

Exploring How Open-Access Snacking Influences Self-Regulation and Overall Mood in
Preschoolers

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Abstract

Exploring How Open-Access Snacking Influences Self-Regulation and Overall Mood in Preschoolers

A thesis presented to the Department of Psychology

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Self-regulation is a hallmark of early development, enabling the child to increasingly monitor and respond to her own and others' emotions, cognitions and behaviors. Adults commonly use snacks as an aid to self-regulate their daily stressors and this mechanism has been shown to be beneficial in children. However, preschool settings rarely provide open access to snacks as a self-regulation mechanism, hindering their ability to manage their energy level and overall mood. The following paper proposes to evaluate an open-access snacking procedure to help improve opportunities for self-regulation through snacking in preschool settings.

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Introduction

Self-regulation is a skill that a child typically acquires early in development. It enables the child to respond to her internal (e.g., emotions, motivations) and external (e.g., behavioral, spatial navigation, social interaction) challenges with adaptive behaviors (Deci & Ryan, 1987; Parritz, 2018; Schunk & Zimmerman, 1997). Coping is a psychological skill that allows for an individual to deal with a situation that is stressful (Zimmer-Gembeck & Skinner, 2011). Everyday adult life often requires multiple instances of self-regulation and coping mechanisms, such as when to sleep, when to work, and when to eat. In regard to eating, adult employees have been shown to achieve optimal performance and improved affect when they are provided with open access to hydration and preferred foods in the work environment (Shearer, Graham, & Skinner, 2016). For instance, Google workplaces provide free food in its offices and worksites to increase employee productivity, energy workers, and mood (Biro, 2017). Although workplace environments have been adapted in these ways to enhance self-regulation and coping, such an approach has yet to be explored for preschoolers in their classroom curricula and environs.

Self-Regulation Skills in Preschoolers

Self-regulation allows for numerous ways to adapt to one's environment productively, improving social relationships as well as providing avenues for success later in life. (Denham, Bassett, & Zinsser, 2012; Schutz, Hong, Cross, & Osbon, 2006; Silkenbeumer, Schiller, & Kärtner, 2018). Parents play a key role in the development of self-regulation of emotions in young children. Through their facial expressions and behavior, parents are able to model proper

ways to express emotions to their young children (Denham, Bassett, & Wyatt, 2007; Denham et al., 2012). Through observing parental expressions, children further learn the appropriate ways to regulate and respond to emotions (Nixon & Watson, 2001). Children who lack the capacity to model parental emotions and behaviors are shown to consistently struggle with their own self-regulation capabilities (Denham et al., 2012). Furthermore, children with parents who are shown to encourage this mimicry and motivate regulating their emotions are able to better access and control their emotions and needs (Fabes, Leonard, Kupanoff, & Martin, 2001; Gottman, Katz, & Hooven, 1997). These positive parental interactions set a baseline for understanding self-regulation; however, educational settings provide further opportunities for development of self-regulation in children.

Preschool is typically the first time that most children transition from their normal household schedules and are challenged to adapt to new environments (Graziano, Reavis, Keane, & Calkins, 2007). This normally affords numerous opportunities for self-regulation. In this setting, children are faced with social, emotional, behavioral and other changes that arise during this transition, and these changes are vital towards later success in academic settings by improving children's awareness and permitting greater activity engagement (Denham et al., 2012). Furthermore, children who have been shown to have strong emotion regulation earlier in life have greater enjoyment and success in later life (Denham et al., 2012; Graziano et al., 2007; Miller et al., 2006).

This reliance on joint parental and educational caregivers is referred to as co-regulation. Co-regulation in preschools has been shown to have longer lasting effects on childhood regulation (Silkenbeumer et al., 2018). Co-regulation has further been shown to lead to both increased moments of self-regulation as well as stronger self-regulation overall in preschoolers

(Gross & Thompson, 2007; Silkenbeumer et al., 2018; Stansbury & Sigman, 2000). Therefore, greater opportunities for co-regulation early on in preschool settings will further the fundamental development of self-regulation and provide a more beneficial learning environment.

Snacking as a self-regulation mechanism. It has been shown that children's emotional balance and their overall behavior can be diminished by restrictions on their feeding behaviors and opportunities (Rollins, Loken, Savage, & Birch, 2014). Additionally, restricting a child's access to food can result in increased irritability, as well as an increased desire for the restricted food (Fisher & Birch, 1999; Rollins et al., 2014). Specifically, children with low inhibitory control, or the inability to identify and appropriately respond to challenging situations, will increase their desire to consume restricted foods, focusing on their desire rather than the challenging situation. Childhood inability to self-regulate can also result in unregulated eating behaviors and difficulties maintaining energy levels (Hassan, 2016). When children are supported and are permitted to serve themselves, it has been shown they are more successful at responding to their internal cues (Birch, McPhee, Shoba, Steinberg, & Krehbiel, 1987; Fisher, Rolls, & Birch, 2003; Ramsay et al., 2010).

Energy Intake. As mentioned before, children have an intrinsic capability to self-regulate energy intake through responding to their internal cues and choosing satisfactory portion sizes (Dev et al., 2017; Fox, Devaney, Reidy, Razafindrakoto, & Ziegler, 2006). Evidence suggests that they develop this skill throughout early childhood with support and guidance from caregivers (Birch, Johnson, Andresen, Peters, & Schulte, 1991; Dev et al., 2017; Frankel et al., 2014). In contrast, children who are restricted in this ability to self-regulate their own food in response to their personal needs are at risk for childhood obesity, difficulties in school, and more (Dev et al., 2017).

Responsive and non-responsive verbal feeding practices have been used to improve self-regulation of energy intake in children (Benjamin Neelon & Briley, 2011). Responsive feeding focuses on reinforcing self-regulation of energy intake in regards to children's internal cues and emotions (Benjamin Neelon & Briley, 2011; Dev et al., 2017). Alternatively, non-responsive feeding cues focus on praising children when they eat, try to eat, or finish their food, as well as prompting children to eat without addressing the need to eat for internal regulation (Dev, McBride, Speirs, Donovan, & Cho, 2014; Dev, Speirs, McBride, Donovan, & Chapman-Novakofski, 2014; Ramsay et al., 2010). As such, these verbal feeding cues focus on improving childhood self-regulation and energy intake while avoiding possible maladaptive learning contingencies so that children misbehave in order to get food.

Self-Regulation as a Predictor for Academic Achievement

Strong self-regulation capabilities, both behavioral and emotional, have been shown to be strongly positively correlated with academic success in children of all ages (Blair, 2002; Edossa, Schroeders, Weinert, & Artelt, 2018; Howse, Calkins, Anastopoulos, Keane, & Shelton, 2003; Kuhl & Kraska, 1989; McClelland, Acock, Piccinin, Rhea, & Stallings, 2013; Valiente, Lemery-Chalfant, & Castro, 2007). Research has shown that underachievers, and individuals who do not use behavioral coping strategies, struggle academically (Borkowski & Thorpe, 1994; Howse et al., 2003).

More so, emotion self-regulation is also a predictor for academic achievement as children who have more positive moods and overall experiences are consequently more successful academically (Kuhl & Kraska, 1989). Furthermore, it is shown that academic achievement and emotional self-regulation are mediated by behavioral self-regulation. (Edossa et al., 2018; Howse et al., 2003) This self-regulation assists in children's ability to focus, monitor, and control their

emotions and behaviors (Edossa et al., 2018). With this ability, children are better to succeed academically, through listening and following directions, actively participating, and completing assignments.

Self-Regulation in Preschool Settings. Children with difficulties regulating their emotions and attention are often irritable and are unable to focus and succeed in the classroom academically (Howse et al., 2003). Furthermore, this lack of self-regulation at such a young age can persist throughout life, as those who struggle with self-regulation early exhibit a greater likelihood of continuing problems subsequent academic levels (Edossa et al., 2018; Howse et al., 2003).

When given the opportunity, children have been shown to use a wide range of coping mechanisms to alter their overall mood. For example, if they feel they need to be comforted, a child will grab a blanket or a stuffed animal, or if the child is overwhelmed, she will remove herself from the stressful situation (Zimmer-Gembeck & Skinner, 2011). Additionally, such coping mechanisms include food usage, allowing children to address their overall mood through self-regulating their food intake to maintain acceptable caloric intake (Birch & Deysher, 1985). Children who have greater self-regulatory skills are more attuned to what their body actually wants, serving themselves appropriate serving sizes for their body (Dev et al., 2017; Fisher et al., 2003). However, eighty percent of children participate in a daycare or preschool setting from ages two through five-years-old, with snack intake in these care centers accounting for 27% of the child's daily diet (Ahn & Nelson, 2015; Boyer, Laurentz, McCabe, & Kranz, 2012). In such settings, children usually have designated snack times, and they are prohibited from eating outside of that time slot.

Preschool children with regulated snack times become accustomed to eating at specific times, even if they are not hungry or if they would prefer to eat at a different time. This is due to proximity to available food increasing likelihood of eating, regardless of a need for self-regulation (Liu, Han & Cohen, 2014). As such, during scheduled snack times, children may solely be eating because this is the only opportunity to do so, not because their body is determining they are hungry or need the nutrients at that moment. Research has demonstrated that children may not observe the difference between an age-appropriate portion and a large portion while eating if another individual created the serving for them. Whereas, children who were permitted to determine their portion size for themselves created proper age-appropriate portion sizes (Fisher et al., 2003), demonstrating capabilities to properly maintain their intake.

The possibility of replenishing a deficit in energy and/or to satisfy hunger could be a useful response for a preschooler who is performing at a level lower than which they would typically perform. The eating behaviors developed in childhood can persist into later development (Scaglioni et al., 2018), so providing preschool children with educational support in understanding when to properly use food in response to the individual body's needs is an important skill might be beneficial to their acquisition of enduring patterns of healthy eating.

Present Study

To date, few studies have explored children's ability to manage their food intake throughout the school day in response to fluctuations in their energy level and mood. Given that children spend a significant portion of their week in classroom settings, their learning and performance might benefit from increased access to food, given the demonstrated effect of food on overall behavior and mood. The proposed experiment will delve into whether a more flexible and less regulated snacking policy is beneficial for children's overall productivity during the

typical school day. We hypothesize that (1) allowing open-access to snacking and hydration in preschooler settings will result in enhanced learning, and greater opportunities for support in moments of diminished self-regulation. We also hypothesize that (2) children who self-regulate through eating snacks will have improved task engagement and increased mood. Finally, we hypothesize that (3) children who have freedom to snack in order to self-regulate will be more engaged and on-task in responding to and controlling their internal and external challenges.

Proposed Method

To see the effect food has on improving behavior in children, we are proposing an open-access snacking procedure to supplement the normal snack-time in preschool to allow children to replenish this energy deficit and improve their overall mood and productivity. Specifically, this method will be implemented with preschool children ages three-to-five-years as eating habits begun during this developmental period have been demonstrated to play a role in the food preferences and practices that they will use for their entire life (Ahn & Nelson, 2015).

Participants

Participants will be recruited from Lemberg Children's Center with the aim of selecting two classrooms of preschool children ages three-to-five years old with comparable socioeconomic status, classroom size, and gender mix. One classroom will maintain the traditional assigned/restricted snack times (Control Group), while the second classroom will have open access to snacks in addition to access at snack time (Experimental Group). If support for the hypotheses is identified at the conclusion of the first semester, the open-snacking approach will be employed in both classrooms for the balance of the year.

Participants and their parents will be required to complete informed consents. To assist in clarifying the requirements, expectations, and measures of this study during participant recruitment, researchers will be available Monday through Friday during pick-up at the preschool for two weeks. Additionally, researchers will hold an open forum to afford parents who are unable to stay during pickup an opportunity to ask questions of the procedures and

parental expectations. During these opportunities, researchers will have informed consents available for the parents to complete in the moment or bring home and return another day.

Measures

Food Ranking Questionnaire. During the first two weeks of the experiment, researchers will observe and record the snacking habits and snacks provided by parents for their children in both classrooms. To determine what snacks will be provided for the experimental condition, participating students and parents for the experimental condition will complete a food-rating scale for how much they like certain relatively healthy snacks. The snacks listed on the scale will be composed of the snacks that researchers observed were packed for the children during the two-week observational period.

Activity Engagement Scale. Trained observers will complete a task engagement rating scale to rate each child's overall participation in the classroom at five-minute intervals throughout the day. The scale is a five point Likert-type scale, ranging from completely unengaged/distracted, slightly unengaged/distracted, neither engaged/distracted, slightly engaged to completely and fully engaged.

Mood Rating Scales. Observers would additionally complete a mood rating scale in a similar manner. This scale uses a five point Likert-type scale, ranging from the participant appearing super sad, slightly sad, neutral, slightly happy to super happy.

In a global self-reported measure of mood, the children in both conditions will complete a Smiley Scale with the researcher or teacher at the start and finish of each day, paralleling the observer mood rating scale. The administrator for the Smiley Scale will ask the child "How do you feel right now?" The children would then color in on a range of faces including super happy,

happy, neutral, sad, and super sad, similar to a Likert-type scale, how they feel at this current moment.

Self-Regulation of Learning Self-Report Scale (SRL-SRS). The SRL-SRS measures how planning, self-monitoring, evaluation, reflection, effort, and self-efficacy in order to determine one's capacity to self-regulatory skills. Cronbach's alpha range from 0.79 to 0.81, demonstrating strong internal validity (Toering, Elferink-Gemser, Jonker, Heuvelen, & Visscher, 2012). The instructors of the classrooms will complete the SRL-SRS two times: once at the beginning and once at the end of the semester.

Caregiver-Teacher Report Form (C-TRF) for 1.5 to 5 year olds. The C-TRF has instructors rate behavioral problems on a 3-point scale (0= not true, 1=sometimes true, 2=very true) to indicate the number of times a child demonstrated a specific behavior each week, and as such, will be given to the instructors to complete each week during the experiment. Behaviors include both internalized and externalized actions, such as the child being emotionally reactive, anxious/depressed, aggressive, attention seeking, somatic complaints and withdrawn. Higher scores are indicative of greater internal and external challenges. Reliability of the C-TRF has been shown to be relatively high, with test-retest reliability with a mean of 0.81 (Rescorla et al., 2012).

Feeding Habits. Parents will complete the Parental Feeding Style Questionnaire (PFSQ) and the Child Eating Behavior Questionnaire (CEBQ). The PFSQ uses a five point Likert scale ranging from "I never do" to "I always do" evaluating four scales: emotional feeding, instrumental feeding, prompting, and control. The CEBQ uses a five point Likert scale ranging from never to always covering eight scales: eating fussiness, speed of eating, eating responsiveness, desire to drink, over-eating, food responsiveness, and overall enjoyment. Parents

will have the opportunity to complete these measures on either hard copy or by phone interview. These measures will be utilized in order to understand eating and feeding behaviors of children that transpire outside of the classroom. Cronbach's alpha ranges from 0.82 to 0.92 and 0.74 to 0.91, respectively, demonstrating good reliability and validity with these measures (Wardle, Guthrie, Sanderson, & Rapoport, 2001; Wardle, Sanderson, Guthrie, Rapoport, & Plomin, 2002).

Procedure

One classroom would be utilized as the experimental condition and the other as the control to gauge a baseline self-regulation of normal snacking procedures.

Prior to starting this new snacking procedure, parents will complete informed consent, the PFSQ, and CEBQ. Additionally, an overview manual and a tutorial describing its aims and structure will be provided for the teachers. Additionally, the researcher will present a puppet show to the children in both the control and experimental conditions. For children in the control group, the puppets would discuss how the foods they eat at snack time could help to assist with their mood and learning behavior. For children in the experimental group, the puppets would discuss what types of experience they might have that would support requesting or agreeing to a snack to assist with mood and learning behavior. During this time, teachers will complete the baseline SRL-SRS report for the participants.

The control condition will follow a normal preschool schedule, with routine snack times at 9:00AM, 2:00PM and 4:30PM. In addition these routinely scheduled snack-times, the students in the experimental condition will have the opportunity to choose if they would like to eat an additional snack to help improve overall mood and productivity. A student could initiate a request to snack, or if a teacher notices a child experiencing diminished self-regulation or overall mood in the classroom, they would be encouraged to prompt the child to retrieve a snack using a

standardized script following the non-responsive verbal strategies: “I see you might be losing interest/tired/unsure what to do/having some difficulty. Are you feeling hungry? Would you like a snack? Do you need to go potty? Do you need alone time?” If the child determines they would like a snack, a snack zone/table in the corner of the room will be supplied with snacks and water for the children to eat. This table will also have chairs and hand sanitizer so the child can still be in the room and account for sanitary issues of eating while snacking.

Snacks provided will be determined based on the results from the food-ranking questionnaire. The inclusion of mid-range snacks is designed to diminish the allure of snacking as an opportunity for a treat, instead encouraging the use of snacking as a method to improve self-regulation. Additionally, in combination with using the non-responsive verbal strategies to encourage self-regulation, this procedure is designed to overcome potential reinforcement of poor mood and inappropriate behaviors while also using mid-range nutritious snacks that have parents’ approval.

Participating students in both conditions will be assigned a number and will be observed by trained observers in the classroom every day per week. For the experimental condition the observers will monitor and record when children choose to, or are prompted to, eat their snack, how much they eat per sitting, the amount of snacking per day and whether they were prompted or chose to do so. Alternatively, observers in the control condition will monitor how much of the routine snack the children eat and any additional time the child expresses a desire for snacking. Research observers in both conditions would be trained to be a part of the classroom routine to record the amount of snacks a child decides to eat per day, as well as observe the self-regulatory behaviors that the children demonstrate. Every 5 minutes, observers from both conditions would complete the Activity Engagement and Mood Rating scales referenced above.

At the end of each week during the study, instructors for the experimental and control conditions will complete the C-TRF for 1.5 to 5 year olds. Lastly, at the end of the semester, instructors would once again complete the SRL-SRS.

Proposed Analytic Plan

Prior to analyzing the hypotheses, data will be cleaned for participants with highly irregular atypical eating profiles as identified during the two-week observational period and through the PFSQ and CEBQ. Though these students will have participated in the full procedure, their data will be excluded from the final analyses.

First, to measure the effect of food as a self-regulation measure, Hypothesis 1 will be analyzed with a mixed-model [2-between subjects (Experimental Group/Control Group) x 2 within-subjects (Time 1/Time 2)] ANOVA. This will be between the control and experimental groups to compare if there is a difference in mean of self-regulation capabilities between the two groups. This analysis will be conducted twice, once at the beginning and once at the end of the semester. It is predicted that in Time 1, there will be no significant differences between the two conditions; however, at Time 2, there will be such a significant interaction such that the Experimental group demonstrates effective self-regulation greater than the Control Group.

To analyze how self-regulation through snacking can improve task engagement and mood, Hypothesis 2 will use a mixed-model [2 between -subjects (Experimental Group/Control Group) x 2 within-subjects (Time 1/Time 2)] MANOVA. It is predicted that participants in the experimental condition will significantly engage more actively in classroom activities and will also have greater reported levels of mood, compared to participants in the control condition at Time 2, but the groups will not differ on either measure at Time 1. Furthermore, participants who

choose to engage in self-regulatory behaviors will further show this increased task engagement and mood.

To measure responses to internal and external challenges as a result from self-regulation, Hypothesis 3 will also implement a mixed-model ANOVA. For this measure, it is predicted that the experimental condition will demonstrate better management of internal and external challenges, as measured in the C-TRF, compared to participants not in the open-access snacking condition at Time 2.

Conclusion

Limitations and Future Directions

The results from this proposed study may not be as strong given the existence of the routine snack times combined with free access snacking. As such, the influence of open access snacking would not be as strong as it would be if open access snacking were the only mechanisms for children to obtain these nutrients for self-regulation. Future studies proposed or conducted should include a methodology in which there is solely the open-access snacking, excluding the routine snack schedule.

Additionally, the use of non-responsive verbal feeding cues, such as teacher prompting, is used to combat the potential reinforcement of misbehavior that could result from allowing children in need of self-regulation to snack when desired. Additionally, the food rating scale is also designed to avoid this potential complication. However, these measures may not be strong enough to combat this learning contingency. Future studies should create additional measures to ensure that snacks are used to permit self-regulation, rather than reinforce off-task behaviors or poor mood.

In this proposed method, the research observers are not aware of the child's typical behavior and could potentially assume that a child is demonstrating abnormal engagement in classroom activities. It is important for future studies to include a period where the research observers can learn and identify typical and atypical behaviors for the participating children.

Measures of activity engagement for this proposed study only utilize a one-question Likert-type scale given the frequency of observations that researchers will have to record. To obtain a better understanding of children's task orientation and engagement, a rating scale could be implemented less frequently with more in-depth activity engagement questions.

Lastly, this study utilizes a small sample size. As such, this small sample size reduces the power of the manipulation and may cause difficulty in generalizing the findings. Future studies should incorporate a larger sample size by incorporating numerous preschool classes, perhaps using two preschools with comparable socioeconomic status, classroom size, and gender mix.

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