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## Psychometrics of the Eating in Emotional Situations Questionnaire (EESQ) among low-income Latino elementary-school children

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### Abstract

The current study examines the psychometric properties of the Eating in Emotional Situations Questionnaire (EESQ) and the frequency of eating in emotional situations among 159 low-income Latino fourth graders. The EESQ assesses eating in emotional situations that are emotion-driven (“I eat when I am lonely”) and context-driven (“I eat when I get a really bad grade”). Internal consistencies for the EESQ subscales and total scale ranged from .70 to .86. Criterion validity of the EESQ was established by statistically significant correlations between the EESQ subscales and total scale, and uncontrollable eating, external eating, and junk food intake. Eating in emotional situations was common in the sample; almost one-half reported eating in at least 3 of the 11 types of emotional situations (e.g. when stressed, sad, bored) and 28% reported eating in at least 6 types. Overall, these findings provide support for the internal consistency and validity of the EESQ in low-income Latino children, and suggest that eating in emotional situations is moderately present in this demographic. Future studies are needed to validate the EESQ in other ethnic groups and examine the longitudinal tracking of eating in emotional situations among Latino youth.

### Keywords

Eating in Emotional Situations Questionnaire (EESQ); emotional eating; children; Latino; Hispanic

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#### Contributors

Authors Riggs, Spruijt-Metz, Chou, and Pentz designed the study. All authors participated in measurement development. Rollins conducted the statistical analyses with the assistance of authors Riggs, Spruijt-Metz, Chou, and Pentz. Rollins wrote the first draft of the manuscript and all authors contributed to and have approved the final manuscript.

#### Conflict of interest

All authors declare that they have no conflict of interest.

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## 1. Introduction<sup>1</sup>

Emotional eating refers to eating in response to emotional distress (Ganley, 1989) and has been linked to external eating (i.e., eating in response to external cues; van Strien & Oosterveld, 2008), loss of control while eating (Goossens, Braet, Van Vlierberghe, & Mels, 2009), and greater daily energy intake (Braet & Van Strien, 1997) and consumption of energy-dense foods among youth (Nguyen-Michel, Unger, & Spruijt-Metz, 2007). Emotional eating is relatively low in preadolescent children (e.g. Carper, Orlet Fisher, & Birch, 2000; van Strien & Oosterveld, 2008); however, limited research has been conducted among low-income Latino children.

Low-income Latino children are a “unique” group in which to study emotional eating because they are likely experience emotional distress in response to the acculturative process (e.g. competing demands from their own culture and the dominant culture; Suarez-Morales, Dillon, & Szapocznik, 2007; Buriel, Perez, De Ment, Chavez, & Moran, 1998) and living in poverty (Aber, Bennett, Conley, & Li, 1997, Weisskirch & Alva, 2002). Together, these experiences may put them at-risk for emotional eating. One study using a predominately Latina adolescent sample found that 22% were classified as emotional eaters (Nguyen-Michel, Unger, & Spruijt-Metz, 2007); however, the incidence of emotional eating in low-income Latino children has yet to be studied.

The objectives of the current study were to describe the frequency of eating in emotional situations (EES) among a sample of low-income Latino elementary school children, and present the psychometrics for a new child measure of EES referred to as the Eating in Emotional Situations Questionnaire (EESQ). Criterion validity of the EESQ was investigated using measures of uncontrollable eating, external eating, and food intake.

## 2. Method

### 2.1. Participants

All data were drawn from a obesity prevention pilot study (Riggs, Kobayakawa-Sakuma, & Pentz, 2007) conducted at 5 schools in Orange County, CA. Fourth-grade students completed one of four survey versions at baseline; each survey version contained items common to all versions as well as items unique to each version. Only children who completed the EESQ were included in the present study ( $n = 184$ ); however, note that a limited sample completed the external eating ( $n = 70$ ) and junk food ( $n = 89$ ) subscales. All surveys were administered aloud in English by a trained data collector. Of the 184 study participants, 12 were excluded because they were not Latino and 13 due to missing data; the final sample consisted of 159 children (age:  $M = 9.4$ ,  $SD = 0.6$ ). The sample was 45.0% male and 57.9% reported participating in the free or reduced lunch program. All procedures were approved by the University of Southern California Institutional Review Board.

### 2.3. Measures

**2.3.1. Eating in Emotional Situations Questionnaire (EESQ)**—The EESQ is an 11-item measure developed by the authors to assess underlying dimensions of EES that were commonly reported in focus groups and interviews, conducted among an ethnically diverse group of girls ( $n = 102$ ) and boys ( $n = 28$ ), aged 11 to 17 years. Children were questioned on social and environmental cues to eating, and reasons for eating. Interviews lasted 50–75 minutes and were used to generate the scale items. The EESQ (see Table 1) assesses dimensions of eating in emotional situations that are emotion-driven (e.g. “I eat when I am

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<sup>1</sup>EESQ, Eating in Emotional Situations Questionnaire; EES, Eating in Emotional Situations.

lonely”) and context-driven (“I eat when I have a hard test coming up”). Response options were 0 = “no” and 1 = “yes”.

**2.3.2. External and uncontrollable eating**—Uncontrollable eating was assessed using one item from the Meanings of Eating Questionnaire (MOE; McClain et al., submitted): “I eat because I can’t stop eating” (1 = “never”, 2 = “sometimes”, and 3 = “often”). In addition, external eating was assessed using one item taken from the Dysregulation Inventory (DI; Mezzich, Tarter, Giancola, & Kirisci, 2002): “I will pick up and eat food just because I happen to see it” (1 = “never”, 2 = “sometimes”, and 3 = “often”).

**2.3.4. Food frequency**—Fruit and vegetable intake items were adapted from the validated Youth Risk Behavior Survey (YRBS; Centers for Disease Control and Prevention, 2005; Eaton et al., 2006). Two items assessed fruit intake over the past week (e.g., “How often did you eat any fruit, fresh, or canned”), and three items assessed vegetable intake (e.g., “How often do you eat green salad”). These items were included on all versions of the student survey, though two different response scales (adapted from the YRBS) were used. Because the response scales were similar, the scales were recoded to 1 = “less than once a week,” 2 = “1–3 times a week,” 3 = “4–6 times a week,” 4 = “once a day,” and 5 = “2 or more of these a day”. An exploratory factor analysis on the 5 fruit and vegetable items yielded 2 factors with eigenvalues exceeding 1: fruit intake (2 items) and vegetable intake (3 items). Mean scores for the scales were computed, and internal consistencies ranged from moderate to good (fruit intake:  $\alpha = .43$ , vegetable intake:  $\alpha = .62$ ).

To measure junk food intake, 5 items (e.g., “How often do you drink soda – not diet (1 can or glass)”) were taken from a validated food frequency questionnaire (Willett et al., 1985). These items have been used in previous studies to measure junk food intake (Nguyen-Michel et al., 2007). Item response options were 1 = “less than once a week,” 2 = “once a week,” 3 = “2–3 times a week,” 4 = “4–6 times a week,” 5 = “once a day,” and 6 = “2 or more of these a day.” The internal consistency of this scale was .77.

**2.3.5. Demographics**—Children reported their ethnicity, gender, and age, and indicated whether they received free or reduced lunch, which was used as a proxy for household income. At the time of data collection, a child was eligible for the National School Lunch Program if his/her family’s income was lower than 130% of the poverty level (United States Department of Agriculture, Food and Nutrition Service, 2008).

## 2.4. Statistical analysis

All statistics and sample descriptives were computed using SAS version 9.1 (SAS Institute Inc., Cary, NC, USA), unless mentioned otherwise. To evaluate the construct validity of the EESQ, a confirmatory dichotomous second-order factor model (Muthen & Muthen, 2001) was performed in Mplus 4.1 (Muthen and Muthen, Los Angeles, CA, USA). We expected a two-factor model comprising the emotion- and context-driven dimensions of EES, and a second-order factor reflecting EES itself. The model was evaluated using the  $\chi^2$  test, comparative fit index (CFI), and root means square error of approximation (RMSEA) model fit indices. The EESQ subscales for emotion- and context-driven EES were computed by summing the dichotomous responses for each of the subscale items; a total EES scale was computed by summing all of the EESQ items. Criterion validity of the EESQ was evaluated using Pearson correlations and Student t-tests.

### 3. Results

#### 3.1. Factor structure of the EESQ

Confirmatory dichotomous (second-order) factor analysis was used to evaluate the hypothesized factor structure of the EESQ and indicated that the model adequately fit the data ( $\chi^2 = 45.05, p = 0.39$ ; CFI = .999; RMSEA = .017). As shown in Table 1, the EES factor explained 93% of the variance in factor 1 and 96% in factor 2. Factor 1, referred to as emotion-driven EES, contained 6 items and described eating in response to psychological distress (e.g. anxiety). Factor 2, referred to as context-driven EES, contained 5 items and described emotional eating triggered by contextual cues (e.g. receiving a bad grade). The factors for emotion and context-driven EES were highly correlated ( $r = .89, p < 0.001$ ). Internal consistencies for the emotion- and context-driven subscales were .81 and .70, respectively, and the EESQ total scale had an internal consistency of .86.

#### 3.2. Incidence of eating in emotional situations (EES)

On average, EES was low but common among the sample ( $M = 3.2, SD = 3.1$ ; Table 1). Almost half (47.8%) of the sample reported eating in three or more emotional situations and 28.3% to eating in six or more emotional situations.

#### 3.3. Criterion validity of the EESQ

Criterion validity of the EESQ was evaluated by correlating the EESQ scales with the food frequency and eating behavior measures, stratified by gender. As shown in Table 4, there was a positive correlation between uncontrollable eating and all the EESQ scales in boys and girls. In addition, junk food intake correlated with all the EESQ scales in boys only, whereas external eating correlated with scores on the EESQ total scale and context-driven subscale in girls only. No significant associations between the EESQ scales, and fruit and vegetable intake were observed. In addition, the EESQ scales were not associated with gender, or free or reduced lunch.

### 4. Discussion

The current study demonstrates good psychometric properties of the EESQ among low-income Latino school children. Compared to pre-existing measures (e.g., van Strien & Oosterveld, 2008), the EESQ is innovative in that it assesses eating in a variety of emotional situations that are driven by psychological states and contextual cues. In addition, the current study found that eating in emotional situations (EES) was moderately common in low-income Latino boys and girls, a group high at-risk for obesity (Ogden et al., 2010).

Though we present evidence for the factor structure of the EESQ, the subscales for context- and emotion-driven EES were highly correlated and may represent one dimension of EES. This is not surprising, given that distressing external events (e.g. preparing for a test) typically lead to negative emotional states (e.g. anxiety). However, the correlation observed between external eating and context-driven EES subscale in girls, which was absent for emotion-driven EES, suggests that this subscale may be sensitive to measuring eating in response to distressful external cues. Thus, the EES context-driven subscale, in particular, may complement pre-existing surveys used to assess emotional eating in children.

EES was common in the current sample of low-income Latino pre-adolescents. Almost 50% of the sample reported eating in 3 types of emotional situations and almost 25% to eating in 6 emotional situations. In contrast, past studies suggest that emotional eating is relatively uncommon among Caucasian and European children (e.g., Carper et al., 2000); although, it's difficult to compare the incidence of EES observed in the current study to past studies

due to measurement differences. However, given that low-income Latino children may experience emotional distress due to the acculturative process and poverty, it's possible that emotional eating is more prevalent in this demographic compared to their racial counterparts. Future research is needed.

The EESQ scales were found to have criterion validity with several obesity-related eating behaviors. In agreement with past studies (Goossens et al., 2009; Wardle et al., 1992), EES was positively associated with uncontrollable eating. In addition, frequent EES was related to consuming greater amounts of junk food, though this finding was only present in boys. Intake of salty, energy-dense foods has been linked to emotional eating among a predominately Latino sample of adolescents (Nguyen-Michel et al., 2007), though the relation was stronger in boys. Taken together, the relation between emotional eating and unhealthy food intake may be stronger among Latino males. Lastly, context-driven EES was associated with external eating in girls only; however, the non-significant finding in boys may have been due to the limited sample size for this correlation coefficient ( $n = 36$ ).

The current study should be considered in light of its limitations. The current study focused on Latinos as one group, and did not account for differences between ethnic subgroups. In addition, we attempted to establish criterion validity with measures of uncontrollable eating and external eating that have not been validated. However, the significant findings between these variables and the EESQ scales are promising and provide preliminary evidence for the EESQ's criterion validity.

## 5. Conclusions

The EESQ showed good psychometrics and can be used to measure EES elicited by psychological states and external cues in low-income Latino children in the 4<sup>th</sup> grade and on. In addition, the current study provides evidence for the moderate frequency of EES among young low-income Latino children, a group high at-risk for obesity.

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### Research Highlights

- EESQ measures emotional eating caused by distressful events and psychological states
- Emotional eating is common among low-income Latino elementary-school children



Frequency of eating in emotional situations (EES) and factor loadings for second-order confirmatory dichotomous factor analysis of the Eating in Emotional Situations Questionnaire (EESQ) using a sample of low-income Latino children ( $n = 159$ )

**Table 1**

	First-order factors			2nd-order factor
	Frequency (%) <sup>a</sup>	Emotion-driven EES	Context-driven EES	Total EES
I eat when I am really sad.	19.5	.84		
I eat when I am <u>anxious</u> .	33.3	.80		
I eat when I am nervous.	29.6	.82		
I eat when I am really mad.	18.9	.80		
I eat when I am <u>lonely</u> .	23.3	.93		
I eat when I am bored.	50.3	.75		
I eat when I have a fight with my friends/family/boyfriend/girlfriend.	22.0		.68	
I eat when I have a <u>hard test</u> coming up.	52.8		.75	
I eat when I get a really bad grade.	15.1		.79	
I eat when I feel like I can't get stuff done.	29.6		.82	
I eat when my friends talk me into it.	25.3		.72	
Emotion-driven EES <sup>b</sup>				.93
Context-driven EES <sup>c</sup>				.96
Variance explained		.68	.57	.90

<sup>a</sup>Frequency of "yes" responses.

<sup>b</sup>Emotion-driven EES refers to eating in emotional situations that are driven by psychological states such as loneliness and anger.

<sup>c</sup>Context-driven EES refers to eating in emotional situations that driven by contextual cues such as receiving a bad grade or preparing for a hard test.

Correlations between eating in emotional situations (EES), eating behaviors, and food intake among low-income Latino children ( $n = 159$ ), in addition to the means and standard deviations (sd) of these variables among the boys ( $n = 71$ ) and girls ( $n = 88$ )

**Table 2**

	Emotion-driven <sup>a</sup> EES		Context-driven <sup>b</sup> EES		Total EES		Mean (sd) <sup>c</sup>	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Uncontrollable eating	.36**	.33**	.44***	.31**	.44***	.35***	1.4 (0.6)	1.2 (0.5)
External eating <sup>d</sup>	.16	.25	.25	.57***	.23	.45**	1.4 (0.6)	1.1 (0.4)
Fruit intake	.02	.01	.01	.09	.02	.05	3.4 (1.1)	3.3 (1.2)
Vegetable intake	-.04	.004	.04	.03	-.01	.02	2.6 (1.1)	2.6 (1.0)
Junk food intake <sup>e</sup>	.42*	.06	.45**	.12	.46**	.09	2.0 (0.8)	1.9 (0.8)
Emotion-driven EES							1.9 (1.9)	1.6 (1.9)
Context-driven EES							1.5 (1.6)	1.5 (1.4)
Total EES							3.4 (3.2)	3.1 (3.1)

\*  $p < 0.05$ ;

\*\*  $p < 0.01$ ;

\*\*\*  $p < 0.001$

<sup>a</sup> Emotion-driven EES refers to eating in emotional situations that are driven by psychological states such as loneliness and anger.

<sup>b</sup> Context-driven EES refers to eating in emotional situations that driven by contextual cues such as receiving a bad grade or preparing for a hard test.

<sup>c</sup> No significant mean differences by gender were observed.

<sup>d</sup> Only data for 70 children were available for this scale (boys:  $n = 36$ , girls:  $n = 34$ ) because the scale was only included on version 2 of the student survey.

<sup>e</sup> Only data for 89 children were available for this scale (boys:  $n = 35$ , girls:  $n = 54$ ) because the scale was only included on version 1 of the student survey.