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### Family Entropy: Understanding the Organization of the Home Environment and Impact on Health Behaviors and Weight in School-Age Children

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Family Entropy: Understanding the Organization of the Home Environment and Impact on Health Behaviors and Weight in School-Age Children

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**Describe role of Submitting/Presenting Trainee in this project (limit 150 words):** The trainee conceived of the study, analyzed the data, and interpreted and presented the findings, including two peer reviewed publications and an oral presentation at a national conference (Society of Behavioral Medicine Annual Conference in March 2019.)

**Background:** Child obesity is a major public health issue with a high disease burden. Although numerous contributing factors have been identified, the family home environment is a central context of influence that requires deeper understanding. The level of organization in the family home environment may influence obesity and obesogenic behaviors, but the literature has suffered from the lack of a strong overarching construct and model to guide this area of research. Family entropy is a conceptual framework that fills this gap by representing the level of organization across the home environment.

**Objectives/Goal:** The current study empirically assessed family entropy using factor analysis in a longitudinal sample of elementary school-age youth. The study examined the influence of family entropy child weight both directly and indirectly through weight-related health behaviors (i.e., sleep and physical activity), and considered the moderating role of socioeconomic status.

**Methods/Design:** Children (N=968) were measured yearly from grades 3-6 as part of the National Institute of Child Health and Development (NICHD) Study of Early Child Care and Youth Development. Family Entropy was assessed using selected items from the Confusion, Hubbub, or Order Scale (CHAOS; Matheny et al., 1995) and Home Observation Measurement of the Environment

in Middle Childhood (HOME-MC; Bradley et al., 1988). Body Mass Index z-score (zBMI) was measured using anthropometrics, and moderate-to-vigorous physical activity was measured using waist-worn accelerometry. Children's sleep duration was measured via parent-report on the Children's Sleep Habit Questionnaire (Owens, Spirito, & McGuinn, 2000).

**Results:** Factor analysis suggested that family entropy is comprised of distinct elements of household organization and disorganization, which are moderately related. Contrary to hypotheses, household organization and disorganization were not significantly related to zBMI. Associations between family entropy, health behaviors, and weight revealed that household disorganization was particularly detrimental to child sleeping behavior both concurrently ( $\beta = -.16, p < .001$ ) and over time ( $\beta = -.10, p < .05$ ) in families of both high and low socioeconomic status.

**Conclusions:** Family entropy is a complex construct with implications for obesogenic behaviors among school-age youth. Increased awareness of organization and disorganization in the family home environment among healthcare providers may facilitate early identification of families that are at high-risk for struggling to implement consistent health behaviors, particularly around sleep. Additional family-centered problem-solving strategies may be necessary to promote optimal sleep and health outcomes for youth in these home environments. Future research at CMH will extend these constructs to into an acute illness context through an examination of the home environment on psychosocial distress and coping in the context of new diagnosis of pediatric cancer.