

Do Children and Adults Think that Nutrition Impacts Mood States?

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Abstract

The present study examined beliefs concerning the impact of psychological mood states on the behaviors of food consumption and food selection. Preschoolers through adults judged whether a character in a positive or negative mood state would consume more food or if mood states do not make a difference. Overall, preschoolers through sixth graders judged that positive mood states would promote more food consumption, whereas adults reasoned that negative mood states would promote an increase in food consumption. Participants reasoned that positive mood states would promote the selection of a mixture of healthy and unhealthy foods whereas negative mood states would promote the consumption of unhealthy foods. These results suggest that even young children have recognition of the impact of psychological mood states on eating behaviors and food selection.

Keywords: Mood States, Cognitive Biases, Cross-Domain Interaction.

1. Background and Significance

Much of the research on children's understanding of conceptual development has focused on children's understanding of biological processes such as physical development, growth and illness. The results from these studies have revealed that children as young as 3 years of age recognize that biological causal agents such as germs are responsible for biological processes like common contagious illnesses (Backsheider, Shatz & Gelman, 1993; Kalish, 1997; Raman & Gelman, 2005).

However, another domain that is important but one that has not been researched extensively is children's understanding of psychological causes and behaviors. Carey (1985) stated that before the age of 10, children do not distinguish psychological concepts from biological ones. When children are asked why they grow bigger, they often respond that they want to (Inagaki and Hatano, 2000). Studies that have examined children's recognition of psychological factors have primarily focused on the role that psychological factors have on biological processes. Some studies have demonstrated that not only children but even adults entertain psychological factors for the origins of biological processes such as common contagious illnesses (Nemeroff, 1995), whereas other studies have found that young children entertain biological causes for dual causal biological processes such as psychogenic illnesses (Notaroetal, 2001; 2002). With the exception of two studies that have focused on children's

reasoning about the impact of eating (Inagaki, 1995; Raman, 2011), most of the other studies have focused on the impact that psychological factors have on the origins of common illnesses (Kalish, 1997; Raman & Gelman, 2008).

The following study explores children's understanding of the impact of psychological factors such as mood states on eating behaviors and food choices. Most of the studies on children's understanding of nutrition have focused on the classification and impact that foods have on biological processes. Wellman and Johnson (1986) examined what children know about a variety of nutritional inputs and the consequences of different diets. Although they found that even kindergartners know that some diets lead to growth and health whereas other diets lead to weight gain and laziness, kindergartners differed from third and sixth graders in that they thought that the consumption of any food would lead to a gain in height and weight. Contento (1981) used an open-ended interview and reported that, although children have some knowledge of input-output relationships, they virtually have no model as to what mediates these relationships. Other studies have examined children's knowledge about food and the digestive system. Research found that young children associate the stomach with food but they do not have any knowledge about the internal digestive processes until they are around 10 years of age (Gellert, 1962; Teixeira, 2000). Nguyen (2007) found that young children based their responses on how foods would impact health and growth when classifying foods as healthy or junky. Slaughter and Ting (2010) found that between the ages of 5 and 8 years, Australian children showed significantly greater amounts of mechanistic and vitalistic reasoning about food and nutrition when assessing the purpose of eating, the effects of different quantities of food, effects of specific foods, and the effects of an unbalanced diet. In a non-Western population, Inagaki (1997) found that Japanese 6 year olds recognized that nutrition could affect the susceptibility to illness and that 6 year olds could generate some explanations as to why this was the case. Thus there has been very little research that has focused on the impact that psychological factors such as mood states can have on psychological behaviors such as food consumption and selection.

Psychological mood states are interesting to study as they could have either positive/negative/or no effect on food consumption. For example, someone in a negative mood state might either eat more or less to combat his/her negative emotions. Similarly, someone in a positive mood state might eat more because he/she is feeling happy or he/she might eat less if he/she is engaged in other activities.

The following study makes a novel contribution to the literature on children's conceptual development in the following ways:

- (a) It is the first study to assess the impact of psychological mood states on what Carey (1985) would term psychological behaviors such as food consumption and food selection.
- (b) The study examines what kinds of underlying mechanisms children and adults' use to determine if and why they think mood states might impact food consumption and food choices.
- (c) The study also directly addresses the question as to whether children recognize that psychological causes can impact psychological behaviors.

There are both theoretical and practical applications of the results of this study. Theoretically, the results will inform us about children's and adults' understanding of the psychological domain. Practically, if participants think that mood states can influence food consumption, people can be made more aware of this fact in order to possibly combat situations in which there is the opportunity for excessive food consumption.

2. Method

2.1. Participants

Twenty-five pre schoolers (15 girls and 10 boys, Mage = 4 years 6 months, range = 4 years 3 months to 5 years 2 months), 26 second graders (7 girls and 19 boys, Mage = 7 years 5 months, range = 7 years 3 months to 8 years 2 months), 35 fourth graders (18 girls and 17 boys, Mage = 9.6 years, range = 8 years 11 months to 10 years 1 month), 28 sixth graders (17 girls and 11 boys, Mage = 11.5 years, range = 11 years to 12 years 1 month) and 24 adults (15 women and 9 men, Mage = 20.4 years, range = 18 years 7 months to 38 years 11 months) were recruited for the study. Participants were residents of a small Midwestern city. Children were recruited from preschools and elementary schools in the area. Adults were recruited from an introductory psychology pool at a state university and were given course credit for their participation.

2.2 Materials and Procedure

The task presented each participant with a total of 6 vignettes (see Table 1 for a listing of the 6 pairs of emotions). Each of the vignettes described two characters, one of the in a positive mood and the other in a negative mood. The participant was then asked if he/she thought one of them would eat more food or if they would both eat the same amount of food. If the participant chose one of the characters as eating more food than the other, then the participant was asked why that character would eat more food. The participant was presented with a biological justification, a psychological justification and a psycho-biological justification that he/she could choose from. The participant was then asked what food (s) the character that they selected would possibly eat. The participant was presented with 6 healthy and 6 unhealthy foods that he/she could choose from. If the participant chose the option that both participants would eat the “same amount of food” in the first question, he/she was then asked why both participants would eat “the same” amount of food today. Participants were shown identical stick figures to represent the characters in the vignette. This was to hold the attention of the child. The emotions in the vignettes were counter balanced such that half the participants received the vignettes with the emotions matched up in one order (happy/sad) and the other half of the participants received the set of vignettes with the emotions in the opposite order (sad/happy). The vignettes were randomized within each condition. An example of a vignette is the following: “Peter was feeling happy today. Mark was feeling sad today. Who do you think is going to eat a lot of food today? (a) Mark; (b) Peter; (c) or they will both eat the same. If the participant says that both characters “eat the same”, then the participant is asked “why do you think Mark and Peter are going to eat the same amount of food today?” However if the participant chooses one of the characters as eating more food then he/she is asked “Why do you think (chosenname) is going to eat a lot of food today?”

- (a) (chosenname) was feeling (happy/sad) and when he is going to feel (happy/sad) he is going to eat more (psychological justification);
- (b) (chosenname) was feeling hungry and when he is feeling hungry he is going to eat more (biological justification);
- (c) (chosenname) was feeling (happy/sad) and when he is feeling (happy/sad) he is going to feel hungrier and eat more.

Now remember you said that (chosen name) who is (happy/sad) is going to eat more. Which food(s) do you think he would like to eat today? Pick which foods you think he will want to eat from these foods– (to reduce the cognitive demands on our youngest group of participants,

participants of all ages were shown pictures of the foods that they could point to make their selections)— broccoli, hamburger, grapes, pizza, peas, Frenchfries, apples, hashbrowns, cereal, donuts, oatmeal, fried chicken.” Participants were asked to answer each vignette and their responses were noted.

3. Results

Coding of Judgments

Judgments were coded in three different ways to determine how many positive emotions, how many negative emotions, and how many “same” responses participants gave. For the positive judgments, if participants chose the character who was in a positive mood, this was coded as ‘1’, all other responses were coded as ‘0’. For the negative judgments, if participants chose the character who was in a negative mood, this was coded as ‘1’, all other responses were coded as ‘0’. For the “same” analysis, if participants chose the “same” response, this was coded as ‘1’, all other responses were coded as ‘0’. Thus each participant got a total score for the positive emotions category, a total score for the negative emotions category, and a total score for the “same” response category (see Table 2 for means across age groups for positive, negative, and “same” responses).

Positive Mood Judgments Analyses

A positive mood x grade one-way ANOVA revealed a significant between subjects effect for grade, $F(4,137)=8.5$, $p<.01$. Posthoc Bonferroni tests revealed that adults selected significantly less positive mood judgments than all other age groups, $ps<.01$.

Negative Mood Judgments Analyses

A negative mood x grade one-way ANOVA revealed a significant between subjects effect for grade, $F(4,137)=7.1$, $p<.01$. Posthoc Bonferroni tests revealed that preschoolers and second graders selected negative mood judgments significantly less than sixth graders or adults, $ps<.01$.

Same Judgments Analyses

A same chance x grade one-way ANOVA revealed a significant between subjects effect for grade, $F(4,137)=5.7$, $p<.01$. Posthoc Bonferroni tests revealed that preschoolers selected significantly more “same” responses than sixth graders, $p<.01$, and adults selected significantly more “same” responses than all other grades, $p<.01$.

Coding of Justifications:

Justifications were analyzed for the positive and negative responses in three ways. In order to determine what kind of justifications participants selected, one analyses focused on biological justifications, another focused on psychological justifications and the third focused on psycho-biological justifications. Thus, in the biological justifications analyses, if participants chose a biological justification, it was coded as ‘1’ and all other justifications were coded as ‘0’. In the psychological justifications analyses, psychological justifications were coded as ‘1’ and all other justifications were coded as ‘0’. Similarly in the psycho-biological analyses, psycho-biological justifications were coded as ‘1’ and all other justifications were coded as ‘0’.

Analyses of Justifications

Preschoolers, second graders, fourth graders and college students who selected positive mood states primarily selected psycho-biological justifications (41%, 35%, 51% and 47% respectively). Sixth graders primarily chose psychological justifications (55%).

Preschoolers and sixth graders who selected negative mood states primarily selected psycho-biological justifications (61% and 54% respectively) where as second graders, fourth graders and adults primarily selected psychological justifications (44%, 49% and 71% respectively).

Preschoolers, second graders and fourth graders who selected “both will eat the same” response primarily gave biological justifications (40%, 35% and 42%), whereas 47% of sixth graders gave psychological justifications. Interestingly in the adult group, 69% of the participants gave “anti-psychological” responses where they stated that mood states do not influence eating but they did not offer any further explanation.

Coding of Judgments and Type of Food

The type of food(s) participants selected was coded in to three categories—healthy foods, unhealthy foods, and mixed foods (this was a mixture of both healthy and unhealthy foods). In order to establish if mood states influence food selection, the following three categories were established—positive moods states and healthy food selection, positive mood states and unhealthy food selection, and positive mood states and mixed food selection. The same pattern was followed for negative mood states giving us a total of 6 categories for each age group across both sets of mood states.

Analyses of Judgments and type of Food:

Positive Mood States:

Preschoolers, second graders, fourth graders and adults who all reasoned that the characters in the positive mood state would eat more than the character in the negative mood state judged that the characters would eat a mixture of healthy and unhealthy foods (56%, 48%, 48%, and 80% respectively). Interestingly, 40% of sixth graders reasoned that the characters would select unhealthy foods to eat when they were in a positive mood state.

Negative Mood States:

In the preschool, second grade, sixth grade and adult age group, participants who selected the character in the negative moods state as eating more than the character in the positive mood state, primarily judged that the characters would select unhealthy foods (51%, 39%, 63% and 83% respectively). Fifty-nine percent of fourth graders judged that the characters would eat a mixture of healthy and unhealthy foods.

Discussion

The study reported in this article examined the impact of psychological factors such as mood states on behaviors such as food consumption and food selection. Two patterns of outcomes were possible in this study. One possibility was that young children would not make an association between moods states and food consumption and choices. If this was the case, it would suggest that children do not recognize the impact of psychological causes on psychological processes such as eating behaviors and choices. However, a second possibility is that children and even adults might reason that mood states impact food consumption and

in turn food selection. This result would suggest that children have an understanding of the impact of psychological factors on behaviors.

In the present study, participants across all grades reasoned that mood states would affect food consumption. However, there were interesting developmental differences. Adults primarily selected negative mood states as influencing food consumption as opposed to the other age groups where the children primarily selected positive mood states as affecting food consumption. Interestingly, after the negative mood state responses, adults also selected the highest number of “they will both eat the same” responses compared to the other grades.

Participants who selected positive mood states primarily gave psychobiological responses, the only exception to this pattern was with sixth graders who selected psychological responses. However with negative mood states, with the exception of preschoolers and sixth graders, all other participants selected psychological justifications. Sixth graders and preschoolers primarily selected psychobiological justifications. Preschoolers, second graders and fourth graders who selected “same” response all generated biological justifications. This demonstrates that when children do select “the same” response, they are clearly arguing for the autonomous theory of biology where mood states do not influence food consumption but biological factors such as appetite do. Adults who selected the “same” response overwhelming generated anti-psychological justifications where they explicitly stated that mood states do not influence food consumption. However, they did not give any further explanations as to what might influence food consumption.

Participants also clearly demonstrated that when the character was in a positive mood, he/she would select a mixture of healthy and unhealthy foods. The one exception to this was with sixth graders who stated that people in a positive mood would primarily choose to eat unhealthy foods. However, with negative mood states there was a clear pattern of association between mood states and food selection. A cross all grades (with the exception of fourth graders who selected mixed foods) participants stated that unhealthy foods would be the food of choice when a person is in a negative mood state.

These results support the notion that both children and adults recognize the impact of psychological causes on psychological processes. An important question that this study raises is, why do children and adults associate mood states as having an influence on food consumption and selection when other studies have demonstrated that children do not associate mood states with other biological processes such as illness (Kalish, 1997; Notaro, et al., 2000; 2001)? There might be a couple of possible explanations for this. First, both children and adults might be making judgments based on personal experiences. For example, most of the young children’s eating habits and choices are dictated by what their parents offer them so children might be associating eating more with happy occasions like birthday parties, going to eat at restaurants etc. However, when they are in a negative mood state (like being angry or frustrated), they might have been denied enjoyable things to eat by their parents as a form of punishment. Thus children might be associating positive mood states as resulting in more eating than negative mood states. Adults however are in control of their eating habits and choices and thus they may be thinking about personal situations where they tend to eat more and eat more unhealthy foods when they are in a negative mood state. Second, the media may be playing a role with children associating increased food consumption with positive mood states. Jacobson and Maxwell (1994) suggest that preschoolers who watch the average amount of television probably see 8,000 cereal commercial search year in addition to their children’s food products such as cookies, candy bars etc. where the children featured in all these commercials are all in a positive mood state. This might be another reason that the children in our study are associating positive mood states with an increase in food consumption.

There are a few limitations to this study. First our adult group is producing the highest number of “same” responses compared to the other age group. Thus, even if adults are aware of the physiological connection between mood states and the influence on food consumption, many of our adults are reasoning that mood states do not influence food consumption (as supported by their anti-psychological justifications). Moreover, when adults choose the response that both characters will eat “the same amount of food”, not a single one of these participants mention the link between mood states and the physiological impact that it might have on appetite.

Another potential limitation to this study is that we had to limit the number of healthy and unhealthy foods presented so that the task would not be too cognitively demanding for preschoolers. Third, the participants were primarily middle-class Euro-Americans, thus limiting the generalize ability of these results to other age groups, socio economic groups and ethnicities. Finally, one can argue that “they will both eat the same” response might imply that the participant thinks that both the positive and negative mood state can influence eating. However, the justifications that the participants generated when they chose the “same” response were primarily biological and anti-psychological, thus making it unlikely that they were endorsing both emotions as having an effect on food consumption.

There are a few directions for future research. It would also be interesting to present participants with neutral mood states (neither happy or unhappy) in addition to the existing positive and negative mood states to determine if they think that neutral mood states have an effect on food consumption. Second, it would be interesting to present participants’ with mixed foods (foods that are both healthy and unhealthy like salad with dressing) in order to determine if participants might opt for this category of foods when they are in certain mood states. Finally, it would be valuable to investigate the impact of psychological mood states on biological processes such as appetite.

Overall, this study clearly demonstrates the developmental changes that are taking place between childhood and adulthood in how participants reason about the impact to mood states on food consumption and selection. The results demonstrate that even young children are capable of recognizing the impact that psychological factors have on psychological behaviors such as food consumption and selection.

List of emotions Happy/sad Calm/excited Friendly/unfriendly Delighted/disappointed Satisfied/dissatisfied Proud/shameful

Table 1: Positive and negative emotions presented to participants

Grade	Response type		
	Positive	Negative	Same
Preschool	2.7 (0.3)	1.4 (0.2)	1.9 (0.4)
Second	2.9 (0.3)	1.7 (0.2)	1.3 (0.2)
Fourth	2.5 (0.3)	2.3 (0.2)	1.3 (0.2)
Sixth	2.4 (0.3)	2.9 (0.3)	0.7 (0.1)
Adults	0.6 (0.2)	3.2 (0.3)	2.3 (0.3)

Values in () indicate standard errors

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