Effects of Ostracism and Social Connection-Related Activities on Adolescents’ Motivation to Eat and Energy Intake

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Objective Assess the effect of ostracism and social connection-related activities on adolescents’ motivation to eat and their energy intake. Methods Participants (n = 103; M age = 13.6 years) were either ostracized or included when playing a computer game, Cyberball. Next, they wrote about their friend (social-connection), watched television (distraction), or completed Sudoku puzzles (cognitive-load), and then completed a task to earn points toward snack food and/or socializing. Afterwards, participants were given access to food and social activities. Results Ostracized adolescents were more motivated to earn food than adolescents who were in the included/control condition. Follow-up contrasts indicated that ostracized adolescents who wrote about friends worked more for food points and consumed more food than other adolescents. Conclusion Results suggest that social connection-related activities following ostracism may further deplete self-regulatory resources, thereby resulting in increased unhealthy food patterns. Study limitations as well as clinical implications of these findings are discussed.

Key words adolescence; eating behavior; ostracism; social connection.

Introduction

Ostracism is the intentional ignoring and excluding of individuals or groups by individuals or groups (Williams, 2007). Ostracism is quite common, with most individuals reporting at least one episode of ostracism each day (Williams, 2007). Studies consistently show that single episodes of ostracism are extremely stressful, as indexed by both self-report and physiological measures of stress and reactivity (e.g., Eisenberger, Lieberman, & Williams, 2003; Zadro, Williams, & Richardson, 2004) and can negatively impact self-esteem and cognition (e.g., Boyes & French, 2009). The effect of ostracism appears to be so powerful, in part, because ostracism undermines fundamental acceptance and belonging needs, which in turn, leads to negative behavioral and psychological reactions (Williams, 2007).

Recent research indicates that brief episodes of ostracism can also lead to increased consumption of energy dense, unhealthy food (Baumeister, DeWall, Ciarocco & Twenge, 2005; Baumeister, Wall, Ciarocco, & Twenge, 2005; Oaten, Williams, Jones, & Zadro, 2008; Oliver, Huon, Zadro, & Williams, 2001). The importance of self-regulation to dieting and healthy/controlled eating has been well-established (Hofmann, Friese, & Roefs, 2009; Pelletier, Dion, Slovinec-D’Angelo, & Reid, 2004). In addition, recent research suggests that such negative interpersonal experiences as peer rejection, peer exclusion, and ostracism evoke threat responses and impair self-regulatory and control processes (Baumeister, Twenge, & Nuss, 2002; Baumeister et al., 2005; DeWall, Baumeister, Stillman, & Gailliot, 2007). Thus, one explanation for why unhealthy eating occurs after ostracism is that ostracism impairs the self-monitoring and self-regulatory processes that are needed for dietary restraint.

There is great variability in the ways individuals attempt to cope with interpersonal stressors, such as
ostracism, but there is some evidence that many individuals seek to connect with others, likely to restore lost belonging and acceptance needs (Baumeister, Brewer, Tice, & Twenge, 2007). Indeed, investigators have consistently found that when belonging needs are threatened, many individuals become more socially attentive (Pickett, Gardner, & Knowles, 2004), unconsciously mimic others (Lakin & Chartrand, 2005), work harder on group tasks (Williams & Sommer, 1997), and become more helpful or compliant with unfamiliar peers (DeWall et al., 2007).

Connecting with others may restore depleted social needs, which in turn, replenishes the resources required for self-regulation and allows individuals to regain control of their behavioral and psychological responses. Results from two recent studies support this hypothesis. Twenge et al. (Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007) found that writing about good relationships with family members or friends after social exclusion diminished hostile, aggression responses. The authors posit that although social exclusion may thwart needs to belong, simply being reminded about social connections may help to restore these needs and thereby diminish aggressive and other negative, dysregulated threat responses. In another recent study, Gross (2009) found that individuals who interacted with unfamiliar peers following computer-simulated ostracism recovered more quickly psychologically than individuals who did not have any social interaction.

Many questions remain regarding the “power” of social connections and relationship-related activities following ostracism. For instance, it is not yet known whether social connection-related activities disrupt the link between ostracism and unhealthy eating that has been reported in earlier studies (Baumeister et al., 2005; Oaten et al., 2008). Yet, given the negative physical and psychological health costs of unhealthy eating, understanding the associations between ostracism, eating, and social connection activities could inform etiological theories and improve prevention and intervention efforts. In addition, it is important to note that the existing literature on ostracism and eating (e.g., Oaten et al., 2008; Twenge et al., 2007) suffer from a number of limitations, including a nearly exclusive focus on young adults and older adolescents (e.g., undergraduate students). Few studies of ostracism and eating have focused on young adolescents (10–14 years). Furthermore, the processes responsible for the effects of ostracism on young adolescents’ behavioral responses are not well understood. This research gap is important because the mental and behavioral consequences of ostracism may be greater during early adolescence relative to adulthood (Sebastian, Viding, Williams, & Blakemore, 2010), likely because the importance of being accepted by peers and fears of being rejected are greatest during the early adolescent developmental period (Rubin, Bukowski, & Parker, 2006).

Although most research on eating and self-regulation has focused on adults, there is growing evidence implicating the importance of self-regulatory processes for healthy eating during adolescence (e.g., Kalavana, Maes, & De Gucht, 2010). Thus, it seems likely that episodes of ostracism may lead to unhealthy eating patterns not only during adulthood, but also during early adolescence. Also, similar to adults, social connection-related activities may decrease the likelihood of negative, dysregulated responses after ostracism among young adolescents.

The Present Research

The present study extends the literature on ostracism and eating by testing the effects of ostracism and social connection-related activities (thinking and writing about close friends) on: (a) the reinforcing value of unhealthy snack food and (b) the actual consumption of unhealthy snack food, in a sample of young adolescents. The reinforcing or motivating value of unhealthy snack foods was measured against the reinforcing value of an alternative activity, socializing with peers, and was assessed with an operant, computerized task in which participants worked (with a mouse-click) to earn points toward unhealthy snack food and/or social time. After completing this relative reinforcing value task, participants were given free access to snack food.

Several factors may influence unhealthy eating, such as body mass index (BMI; Kuczmarski et al., 2002), the availability of such foods in the house or at school (Pearson, Atkin, Biddle, Gorely, & Edwardson, 2010), the modeling of family members’ and friends’ unhealthy eating (Story, Neumark-Sztainer, & French, 2002), and engagement in certain sedentary activities (e.g., watching television; Epstein et al., 2008). The present study focuses on the impact of ostracism on motivation to eat and unhealthy eating, which to date, has received little empirical attention. This study is guided by recent theory and research suggesting that increased motivation to eat unhealthy foods and increased consumption of these foods may reflect and be measures of self-regulatory failure (Baumeister et al., 2005; Oaten et al., 2008; Oliver et al., 2001). More specifically, it is argued that because the (over)consumption of unhealthy snack foods is widely recognized as a contributing factor to the worldwide obesity epidemic, and because people are attracted to palatable energy dense foods and must therefore overcome their desire to eat, curtailing or inhibiting
consumption qualifies as self-regulation and consuming a large amount of unhealthy palatable snacks is tantamount to impairment in self-regulation.

Drawing from past research, it was expected that a brief episode of ostracism would lead to greater motivation to eat unhealthy snack food and increased consumption of such foods, but that the social-connection activity would restore belonging needs and replenish resources required for self-regulation and dietary restraint (Twenge et al., 2007). More specifically, ostracized young adolescents who were primed to think about their friends with a social-connection activity were expected to self-regulate better, and thereby be less motivated to eat unhealthy snack food and eat less than ostracized young adolescents who engaged in alternative activities.

Methods

Participants

The study sample was a community sample recruited from September 2009 to May 2010 with flyers and posters distributed around the university and in the community and from the laboratory’s database of families who volunteered for past studies. Participants were screened by phone to assess their eligibility to participate in the study, and considered ineligible if they reported having any food allergies or intolerances to the experimental foods, had upper respiratory illness that would affect their sense of smell or taste, reported being underweight (< 5th BMI percentile), or having any diagnosed psychological disorders or symptoms of disordered eating. Also during the phone screening, participants’ preferred snack food, from the list of snacks available (Table I), was determined by asking participants to rate on a 5-point scale, from 1 (does not like) to 5 (likes a lot), their snack preferences.

Table I. Nutrient Content and Kilocalories of Experimental Foods Used in the Study (in grams)

<table>
<thead>
<tr>
<th>Foods</th>
<th>Serving size</th>
<th>Energy density (kcal/g)</th>
<th>Fat</th>
<th>Carbohydrates</th>
<th>Protein</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potato chipsa</td>
<td>19</td>
<td>5.4</td>
<td>6.7</td>
<td>10.0</td>
<td>1.3</td>
</tr>
<tr>
<td>Cool ranch dontosa</td>
<td>20</td>
<td>5.0</td>
<td>5.0</td>
<td>12.9</td>
<td>1.4</td>
</tr>
<tr>
<td>M &amp; Msb</td>
<td>20</td>
<td>5.0</td>
<td>5.0</td>
<td>14.3</td>
<td>1.0</td>
</tr>
<tr>
<td>Twixb</td>
<td>16</td>
<td>5.0</td>
<td>5.0</td>
<td>10.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Kit Karc</td>
<td>14</td>
<td>4.8</td>
<td>4.8</td>
<td>9.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Butterfingersd</td>
<td>19</td>
<td>4.5</td>
<td>4.5</td>
<td>13.5</td>
<td>1.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>aFrito-layTM</th>
<th>bMars</th>
<th>cHershey’s</th>
<th>dNestle</th>
</tr>
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</table>

Parents were told that their adolescent had to abstain from eating 2 hr prior to the experiment to ensure standardization of preexperiment food intake and that variability in the consumption of experimental foods was not a function of recent food intake, or lack thereof. One hundred and four young adolescents (51 boys; M age = 13.58 years, SD = 0.83) were eligible for the study. However, one participant wrote about a relative (her mother) rather than her best friend during the writing task described below and was therefore excluded from the analyses resulting in a final sample of 103 young adolescents. 79% of the final sample self-identified as Caucasian, 11% as African American, and 10% were of another ethnicity. The average zBMI was 0.83 (SD = 1.10).

Procedure

Participants were told during recruitment and while providing consent that they would be playing a computer game during which they would be earning points exchangeable for their preferred snack food and/or interacting with a peer. They were also told that they would have the possibility to eat the snacks and/or interact with a peer. Upon arrival at the laboratory, written parent consent and adolescent assent was obtained, and participants completed a same-day food recall measure to ensure they had not eaten for 2 hr before reporting to the laboratory. All participants were found to be in compliance with the eating requirement and none were rescheduled.

Following the food recall, participants were introduced to the confederate and allowed to converse with him or her to get acquainted. Participants were then escorted to a room where they were instructed on how to play Cyberball (Williams & Jarvis, 2006), which is described in detail below. Participants were randomly assigned to either the ostracism (n = 51) or inclusion/control condition of Cyberball (n = 52). Participants were not told which Cyberball condition they were assigned to until after the study was completed, but they were told that the session would be observed through a closed-circuit camera. After playing Cyberball, participants completed the Aversion Impact Index questionnaire (Williams, Cheung, & Cho, 2000) to assess the effect of the ostracism manipulation on mood and psychological needs. Participants then completed one of three different activity tasks: (a) writing about their best friend (i.e., describing their friend’s best qualities; n = 37; writing); (b) watching a documentary on bird migration (n = 39; TV); or (c) completing a Sudoku puzzle (n = 27; Sudoku). The Sudoku puzzle activity was chosen as a cognitive-load control activity because it involves a similar amount of cognitive-load as the writing activity, and cognitive distraction or cognitive demand
per se (without social connection content) can also lead to increased food consumption (Boon, Stroebe, Schut, & Ljntema, 2002). Television watching was chosen as an alternative control activity because it also provides cognitive distraction and represents an activity that does not require considerable cognitive resources, but has also been found to increase motivation to eat and food consumption in youth (e.g., Temple, Giacomelli, Kent, Roemmich, & Epstein, 2007).

After working on the activity task (writing, TV, or Sudoku) for 5 min, participants played an operant computer task (the relative reinforcing value task; RRV task) that assesses the reinforcing value of their preferred snack food relative to time socializing with a same-sex, unfamiliar peer. As described below, participants were told that they would earn points redeemable for their preferred available snack food and/or social time with a peer. Following the RRV task, participants were served a large portion of the type of snack they earned during the RRV task in a preweighed bowl, and told that could eat as little or as much of the snack provided. The portion of snack food provided was the same for all participants (416.47 g, Table I) regardless of the number of points earned, and was larger than what most participants actually earned. This strategy was employed to avoid a ceiling effect that limited participants’ food consumption (e.g., participants who earned few points for eating would only be able to eat a small amount). Although this procedure diverges from previous research, it allowed for independent assessments of the motivation to eat unhealthy snack food (RRV task), and subsequent unhealthy food intake when no constraints are imposed on eating. After participants finished eating their snack food, the bowl was weighed again to record the amount of food that was consumed.

Next, participants conversed with the confederate for the amount of social time earned. The confederate was a same-sex peer within 1 year of the participant’s age who was recruited in the same manner as the participant. Same-sex, same-age peers were used as confederates because it is well-established that children and young adolescents prefer same-sex, same-age peers as social interaction partners and friends (Rubin et al., 2006). The confederates were recruited in the same way as the participants. The confederates were instructed to converse with the participant for the allotted amount of social time the participants earned and to ask the participants “getting to know you” questions (i.e., Where do you go to school?, How long have you lived here?, Do you have any hobbies?), and were compensated with a $15 gift card.

Finally, after eating and/or socializing, study participants’ height and weight were measured, debriefing occurred, and participants received a $30 gift card to a local shopping mall. Participants’ height and weight were measured at the end of the session because weight measurements could influence food intake due to increased self-awareness and self-consciousness of weight. If participants did not earn points for either activity, they simply skipped the activity and were debriefed and compensated for their participation.

In summary, the sequence of events/activities for this study was: (a) consent procedures and food recall; (b) playing of the Cyberball game (Ostracized or Included/Control); (c) completion of one of three activity tasks (writing, TV, Sudoku); (d) playing of the operant task to earn points for snack food and/or social time (RRV); (e) time to eat snack food; (f) time to converse with unfamiliar peers; and (g) debriefing.

**Experimental Manipulation: Cyberball**

The Cyberball game was used to induce ostracism or inclusion (Williams & Jarvis, 2006). Cyberball is a well-validated computerized ball-tossing procedure used to induce a brief episode of simulated ostracism (Oaten et al., 2008; Oliver et al., 2001; Williams, 2007; Williams et al., 2000; Williams & Jarvis, 2006). Studies that have used Cyberball have found strong effects (effect sizes ranging from 1.0 to 2.0) on post-experimental measures indicating that the Cyberball game negatively influences mood, emotion (e.g., sadness, anger), levels of belonging, self-esteem, feelings of control, and meaningful existence (Boyes & French, 2009; Williams & Jarvis, 2006) that dissipate after debriefing. Cyberball has also been found to elicit an emotion-focused and avoidance coping response, as well as activation of the dorsal anterior cingulated cortex, the same region of the brain that is activated when pain is detected (Eisenberger et al., 2003). This research supports that Cyberball is an effective laboratory-stressor for examining the psychological and behavioral impacts of simulated ostracism.

Before beginning the game, participants were told that they were playing the Cyberball game over the internet with two other adolescents who were “like them,” that they were to control a character at the bottom of the screen, and could throw the ball to either player on the screen with the click of the mouse. All participants were instructed to imagine with whom they were playing, what the physical environment looks like, and anything else they might wish to imagine about the situation and the players. However, the other “players” were actually programmed by the computer to either include (or therefore not ostracize) or exclude (ostracize) the participants from the ball-tossing game. Participants were randomly assigned to either an
ostracized or inclusion/control condition. In the ostracized condition, the participant received the ball twice at the start of the game, and thereafter, never received it again. In the included/control condition, the participant received the ball 33% of the time (which was similar to the amount of time that the other players received the ball). In both conditions, there were a total of 30 throws among the players, lasting approximately 5 min.

**Experimental Foods**

The nutrient content and kilocalories of experimental foods are presented in Table 1. These snacks were similar in energy density (M = 4.95, range: 4.5–5.4). Doritos were chosen as their preferred snack food by 27.6% of the participants, 27.6% chose Twix, 16.2% chose potato chips, 13.3% chose Kit Kat, 9.5% chose Butterfingers, and 5.7% chose M & Ms. Allowing participants to choose their preferred snack helped to prevent personal preferences influencing the results, which was likely to happen if one snack was imposed on all participants.

**Measures**

**Demographics and Anthropometric Measures**

Parents completed a modified version of the Hollingshead’s Four-Factor Index of Social Status (Hollingshead, 1975) to assess socioeconomic status (SES). The four factors included in the Hollingshead social status construct include parents’ sex, marital status, education, and occupation, but only parents’ education and occupation are used to compute the SES score. SES scores ranged from 8 to 66 (M = 26, SD = 11), with higher scores representing a higher SES.

Height (cm) and weight (lbs) were measured with a stadiometer (SECA, Birmingham, UK) and digital scale (Tanita, Arlington Heights, IL, USA), respectively, and these measures were used to compute BMI (kg/m²). To account for age- and sex-specific growth rates in adolescents, a z-score for BMI was used as a standard measure of weight in analyses (Kuczmański et al., 2002). zBMI was included as a covariate in the analyses because weight is likely to influence youths’ food consumption.

**Manipulation Check**

After playing the Cyberball game, participants completed the Aversion Impact Index (AII) which assesses the effects of the ostracism manipulation on mood and psychological needs including feelings of belonging, control, meaningful existence, and self-esteem, rated on a 5-point scale from 1 (not at all) to 5 (extremely), as well as the perceived number of throws directed toward the participant during the game (Williams et al., 2000). Higher scores indicated that participants were more negatively affected by the game.

**Reinforcing Value of Food Relative to Social Interactions**

The relative reinforcing value of food task (RRV) is a well validated operant task used in diverse populations and with several reinforcers as alternatives (Saelens & Epstein, 1996; Temple, Legierski, Giacomelli, Salvy, & Epstein, 2008). The number of responses performed for each alternative is used as an index of the individuals’ motivation to gain access to the activity/commodity. Individuals who respond more for food find food more reinforcing relative to the alternative, and allocate more time and effort to these activities than individuals who do not find these commodities as reinforcing (Epstein & Saelens, 2000; Saelens & Epstein, 1996; Temple et al., 2008).

The operant task is similar to a slot machine game. Participants are presented with three shapes on a computer screen. These three shapes are of various colors and rotate and change colors with the press of a computer mouse. Participants are told that the point of the task is to match the colors of the three shapes, and when the colors match, they earn one point (which was later redeemable for food or social time).

The schedule of reinforcement was a fixed, progressive-ratio schedule. Initially, participants were required to press the mouse four times to obtain one serving of snack food or 3 min of time to converse with the peer confederate. However, the response requirements for food and social time increased progressively over the subsequent trials so that participants had to press the mouse 4, 8, 16, 32, 64, 128, etc. times to earn the same amount of points. Two computer monitors were placed in the room and both were equipped with the operant task. One monitor was labeled the “snack food computer” while the other was labeled the “social computer.” Participants were instructed to attend to one computer at a time, and to remain seated at a computer while earning points. However, they were also informed that they could alternate between the two computers as often as they wanted, either earning all of their points toward snack food or social time, or distributing their points between the two rewards. The game ended after a total of nine trials had been completed. Responses for food and social interaction refer to the number of mouse-clicks for food or social interaction during this task.

**Analytic Plan**

Double data entry and quality check were performed prior to performing statistical analysis to ensure accuracy of the
data. T-tests were conducted to determine whether age, zBMI, and SES scores differed as a function of assigned Cyberball condition and activity type (TV, Sudoku, and writing). To assess whether the ostracism manipulation was effective, a multivariate analysis of variance (MANOVA) was performed to examine the effect of Cyberball condition on the following dependent variables: feelings of belonging, control, meaningful existence, self-esteem, negative mood, and the perceived number of throws directed toward the participant during the game.

The primary study hypotheses were that ostracized young adolescents who were primed to think about their friends with a social-connection activity would be less motivated to eat unhealthy snack food and would have a lower energy intake than ostracized young adolescents who engaged in alternative activities. These hypotheses were tested with two separate (Cyberball condition: Ostracized, Included/Control-x-3 (Activities: writing, TV, Sudoku) ANOVAs with responses for food and energy intake (kcal) serving as the dependent variables. Sex and zBMI were entered as covariates. Tukey’s studentized range test was used to examine significant differences. To further test study hypotheses, specific follow-up contrasts were performed between the ostracized/writing group compared to all other condition/activity groups collectively and between the ostracized/writing group and the included/writing group. Statistical analyses were performed using SAS Software (SAS, 2009).

Results
Examining Individual Characteristics as a Function of Cyberball and Activity Condition
Participants did not significantly differ in age, zBMI, or SES scores as a function of Cyberball condition or activity type (p > .05).

Testing the Effectiveness of the Ostracism Manipulation
MANOVA revealed a significant multivariate effect for Cyberball condition (Wilks’ λ = .44, p < .001). The ostracized group (M = 8.18, SD = 3.39) reported less positive feelings of belonging than the included/control group [M = 4.08, SD = 1.94; F (1,98) = 55.85, p < .001, R² = .36]. The ostracized group (M = 10.41, SD = 3.32) reported less positive self-esteem [M = 7.29, SD = 2.39; F (1,98) = 29.23, p < .001, R² = .23] and weaker feelings of having a meaningful existence [M = 8.61, SD = 3.78] than the included/control group [M = 3.88, SD = 1.84; F(1,98) = 63.94, p < .001, R² = .40]. Compared to the included/control group (M = 10.63, SD = 2.92), the ostracized group reported a greater lack of control [M = 13.49, SD = 1.98; F (1,98) = 32.67, p < .001, R² = .25] and greater negative mood (M = 20.33, SD = 6.90) than the included/control group [M = 12.82, SD = 4.13; F (1,98) = 4.93, p < .001, R² = .12]. The ostracized group (M = 11.96, SD = 431.29) worked more for food than the included/control group (M = 87.08, SD = 102.03). There were no significant main effects of Cyberball condition and no effect of the covariates (sex, or zBMI) for responses for social interaction and no significant main effects of activity type (p > .5).

The interaction between Cyberball condition and activity type was not significant for responses for food (p = .17) or social interaction (p = .89). However, planned contrasts revealed that the ostracized/writing group, (M = 374, SD = 611), responded more for food than the ostracized/Sudoku group, (M = 139, SD = 257), than the ostracized/TV group (M = 114.44, SD = 238.58), F (9,89) = 14.22, p < .005, R² = 0.15, and also more than the included/writing group (M = 107.56, SD = 123.95), F (9,89) = 8.16, p < .005, R² = 0.15.

Testing the Effects of Ostracism and Activity Type on Food Intake
A significant main effect of activity type was evinced, F (7,91) = 4.48, p < .01, R² = .19. Participants who wrote about their friends (M = 445.24, SD = 194.19) consumed greater energy than participants who watched television (M = 309.49, SD = 181.21). There were no significant differences in energy intake between participants who played Sudoku compared to those who watched television or wrote about their friend (p > .05).

The interaction of Cyberball condition and activity type was not significant (p = .28). However, planned contrasts revealed that the ostracized/writing group (M = 513.89, SD = 196.26) consumed more calories than the other groups combined (M = 347.07, SD = 158.08), F (9,89) = 12.83, p < .01, R² = .21, and more calories than the included/writing group (M = 372.78, SD = 168.06),
the expectation that emotional distress/reactivity mediated moods have been shown to increase eating compared to emotionally neutral activities. Both positive and negative affective states than the other activities of watching documentaries and solving puzzles, which are usually considered emotionally neutral activities. Both positive and negative moods have been shown to increase eating compared to neutral mood (Patel & Schlundt, 2001), which may lead to the expectation that emotional distress/reactivity mediated the association between ostracism and motivation to eat and food consumption. Yet, it is important to emphasize that although feelings of belonging, control, and meaningful existence, negative mood, and self-esteem scores differed as a function of the Cyberball manipulation, these measures did not predict responses for food or food intake (all p > .2). These findings are consistent with previous research indicating that mood or emotional distress is not the mediating process by which ostracism impacts eating and other behavioral outcomes (e.g., Buckley, Winkel, & Leary, 2004; Twenge, Baumeister, Tice, & Stucke, 2001; Twenge, Catanese, & Baumeister, 2002, 2003), and suggest that other explanations are needed.

Alternatively, because ostracism undermines belonging needs and young adolescents are extremely sensitive to issues of rejection (Rubin et al., 2006; Williams, 2007), it is possible that the heightened sensitivity following ostracism led participants to think more negatively about their social worlds, which in turn, further threatened belonging and acceptance needs and depleted abilities to self-regulate. It is also plausible that ostracism increases accessibility of negative social memories, which is similar to social information processing theory and models (Crick & Dodge, 1996; Lemerise & Arsenio, 2000), which in turn, led to heightened negative responses. In either case, ostracism and threat-detection would cause both attention and effort to be simultaneously drawn toward social cues, especially for adolescents who are primed to think about their friend and away from the self-monitoring and self-regulatory processes needed for dietary restraint. On the other hand, engaging in activities that do not require a considerable amount of cognitive attention or effort, such as watching television, might protect regulatory resources compared to cognitively demanding tasks such as completing puzzles or engaging in a writing exercise. Our pattern of results is generally consistent with this hypothesis as all participants who wrote about their friends consumed greater energy than participants who watched television, but there were no significant differences in energy intake between participants who played Sudoku compared to those who wrote about their friend (p > .05). Additional research is needed, but it is clear that the socioemotional component of the writing exercise uniquely contributed to our findings independently from the effects of executive control. Of course, it is also plausible that the lack of commercials, the subject of the video, or some other unique aspects of our “TV” activity may have impacted the study findings and that should be considered in future research.

There are a number of limitations of this study that should be considered when evaluating these findings. The first limitation pertains to our sample characteristics.
The relatively small number of subjects most likely influenced the magnitude of the differences across conditions. In addition, analysis of SES scores indicates that our sample had a moderate to high socioeconomic status which could limit the generalizability of our findings. Future research would benefit from greater statistical power to explore interactions of gender or weight status. Second, the use of a between-subject design limits our interpretation of the results as there were no direct comparisons of the impact of ostracism and activity types within the same participant. However, as we were designing the study, we deemed that carry-over effects (from being exposed to either the ostracism or inclusion condition first) would potentially influence the findings of the experiment.

Finally, as with any choice experiment, the choice of alternatives undoubtedly influenced the results, and it is likely that providing different alternatives to eating may have resulted in different patterns of responding and eating behavior. For instance, there is growing evidence that young adolescents not only interact differently with friends and nonfriends/unfamiliar peers, but also that they think differently about their friends and that friends are uniquely influential on psychosocial growth and development (e.g., Burgess, Wojlawowicz, Rubin, Rose-Krasnor, & Booth-LaForce, 2006; Rubin et al., 2006). Thus, having the possibility to interact with an actual friend may have been a more powerful alternative than eating or socializing with an unfamiliar peer, and should be considered for future research pertaining to ostracism and eating during early adolescence.

Despite these limitations, these findings advance the extant literature on ostracism and eating, and have important clinical implications for interventions targeting responses to peer adversity in young adolescents. Together with the our previous findings, results from this study strongly suggest that ostracism may perpetuate unhealthy behavior in some youth by increasing their motivation to eat and energy intake (Salvy et al., 2011). Results further suggest that the impact of young adolescents’ activity type and coping strategies following ostracism play a more critical role than has been acknowledged, and that certain activities postostracism, such as social-connection related activities, may promote the continuance of unhealthy eating in young adolescents.

In addition, the fact that our findings differed from past studies with older participants (Gross, 2009; Twenge et al., 2007) suggests that the negative impact of social-connection activities may be unique to adolescents, and that interventions focusing on emotional support, emotional expression, cognitive restructuring, and positive social self-statements (Lazarus & Folkman, 1984) when interpersonal stressors occur may not be effective for adolescents. Indeed, our findings suggest that surmising about a social problem while thinking about one’s friend may “backfire” and imperil further behavioral control during early adolescence. Instead, it appears that young adolescents who are experiencing problematic peer relations and who are at risk for impairment in self-regulation may benefit from engaging in nonsocial, less taxing, mind-occupying strategies that allow them to regain behavioral control such as cognitive distraction, thought-stopping, or selective attention (Kendall & Braswell, 1993). Clinicians may also want to help young adolescents generate a list of mind-occupying activities and responses from which they can choose, given strong evidence that youth who are able to choose from a variety of coping strategies have more favorable emotional and behavioral adjustment than youth who rely solely on one type of strategy (e.g., Holahan & Moos, 1987). If clinicians can help more adolescents develop such coping strategies, we may see that their use helps to alleviate some of young adolescent boys’ and girls’ unhealthy eating.

Conflicts of interest: None declared.

References


