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# Nutrition as the Foundation for Good Health: Evaluating the Impact of Food Programs on Health

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### Introduction

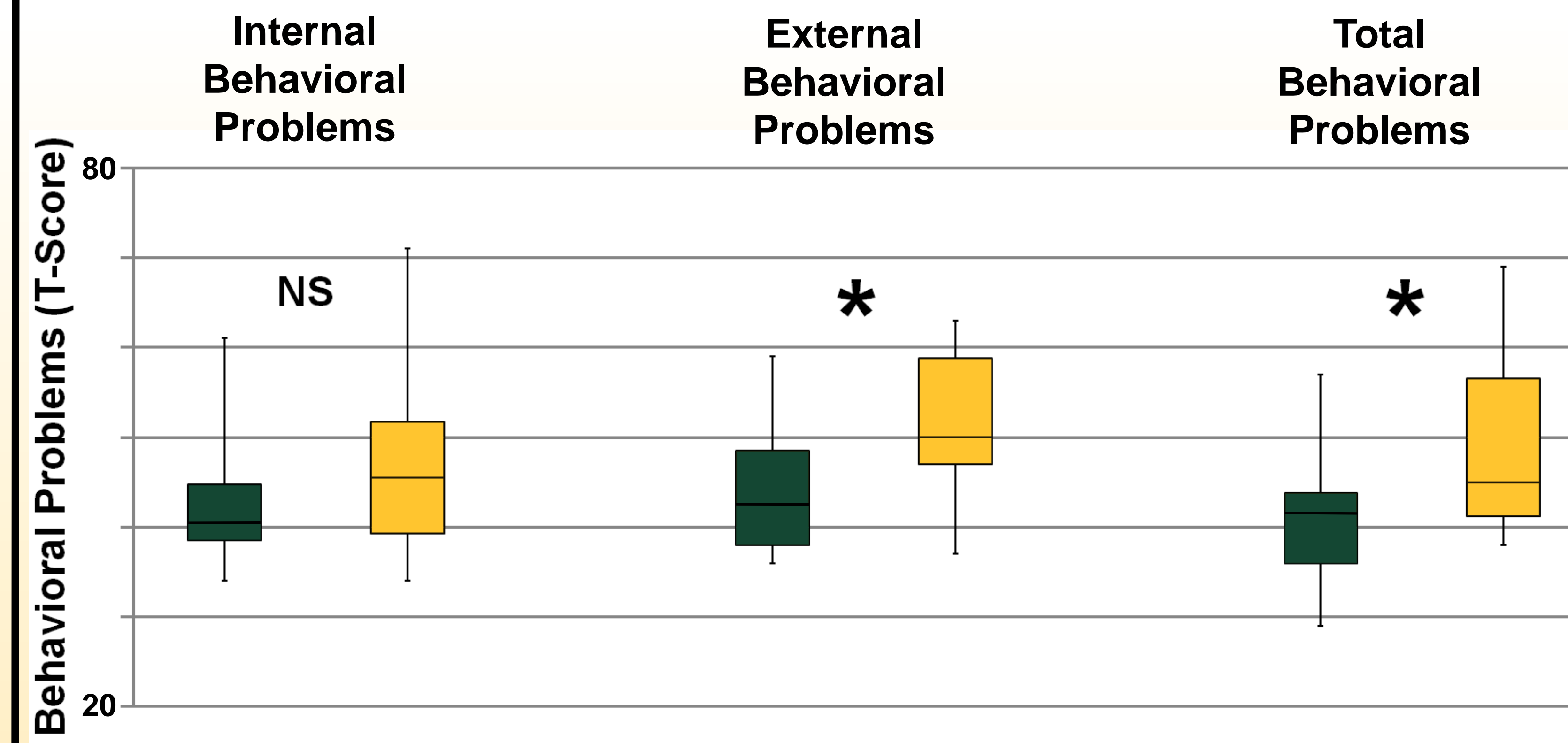
Several studies have focused on the relationship between food and behavior. Moreover, there has been increasing interest in school food programs throughout the nation. Burlington Children's Space (BCS) is a local preschool in Burlington, VT that strives to provide exceptionally nutritious meals to children from a wide range of socioeconomic backgrounds. Breakfast, lunch, and a snack are served at BCS daily. Children in the greatest need of food are also provided with food baskets over the holidays and vacations.

Data gathered from a 2006 study that specifically assessed food insecurity and behavioral problems among children 1.5-5 years old found a positive correlation between the degree of food insecurity and the extent of behavior problems, particularly internal ones. Our study examines the association between food insecurity and children's behavior, and the role Burlington Children's Space's healthy meal program plays in this relationship. We predicted that the food program at BCS decreases the number of internal behavioral problems, such as anxiety and depression, typically seen amongst food insecure children.

### Methods

- Out of forty-two eligible students, twenty-five students (M=9, F=16) between the ages of 18 months and 5 years, whose parents agreed to participate in the study, were enrolled. They were categorized as coming from food secure (n=16) and food insecure (n=9) households.
- The presence of household food insecurity was assessed in two ways:
  - U.S. Household Food Security Survey Module: Six-Item Short Form was presented to and completed by the parents of qualifying children who attend the Burlington Children's Space (BCS).  
 ex. "In the last 12 months, were you ever hungry but didn't eat because there wasn't enough money for food?"
  - Eligibility for the Child and Adult Care Food Program.
- BCS Teachers assessed these same children for behavioral, emotional, and social issues using the Child Behavior Checklist/1.5-5. Scoring of the CBCL/1.5-5 standardizes subjects across gender and provides a detailed breakdown of internal, external, and total behavioral problems. A higher standardized score (i.e. t-score) indicates more behavioral problems.
  - Sample Questions Addressing Internal Problems
    - "Looks unhappy without good reason" (Depression)
    - "Nervous, highstrung, or tense" (Anxiety)
    - "Too fearful, or anxious" (Anxiety)
  - Sample Questions Addressing External Problems
    - "Destroys his/her own things" (Aggression)
    - "Physically attacks people" (Aggression)
    - "Screams a lot" (Acting out)
- Independent-samples T-Tests were conducted to compare behavioral problems between the food secure and food insecure groups.

### Results



- No significant differences ( $p = .49$ ) were found when comparing the internal problem T-scores of free lunch eligible students (mean = 47) and ineligible students (mean = 43.6).
- For external problems, students eligible for free lunch showed statistically significant higher t-scores (mean = 51.75) than students who were not eligible (mean = 43.88).
- A statistically significant difference between t-scores ( $p < .05$ ) was also seen for total problems between free lunch eligible (mean = 49) and ineligible (mean = 41.38) students.

Yellow box = Food Insecure  
 Green box = Food Secure

	Food Secure	Food Insecure
N =	16	9
Mean Internal Problems (T-Score)	43.6	47
Mean External Problems (T-Score)	43.88	51.75
Mean Total Problems (T-Score)	41.38	49



**"Food is powerful; it can affect kids in a profoundly negative or positive way."**  
 - Erinn Simon, The BCS Chef

### Discussion

- Previous research showed that food insecurity correlates with an increased risk of behavioral problems, particularly internal ones, such as anxiety and depression.
- Our study found no difference in internal behavioral problems between food secure and food insecure children, supporting our hypothesis that the Burlington Children's Space meal program may mitigate the internal behaviors associated with food insecurity.
- Food insecurity is a complex and difficult issue to assess. This may be due to parents being reluctant to openly discussing their food insecurity. Consequently, using eligibility for the Free and Reduced Lunch Program provided us with a better measure of food insecurity when compared to using the US Household Food security survey.
- Our study controlled only for age and gender. Children may score higher on the CBCL/1.5-5 for a multitude of other reasons, including parental depression and behavior, household smoking, abnormal neurodevelopment, or socioeconomic status.



**"The whole idea of "plenty" is alien to some of the children and it is important for them to know that they will have enough here."-BCS Teacher**

### Conclusion

- The BCS food program demonstrated a reduction in negative internal behaviors exhibited by food insecure children.
- Limitations of our study included a small sample size that may not be representative of the general population. Furthermore, we could not control for other mediators of behavior.
- Future directions would include comparing the children at BCS to those at other regional schools without a comparable food program. Ideally, we can use this research to expand the BCS food program and establish similar programs at other institutions.

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- Photographs courtesy of Sam Simon Imaging.
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