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Digital food marketing to children: How an influencer's lifestyle can stimulate healthy food choices among children

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ABSTRACT

While influencer marketing has been shown to be effective at promoting food low in nutritional value among children, it is less clear whether influencers can also be used to promote healthy nutrition. This article reports on the results of an experimental study on whether and how influencer marketing on Instagram can be deployed to stimulate healthy eating behavior among children. In particular, the study examines whether signaling a healthy, athletic lifestyle can affect children's healthy snack choice (i.e., choice of a snack high in nutritional value). To do so, a two (influencer lifestyle: sedentary versus athletic) by two (snack type: low in nutritional value versus high in nutritional value) between-subjects experiment was conducted among 190 children between eight and 12 years. The results show that promoting a sedentary lifestyle (compared to an athletic lifestyle) resulted in more children choosing the product high in nutritional value. In addition, the children chose a healthy snack more frequently when an influencer portraying a sedentary lifestyle (compared to an athletic lifestyle) promoted a product low in nutritional value. There were no significant interaction effects of influencer lifestyle and snack type on the evaluation of the influencer. However, the study did show that there was less admiration for the influencer when they portrayed a sedentary lifestyle versus an athletic lifestyle.

1. Introduction

Children spend a great deal of their leisure time online connecting with others (Apestaartjaren, 2020; Ofcom, 2020) and increasingly follow so-called social media influencers on some of the most widely used platforms, such as YouTube, Instagram, and TikTok (De Veirman et al., 2019). Many of these social media influencers (hereafter influencers) are rising stars on social media, with a large and/or highly engaged follower base, and maintain a carefully built online identity (Hudders et al., 2020). Due to the relationship with their followers, it is assumed that they have the power to impact these followers' opinions and potentially even their actions (De Veirman et al., 2017; Djafarova & Rushworth, 2017). Therefore, advertisers contact these influencers to promote products or services in their social media posts. This marketing strategy is called influencer marketing, and it emerged from the tactic of celebrity endorsement, whereby celebrities are used as endorsers to affect consumer attitudes and behaviors toward brands (De Veirman et al., 2019; Ross et al., 1984).

While there is no specific regulation in Belgium concerning influencer marketing targeted at children, there are some self-regulatory initiatives that are aimed at a more ethical use of influencer marketing, such as the recommendation of the Advertising Advisory Board with regard to online influencers (JEP, 2018) and the European Advertising Standards Alliance best practice recommendation on influencer marketing (EASA, 2018). These guidelines, for example, state that any commercial communication by an influencer should be clearly recognizable as such and should be honest (i.e., not containing false information or misleading the target group). In addition, Belgium has taken part in the European Pledge agreement in which food brands commit not to advertise unhealthy foods to children under the age of 12 (EU Pledge, 2019). Nonetheless, studies show that influencer marketing targeted at children predominantly presents advertisements of food and beverages high in calories, fat, and sugar (Coates et al., 2019a), i.e., snacks low in nutritional value. This is problematic since children's exposure to media and food marketing has been identified as a factor with the potential to increase the risk of childhood obesity (Folkvord et al., 2016; Robinson et al., 2017).

In 2016, over 340 million children and adolescents between five and

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19 years worldwide were overweight or obese (WHO, 2020). Besides an increase in physical inactivity, an increased intake of foods high in fat and sugar is considered one of the main causes of childhood obesity (WHO, 2020). Childhood overweight or obesity is likely to remain when children become adults, which may cause non-communicable diseases such as cardiovascular diseases, diabetes, and cancer. Besides the likely impact of obesity on children's physical health, it may also negatively affect their emotional well-being and self-esteem (Sahoo et al., 2015). Thus, although various factors impact childhood obesity, the preponderance of unhealthy food exposure within a media context (see for instance Tan et al., 2018) might contribute to an increased choice of food and beverages low in nutritional value. Furthermore, people are born with a preference for sweet or salty foods; therefore, people demonstrate an inherent preference for foods high in fat, salt, and/or sugar (Desor et al., 1973; Harris et al., 1990).

There has been some research on the impact of influencer marketing on children's food choice, with results showing that the phenomenon may be effective at promoting food low in nutritional value among children (Coates et al., 2019b; Smit et al., 2019). However, it is unclear whether influencers can also be deployed to promote healthy nutrition. Initial limited results indicate that the promotion of healthy foods to children needs to be related to stronger persuasive strategies than unhealthy food presentations (Coates et al., 2019b; Folkvord & de Bruijne, 2020; Folkvord et al., 2013; Naderer et al., 2018). Therefore, the current study examines how influencer marketing can stimulate healthy eating behavior among children.

The Healthy Food Promotion Model (Folkvord, 2019) suggests that contextual factors are important determinants in children's susceptibility to healthy food promotion. This indicates that an endorser's characteristics might be crucial in encouraging children in their choice of healthy foods. Previous research has shown that the personal characteristics of endorsers (such as body size and physical attractiveness) determine the persuasiveness of the message (e.g., Kahle & Homer, 1985; Roozen, 2014). As such, we investigate how an influencer's personal characteristic (i.e., athletic versus sedentary lifestyle) affects children's healthy food choice and whether this depends on the snack type (snack high in nutritional value versus snack low in nutritional value) being promoted. In addition, the current study examines how the influencer's characteristics and the promoted snack type affect the evaluation of the influencer (by investigating relevant source effects in the context of influencer marketing research: source credibility, influencer admiration, and parasocial interaction; Hudders et al., 2020). To address these research questions, we conducted an experimental study investigating how influencer promotion of an athletic and healthy lifestyle versus a sedentary lifestyle can affect children's healthy food choice.

2. Theoretical framework

The current paper relies on social cognitive theory (Bandura, 2001) to explain how influencers can model people's behaviors through observational learning processes. We argue that influencers act as symbolic models by showing people how to behave in order to achieve valued outcomes. Observing the rewards resulting from employing certain behaviors may incentivize similar behaviors, and influencers are often admired by followers due to the success they have and the praise they receive. They may, therefore, impact followers through a process of abstract modeling whereby people observe the behavior of others (in this case, the influencer) and develop "rules of thought and conduct," which may help them reproduce this behavior (Bandura, 2001, p. 275). The potential that influencers' behaviors are being modeled by their followers increases as a) influencers are often considered as peers, and b) followers develop strong parasocial interactions with influencers. Thus, food promotions endorsed by influencers may strongly affect the food preferences, food choices, and eating behaviors of their followers.

Two recent studies showed that the promotion of unhealthy foods by influencers affects children's food intake. Coates et al. (2019b) examined children's (9–11 years) snack intake after exposure to vlog advertising for a product low in nutritional value. They showed that the children who were exposed to influencer marketing, with and without advertising disclosure (i.e., displaying the label "This is an advert" in the top left-hand corner of the screen during the exposure to the marketing content), consumed more of the advertised brand compared to the alternative brand (i.e., the marketed brand labelled as the alternative brand). The difference in snack intake between the advertised brand and the alternative brand was not significant in the control condition where a non-food brand was promoted. Similarly, Coates et al. (2019b) found that children's (9–11 years) overall caloric intake and their intake of unhealthy products increased after exposure to influencers promoting unhealthy products on Instagram (compared to the control condition where children viewed influencers promoting non-food products on Instagram).

The Food Marketing Defense Model (Harris et al., 2009) further explains the difficulties related to resisting marketing influences. The model suggests that four conditions need to be met in order to successfully resist marketing temptations: awareness of persuasive attempt, understanding of the tactics used, and the ability and motivation to resist the attempt. These conditions may be strongly challenged in an influencer marketing context where messages are often embedded within the editorial content, making it difficult to recognize the persuasive attempt and understand its persuasive intent. This may be even more difficult for young children as their persuasion knowledge is not yet fully developed (Hudders et al., 2017). Additionally, followers often develop strong parasocial interactions with influencers, making resistance of the persuasive attempt less probable (e.g., De Jans et al., 2018).

The Reactivity to Embedded Food Cues in Advertising Model (REFCAM) of Folkvord et al. (2016) further explains that the persuasive impact of embedded marketing content follows a two-step process: First, food cues in advertising generate physiological and psychological reactions to food (a process the authors refer to as the *advertising effect process*), which, second, cause a reciprocal relationship with eating behavior (which they refer to as the *incentive-sensitization process*). Moreover, they indicate that message factors (e.g., the integration of food cues in the media content) and individual factors influence and determine children's susceptibility and reaction to food cues in advertising.

2.1. Endorsement of healthy versus unhealthy food products

The Healthy Food Promotion Model (Folkvord, 2019) posits that food cues in advertising will enhance children's attention toward the value of healthy foods, which will result in a reciprocal relation with dietary intake and further an increased intake of healthy foods and a habit formation regarding the intake of these healthy foods. These habits will then result in better health states. However, while media content showing products low in nutritional value has been continuously linked to specific unhealthy brand choices (e.g., Naderer et al., 2018) and an increase in unhealthy food consumption in children (e.g., Halford et al., 2004; Harris et al., 2009), presentations of healthy food seem to be less effective. For instance, Folkvord et al. (2013) conducted an experimental study in which children (8–10 years) either played no advergame (i.e., a custom-built online game designed to promote a company's brand; Lee et al., 2009; van Reijmersdal et al., 2012), or they played a non-food promoting advergame, an advergame containing unhealthy food options, or an advergame promoting healthy products. The results showed that the mere presence of food (i.e., either healthy or unhealthy) increased the children's general caloric intake compared to children who played either no advergame or the advergame without food placements. Moreover, both food placement advergames motivated the children to choose more unhealthy snacks, irrespective of the type of embedded product (healthy or unhealthy). This is in line with the study

of Naderer et al. (2018), which showed that children (6–11 years) chose more of a low-nutritional snack (compared to a high-nutritional snack) after exposure to a cartoon with a low-nutritional or high-nutritional food placement, albeit not when exposed to a control condition (a cartoon with no food placement). In the control condition, the children chose both the high-nutritional and low-nutritional snacks with equal frequency. In addition, Coates et al. (2019b) showed that children's (9–11 years) exposure to the promotion of healthy foods through influencer marketing on Instagram did not impact their overall caloric intake or their intake of healthy snacks compared to influencer marketing for a non-food brand. Furthermore, Folkvord and de Bruijne (2020) found that exposure to the promotion of vegetables through influencer marketing on Instagram did not increase adolescents' (13–16 years) intake of vegetables.

Consequently, the dominance of unhealthy food in media presentations (see for instance Matthes & Naderer, 2019) might contribute to children increasingly opting for food and beverages low in nutritional value. Against this backdrop, cultivation theory (Gerbner et al., 2002) suggests that portrayals in the media may affect world views. The dominance of unhealthy foods in advertising may lead children to think that most people eat unhealthy food (Harris et al., 2009). Moreover, due to our innate desire for sweet and salty foods, we have a preference for sweets and snacks (Desor et al., 1973; Harris et al., 1990). Thus, our inherent predispositions increase the likelihood of us choosing unhealthy options when faced with the choice between foods high in fat, salt, and or/sugar and, for example, fruits. Nevertheless, we expect that a snack endorsement by a social media influencer could affect snack choice. Below, we will further elaborate on the importance of influencer characteristics (i.e., lifestyle) in affecting children's healthy food choice.

2.2. Impact of influencer characteristics on children's healthy food choice

The mere presentation of foods high in nutritional value might not be sufficient, on its own, to impact children's healthy food choice. As such, it might be necessary to dive deeper into some of the persuasive strategies that potentially increase the attractiveness of foods high in nutritional value (Binder et al., 2019). As indicated in the Healthy Food Promotion Model (Folkvord, 2019), contextual or situational factors determine children's susceptibility to healthy food cues in advertisements. In the context of influencer marketing, influencers can be deemed a contextual or situational factor. Employing influencers to promote foods high in nutritional value to children can be a successful marketing strategy: First, the product is seamlessly woven into the content that influencers post on their social media accounts. Thus, this type of marketing increases message authenticity and credibility (Djafarova & Rushworth, 2017) as it comes across as regular eWOM (electronic word of mouth, i.e., electronic interpersonal communication about products and services between consumers; Lee & Youn, 2009). Second, recipients follow influencers with whom they share interests, to whom they feel similar, or whom they strive to be like (Hoffner & Buchanan, 2005). Therefore, influencers are perceived as "fashionable friends" whose community of followers is often willing to follow their opinions (Colliander & Dahlén, 2011).

Studies have indicated that influencers appear very approachable and can generate feelings of familiarity comparable to having a friend or peer in real life (e.g., Colliander & Dahlén, 2011). This makes influencers a potential model of behavior for their audience. Through social cognitive theory, we understand that perceptions of the influencer and their actions affect the learning outcome of the modeled behavior (Bandura, 2004). However, as indicated above, earlier studies have shown that the mere exposure to influencer marketing of foods high in nutritional value might not be sufficient to increase healthy food choices among children and adolescents (Coates et al., 2019b; Folkvord & de Bruijne, 2020).

How effectively modeled behavior is translated into one's own behavior is dependent on many factors. In social cognitive theory, the role of the consequences connected to modeled behavior is deemed crucial (Bandura, 1969). It is assumed that the perception of negative outcomes diminishes (while that of positive outcomes increases) the likelihood of adopting modeled behavior. On one hand, people will be motivated to adopt modeled behavior when they see the successes of that behavior achieved by others to whom they feel certain similarities. On the other hand, people will be reluctant to adopt modeled behavior that attracts adverse consequences (Bandura, 2001). de Graaf (2013), for instance, compared the portrayal of positive and negative alcohol-related consequences (one group saw a video in which alcohol use had positive consequences, and another group saw a video portraying negative consequences) to a control condition where there was no video exposure. The study found more negative expectancies due to alcohol consumption and a decrease in viewers' attitudes toward alcohol after seeing the video depicting the negative consequences of alcohol consumption (compared to the positive consequences and the control condition). Therefore, it can be assumed that the potential consequences of food consumption might impact the likelihood that viewers will follow the food choice being promoted (Bandura, 1969).

One of the positive consequences of healthy eating is having a healthy, athletic lifestyle. Thus, when a snack high in nutritional value is endorsed by a healthy and athletic influencer, children will also try to achieve the positive outcomes portrayed by imitating the influencer and choosing snacks high in nutritional value (H1a). In addition, one of the potential negative consequences of unhealthy food consumption is lack of exercise (e.g., Swinburn et al., 2004) or a sedentary lifestyle. Thus, we expect that when a product low in nutritional value is endorsed by a sedentary influencer, children will try to avoid this negative consequence by posing contrasting behavior and opting for the snack high in nutritional value (H1b).

2.3. The mediating impact of the evaluation of the influencer

We further assume that these effects can be explained through an evaluation of the influencer. Social cognitive theory suggests that socially approvable behavior can be seen as a source of self-pride, whereas socially disprovable behavior can be seen as self-censured (Bandura, 2001). Thus, the endorsement of a product high in nutritional value by an influencer with a healthy and athletic lifestyle (compared to a sedentary lifestyle) will signal to followers that the influencer has a sense of self-pride and self-worth; therefore, the influencer will be perceived as more credible. Moreover, we assume that the influencer will not only be perceived as more credible but that the children will also admire the influencer more and feel more connected to them—a process referred to as a parasocial interaction (i.e., the interactions media users have with media figures; Horton & Wohl, 1956; Schramm & Hartmann, 2008)—due to the influencer's signaling of self-worthiness. This is because the influencer will be perceived as more authentic, which will be rewarded by the children in terms of loyalty. However, when a product low in nutritional value is endorsed by an influencer with a sedentary lifestyle (compared to an athletic lifestyle), the influencer will be regarded as self-destructive, resulting in more negative source effects (source credibility [H2a], influencer admiration [H2b], and parasocial interaction [H2c]).

Moreover, based on previous research showing that source credibility, influencer admiration, and parasocial interaction have a positive impact on advertising effectiveness (De Jans et al., 2018, 2020; Lee & Watkins, 2016; Schouten et al., 2020), we expect that these source effects will positively affect children's choice of snack high in nutritional value. In particular, we propose that an athletic influencer promoting a snack high in nutritional value will increase source credibility (H3a), influencer admiration (H3b), and parasocial interaction (H3c), thereby further enhancing children's choice of snack high in nutritional value.

3. Method

3.1. Design and procedure

We conducted a two-by-two between-subjects experimental study (influencer lifestyle: sedentary versus athletic; snack type: low in nutritional value versus high in nutritional value). The children were first introduced to an influencer and asked to carefully watch the Instagram profile of this influencer (either portraying an athletic or sedentary lifestyle). They were then instructed to carefully watch an individual Instagram post of the influencer promoting a snack (either low or high in nutritional value). They could choose how long to watch the Instagram profile and post, and we did not restrict their exposure time to the stimulus material. Afterwards, the children answered the same questionnaire. The experiment was conducted individually (per class, approximately 15–20 children at the same time) on tablets in a classroom setting. The children were randomly allocated to one of the four conditions. This was ensured by setting up the tablets, each for a specific condition, before the children entered the classroom. Once the children had entered the classroom, they were instructed to use the assigned tablet. A researcher was present for the duration of the study to guide the experiment.

3.2. Stimuli material

Using a fictitious influencer, we manipulated their lifestyle by creating two Instagram profiles and two corresponding Instagram posts. We presented the influencer as having an athletic, active, and healthy lifestyle in the first profile (see Appendix 1) by including pictures associated with sportiness (e.g., pictures of the gym, the influencer doing sports, etc.). The influencer was presented as sedentary in the second Instagram profile (see Appendix 2), with the use of pictures associated with indolence (e.g., pictures of the influencer lying on the couch, showing a cuddly blanket, etc.). Furthermore, we matched the gender of the influencer with the gender of the participants (similar to the study of De Veirman et al., 2017). Matching participants' gender with that of the influencer was based on a preliminary study ($N = 146$) with a similar stimulus and the same research procedure. In this preliminary study, the participants (both girls and boys), aged 11–13 years, only saw a female influencer. We found that the boys ($M = 3.16$, $SD = 0.82$) rated the influencer significantly less positively compared to the girls ($M = 3.53$, $SD = 0.75$; $t(144) = -2.86$, $p = .005$).

In addition, to manipulate the snack type being portrayed, the individual Instagram post portrayed either a snack high in nutritional value (i.e., strawberries, see Appendix 3) or one low in nutritional value (i.e., donuts, see Appendix 4). This manipulation was also based on insights from the preliminary study, in which carrots and cookies were used as stimuli. However, we found that vegetables were not appropriately comparable to candy. Thus, we followed other studies in this line of research and opted for a comparison between fruit and candy (i.e., Naderer et al., 2018).

3.3. Pretest

We conducted a pretest among 85 children between nine and 12 years ($M_{age} = 10.00$, $SD = 0.93$) who did not participate in the main experiment. The pretest participants were recruited from one primary school in Belgium. The results revealed that the influencer was perceived as fitter ($t(77) = -9.64$, $p < .001$, $r = 1.17$; "How athletic do you think the influencer is?") and sportier ($t(72) = -9.70$, $p < .001$, $r = 1.23$; "How sporty do you think the influencer is?") when the children saw the profile of the athletic influencer ($M_{fit} = 4.13$, $SD = 0.62$; $M_{sporty} = 3.97$, $SD = 0.55$) versus when they saw the profile portraying the sedentary influencer ($M_{fit} = 2.36$, $SD = 1.05$; $M_{sporty} = 2.26$, $SD = 1.05$). Moreover, the children believed that the influencer depicted in the sedentary profile liked doing nothing ($t(81) = 8.69$, $p < .001$, $r = 0.92$; "The influencer likes doing nothing") and preferred staying indoors ($t(81) = 8.69$, $p < .001$, $r = 0.92$; "The influencer likes to stay inside") ($M_{nothing} = 3.49$, $SD = 1.20$; $M_{inside} = 4.23$, $SD = 1.15$) compared to the influencer portrayed in the athletic profile ($M_{nothing} = 1.58$, $SD = 0.83$; $M_{inside} = 1.92$, $SD = 0.85$).

In addition, they also perceived the product high in nutritional value (i.e., strawberries) to be healthier ($M = 4.35$, $SD = 0.78$) than the product low in nutritional value (i.e., donuts; $M = 1.89$, $SD = 0.89$; $t(84) = -18.88$, $p < .001$, $r = 2.34$), and they liked both strawberries ($M = 4.44$, $SD = 1.11$) and donuts ($M = 3.85$, $SD = 1.15$) a great deal. The items of the pretest were all measured on five-point Likert-type scales. The pretest showed that the manipulation of both the influencer lifestyle and snack type variables was successful.

3.4. Participants

A total of 190 children between eight and 12 years ($M_{age} = 10.04$, $SD = 0.86$; 52.1% female) participated in the study. This age range was chosen as children in this cohort are categorized as belonging to the same developmental stage and have a comparable way of processing information (Buijzen et al., 2010). Their processing is rather complex and abstract at this stage, and they reflect well on product decisions (John, 1999). The children were randomly selected from three primary schools in Belgium, a West European country. Institutional ethical approval was requested, and active parental consent was obtained for each child participating in the study.

3.5. Measures

All measures used five-point Likert-type scales or semantic differentials and were adapted to the cognitive capacities of the children by adding smiley faces. First, we used ten semantic differentials to measure source credibility (Ohanian, 1990; $\alpha = 0.88$, $M = 3.61$, $SD = 0.76$): "What do you think of [influencer]?" (e.g., "unattractive/attractive"). We also gauged source admiration using four items from De Jans et al. (2020; $\alpha = 0.88$, $M = 2.63$, $SD = 0.1.03$; e.g., "I admire [influencer]"). Parasocial interaction was measured using eight items (Lee & Watkins, 2016; $\alpha = 0.92$, $M = 2.74$, $SD = 0.1.01$; e.g., "I would like to meet [influencer] in person"). These items all employed five-point semantic differentials or Likert-type scales. Thus, the measures were not standardized. Finally, we measured food choice behavior using a binary behavioral measure by letting the children choose between a strawberry (i.e., snack high in nutritional value) and a mini-donut (i.e., snack low in nutritional value) as a reward after completing the survey (Ngqangashe et al., 2018). As the children indicated their snack choice in the questionnaire and received their chosen snack outside the classroom after finishing the questionnaire, they did not see each other's snack choice and, therefore, were not influenced by each other's choice (see Appendix 5 for a table of the measures).

4. Results

4.1. Randomization

The experimental groups did not differ with respect to gender, age, Instagram involvement, hunger at the moment of the study, liking of donuts, liking of strawberries, or how important healthy eating was for them (see Table 1).

4.2. Manipulation checks

Using independent samples t-tests, the results show that the influencer was perceived as fitter ($t(167) = -9.74$, $p < .001$, $r = 0.78$) and sportier ($t(165) = -10.22$, $p < .001$, $r = 0.82$) after seeing the athletic influencer ($M_{fit} = 4.09$, $SD = 0.77$; $M_{sporty} = 3.97$, $SD = 0.73$) compared to the sedentary influencer ($M_{fit} = 2.76$, $SD = 1.09$; $M_{sporty} = 2.62$, $SD =$

Table 1
Randomization.

	F	p	η_p^2
Gender	7.34 (χ^2)	.119	.05
Age	.20	.898	.00
Instagram involvement	1.85	.139	.03
Hunger at the moment of the study	1.22	.301	.02
Liking of donuts	.38	.766	.01
Liking of strawberries	.41	.745	.01
How important healthy eating is for them	.46	.707	.01

1.06). Furthermore, the children believed that the influencer depicted in the sedentary profile liked doing nothing ($t(167) = 8.21$, $p < .001$, $r = 0.62$) and preferred staying indoors ($t(188) = 10.78$, $p < .001$, $r = 0.76$) ($M_{nothing} = 3.15$, $SD = 1.44$; $M_{inside} = 3.99$, $SD = 1.26$) compared to the influencer portrayed in the athletic profile ($M_{nothing} = 1.67$, $SD = 1.01$; $M_{inside} = 2.15$, $SD = 1.10$). Moreover, strawberries were perceived as healthier ($M = 4.71$, $SD = 0.70$) than donuts ($M = 1.47$, $SD = 0.83$; $t(189) = -38.33$, $p < .001$, $r = 3.12$). The same measures were used as in the pretest.

4.3. Hypotheses testing

We conducted a moderated mediation analysis (Hayes, 2019) using PROCESS macro, model 8 (10,000 bootstrap samples), to test the proposed hypotheses, with influencer lifestyle as the independent variable, snack type as the moderator, and snack choice as the dependent variable. Source credibility, influencer admiration, and parasocial interaction were integrated as mediators. Four variables (liking of donuts, liking of strawberries, hunger, and importance of healthy eating) were incorporated as covariates in the model. To correct for potential heteroscedasticity in the errors of estimation, the continuous variables were mean centered, and heteroscedasticity-consistent standard errors (HC3) were applied. Snack choice was a dichotomous variable whereby choosing the snack high in nutritional value was coded as 1, and choosing the snack low in nutritional value was coded as 0. A logistic regression was employed in PROCESS to estimate the effects of our predictors on snack choice.

First, the interaction effect of influencer lifestyle and snack type on snack choice was significant ($B = 1.59$, $SE = 0.77$, $z = 2.08$, $p = .037$; see Fig. 1). It revealed no difference in snack choice when the product high in nutritional value was promoted by an athletic versus a sedentary influencer ($B = 0.28$, $SE = 0.55$, $z = 0.52$, $p = .605$). However, the children chose a healthy snack more frequently when the product low in nutritional value was promoted by the sedentary influencer compared to when it was promoted by the athletic influencer ($B = -1.31$, $SE = 0.57$, $z = -2.32$, $p = .020$). This result confirms H1b but not H1a, as there was no difference in snack choice between exposure to an athletic versus a sedentary influencer when promoting a snack high in nutritional value.

The analysis further showed no main effect of snack type on snack choice ($B = -0.61$, $SE = 0.53$, $z = -1.14$, $p = .256$). Hence, in general, the children did not choose more of the snack low in nutritional value than the snack high in nutritional value. In addition, there was a main effect of influencer lifestyle on snack choice ($B = -1.31$, $SE = 0.57$, $z = -2.32$, $p = .020$), indicating that promoting a sedentary lifestyle resulted in a higher frequency in choosing the product high in nutritional value (compared to an athletic lifestyle; see Table 2 for the children's healthy snack choice across the different conditions).

Moreover, the analysis showed that the interaction effects of influencer lifestyle and snack type were not significant in relation to source credibility ($B = 0.24$, $SE = 0.22$, $t = 1.09$, $p = .276$), influencer admiration ($B = 0.19$, $SE = 0.29$, $t = 0.63$, $p = .526$), or parasocial interaction ($B = 0.22$, $SE = 0.30$, $t = 0.73$, $p = .464$). Thus, H2 (a, b, and c) could not be confirmed. We did, however, find a main effect of influencer lifestyle on influencer admiration ($B = 0.51$, $SE = 0.22$, $t = 2.33$, $p = .021$). This result indicates that the influencer was the subject of less admiration when they portrayed a sedentary lifestyle versus when they depicted an athletic lifestyle. The main effects of influencer lifestyle on source credibility ($B = 0.24$, $SE = 0.17$, $t = 1.43$, $p = .155$) and parasocial

Table 2
Children's choice for snack high in nutritional value across the different conditions.

	Promotion of snack low in nutritional value	Promotion of snack high in nutritional value
Sedentary influencer	58.1% ($N = 25$)	47.1% ($N = 24$)
Athletic influencer	38.3% ($N = 18$)	54.2% ($N = 26$)

Note: Full sample size = 189.

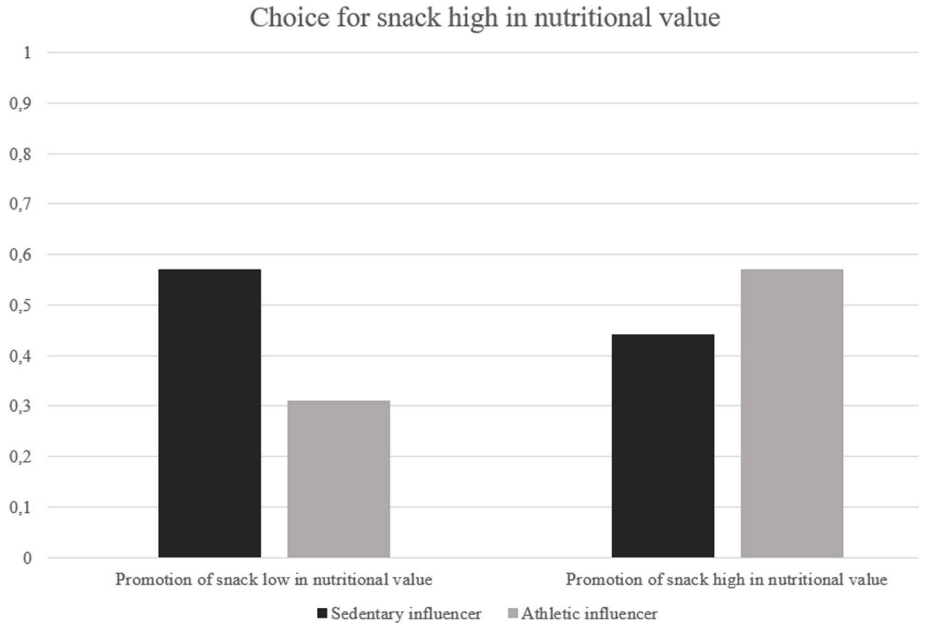

Fig. 1. Interaction effect of influencer lifestyle and snack type on choice for snack high in nutritional value.

interaction ($B = 0.18$, $SE = 0.22$, $t = 0.78$, $p = .434$) were not significant.

Finally, the analysis showed that these source effects did not further affect the children's snack choice. In particular, source credibility ($B = 0.33$, $SE = 0.38$, $z = 0.86$, $p = .389$), source admiration ($B = 0.14$, $SE = 0.34$, $z = 0.40$, $p = .692$), and parasocial interaction with the influencer ($B = 0.14$, $SE = 0.30$, $z = 0.46$, $p = .643$) did not affect the children's snack choice. Accordingly, H3a, H3b, and H3c could not be confirmed.

In sum, the index of the moderated mediation with source credibility (*Index* = 0.08, *SE* = 0.18, 95%*CI* = [-0.1806, 0.5320]), influencer admiration (*Index* = 0.03, *SE* = 0.15, 95%*CI* = [-0.2643, 0.3720]), and parasocial interaction (*Index* = 0.03, *SE* = 0.13, 95%*CI* = [-0.2104, 0.3493]) were not significant (see Fig. 2 for the conceptual model).

5. Discussion

In order to investigate potential strategies to increase children's healthy food choices, the current article examined how children's choice of food high in nutritional value can be affected by the characteristics of influencers. First, our results show that there was a significant direct effect of influencer lifestyle on snack choice, indicating that children who were exposed to the influencer portraying a sedentary lifestyle more often chose the snack high in nutritional value compared to those exposed to the influencer depicting an athletic lifestyle. This result arguably indicates the existence of a contrasting effect whereby children are more motivated to choose healthy snacks when confronted with the negative consequences of unhealthy behavior (in this case, the sedentary lifestyle of an influencer). Indeed, studies have shown that children construct fitness as a quest for thinness (Powell & Fitzpatrick, 2015), which is a positively connotated ideal, even for children (Sands & Wardle, 2003). Further, our results reveal a significant interaction effect of influencer lifestyle and snack type on snack choice. More specifically, our results show that the children's choice of the snack high in nutritional value did not differ when it was promoted by an athletic compared to a sedentary influencer. Nevertheless, when the sedentary influencer (compared to an athletic influencer) endorsed the snack low in nutritional value, this prompted the most response from the children in terms of the number of times they chose the snack high in nutritional value. This is in line with the REFCAM (Folkvord et al., 2016) and the Healthy Food Promotion Model (Folkvord, 2019), as both models indicate that children's susceptibility to food cues in marketing depends on both message and situational factors. Therefore, the current study specifically examined the characteristics of the influencer (as the source of the message) as message or contextual factors and showed that healthy food behavior among children may be affected by such factors.

Furthermore, this result also confirms our assumption based on social cognitive theory (Bandura, 1969, 2001), that negative consequences that might be connected to unhealthy food consumption (in this case, a sedentary lifestyle) can impact children's healthy food choice behavior (Bandura, 1969). This indicates that children might no longer prefer foods low in nutritional value when they are confronted with the negative consequences of consuming it and that they, instead, show contrasting behavior (i.e., choosing the snack high in nutritional value). Thus, the attractiveness of foods low in nutritional value could decrease when children are exposed to the negative consequences of consuming such foods—in this case, the sedentary lifestyle. Furthermore, in order to avoid the perceived negative consequences of food low in nutritional value, the high nutritional value option became more desirable to the children. To provide more support for the contrasting behavior, future research could examine other possible perceived negative consequences that might be related to unhealthy food behavior (e.g., gaining weight). In terms of promoting a snack high in nutritional value, no significant differences were found between an athletic versus a sedentary influencer, indicating that showing the positive consequences of healthy eating did not lead the children to more often choose the snack high in nutritional value.

The study could not provide further evidence to support the underlying mechanisms explaining these effects. Neither of the variables measuring influencer evaluations (source credibility, influencer admiration, and parasocial interaction) affected snack choice, and there was no interaction effect of influencer lifestyle and snack type on these variables. These results imply that the children did not make food-related decisions based on their evaluation of the influencer promoting the food. Future research could examine other underlying mechanisms explaining this relationship (e.g., credibility of the post, brand effects). Our results did show that the influencer was evaluated differently based on their characteristics. In particular, the influencer received less admiration when they portrayed a sedentary lifestyle (versus an athletic lifestyle). Hence, the influencer was evaluated more negatively when the negative consequences of their modeled behavior were portrayed.

Finally, our results also showed that the children did not choose more of the snack low in nutritional value, independent of whether they were exposed to unhealthy or healthy food placements in the Instagram posts. This result is not in line with previous research among children (Folkvord et al., 2013; Naderer et al., 2018) and the inherent human preference for sweets and snacks (Desor et al., 1973; Harris et al., 1990). This could be explained by the food options utilized in the current study. In particular, strawberries were used as the product high in nutritional value. The fact that the children did not choose more of the product low in nutritional value may be explained by the assumption that young children enjoy strawberries (more so than other healthy snacks such as other fruits or vegetables). Indeed, the results from our experiment show that children do like strawberries ($M = 4.47$, $SD = 1.03$) more than other types of fruit, such as apples ($M = 4.22$, $SD = 0.91$) or bananas ($M = 3.49$, $SD = 1.37$). Thus, children may have chosen more of the product high in nutritional value as strawberries are a very attractive healthy option. This may explain the children's rather high tendency to choose the snack presented as being high in nutritional value (i.e., strawberries). This indicates that the promotion of healthy foods to encourage healthy eating behavior among children might be dependent on the specific types of healthy food.

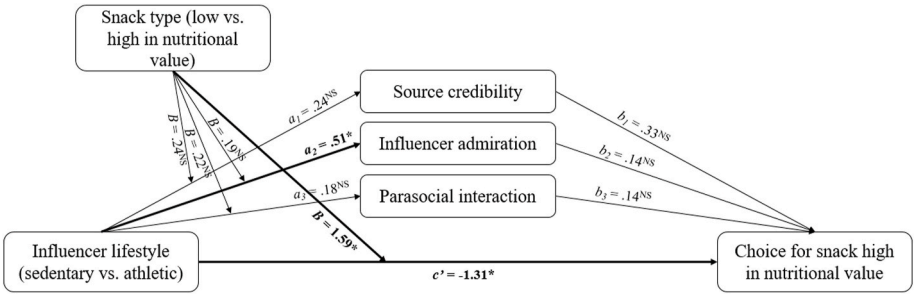

Fig. 2. Conceptual model
*Notes: NS = not significant; * = significant at $p < .05$.*

5.1. Limitations

This study has some limitations that translate into suggestions for future research. First, the children could only choose between one healthy snack and one unhealthy snack (those presented in the stimulus materials); however, the children's liking or disliking of these snacks or their preferences for sweets could have impacted their snack choice. Future research could, therefore, allow the children to choose between multiple healthy (both vegetables and fruits) and unhealthy snacks to account for their liking of the snack options. Another limitation might be the specific food options used in this study. We used fruit (i.e., strawberries) as the product high in nutritional value. However, this may explain the finding that the children generally did not choose more of the product low in nutritional value, as explained earlier. This may also indicate that different strategies might be needed to stimulate children's healthy eating behavior for different types of food high in nutritional value. Third, the current study only examined the efficacy of one influencer characteristic (i.e., influencer lifestyle). Thus, future research could examine how other influencer characteristics (e.g., influencer weight, age, gender) might affect children's healthy food choice behavior or investigate whether the contrasting effect also exists when other consequences related to unhealthy food behavior (e.g., being overweight) are portrayed. In addition, we did not explicitly ask the children why they chose a specific snack, which could have provided us with additional insights into the children's reasons for choosing the snack high in nutritional value. Finally, the children in the study were exposed to fictitious influencers, which may limit the study's validity. The results might be different when children are exposed to influencers whom they know and follow.

5.2. Practical and public policy implications

While influencer content is an important part of children's and adolescents' media use (Ofcom, 2020), influencer marketing is not an easy fix for promoting healthy food to children. Our results suggest initial insights into the mechanisms motivating children to eat healthier. As a suggestion for practical implications, illustrating on social media the associations of snacks and foods low in nutritional value with the possible negative consequences of consuming them (such as indolence) might be a successful way to motivate healthier nutritional intake among children. It should be noted that this might contribute to a negative evaluation of the message sources. Therefore, using healthy and fit influencers to promote food high in nutritional value is not a sufficient strategy to stimulate healthy eating behavior among children. Moreover, previous research has shown that the portrayal of ideal fitness images to promote a healthy and athletic lifestyle on social media (which is called "fitspiration") might decrease body satisfaction and increase negative mood (e.g., Prichard et al., 2018). Thus, exposing children to ideal fitness and health images might have a negative impact on their body image and self-esteem when they cannot live up to the standards they encounter.

Research on health communication and how children can be motivated and stimulated to eat healthier remains limited. Thus, more research is needed to examine the keys to positive modeling behavior and how influencers could be facilitated to bring about positive change in children's eating behavior.

Ethical approval

We obtained ethical approval from the ethical review board of the Faculty of Political and Social Sciences, Ghent University (number: 2019–40). Active parental consent was requested for each child participating in the study and children's request was required.

Ethical statement

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Declaration of competing interest

None.

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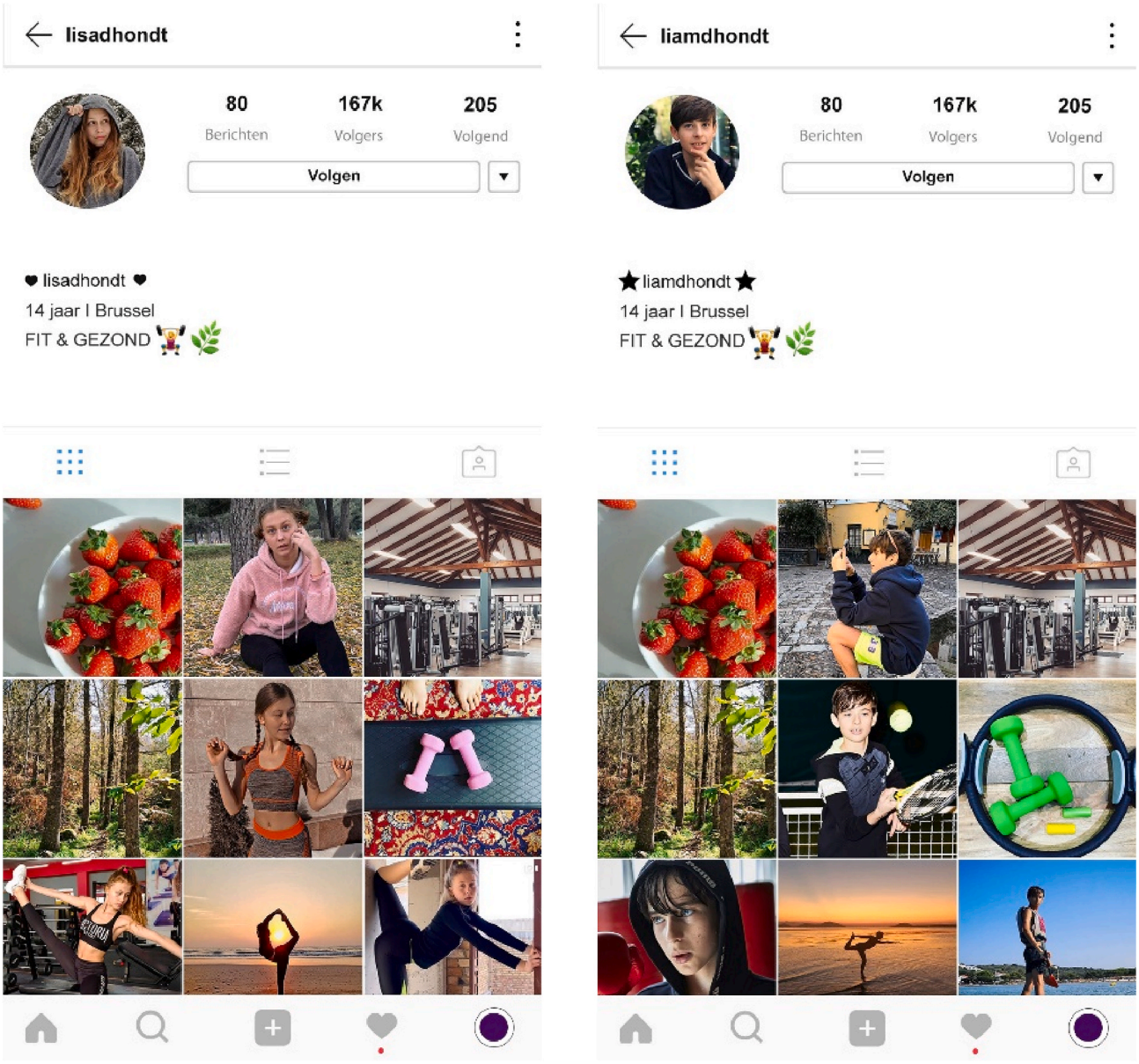
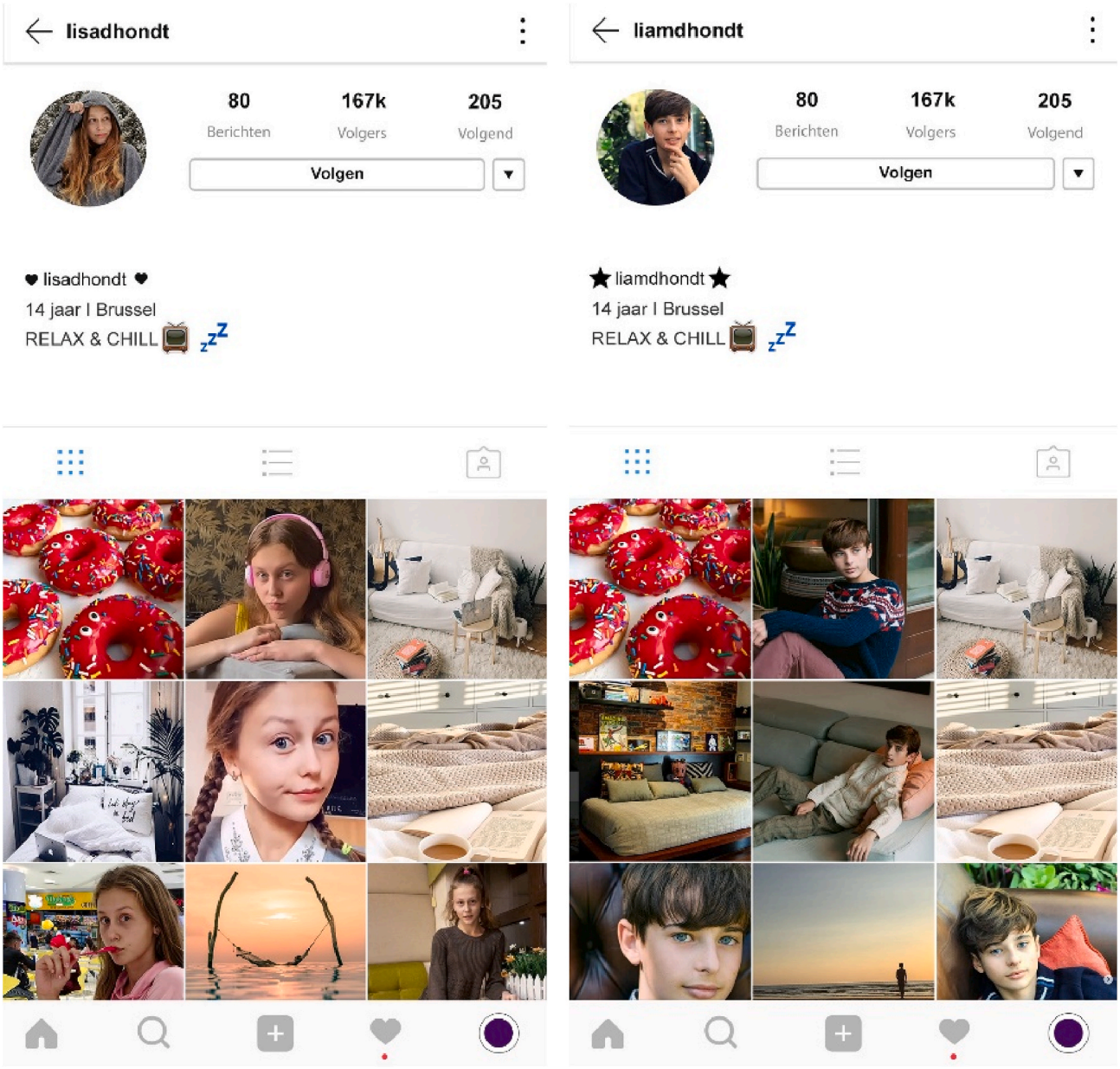
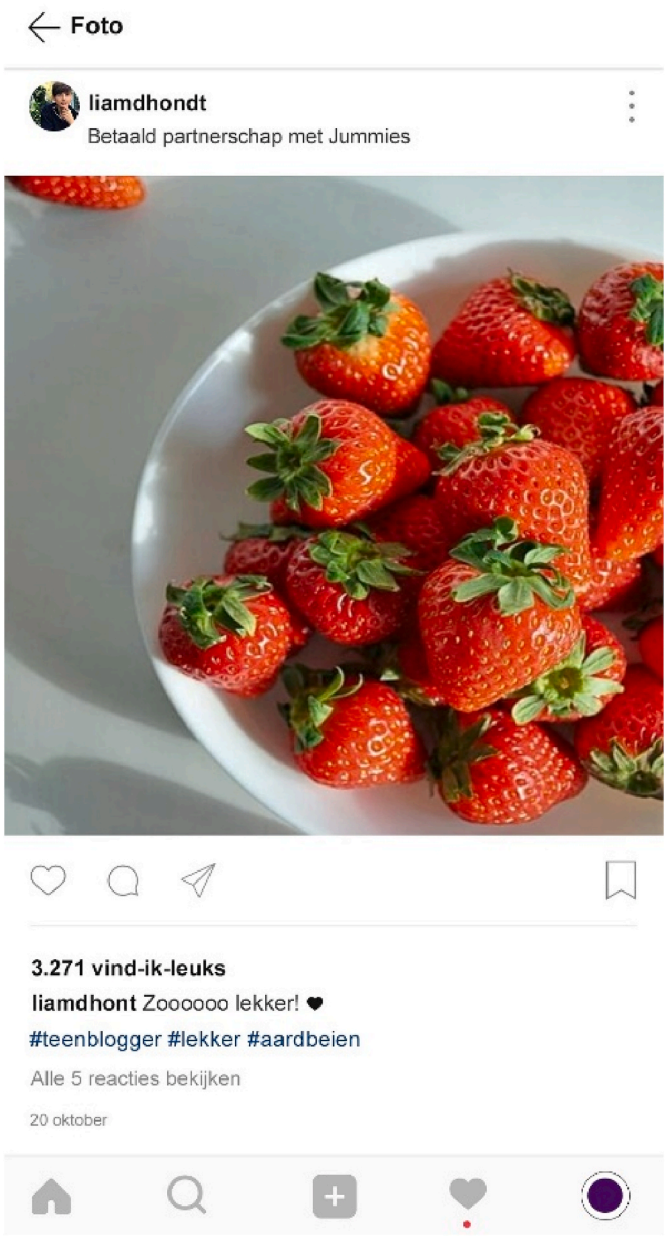
Appendix 1. Instagram profiles of athletic female and male influencer



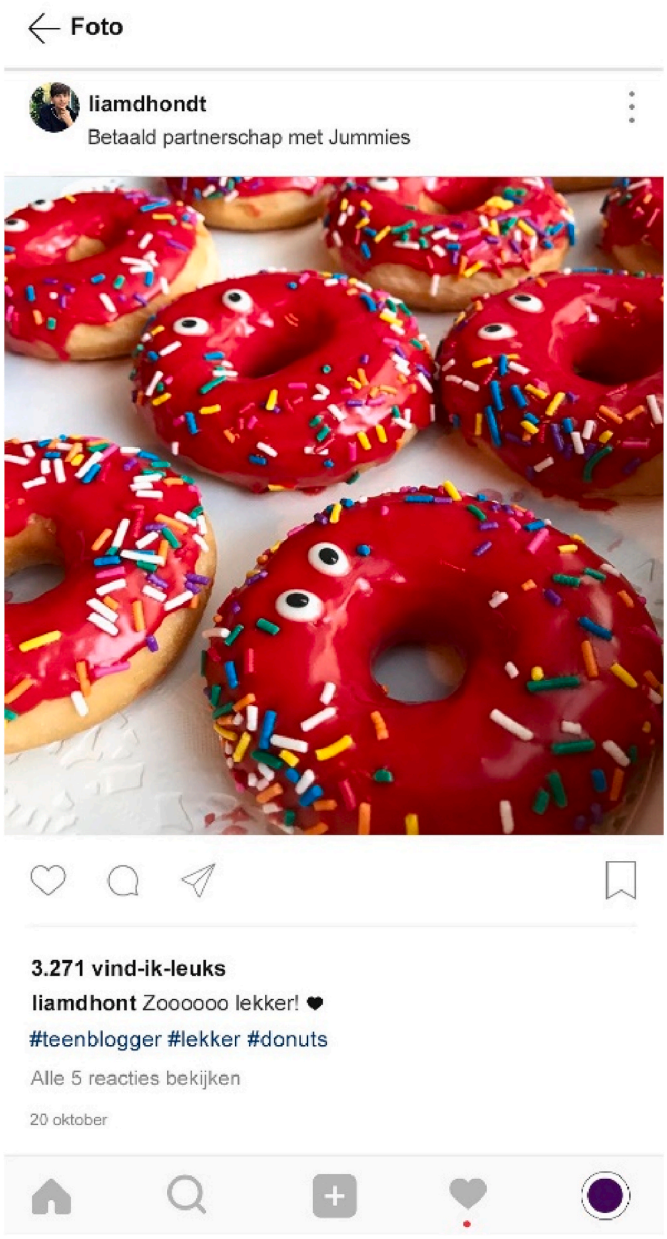
Appendix 2. Instagram profiles of sedentary female and male influencer



Appendix 3. Influencer post with snack high in nutritional value



Appendix 4. Influencer post with snack low in nutritional value



Appendix 5. Table of measures

Measures	Items	Response Categories	References
Source credibility	*"What do you think of [influencer]?"*	unattractive – attractive not classy – classy ugly – beautiful unreliable – reliable lies – tells the truth dishonest – honest untrustworthy – trustworthy not an expert – an expert inexperienced – experienced unknowledgeable – knowledgeable	Ohanian (1990)
Source admiration	*"I admire [influencer]"* *"I look up to [influencer]"* *"I would like to be just like [influencer]"* *"I feel that [influencer] gives direction to my life"* *"I look forward to watching [influencer]'s pictures"*	1 = "totally disagree", 5 = "totally agree"	De Jans et al. (2020)

(*continued on next page*)

(*continued*)

Measures	Items	Response Categories	References
Parasocial interaction	*"If I came across a picture of [influencer], I would definitely watch it"* *"When I watch [influencer], it feels like (s)he is my friend"* *"I think [influencer] is like a good friend"* *"I would like to meet [influencer] in person"* *"If there were a story about [influencer] in a newspaper or on the internet, I would read it"* *"[influencer] makes me feel comfortable, as if I am with friends"* *"When [influencer] shows me how (s)he feels about a brand, it helps me make up my own mind about the brand"*	1 = "totally disagree", 5 = "totally agree"	Lee and Watkins (2016)
Food choice behavior	The children could choose between two snacks	A strawberry and mini-donut	Ngqangashe et al. (2018)

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