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The social image of food: Associations between popularity and eating behavior

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A B S T R A C T

One factor that determines what we eat and why we eat is our social environment. In the present research, two online studies examined the relationship between food intake and social images. Specifically, the present research assessed the relationship between the food intake university students ascribed to peers who varied in popularity and own self-reported food intake, and whether this relationship was moderated by identification with the peer group. Participants (N 97 in Study 1; N 402 in Study 2) were randomly presented with one of four (Study 1) or two of eight (Study 2) vignettes describing a popular or unpopular student (male or female) from their university without receiving any information about the peer's eating behavior. Subsequently, healthy and unhealthy eating ascribed to the peers and own self-reported eating behavior were assessed. Results indicated that popular peers were perceived to eat more healthily than unpopular peers. Moreover, eating behavior ascribed to popular peers were associated with own healthy and unhealthy eating. Importantly, the relationship between healthy eating behavior ascribed to popular peers and own healthy eating behavior was moderated by identification with the student group – the more participants identified with their peers, the more their own eating was aligned with the healthy eating ascribed to a popular peer. Hence, the popularity of others seems to shape perceptions of the food they eat and may facilitate healthy eating via social influence.

1. Introduction

Food consumption in contemporary western society is more than just providing the body with energy. Studies have identified a whole range of motivations for eating, showing that not only hunger, but also factors like the social environment play an important role in food choice. Several social motives that influence eating behavior have been identified, e.g. sociability, social norms, and social images (Renner, Sproesser, Strohbach, & Schupp, 2012). These social cues provide a guide on what and how much to eat is correct or acceptable in certain situations (Higgs & Thomas, 2016). The current study explores whether the popularity of peers moderates the influence social motives have on eating behavior.

During childhood and early adolescence, parents act as nutritional gatekeepers (Wansink, 2006) by determining a substantial amount their children's food intake, from being breast- or bottle-fed, to adopting an adult diet (Savage, Fisher, & Birch, 2007). This process invariably shapes children's food preferences (Pliner & Stallberg-White, 2000); however, influences from other sources within the proximal social environment (e.g. friends and classmates) increase as children and adolescents grow older and become more independent. Peer groups are especially influential regarding snacks (Feunekes, de Graaf, Meyboom, & van Staveren, 1998) and fast food (Ali, Amialchuk, & Heiland, 2011) as they are consumed outside of the family home. As young adults who move away from home and transition to university build new social connections and become responsible for their daily food supply and intake for the first time, they may seek guidance outside of their parents (Deliens, Clarys, De Bourdeaudhuij, & Deforche, 2014) as well as being encouraged to conform to the social environment (Gall, Evans, & Bellerose, 2000; see also LaCaille, Dauner, Krambeer, and Pedersen (2011) for a qualitative study). Recent studies confirm this notion, showing college students' eating behavior to be

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associated with both their families' and their friends' food consumption patterns in different food choice contexts, such as purchasing, preparing, and consuming fruits and vegetables (Graham, Pelletier, Neumark-Sztainer, Lust, & Laska, 2013; Pelletier, Graham, & Laska, 2014). Thus, family, friends, and peers all influence eating behavior by setting eating-related rules and norms that convey which behaviors are appropriate and/or expected of members of their social group (Lien, Lytle, & Klepp, 2001; Pliner & Stallberg-White, 2000).

1.1. Using social influences to change eating behavior

Alongside cross-sectional and field studies, which have established that the proximal social environment influences eating behavior, health behavior models like the Theory of Planned Behavior indicate the effect of social influences, like subjective norms (TPB; Ajzen, 1991). Reviews summarizing results on predicting dietary behavior using the TPB show moderate correlations between subjective norms and behavioral intention across the lifespan (McDermott et al., 2015; McEachan, Conner, Taylor, & Lawton, 2011). Moreover, experimental studies have shown that eating-related norms can be used to influence eating behavior, e.g. to increase fruit and vegetable intake (Stok, de Ridder, de Vet, & de Wit, 2014; Stok, de Vet, de Ridder, & de Wit, 2012; Stok et al., 2015) or reduce high calorie snack (Robinson, Harris, Thomas, Aveyard, & Higgs, 2013) and soft drink consumption (Stok et al., 2015) in adolescents and young adults. Recent meta-analyses and reviews consistently report medium effects of social norm interventions on eating behavior (Robinson, 2015; Robinson, Thomas, Aveyard, & Higgs, 2014; Stok, de Vet, de Ridder, & de Wit, 2016), and these findings corroborate the results of meta-analyses investigating the correlation between social norms and behavioral intention in the Theory of Planned Behavior (e.g. McDermott et al., 2015; Rivis & Sheeran, 2003). These effects are usually tested by providing information about the peer group's behavior (descriptive norm) or approval of a behavior (injunctive norm).

1.2. Who is influential?

Besides leveraging social norms in experimental studies and health behavior interventions, social norms are used in food advertisements. Celebrities, athletes, and cartoon characters usually appear in TV commercials, printed advertisements, and food packaging promoting unhealthy products (e.g. de Droog, Valkenburg, & Buijzen, 2010; Harris, Schwartz, & Brownell, 2010; Henderson & Kelly, 2005; Kelly et al., 2010; Pringle & Binet, 2005), thus communicating social norms, roles, and images alongside product information (Pollay & Mittal, 1993). As many unhealthy food products are advertised by popular public persons who may be used as role models (Martin & Bush, 2000), the question arises whether being successful and popular is generally associated with an unhealthy diet due to associations shaped by advertising. On the other hand, most celebrities and athletes are thin and fit, thus their popularity might also be associated with a healthy lifestyle. Either way, people may emulate the displayed behavior in the hope of assuming the associated social attributes (Higgs, 2015; Hogg & Banister, 2001). Similar influences might also become evident in the increasing number of popular food bloggers and youth displaying their food choices online on photo-sharing services like Instagram, further shaping associations between food consumption and social appeal (Holmberg, Chaplin, Hillman, & Berg, 2016).

Research has examined the association between descriptions of social appeal and eating behavior by providing participants with a description of a person's eating habits and a subsequent questionnaire on personality traits including items assessing the prototype's social standing. However, such studies have so far reported mixed results on the relationship between described food preferences or food intake and perceived social appeal: While healthy eaters are perceived as being more intelligent, dutiful, and moral, they are also perceived as being less sociable and friendly (for a review, see Vartanian, Herman, & Polivy, 2007). Oakes and Slotterback (2004) compared personality ratings for eaters of two types of breakfast, a healthy oatmeal and an unhealthy pie. Adult oatmeal eaters generally are ascribed more positive attributes, e.g. being more successful, attractive, and popular, while adult pie eaters are seen as, amongst other things, more undisciplined, selfish, lazy, and overindulgent.

While a range of studies have investigated expectations about personality or popularity based on eating styles, few explore expectations about a person's diet based on a description of their popularity. In a field study asking school children to indicate the most popular and unpopular children in their class and their eating behavior, Giese, Juhász, Schupp, and Renner (2013) found that popular children were perceived to eat more healthily than their unpopular classmates. However, it remains open whether these findings can be generalized to other populations or broader referent groups, e.g. all school aged children, as it requires inferring a peer's behavior using perceived norms rather than observed behavior (Robinson, 2015).

1.3. Who is influenced? The role of identification with the referent group

Besides the relationship between popularity and perceived healthier food choices, Giese et al. (2013) reported an association between the intake of unhealthy foods ascribed to the popular peer and own food preferences and intake. While this study did not account for personal moderators of this relationship, the literature suggests that identification with the referent group (e.g. the school class or school children in general) might moderate whether one is prone to being influenced by a certain social group. As summarized in a recent review, identification with the referent group moderates the relationship between descriptive social norms and food intake: Adolescents and young adults who identify with the given referent group are more likely to adapt their behavior to that of the referent group (Stok et al., 2016). Moreover, people may be more willing to behave according to a group's rules and norms when a perceived connection to the same social group exists, (Ajzen, 1991; Haslam, Jetten, Postmes, & Haslam, 2009; Turner, 1991). Which behavior is exhibited may therefore depend on the salient social identity as the identity highlights the norms that might be most important to oneself in the current social setting (Higgs & Thomas, 2016). Adolescents and young adults might be more prone to social influences than older adults because they are still forming their identities and want to fit in with the peer group to create social connections (Steinberg & Monahan, 2007; Stok, de Ridder, Adriaanse, & de Wit, 2010).

1.4. Present research

Extending the literature, the current research aimed to investigate the relationship between the popularity of a peer, the food consumption ascribed to the peer, and own eating behavior in university students. In line with previous studies on the relationship between eating behavior and social appeal (e.g. Gerrits, de Ridder, de Wit, & Kuijer, 2009), peers in the context of the present research are defined as people in the same living context (i.e. university students) without assuming a personal relationship.

In Study 1, we first investigated whether vignettes describing a peer's popularity, but lacking any information on their eating behavior, would elicit differential expectations about their food consumption. Additionally, we explored whether these expectations were also associated with the participants' food consumption. Study 2 began by replicating these popularity based, differential ascriptions of healthy and unhealthy snacking using a larger sample from across Germany. Here, we examined the relationship between the expectations elicited by the vignettes and the participants' own snacking, tested whether this relationship was moderated by the peer's popularity, and investigated who was especially influential. Finally, we tested whether the association between the snacking ascribed to the peer and own snacking was moderated by identification with the referent group to examine who is especially prone to social influences. The vignette method was chosen because of its more implicit nature than questionnaires, which may not fully capture subtle or unconscious influences the social environment may exert on behavior (Nolan, Schultz, Cialdini, Goldstein, & Griskevicius, 2008).

2. Study 1

2.1. Methods

2.1.1. Participants

A total of $N = 153$ participants were recruited online in the summer of 2014. Links to the online experiment were posted in Facebook groups and on a German online career network for students as well as distributed via student mailing lists. Several participants had to be excluded because 1) they indicated that they just wanted to look at the pages and would not respond seriously ($n = 17$), 2) they left the experiment before they were assigned to an experimental condition ($n = 22$), 3) they had missing data on all variables relevant to data analysis ($n = 16$), or 4) missing data in the seriousness check ($n = 1$).

A final sample of $N = 97$ participants was included in the analysis (74% female). The students (78% of the sample) represented a wide range of academic majors, including Psychology (39.7%), Law (5.5%), and Mathematics (5.5%). All other majors each represented less than 5% of participants. Non-student participants represented a range of occupations including academic staff at a university (19%), computer scientist (14%), office worker (10%), physiotherapist (10%), and psychologist (10%). Other occupations represented less than 10% each, and two participants refrained from indicating their current occupation. Median age was 20–25 years. Participants did not receive any compensation.

2.1.2. Design and procedure

The experiment used a 2 × 2 between-subjects design. The independent variables were Peer Gender (male/female) and Peer Popularity (popular/unpopular) of a described peer. Data was collected online using Wextor (Reips & Neuhaus, 2002).

The first page contained a short introduction and a seriousness check in which participants had to indicate whether they wanted to participate in the experiment and respond in a serious manner (Musch & Klauer, 2000; Reips, 2002). After demographics were assessed, participants were randomly presented with one of the four vignettes describing a peer having either the same or different gender from the participant. They were asked to fill out the questions that served as a manipulation check before the peer's and their own food consumption were assessed. In the end, further demographic information was assessed.

2.1.3. Materials

Peer vignettes. Four brief vignettes were developed to manipulate the peer's popularity and gender (for similar procedures, see e.g. Blanton et al., 2001; Gibbons et al., 2004). In the vignettes, a prototypical student from the participant's university was described based on five attributes connected to his/her social appeal (see also König et al., 2014). The student in the vignette was described based on his/her number of friends (high or low), popularity (popular or unpopular), agreeableness (friendly or unfriendly), cooperativeness (high or low), membership in a student group (yes or no), and whether he/she spends his/her free time with friends (yes or no) with the former statements describing popularity and the latter describing unpopularity. The selection of the attributes was based on previous literature (e.g. LaFontana & Cillessen, 1998, 2002) and focus groups. As actual food intake and therefore expectations about consumption might differ between genders, separate vignettes were developed to represent female (Katharina) and male (Christian) peers, but otherwise remained identical. The names were chosen from national ranking lists of popular names in the late 1980s and had an equal number of letters to avoid differences in ratings due to the names (Leirer, Hamilton, & Carpenter, 1982; Mehrabian & Piercy, 1993).

Manipulation check. To ensure that the manipulation was successful participants were asked whether the described student was cool or uncool, popular or unpopular, clever or unintelligent, and good or bad looking on seven-point semantic differentials ranging from 0 to 6. In addition, participants had to indicate whether the described student could be one of his/her (best) friends on a seven-point Likert scale from (0) totally agree to (6) totally disagree. Data was recoded to make sure that higher values represented higher popularity and then aggregated to obtain mean perceived popularity ($M = 2.49$, $SD = 1.20$, $\alpha = 0.82$).

Food consumption. Participants reported their own food consumption as well as the perceived food consumption of the peer presented in the vignette using a food frequency approach (Willett et al., 1985) by indicating how often they and the peer consumed salad and raw vegetables, cooked vegetables, fresh fruits, chocolate, cake, and sweets on a six-point Likert scale from (0) nearly every day to (5) never. Data was recoded so that higher values indicated more frequent consumption. The items salad and raw vegetables, cooked vegetables, and fresh fruits were aggregated to obtain scores for the healthy food consumption ascribed to the peer and the participants' own healthy food consumption ($M_{own} = 3.81$, $SD_{own} = 1.10$, $\alpha_{own} = 0.70$; $M_{Peer} = 2.88$, $SD_{Peer} = 1.07$, $\alpha_{Peer} = 0.84$). The items chocolate, cake, and sweets were aggregated to obtain scores for unhealthy food consumption ($M_{own} = 2.34$, $SD_{own} = 1.01$, $\alpha_{own} = 0.56$; $M_{Peer} = 2.72$, $SD_{Peer} = 0.93$ $\alpha_{Peer} = 0.82$). For the regression analysis, the aggregates were z-standardized.

Demographic variables. Participants were asked to indicate their gender with the possibility to refuse. They indicated their age group in steps of five, beginning with 10–15 and ranging up to 65 and older. In the end, participants indicated whether they were students and what they were currently studying or what profession they currently held.

2.1.4. Data analysis

Data were analyzed using SPSS 22 (IBM Corp., released 2013). Missing values were below 2.5% for all variables. For the manipulation check and the food consumption ascribed to the peer, 2 *Peer Popularity* x 2 *Peer Gender* between-subjects ANOVAs were conducted. Further exploratory analyses on the relationship between food consumption ascribed to the peer and own food consumption were conducted using linear step-wise regressions.

2.2. Results

2.2.1. Manipulation

To test whether the popularity manipulation was successful and

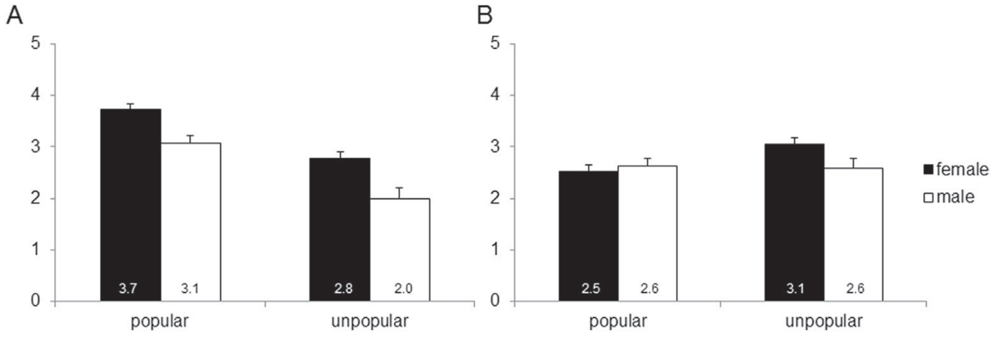

Fig. 1. A) Healthy food consumption ascribed to the peer by peer popularity and peer gender. B) Unhealthy food consumption ascribed to the peer by peer popularity and peer gender. Error bars represent the standard error of the mean.

whether it differed between genders, a *Peer Popularity* (popular/unpopular) x *Peer Gender* (female/male) between-subjects ANOVA was conducted for the manipulation check score. There was a significant main effect for Peer Popularity ($F(1, 93) = 355.64$, $p < 0.001$, *partial* $\eta^2 = 0.79$). Peers that were described as being popular were perceived as significantly more popular than peers described as being unpopular ($M_{popular} = 4.47$, $SD_{popular} = 0.64$; $M_{unpopular} = 1.86$, $SD_{unpopular} = 0.72$). Neither the main effect for Peer Gender nor the interaction between Peer Popularity and Peer Gender reached significance ($Fs(1, 93) \leq 1.43$, $ps \geq 0.235$). Thus, the manipulation of popularity was successful.

2.2.2. Food consumption ascribed to the peer

Subsequently, a between-subjects *Peer Popularity* (popular/unpopular) x *Peer Gender* (female/male) ANOVA was conducted to test whether the consumption of healthy and unhealthy food ascribed to peers differed based on the peer vignette participants received (for a summary, see Fig. 1). For healthy food consumption ascribed to peers, there was a significant main effect for Peer Popularity ($F(1, 93) = 29.94$, $p < 0.001$, *partial* $\eta^2 = 0.24$), indicating that a more frequent consumption of healthy food was ascribed to popular peers compared to unpopular peers ($M_{popular} = 3.38$, $SD_{popular} = 0.85$; $M_{unpopular} = 2.42$, $SD_{unpopular} = 1.07$). Moreover, a significant main effect for Peer Gender emerged ($F(1, 93) = 15.24$, $p < 0.001$, *partial* $\eta^2 = 0.14$), where more frequent healthy food consumption was ascribed to female peers compared to male peers ($M_{female} = 3.20$, $SD_{female} = 1.05$; $M_{male} = 2.56$, $SD_{male} = 1.01$). No significant interaction between Peer Popularity and Peer Gender was found ($F(1, 93) = 0.10$, $p = 0.751$). Regarding unhealthy food consumption ascribed to the peer, there were no significant main effects or interactions ($Fs(1, 93) \leq 2.40$, $ps \geq 0.125$).[1]

2.2.3. Exploratory analyses: associations between food consumption ascribed to the peer and own food consumption

The relationship between healthy and unhealthy food consumption ascribed to the peer and own food consumption was explored using stepwise linear regressions in SPSS: Own gender and peer popularity were included in a first step, healthy and unhealthy food consumption ascribed to the peer in a second step, and the interaction between peer popularity and food consumption ascribed to the peer were included in a third step (for a summary and statistical values, see Table 1).

For own healthy food consumption, there was a significant positive association with healthy food consumption ascribed to the peer that remained significant when including the interaction, indicating that the self-reporting of more frequent, healthy food consumption was related to perceiving the peer to frequently consume healthy food. The interaction itself did not reach significance. For own unhealthy food consumption, there also was a significant positive association with the unhealthy food consumption ascribed to the peer after including the interaction. The interaction effect was marginally significant. This finding was followed up using simple effects as recommended by Aiken and West (1991) to test the relationship between the unhealthy food consumption ascribed to the peer and own unhealthy food consumption separately for popular and unpopular peers. For popular peers, the unhealthy food consumption ascribed to the peer was significantly related to own unhealthy food consumption ($\beta = 0.32$, $p = 0.029$), while for unpopular peers, this relationship did not reach significance ($\beta =$ 0.03, $p = 0.815$).

3. Study 2

Study 1 demonstrated that short descriptions of a popular or unpopular student might elicit differential expectations about that student's food intake. Exploratory analyses yielded positive associations between food consumption ascribed to the peer and participants' own eating behavior. Study 2 first aimed to replicate these findings. Based on the results of Study 1, it was expected that popular students would be perceived to snack more healthily than unpopular students. Second, it aimed to follow up on the specific associations between the snacking ascribed to the peer and own snacking in a larger sample recruited across Germany with a focus on differential associations between own snacking and snacking ascribed to popular and unpopular peers. It was hypothesized that the snack consumption ascribed to popular peers would be associated with own snack consumption, while no relationship between the snack consumption ascribed to unpopular peers and own snack consumption was expected. Third, identification with the student group was taken into account to test for potential moderations as suggested in the literature (c.f. Stok, de Ridder, de Vet, & de Wit, 2012), allowing the study to combine information about influential individuals in the referent group (popular vs unpopular students) and identification with the referent group. Regarding identification, it was hypothesized that the relationship between the snacking ascribed to the peer and own snacking would be stronger for participants who identified strongly with the referent group. To further improve on the design of Study 1, only

[1] Control analyses revealed that the non-student subsample was significantly older than the student subsample. Manipulation was successful for both subsamples. Regarding popularity and gender differences in food intake ascribed to the peer, effects were comparable for the student and the non-student subsample. Only the gender main effect for healthy food consumption ascribed to the peer did not reach significance for the non-student subsample, which might be due to the lack of statistical power.

Table 1
Results of the stepwise regression analysis for own healthy and unhealthy food consumption.

	Own healthy food consumption			Own unhealthy food consumption		
	β	SE(β)	ΔR^2	β	SE(β)	ΔR^2
Step 1			0.03*			0.03
Constant	0.109	0.164		0.076	0.164	
Own gender	0.430	0.245		0.133	0.245	
Peer popularity	0.048	0.208		0.079	0.202	
Step 2			0.07*			0.02
Constant	0.088	0.159		0.070	0.163	
Own gender	0.384	0.238		0.112	0.244	
Peer popularity	0.034	0.202		0.079	0.207	
Food consumption ascribed to peer[a]	0.270*	0.102		0.140	0.102	
Step 3			0.00			0.03
Constant	0.085	0.161		0.059	0.162	
Own gender	0.378	0.241		0.076	0.243	
Peer popularity	0.033	0.203		0.072	0.205	
Food consumption[a] ascribed to peer	0.291⁺	0.146		0.320*	0.145	
Food consumption[a] ascribed to peer x popularity	0.041	0.206		0.352⁺	0.203	

Note. ⁺ $p < 0.10$, *$p < 0.05$. Gender: 0 = female, 1 = male. Popularity: 0 = popular, 1 = unpopular.
[a] The same food category was included for peer-ascribed and own consumption.

students were recruited for Study, 2 as the 22% of participants who were not students might not have identified with the presented vignettes. Furthermore, only the consumption of snack foods was assessed to ensure the comparability of healthy and unhealthy foods. Moreover, a second set of vignettes using similar attributes was developed so that more than one vignette could be shown to the participants.

3.1. Methods

3.1.1. Participants

In the spring of 2015, a total of $N = 496$ participants were recruited to take part in an online diary study on eating behavior of students. They were recruited via student mailing lists and in online communities such as Facebook. Several participants had to be excluded because: 1) they left the study before filling in any information ($n = 32$), 2) they left the study before they were assigned to an experimental condition ($n = 43$), 3) they indicated that they were currently employed and thus did not belonged to the target population ($n = 15$), or 4) missing data on all variables relevant to data analysis ($n = 4$).

A final sample of $N = 402$ participants was included in the analysis. Seventy-one percent of the sample was female. Their median age was 23 ($M = 23.35$, $SD = 3.42$) years and their mean Body Mass Index (BMI) was in a normal range ($M = 22.56$, $SD = 3.59$, ranging from 15.53 to 40.57). The participants represented a wide range of academic majors including Medicine (15.4%), Psychology (12.4%), Biology (9.7%), and teacher training programs with several combinations of subjects (9.7%). Other majors were each indicated by less than 5% of participants. As an incentive to participate, a lottery was held in which 20 participants received a 10€ online shopping voucher.

3.1.2. Design and procedure

The study used a 2 × 2 within-subjects design. *Peer Gender* (female/male) and *Peer Popularity* (popular/unpopular) of a described peer were manipulated in short vignettes, and each participant received two vignettes. Data was collected online using Unipark (questback, 2015).

The study commenced with participants reading about the purpose and the procedure of the study, their right to withdraw their participation at any point, and the compensation lottery in accordance with the ethical guidelines of the German Psychological Association (DGPs). Participants filled out questions on various psychosocial variables before they were presented with two of the eight vignettes. It was assured that participants did not receive two vignettes with the same combination of independent variables (e.g. a popular female). Again, all participants were able to receive vignettes of their own or the opposite gender; and participants did not receive any information about the peer's food intake. Participants indicated their perception of the peer's snack preference and snack consumption directly after reading each vignette. Afterwards, they indicated their own snack preferences and consumption and were able to enter their email address in order to take part in the diary study and the lottery. Participants received short questionnaires asking for their snack and fruit consumption for the previous day for the three subsequent days.[2] In the present article, we focus on the snacking ascribed to the peer and own snacking reported in the main questionnaire.

3.1.3. Materials

The following measures were included in the current analysis. Correlations between the variables are listed in Table 2.

Peer vignettes. In addition to the four vignettes used in Study 1, four more vignettes were created based on the same attributes (number of friends, popularity, sociability, cooperativeness, spending time with friends, volunteering) so that more than one vignette could be presented to each participant. Again, the described students could be either female (Franziska/Katharina) or male (Alexander/Benjamin) and their names stemmed from national ranking lists of popular names in the late 1980s and had a comparable number of characters. To ensure that there were no differences in the consumption frequency of fruits and sugary snacks ascribed to the peer based on their name, a pilot study was conducted with $N = 21$ participants. There were no differences in food consumption ascribed to Franziska and Katharina or Alexander and Benjamin, respectively (female, healthy: $F(1, 16) = 0.19$, $p = 0.671$; female, unhealthy: $F(1, 17) = 1.41$, $p = 0.251$; male

[2] Thirty-two percent of participants did not take part in the diary surveys, and an additional 12% did not fill out all three diary surveys. In addition to this insufficient retention rate, a dropout analysis revealed that the dropout sample had a significantly higher BMI than participants who filled out all three diary surveys ($t(391) = 2.59$, $p = 0.010$, $d = 0.26$; $M_{dropout} = 23.08$, $SD_{dropout} = 3.73$; $M_{all\ diaries} = 22.14$, $SD_{all\ diaries} = 3.44$). As the subpopulation who completed the dietary recalls was not representative of the whole study population, the results from the dietary recalls could not be interpreted in the same vain as other study results. Therefore, the dietary recalls will not be analyzed further in the present publication.

Table 2
Correlations between study variables.

		2	3	4	5	6	7	8	9	10	11	12
1	Own healthy snacking	0.03	0.20***	0.14*	0.15*	0.16**	0.19**	0.21**	0.15*	0.10	0.00	0.03
2	Own unhealthy snacking		0.09	0.05	0.19**	0.09	0.11*	0.06	0.20**	0.11	0.08	0.11*
3	Healthy snacking ascribed to popular peer			0.47**	0.31**	0.27**	0.80**	0.60**	0.36**	0.26**	0.03	0.04
4	Healthy snacking ascribed to unpopular peer				0.64**	0.48**	0.73**	0.85**	0.65**	0.39**	0.09	0.13*
5	Unhealthy snacking ascribed to popular peer					0.69**	0.27**	0.74**	0.88**	0.84**	0.10	0.03
6	Unhealthy snacking ascribed to unpopular peer						0.36**	0.47**	0.90**	0.93**	0.03	0.04
7	Healthy snacking ascribed to female peers							0.36**	0.38**	0.17**	0.07	0.09
8	Healthy snacking ascribed to male peers								0.69**	0.42**	0.04	0.07
9	Unhealthy snacking ascribed to female peers									0.74**	0.04	0.04
10	Unhealthy snacking ascribed to male peers										0.01	0.09
11	Identification with reference group											0.07
12	Own gender											

Note. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; own gender: 0 = female, 1 = male.

healthy: $F(1, 15) = 0.47$, $p = 0.503$; male unhealthy: $F(1, 15) = 0.00$, $p = 0.960$).

Manipulation check. Following the procedure in Study 1, participants were asked whether the peer was cool or uncool, popular or unpopular, clever or unintelligent, and good or bad looking on five-point semantic differentials after having read the vignette. Furthermore, they indicated whether the described student could be one of his/her (best) friends on a five-point Likert scale ranging from (1) totally agree to (5) totally disagree. Data was recoded to make sure that higher values represented higher popularity and then aggregated to obtain the mean perceived popularity ($M = 3.10$, $SD = 0.55$, $\alpha = 0.77$).

Snack consumption. Snacking was assessed using three fruits and three sugary snacks. For fruits, apples, bananas, and oranges were selected as the most common fruits consumed in Germany and harvested worldwide (Bundesministerium für Ernährung und Landwirtschaft, 2013; Food and Agriculture Organization of the United Nations, 2015). Candy bars, cookies, and wine gums were chosen as examples for most common sugary snacks in Germany (Association of the German Confectionery Industry, 2015). Participants were asked to indicate how often the peer/they themselves consumed these six snacks per week and how much the peer/they themselves would consume per occasion, following the procedure by Haftenberger et al. (2010). Due to technical malfunction, data for the amount of snacks consumed was not recorded for the self, so only the consumption frequency is reported in this article. Weekly consumption frequency was assessed on a nine-point Likert scale ranging from (1) never to (9) more than five times a day. Frequency data was recoded and aggregated to yield weekly snacking for healthy ($M_{Self} = 9.08$, $SD_{Self} = 8.13$, $\alpha_{Self} = 0.46$; $M_{Peer} = 11.02$, $SD_{Peer} = 12.33$, $\alpha_{Peer} = 0.91$) and unhealthy snacks ($M_{Self} = 4.91$, $SD_{Self} = 5.37$, $\alpha_{Self} = 0.42$; $M_{Peer} = 12.14$, $SD_{Peer} = 13.60$, $\alpha_{Peer} = 0.92$). The aggregates were z-standardized for the regression analyses.

Identification with student group. To assess whether the participants identified with the student population of their university, identification with the student group was assessed with three items ("I identify with the students of my university.", "I feel a connection to the students of my university.", "I see myself as a typical student of my university.", c.f. Sparks and Shepherd (1992); Stok, Verkooijen, de Ridder, de Wit, and de Vet (2014)) on a five-point Likert scale ranging from (1) not at all (5) exactly true ($M = 3.01$, $SD = 0.89$, $\alpha = 0.82$).

Demographics and anthropometrics. Participants were asked to indicate their age and gender. BMI was calculated from self-reported height and weight. Furthermore, participants indicated their current occupation ((1) employed, (2) attending vocational training, (3) student, (4) unemployed, (5) retired, (6) homemaker).

3.1.4. Data analysis

Data was analyzed using R 3.2.0 (with package nlme 3.1–120) and MPlus 7.1 (Muthén & Muthén, 2012). Missing values ranged from 0% for gender and identification with the student group to 27.1% for healthy and unhealthy snack consumption ascribed to unpopular peers due to the randomization to two of the eight vignettes (Graham, Hofer, & MacKinnon, 1996). For the manipulation check and the associations of popularity and gender with snacking ascribed to the peer, multilevel regressions were conducted in R. Full information maximum likelihood (FIML) estimates were applied for missing values using MPlus. In step-wise linear regressions, the associations between healthy and unhealthy snacking ascribed to the peer and own snacking were tested.

3.2. Results

3.2.1. Manipulation check

First, it was tested whether the popularity manipulation was successful using linear mixed modeling. Peer Gender (female/male) and Peer Popularity (popular/unpopular) were entered as independent variables, and perceived popularity was entered as the dependent variable. A main effect for Peer Popularity emerged ($\chi^2(1) = 708.84$, $p < 0.001$, $r = 0.92$) with the peers described as popular being perceived as significantly more popular than the peers described as unpopular. There was neither a main effect for Peer Gender nor an interaction between Peer Popularity and Peer Gender ($\chi^2s(1) \leq 3.03$, $ps \geq 0.081$). Popularity was thus successfully manipulated.

3.2.2. Snack consumption ascribed to the peer

Differences in snacking ascribed to the peer between peers were tested using linear mixed modeling. The peers' gender and popularity were entered as independent variables and healthy and unhealthy snacking ascribed to the peer as dependent variables, respectively. For healthy snacking, the main effect for Peer Gender was significant ($\chi^2(1) = 10.48$, $p = 0.001$, $b =$ 1.02, $r = 0.29$). A more frequent consumption of healthy snacks was ascribed to female peers compared to male peers (see Fig. 2A). There was neither a significant main effect for Peer Popularity nor a significant interaction ($\chi^2s(1) \leq 0.56$, $ps \geq 0.454$, $bs \leq |0.24|$).

For unhealthy snacking ascribed to the peer, main effects for Peer Gender ($\chi^2(1) = 13.09$, $p < 0.001$, $b = 1.31$, $r = 0.33$) and Peer Popularity ($\chi^2(1) = 17.16$, $p < 0.001$, $b =$ 1.50, $r = 0.27$) emerged. A more frequent unhealthy snacking was ascribed to males compared to females and a more frequent unhealthy snack consumption was ascribed to unpopular peers compared to popular peers (see Fig. 2B). There was no significant interaction of Peer Popularity and Peer Gender ($\chi^2(1) = 3.32$, $p = 0.068$, $b =$ 0.66).

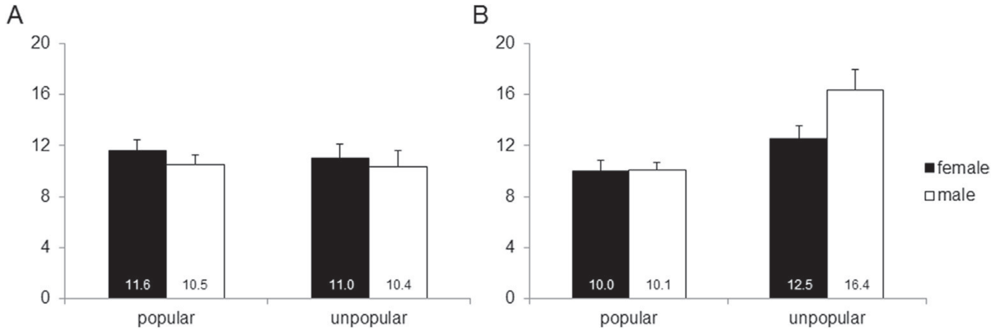

Fig. 2. A) Healthy snack consumption ascribed to the peer by peer popularity and peer gender. B) Unhealthy snack consumption ascribed to the peer by peer popularity and peer gender. Error bars represent the standard error of the mean.

3.2.3. Associations between snacking ascribed to the peer and own snack consumption

Associations between snacking ascribed to popular and unpopular peers and own snack consumption and moderation by identification with the student group. To explore the associations between the snacking ascribed to the peer and the participants' own snacking, linear regressions were conducted. First, the association between the snacking ascribed to popular an unpopular peers and own snacking were examined separately for healthy and unhealthy snacking. To account for a possible moderation of identification with the student group, interactions of the snacking ascribed to popular and unpopular peers and self-identification were included in the model (for a summary, see Table 3).

For healthy snacking, a positive association between the snacking ascribed to popular peers and own snacking emerged ($\beta = 0.25$, $p = 0.001$). In addition, there was a marginally significant moderation of this relationship by identification ($\beta = 0.11$, $p = 0.050$). Simple effects revealed the positive association between the healthy snacking ascribed to the popular peers and own healthy snacking was stronger for participants who identified more with the student group (+1SD; $\beta = 0.36$, $p = 0.003$) than for participants who identified less with the student group (1SD; $\beta = 0.14$, $p = 0.022$) (see also Fig. 3).

For unhealthy snacking, there was a significant positive association between the snacking ascribed to popular peers and own snacking ($\beta = 0.24$, $p < 0.001$). However, no moderation by identification with the student group was found for unhealthy snacking ($\beta s \leq 0.0.09$, $ps \geq 0.175$).

Associations between snacking ascribed to female and male peers and own snack consumption. Second, gender effects were examined by linear regressions, with snacking ascribed to female and male peers as independent variables and own snacking as the dependent variable. Again, models were computed separately for healthy and unhealthy snacking. Possible interactions with the participants' gender were accounted for by computing models overall as well as separately for female and male participants (for a summary, see Table 4).

For healthy snacking, the positive associations between own snack consumption and the snack consumption ascribed to both female and male peers were significant (female peers: $\beta = 0.16$, $p = 0.019$; male peers: $\beta = 0.15$, $p = 0.013$). However, the positive association with snack consumption ascribed to female peers only reached significance in the female subsample ($\beta = 0.42$, $p < 0.001$), and the snack consumption ascribed to male peers was only

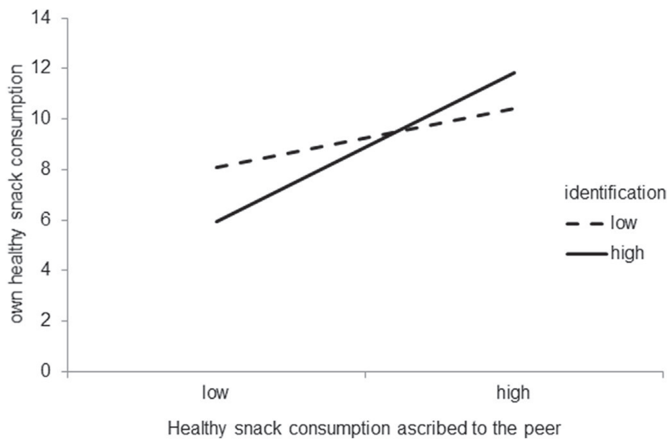

Fig. 3. The interaction effect of healthy snack consumption ascribed to the peer and identification with the student group on own weekly healthy snack consumption frequency. Simple slope effects for |1SD| for both healthy snacking ascribed to the peer and identification.

Table 3
Results of the regression analysis for own healthy and unhealthy snacking by the peers' popularity and self-identification.

	Own healthy snacking		Own unhealthy snacking	
	β	SE β	β	SE β
Constant	0.006	0.051	0.001	0.036
Own gender	0.044	0.052	0.080	0.036
Identification with peer group	0.021	0.054	0.060	0.037
Snacking[a] ascribed to popular peer	0.253**	0.078	0.244***	0.057
Snacking[a] ascribed to unpopular peer	0.035	0.083	0.061	0.060
Identification x snacking[a] ascribed to popular peer	0.109*	0.056	0.025	0.062
Identification x snacking[a] ascribed to unpopular peer	0.119	0.093	0.088	0.065
R^2		0.070		0.080

Note. *$p \leq 0.05$, **$p < 0.01$, ***$p < 0.001$. Own gender: 0 = female, 1 = male.
[a] The same snack category was included for snacking ascribed to the peer and own snacking.

Table 4
Results of the regression analyses for own healthy and unhealthy snacking by the peers' gender.

	Own healthy snacking						Own unhealthy snacking					
	Total ($N = 386$)		Females ($n = 274$)		Males ($n = 112$)		Total ($N = 387$)		Females ($n = 275$)		Males ($n = 112$) [a]	
	β	SE β	β	SE β	β	SE β	β	SE β	β	SE β	β	SE β
Constant	0.868	0.091	0.729	0.119	0.791	0.143	0.740	0.083	0.708	0.101	0.954	0.152
Snacking[b] ascribed to female peers	0.164*	0.070	0.421***	0.093	0.056	0.114	0.253**	0.091	0.226*	0.090	0.512*	0.238
Snacking[b] ascribed to male peers	0.147*	0.059	0.060	0.094	0.194*	0.096	0.045	0.084	0.052	0.089	0.211	0.227
R^2	0.07		0.15		0.05		0.05		0.04		0.11	

Note. $^*p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.
[a] runhealthy snacks female peer, unhealthy snacks male peer (112) = .90.
[b] The same snack category was included for snacking ascribed to the peer and own snacking.

significantly, positively related to own healthy snacking in the male subsample (β = 0.19, $p = 0.043$).

Regarding unhealthy snacking, only the positive association between the consumption frequency of unhealthy snacks ascribed to female peers and own snack consumption reached significance in the total sample (β = 0.25, $p = 0.005$). This positive relationship remained significant in both subsamples (female subsample: β = 0.23, $p = 0.013$; male subsample: β = 0.51, $p = 0.037$). However, one has to note that correlations between independent variables were high in the male subsample ($r(112) = 0.90$) and, therefore, the relationship between the snacking ascribed to male peers and own unhealthy snack consumption has to be interpreted with caution.

4. Discussion

In the present research, vignettes describing the popularity of student peers were used as a new and implicit way to assess the social image of foods. Results indicate that the vignette format, despite providing only very brief and incomplete descriptions of a peer's social appeal, successfully shapes the participants' perception of a peer's popularity. The vignettes were first developed and tested in a small sample before results were replicated and extended in a larger university student sample across Germany. The present research showed that, based on a peer's popularity and/or gender, participants expressed differential expectations about a student's healthy and unhealthy food consumption. Furthermore, these expectations were also related to their own food consumption.

4.1. Differences in food consumption ascribed to the peer

Results showed that popular peers generally were perceived to eat more healthily than unpopular peers, which was reflected in the increased consumption frequency of healthy foods ascribed to the popular peer in Study 1 and in the decreased consumption frequency of unhealthy snacks ascribed to the popular peers in Study 2. Differences between the observed main effects might be due to a slightly varying eating behavior assessment, which included fruit and vegetables in Study 1 but only fruit in Study 2.

Previous studies examining the relationship between described healthy food intake, represented by a low fat or vegetarian diet, and perceived attributes of social appeal have produced mixed results. While healthy eaters were seen as being less sociable, they were at the same time rated as being more attractive and moral compared to unhealthy eaters (Vartanian et al., 2007). In the present study, popular students were described as having a high number of friends, being popular, agreeable, cooperative, outgoing, and members of a campus group. These attributes represent a mixture of attributes previously associated with a healthy diet both in adolescents and in adults, e.g. being conscientious, disciplined, responsible, self-regulated, and popular (Gerrits et al., 2009; Kinnunen et al., 2015; Mooney & Lorenz, 1997; Oakes & Slotterback, 2004), as well as attributes associated with an unhealthy diet, e.g. being friendly and easygoing and attending parties (Barker, Tandy, & Stookey, 1999; Fries & Croyle, 1993). Furthermore, the perception of a person being popular might in turn trigger expectations about the peer's attractiveness (Boyatzis, Baloff, & Durieux, 1998; LaFontana & Cillessen, 2002; Shaw, Rees, Dawe, & Charles, 1985) or (interpersonal) success requiring self-control efforts (Tangney, Baumeister, & Boone, 2004), which in turn have been previously associated with a healthier diet in adults (e.g., Fries & Croyle, 1993; Mooney & Lorenz, 1997; Oakes & Slotterback, 2004). Overall, the vignettes covered a greater proportion of the attributes ascribed to healthy eaters in previous studies. Moreover, the results are in line with a recent study reporting an association between choosing vegetables and having a higher social standing in a sample of young male adults (Kinnunen et al., 2015). Accordingly, the results suggest that the relationship between expectations about diet and popularity might be bidirectional: a description of a healthy eater induces the expectation that this person is popular, and vice versa. This said, the capacity to actually form friendships by eating healthily or unhealthily depends on the group context (De la Haye, Robins, Mohr, & Wilson, 2010, 2013) and might still differ from the image people associate with certain foods.

In addition to differences due to popularity, gender also elicited differential expectations about food intake. Female peers were expected to generally eat healthier, such that they were perceived to eat more healthy foods in Study 1, and more healthy and fewer unhealthy snacks in Study 2. These expectations are in line with stereotypes about female eating stating that women have oatmeal with fruits and nuts for breakfast, eat salads, are vegetarians and typically consume smaller portions (Bock & Kanarek, 1995; Oakes & Slotterback, 2004; Rozin, Hormes, Faith, & Wansink, 2012; for reviews see Vartanian, 2015; Vartanian et al., 2007).

4.2. Associations with own food consumption: Who is influential?

In addition to examining the associations between popularity and healthiness of diet, the present research aimed to investigate the associations between the food consumption ascribed to popular and unpopular peers and own food consumption. Results showed that the snacking ascribed to popular peers was associated with own snacking, while there was no association with the snacking ascribed to the unpopular peers.

As the peer's popularity manipulated in the vignettes drove differences in the eating behavior ascribed to the peer and was also related to own snacking, the results of the present study indicate that information about social appeal might be able to elicit differentiated expectations (Giese et al., 2013). Therefore, the relationship might be explained by an orientation towards a desirable peer group. People generally feel the need to befriend others and to be part of a social group (Baumeister & Leary, 1995). Following a norm may lead to being liked by others, increased social approval, and enhanced affiliation (Bandura, 1971; Cialdini & Goldstein, 2004; Higgs, 2015). In the present study, own behavior was only related to the behavior ascribed to popular peers. We would argue that popular peers do represent a social group that people want to belong to, thus people might orient their behavior towards popular peers in order to be recognized by them and to fit in.

It should be noted that as the present analyses were cross-sectional and do not provide information about causation, the alternative explanation that own behavior might be projected on others, which could lead to a false consensus effect (Ross, Greene, & House, 1977), cannot be completely ruled out. This might be the case especially for unhealthy behaviors like the consumption of sugary snacks, while false uniqueness, i.e. the tendency to believe that one's behavior is not shared by others, is more likely to occur for desirable health behaviors (Suls, Wan, & Sanders, 1988). In the present study, both own healthy and unhealthy snacking were associated with snacking ascribed to the popular peers. Thus, false consensus might at least not be fully able to explain the present results.

4.3. *Moderation by identification with the referent group: Who is influenced?*

Lastly, the present research investigated whether identification with the portrayed peer group strengthens the relationship between the snacking ascribed to the peer and own snack consumption. The results of Study 2 revealed an interaction between identification with the student group and snacking ascribed to the popular peer for healthy snacking, suggesting that norms for healthy eating set by popular students might only be relevant if one generally identifies with being a student. For unhealthy snacking, however, the interaction did not reach significance. In the literature, the influence of identification with the referent group on the effect of social norms in emerging young adults has mainly been investigated within the contexts of healthy eating behaviors like eating fruit or vegetables (for a summary, see Stok et al., 2016). Peer group identification in the context of unhealthy eating so far has only been investigated in one study with university students. This study reported an interaction between identification with and norms for the intention to eat unhealthily but not for unhealthy snacking itself (Louis, Davies, Smith, & Terry, 2007). It could thus be suggested that identification with the referent group might be more important for healthy than for unhealthy eating behavior. Students and university graduates generally eat more high fiber foods than non-students (Georgiou et al., 1997) and people with higher education have more health concerns and pay more attention to dietary recommendations (Nayga & Capps, 1999; Ree, Riediger, & Moghadasian, 2008). Another qualitative study reported that Belgian university students intend to eat healthily (Deliens et al., 2014). Therefore, one might argue that healthy eating is a healthy lifestyle behavior relevant for students, and thus young adults identifying with the student group might be more willing to eat healthily. For unhealthy snacking, on the other hand, the student group might not be a relevant referent group. Instead, other contexts like close friends might be more important, which might explain the nonsignificant interaction between the unhealthy snacking ascribed to the peer and identification with the student group.

The finding that eating behavior ascribed to own-gender vignettes was more closely related to own behavior than eating behavior ascribed to opposite-gender vignettes provides additional indirect support for the claim that identification with the referent group might be a necessary precondition of social influence effects. While we have not directly assessed whether participants identified more strongly with own gender vignettes than with other-gender vignettes, it seems logical that people identify more strongly with people of their own gender. As such, the manipulation of gender may have indirectly provided us with a manipulation of identification with the peer group, and our results could support the general notion that social influence effects occur only when people identify with the referent group.

4.4. *Directions for future research*

The present research showed that social appeal might elicit expectations about food consumption and revealed associations between food consumption ascribed to the peer and own eating behavior. As the two studies mainly focused on snack foods, the generalizability of the current findings to broader food or drink categories is open to further investigation. While we would expect similar results for other food categories like fast food or salads, a social network study by Howell et al. (2014) suggests that differing mechanisms might apply for student drinking behavior. For alcohol consumption, for instance, a more unhealthy consumption pattern might be seen as norm set by popular students and might therefore be mimicked in order to become or stay popular (see also Giese, Stok, & Renner, in press). Furthermore, considering that associations between social appeal and eating behavior have mainly been investigated in adolescents and young adults in western societies, future studies should extend this line of research to other demographics and cultures to test whether social influence effects are comparable.

The snacking ascribed to popular peers was associated with own snacking for both healthy and unhealthy snacking, and these relationships were of similar magnitude, indicating that peers' behavior might be equally important for healthy and unhealthy snack consumption frequency. So far, studies investigating the link between the food consumption ascribed to the peer and own consumption in adolescents mainly reported associations for unhealthy food consumption like eating sugary snacks (e.g. Gerrits et al., 2010; Giese et al., 2013). Kinnunen et al. (2015), however, reported peer influences on both fruit and vegetable and fatty foods consumption in young male adults, with the influence being even stronger for healthy eating. Stok et al. (2016) suggest that an association between norms and behavior is more likely to be observed in observable behaviors. In adolescence, snacking is a form of eating behavior that is often observed in peer groups, e.g. during school breaks or after school (Grenard et al., 2013), while vegetables are usually consumed during meals with the family. As a result, healthy food is more strongly associated with family, while unhealthy food is associated with friends (Chapman & Maclean, 1993), and the relationship between peer and own behavior is stronger for snacking in adolescents. In adulthood, however, it becomes more likely that main meals are consumed with peers, e.g. when eating at work or at social gatherings, thus one might argue that peer influences on healthy foods increase through increased observation. Future studies could further investigate this issue by providing more details about which aspects of peers' eating behavior are observed in an adult population.

Due to a technical malfunction, in the present research only the association between snack consumption frequency ascribed to the peer and own snack consumption frequency could be investigated. As social influences have been found to be meaningful for choosing what to eat as well as deciding how much to eat (for a review, see Cruwys, Bevelander, & Hermans, 2015), we would expect the pattern of results to be similar. However, at this point, it is open to future studies to further investigate this question.

Moreover, the present research revealed gender differences in the ascription of food consumption and showed gender-specific associations. As discussed above, while the extent of identification with vignettes of one's own gender, versus that of the opposite gender, was not directly assessed in the present study, it might be expected that similar relationships like those found for popularity might apply. It would be important for future research to formally test these assumptions. Furthermore, the present study could not investigate interactions between popularity and gender due to a small male subsample. Future studies should test whether there is an additive effect of both manipulations, with gender and popularity triggering independent associations, or whether there is an interactive effect, with for example eating behavior ascribed to a popular peer of the same gender being most closely associated with own eating behavior.

5. Conclusions

The present research suggests that popular peers' snacking is more closely related to own snacking than unpopular peers' snack consumption. Furthermore, it underlines that identification with the student group might be especially important when targeting snacking behavior in university students. Therefore, when composing norm messages to influence eating behavior, one needs to consider the individuals being addressed and which population is used as a referent group as both could trigger differential effects.

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