealthy snacks to ensure that the influence of participant characteristics is not a mere reflection of a higher snack intake in general. Square root transformed caloric intake was entered in each regression analysis in Step 1. In Step 2, the participant characteristics were entered, including gender, age, education level (dummy coded), BMI, and dieting. Because of the large sample size, even very small effects are found statistically significant. Therefore, in line with Cohen's (1988) criteria for effect sizes, the description below is limited to standardized beta scores of  $\beta \geq 0.10$  (as  $\beta$ 's  $< 0.10$  are considered to reflect small effect sizes, Cohen, 1988). A complete overview of the results can be found in Table 3.

For each reason, caloric intake was found to be a significant contributor, demonstrating that participants who consume more calories from unhealthy snacks have a higher score for each type of reason. In addition, compared to men, women scored higher on the categories enjoying a special occasion, gaining energy, and coping with negative emotions. Younger people reported to a larger extent to snack unhealthily because it is opportunity induced, to gain energy, to reward oneself, because of social pressure, and to cope with negative emotions. Furthermore, people with a higher education reported to a larger degree that enjoying a special occasion is a reason for unhealthy snacking. A higher BMI was associated with consuming unhealthy snacks to cope with negative emotions. Finally, the stronger people perceive themselves as dieters, the more often they indicate rewarding oneself, social pressure, and coping with negative emotions as a reason for unhealthy snacking.

#### Discussion

The present study assessed the reasons people provide for consuming unhealthy snacks among a large and representative community sample, using the newly developed Reasons to Snack inventory. The present study did not aim to provide an exhaustive overview of all the possible reasons for unhealthy snacking, but rather to indicate the main categories in reasons for

**Table 3**  
Regression analyses per reason predicted by caloric intake (Step 1) and participant characteristics (Step 2).

	Special occasion			Opportunity induced			Gaining energy			Rewarding oneself			Social pressure			Negative emotions		
Step 1	$\beta$	$R^2$	F	$\beta$	$R^2$	F	$\beta$	$R^2$	F	$\beta$	$R^2$	F	$\beta$	$R^2$	F	$\beta$	$R^2$	F
Caloric intake <sup>a</sup>	.18***	.03	51.28	.28***	.08	124.29	.11***	.01	18.15	.20***	.04	62.87	.19***	.04	53.81	.18***	.03	48.26
Step 2	$\beta$	$R^2$	$\Delta F$	$\beta$	$R^2$	$\Delta F$	$\beta$	$R^2$	$\Delta F$	$\beta$	$R^2$	$\Delta F$	$\beta$	$R^2$	$\Delta F$	$\beta$	$R^2$	$\Delta F$
Caloric intake <sup>a</sup>	.19***	.08	12.87***	.27***	.26	60.47***	.11***	.15	40.48***	.20***	.17	37.84***	.19***	.08	11.86***	.19***	.21	57.47***
Gender <sup>b</sup>	.18***			.00			.13***			.08**			.06*			.19***		
Age	-.05			-.43***			-.33***			-.05			-.14***			-.30***		
Low education <sup>c</sup>	-.11***			-.06*			-.06			-.05			-.02			-.05		
Middle education <sup>c</sup>	-.10**			-.06*			-.07*			-.08**			-.07*			-.07**		
BMI	.01			.06*			-.02			.03			.03			.17***		
Dieting	.05			.02			.06*			.10***			.13***			.15***		

\*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ .

<sup>a</sup> Square root transformed.

<sup>b</sup> 1 = male; 2 = female.

<sup>c</sup> Dummy coded.

unhealthy snacking relevant to a broad audience. From an elaborate range of reasons for unhealthy snacking, six categories emerged, namely, opportunity induced eating, to cope with negative emotions, to enjoy a special occasion, to reward oneself, because of social pressure, and to gain energy. The highest scores were found for consuming unhealthy snacks to enjoy a special occasion, followed by opportunity induced eating. Relatively lower scores were observed for coping with negative emotions and social pressure. Differences in reasons for unhealthy snacking based on participant characteristics were most profound for age. Except for enjoying a special occasion, younger people indicated a higher score for each category. Additionally, women had a higher score than men for half of the reasons, including to cope with negative emotions, to enjoy a special occasion, and to gain energy. Dieting was found to contribute to the consumption of unhealthy snacks to cope with negative emotions, because of social pressure and to reward oneself. Finally, a higher BMI was related to a higher score in snacking unhealthily to cope with negative emotions and a higher education to the category regarding enjoying a special occasion.

In line with previous literature (Steptoe et al., 1995), the overall scores were rather low (with a highest mean just above midpoint), suggesting that people oftentimes report that the reason does not extensively affect their unhealthy snacking behavior. To a large extent, the present study found support for motives that repeatedly appear in the existing literature. Opportunity induced eating, for example, entails hedonic features like craving tasty food and eating because the food tastes good, which are also reported in prior research (Cleobury & Tapper, 2014; Lowe et al., 2009; Renner et al., 2012; Steptoe et al., 1995; Van Strien et al., 1986). Also corresponding to previous research (Renner et al., 2012; Steptoe et al., 1995; Tuomisto et al., 1998), eating for social pressure was found to be a distinct motive, yet, the present study similarly showed that this category received relatively lower scores. In line with previous literature (e.g., Renner et al., 2012; Cleobury & Tapper, 2014) coping with negative emotions was identified as a reason for unhealthy food consumption. Nevertheless, although much research has been devoted to the role of coping with negative emotions on eating behavior (e.g., Van Strien et al., 1986), studies that integrate multiple factors (e.g., Renner et al., 2012), including the present study, found that this factor is reported relatively infrequently. Finally, the present study confirms that next to psychological reasons, physiological motives are important to be included as a separate factor as well (Renner et al., 2012).

In contrast, the reason that was found most important in the current study, namely, to enjoy a special occasion, has received little attention in previous research. Some previous studies included slightly similar concepts such as 'tradition' (Renner et al., 2012) or 'to be social' (Jackson et al., 2003). Nevertheless, while consuming unhealthy foods to enjoy a special occasion intuitively makes sense, remarkably, no studies are known that explicitly addressed such motive. As opposed to previous studies that mostly regarded eating behavior in general, the focus of the current study on unhealthy snacks probably contributed to the identification of this rather novel category. Unhealthy snack consumption, rather than eating behavior in general, is likely particularly associated with enjoying a special occasion, such as being at a party. Similarly, although some studies have included items that relate to the factor 'to reward oneself' (Renner et al., 2012), little research integrating multiple factors for eating has identified this as a distinct motive. Comparably, this factor might be especially relevant for unhealthy snacking rather than overall food consumption. These results stress the importance of adopting a specific focus on unhealthy snacking behavior as, evidently, reasons for eating behavior in general cannot unconditionally be applied to unhealthy snacking.

Regarding the differences in reasons for unhealthy snacking behavior based on participant characteristics, the most pronounced

effects were found for age, as most categories appeared more relevant for younger people. In line with this finding, age was also correlated to caloric intake, indicating that younger people in general consume more unhealthy snacks than older people. Additionally, in line with previous research (Cleobury & Tapper, 2014; Renner et al., 2012), it was found that many of the categories were more frequently reported by women than men. Probably, this reflects a general tendency from women to be more preoccupied with eating behavior than men and more inclined to provide a reason for their food consumption (Cleobury & Tapper, 2014; Renner et al., 2012). Specifically, the importance of consuming foods to cope with negative emotions for women rather than men has been described before (e.g., Cleobury & Tapper, 2014; Snoek, Van Strien, Janssens, & Engels, 2007; Steptoe et al., 1995). Coping with negative emotions was also found to be more relevant for people with higher BMI as well as for dieters, which might imply that consuming snacks for this reason is rather maladaptive. Yet, it has also been suggested that the self-perceived status of 'emotional eating' merely reflects concerns regarding one's eating behavior, rather than a proper trigger for food consumption (Cleobury & Tapper, 2014; Evers, de Ridder, & Adriaanse, 2009) and gender differences in emotional eating are not reflected in actual food intake (Adriaanse, Evers, Verhoeven, & De Ridder, 2014a).

The reasons identified in the present study demonstrate a remarkable large diversity, showing that a broad range of situations is mentioned as a reason to consume unhealthy snacks. These include opposite factors like experiencing positive affect and sadness, or having worked hard as well as having a day off. It has been suggested that if people are unaware of the triggers for their behavior, which is particularly the case when the behavior is performed automatically (i.e., when people have a habit of consuming unhealthy snacks; Verhoeven, Adriaanse, Evers, & De Ridder, 2012; Verplanken, 2006), people afterwards confabulate a plausible reason to explain their unhealthy behavior (Adriaanse, Weijers, De Ridder, De Witt-Huberts, & Evers, 2014b). The diversity of reasons in the present study reflect that most situations could serve as such an explanation. Another novel approach regards self-regulation failure (De Witt Huberts, Evers, & De Ridder, 2014) and suggests that before indulging in unhealthy eating, people may consciously take advantage of situations for unhealthy snacking in order to actively make up an explanation that justifies their unhealthy behavior. The present study confirms the broad range of reasons people can give for their unhealthy behavior and fits this perspective in the ease by which explanations can be thought of, as well as the seemingly arbitrary nature of the reasons that – either before or after indulgence – can be applied as an explanation (De Witt Huberts et al., 2014).

### Implications

By adopting a specific focus on unhealthy snacking behavior and by including a representative community sample, the present study provides information relevant to health interventions aiming to diminish unhealthy snack consumption relevant to a large audience. Hence, important implications for prevention research and health interventions aiming to change unhealthy food consumption might be drawn from the present study. Future research can benefit from the identified six reasons for unhealthy snacking, for example when using strategies where identification of personal obstacles or triggers is warranted, such as action and coping planning (e.g., Adriaanse et al., 2009; Gollwitzer, 1999) or mental contrasting techniques (e.g., Oettingen et al., 2001). Providing participants with a list comprising the six categories for unhealthy snacking can facilitate identification of personal triggers and can enhance the effectiveness of such strategies. Also, further research should be devoted to examine to role of enjoying a special occasion and on opportunity induced eating, as these categories were found highly relevant for

unhealthy snacking, but seem to have been overlooked in research so far.

Similarly, with regard to health interventions, when tailoring to one's personal circumstances is required, intervention developers could aim to include items that represent each of the six categories in order to reflect the main reasons for consuming unhealthy snacks applicable to a large audience. Furthermore, a stronger focus on enjoying a special occasion and on opportunity induced eating may be adopted as participants indicated these categories as relatively most important for unhealthy snacking. This could for instance be done by promoting the availability of healthy alternatives when celebrating an event, and on impulse control to combat opportunity induced eating (Cleobury & Tapper, 2014). Impulse control could, for instance, be achieved by including strategies that override the first impulse to grab an unhealthy snack and instead take an alternative (e.g., implementation intention such as: 'If I see or smell tempting food, then I will eat an apple.'; Adriaanse et al., 2009; Kroese, Adriaanse, Evers, & De Ridder, 2011).

Finally, with regard to clinical settings, professionals can benefit from the six categories that emerged in the current study when identifying problematic situations for unhealthy snacking behavior. For example, by providing people with a diary consisting of reasons for unhealthy snacking based on these six categories, they could facilitate people in identifying personally relevant obstacles or critical situations. Professionals working with overweight or obese patients as well as dieticians in general additionally could pay specific attention to unhealthy snacking to cope with negative emotions as this category was particularly affected by a higher BMI and dieting status.

### Limitations

It is important to also mention the limitations of the present study. Firstly, the present study showed a selective drop-out as non-completers were found to be younger and lower in BMI than completers. Also, it should be noted that BMI was retrieved from the LISS panel database, which was updated 4 months before the present data collection. This might have caused a potential discrepancy in the included and current BMI. These factors should be kept in mind when interpreting the results. Additionally, regarding dieting status, we did not distinguish between people who diet because of weight-loss purposes or for health or medical related reasons. Future research could establish whether differences exist between different types of dieters by including more elaborate measures of dieting status. Another important limitation is that the reasons for unhealthy snacking were obtained by self-report. Although this method ascertains that possible interventions will closely match the experiences of participants, this does not mean that the generated reasons accurately reflect the actual cause of unhealthy snacking behavior. In addition, although we did include a measure of unhealthy snack consumption, the relation between the different motives and unhealthy snack consumption cannot be interpreted straightforwardly, especially because we cannot relate the findings to how often people engage in unhealthy snacking. Reporting that a specific reason is more important for consuming unhealthy snacks does not imply that, overall, people will consume more unhealthy snacks, which might also explain the rather low correlations with caloric intake. For example, if people indicate that if they consume an unhealthy snack, this is often because they are at a party, but they are in this situation only irregularly, then overall, the intake will not increase that much. The other way around, if people consume snacks sometimes because they are watching TV, but they are in this situation every day, this still might affect their snack intake. In addition, the measure for unhealthy snack consumption was also self-reported and comprised only a single day. Although it will be challenging to examine the reasons for unhealthy food consumption in an

ecologically valid way without the use of self-report data, future research is needed to address this with more objective measures.

## Conclusions

To conclude, the present study generated insight into the reasons people give for consuming unhealthy snacks. Six distinct motives were identified which are applicable to a broad audience. To enjoy a special occasion and opportunity induced eating were most frequently reported as a reason for taking unhealthy snacks. Enjoying a special occasion is a novel motive for unhealthy snacking especially relevant to the consumption of unhealthy snacks. The present results emphasize the importance of targeting these motives in health interventions aimed at diminishing unhealthy food intake.

## References

- Adriaanse, M. A., De Ridder, D. T. D., & De Wit, J. B. F. (2009). Finding the critical cue. Implementation intentions to change one's diet work best when tailored to personally relevant reasons for unhealthy eating. *Personality and Social Psychology Bulletin*, 35, 60–71. doi:10.1177/0146167208325612.
- Adriaanse, M. A., Evers, C., Verhoeven, A. A. C., & De Ridder, D. T. D. (2014a). Investigating sex differences in psychological predictors of snack intake among a large representative sample. (submitted).
- Adriaanse, M. A., Weijers, J., De Ridder, D. T. D., De Witt-Huberts, J., & Evers, C. (2014b). Confabulating reasons for behaving bad. The psychological consequences of unconsciously activated behaviour that violates one's standards. *European Journal of Social Psychology*, 44, 255–266. doi:10.1002/ejsp.2005.
- Cleobury, L., & Tapper, K. (2014). Reasons for eating 'unhealthy' snacks in overweight and obese males and females. *Journal of Human Nutrition and Dietetics*, 27, 333–341. doi:10.1111/jhn.12169.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale: Lawrence Erlbaum.
- De Vet, E., Gebhardt, W. A., Sinnige, J., Van Puffelen, A., Van Lettow, B., & De Wit, J. B. F. (2011). Implementation intentions for buying, carrying, discussing and using condoms. The role of the quality of plans. *Health Education Research*, 26, 443–455. doi:10.1093/her/cyr006.
- De Vos, K. (2010). *Representativeness of the LISS panel 2008, 2009, 2010*. Tilburg: CentERdata.
- De Witt Huberts, J. C., Evers, C., & De Ridder, D. T. D. (2014). "Because I am worth it". A theoretical framework and empirical review of a justification-based account of self-regulation failure. *Personality and Social Psychology Review*, 18, 119–138. doi:10.1177/1088868313507533.
- Dutch Nutrition Centre. (2014). Caloriechecker. Retrieved January 10, 2014, from <https://mijn.voedingscentrum.nl/nl/caloriechecker/>.
- Evers, C., Adriaanse, M. A., De Ridder, D. T. D., & De Witt Huberts, J. C. (2013). Good mood food. Positive emotion as a neglected trigger for food intake. *Appetite*, 68, 1–7. doi:10.1016/j.appet.2013.04.007.
- Evers, C., de Ridder, D. T. D., & Adriaanse, M. A. (2009). Assessing yourself as an emotional eater. Mission impossible? *Health Psychology*, 28, 717–725. doi:10.1037/a0016700.
- Forslund, H. B., Torgerson, J. S., Sjöström, L., & Lindroos, A. K. (2005). Snacking frequency in relation to energy intake and food choices in obese men and women compared to a reference population. *International Journal of Obesity*, 29, 711–719. doi:10.1038/sj.ijo.0802950.
- Gollwitzer, P. M. (1999). Implementation intentions. Strong effects of simple plans. *American Psychologist*, 54, 493–503. doi:10.1037/0003-066X.54.7.493.
- Hagger, M. S., & Luszczynska, A. (2014). Implementation intention and action planning interventions in health contexts. State of the research and proposals for the way forward. *Applied Psychology: Health and Well-Being*, 6, 1–47. doi:10.1111/aphw.12017.
- Hermans, R. C., Larsen, J. K., Herman, C. P., & Engels, R. C. (2008). Modeling of palatable food intake in female young adults. Effects of perceived body size. *Appetite*, 51(3), 512–518. doi:10.1016/j.appet.2008.03.016.
- Jackson, B., Cooper, M., Mintz, L., & Albino, A. (2003). Motivations to eat. Scale development and validation. *Journal of Research in Personality*, 37(4), 297–318. doi:10.1016/S0092-6566(02)00574-3.
- Kroese, F. M., Adriaanse, M. A., Evers, C., & De Ridder, D. T. D. (2011). Instant Success'. Turning temptations into cues for goal-directed behavior. *Personality and Social Psychology Bulletin*, 37, 1389–1397. doi:10.1177/0146167211410889.
- Kroese, F. M., Adriaanse, M. A., Vinkers, C. D. W., Van de Schoot, R., & De Ridder, D. T. D. (2014). The effectiveness of a proactive coping intervention targeting self-management in diabetes patients. *Psychology & Health*, 1, 110–125. doi:10.1080/08870446.2013.841911.
- Lowe, M. R., Butryn, M. L., Didie, E. R., Annunziato, R. A., Graham Thomas, J., Crerand, C. E., et al. (2009). The Power of Food Scale. A new measure of the psychological influence of the food environment. *Appetite*, 53, 114–118. doi:10.1016/j.appet.2009.05.016.
- Oettingen, G., Pak, H. J., & Schnetter, K. (2001). Self-regulation of goal-setting. Turning free fantasies about the future into binding goals. *Journal of Personality and Social Psychology*, 80, 736–753. doi:10.1037/0022-3514.80.5.736.
- Osborne, J. W., & Fitzpatrick, D. C. (2012). Replication analysis in exploratory factor analysis. What it is and why it makes your analysis better. *Practical Assessment, Research & Evaluation*, 17.
- Piernas, C., & Popkin, B. M. (2010). Snacking increased among U.S. adults between 1977 and 2006. *Journal of Nutrition*, 140, 325–332. doi:10.3945/jn.109.112763.
- Prinsen, S., De Ridder, D. T. D., & De Vet, E. (2013). Eating by example. Effects of environmental cues on dietary decisions. *Appetite*, 70, 1–5. doi:10.1016/j.appet.2013.05.023.
- Renner, B., Sproesser, G., Strohbach, S., & Schupp, H. T. (2012). Why we eat what we eat. The Eating Motivation Survey (TEMS). *Appetite*, 59, 117–128. doi:10.1016/j.appet.2012.04.004.
- Snoek, H. M., Van Strien, T., Janssens, J. M., & Engels, R. C. (2007). Emotional, external, restrained eating and overweight in Dutch adolescents. *Scandinavian Journal of Psychology*, 48, 23–32. doi:10.1111/j.1467-9450.2006.00568.x.
- Sproesser, G., Schupp, H. T., & Renner, B. (2014). The bright side of stress-induced eating. Eating more when stressed but less when pleased. *Psychological science*, 25, 58–65. doi:10.1177/0956797613494849.
- Stepoe, A., Pollard, T. M., & Wardle, J. (1995). Development of a measure of the motives underlying the selection of food. The food choice questionnaire. *Appetite*, 25, 267–284.
- Stok, F. M., De Ridder, D. T. D., De Vet, E., & De Wit, J. B. F. (2014). Don't tell me what I should do, but what others do. The influence of descriptive and injunctive peer norms on fruit consumption in adolescents. *British Journal of Health Psychology*, 19, 52–64. doi:10.1016/j.adolescence.2011.06.004.
- Stunkard, A. J., & Messick, S. (1985). The three-factor eating questionnaire to measure dietary restraint, disinhibition and hunger. *Journal of Psychosomatic Research*, 29, 71–83.
- Tuomisto, T., Tuomisto, M. T., Hetherington, M., & Lappalainen, R. (1998). Reasons for initiation and cessation of eating in obese men and women and the affective consequences of eating in everyday situations. *Appetite*, 30, 211–222. doi:10.1006/appe.1997.0142.
- Van Strien, T., Frijters, J. E. R., Bergers, G. P. A., & Defares, P. B. (1986). The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior. *International Journal of Eating Disorders*, 5, 295–315.
- Verhoeven, A. A. C., Adriaanse, M. A., Evers, C., & De Ridder, D. T. D. (2012). The power of habits. Unhealthy snacking behaviour is primarily predicted by habit strength. *British Journal of Health Psychology*, 17, 758–770. doi:10.1111/j.2044-8287.2012.02070.x.
- Verplanken, B. (2006). Beyond frequency. Habit as mental construct. *British Journal of Social Psychology*, 45, 639–656. doi:10.1348/014466605X49122.