EATING AS ADJUNCTIVE BEHAVIOR IN HUMANS

An abstract of a Thesis by
Steven C. Yund
October 1979
Drake University
Advisor: Larry A. Alferink

The problem. The present study investigated the possibility that some eating may be adjunctive in nature during television viewing when an opportunity to eat is provided.

Procedure. Three children were individually placed in a room with a television that monitored either uninterrupted cartoons or intermittent cartoons with commercials intended to serve as an S-. There were two levers in front of the chair in which they sat. One lever turned off the video portion for 10 sec while the other lever produced breakfast cereal only while the video portion was off. The frequency of responding on these levers and the temporal placement of responses were recorded.

Findings. Two subjects showed response increases during the phases consisting of intermittent cartoons with commercials and during these phases all subjects responded considerably more during commercials than cartoons. During uninterrupted cartoons, a higher proportion of responding occurred during the first 30 sec of a cartoon than the last 30 sec.

Conclusions. The results suggest that commercials serving as an S- can induce adjunctive eating. The fact that during uninterrupted cartoons a higher proportion of responding occurred during the first 30 sec (which is less reinforcing and more predictable) than the last 30 sec (which is more reinforcing and less predictable) of a cartoon may lend additional support to the notion that some eating is controlled by S- variables.

Recommendations. Additional research is needed to investigate what kinds of commercials, television programs, and what time parameters lead to adjunctive eating. Furthermore, other S- variables may be investigated to identify conditions where adjunctive eating may be related to weight control problems.
EATING AS ADJUNCTIVE BEHAVIOR IN HUMANS

A Thesis
Presented to
The School of Graduate Studies
Drake University

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

by
Steven C. Yund
October 1979
EATING AS ADJUNCTIVE BEHAVIOR IN HUMANS

by

Steven C. Yund

Approved by Committee:

Chairperson

Dean of the School of Graduate Studies
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>METHOD</td>
<td>6</td>
</tr>
<tr>
<td>RESULTS</td>
<td>10</td>
</tr>
<tr>
<td>DISCUSSION</td>
<td>19</td>
</tr>
<tr>
<td>REFERENCE NOTES</td>
<td>25</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>26</td>
</tr>
</tbody>
</table>
LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The mean number of responses during cartoons and their temporal placement</td>
<td>17</td>
</tr>
</tbody>
</table>

LIST OF FIGURES

<table>
<thead>
<tr>
<th>FIGURE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The total number of television off and food responses per session as a function of uninterrupted cartoons and intermittent cartoons with commercials</td>
<td>11</td>
</tr>
<tr>
<td>2. The total number of responses that occurred during cartoons and the total number of responses that occurred during commercials per session as a function of uninterrupted cartoons and intermittent cartoons with commercials</td>
<td>14</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

Eating, as a behavior, has typically been studied by looking at the environmental variables which function to control it. These variables have usually been identified as contingencies of reinforcement which maintain the eating responses or the discriminative stimuli which cue the eating episode (Stuart & Davis, 1972). Recently, however, a class of behaviors which occurs during periods of low probability of reinforcement has come under investigation. These behaviors, termed adjunctive (Falk, 1971), appear during the S- periods for another behavior (Falk, 1971) and are thus adjuncts to that other behavior. The frequent appearance of S- periods has been known to lead to behavioral states called depression (Ferster, 1965; Lazarus, 1968; Moss & Boren, 1972) in which responses go unreinforced and much behavior ceases. Simon (1963) has noted eating as a depressive equivalent and Stuart & Davis (1972) note the occurrence of eating during depression, loneliness, and boredom. Seligman, Klein, and Miller (1976) report that data on immunization against depression suggest that some people have the skills necessary to control and manipulate sources of reinforcement. Eating may be thought of as a skill with the potential to manipulate one source of reinforcement (food).
during periods of the low probability of occurrence of other reinforcers. It therefore seems reasonable to investigate if some eating is a function of periods of low probability of reinforcement for other behavior and therefore is adjunctive.

Adjunctive behavior has been defined as a stable increase in behavior not attributable to variables that directly affect the unconditioned, conditioned, or operant probability of that behavior, but which is a function of variables primarily determining some other class of behavior (Falk, 1971). Adjunctive behaviors include polydipsia (Falk, 1969, 1971), airlicking in rats (Mendelson & Chillag, 1970), aggression with pigeons (Azrin, Hutchinson, & Hake, 1966), pica or schedule-induced eating of wood chips (Villareal, Note 1), digital movements in humans (Wallace, Singer, Wayner, & Cook, 1975), and pacing with humans (Kachanoff, Leveille, McLelland, & Wayner, 1973; Muller, Crow, & Cheney, 1979) and pigeons (Killeen, 1975). Reinforcement is independent of these behaviors and thus these behaviors appear as adjuncts to the behavior upon which reinforcement is contingent.

Schedules which produce discriminable periods of low probability of reinforcement also produce adjunctive behavior (Alferink, Bartness, & Harder, in press; Falk, 1971; Frederiksen & Peterson, 1974; Staddon, 1977) and an added stimulus has been demonstrated to exert control over
schedule-induced drinking when signalling periods of S-.
Using brief stimulus presentations in place of reinforce-
tment, Porter and Kenshao (1974) reported drinking follow-
ing stimulus presentations with a Rhesus monkey while
Rosenblith (1970) achieved the same result with rats.
Alferink et al. (in press) used a Mixed FR10 Chain FR10 FR90
in their study. The small FR10 occurred with a .25 prob-
ability and a tone followed completion of the FR10 in the
Chain component and remained on until completion of the
Chain. Results demonstrate that the temporal locus of
drinking was displaced to the period after the onset of the
tone.

Eating behavior in humans commonly occurs in the
presence of a television. Stuart and Davis (1972) note that
frequent pairings of television and eating may result in
television cueing eating. However, little research has
actually focused upon identifying the variables which exert
control over eating during television viewing. A television
may be thought of as a stimulus which allows programming to
exert control over observation behavior. The control of
observation behavior has been described by Ward, Levinson,
and Wackman (1971) who noted a drop in the attention
children paid to a television when commercials began. This
observation was consistent across age groups 5-12 years old.
Lindsley (1962) reported that subjects taught to press a
button in order to maintain a television picture during a
program consistently ceased responding when commercials appeared. Grass and Wallace (1969) found that a viewer repeatedly exposed to a television commercial will display an initial increase in attention but eventually the attention will decline with repeated viewing. Ward et al. (1971) report a similar drop in attentiveness when two or more commercials appear in sequence. Therefore, it appears that some commercials are less reinforcing than the programming which occurs prior to commercial onset resulting in less observation behavior during a commercial.

Commercials have been studied to determine the variables which control any attentiveness that may be observed during their occurrence. Rust and Watkins (1975) found three important phenomena with children. First, new commercials were more likely to result in attentive observation than old ones. Second, message monologues result in less attentiveness. Third, young children attend less to material which isn't clear and concise. These findings suggest variables which may function to control the degree to which children observe television during a commercial. Also noted by Ward et al. (1971) is a decrease in attentiveness to commercials that occur towards the end of a program relative to those that occur during the beginning.

It therefore seems plausible to use television programming as an intermittent schedule of reinforcement. The commercials provide periods that may constitute a reduction
in the probability of reinforcing observation of television as demonstrated by a general drop in attentiveness during their onset. These commercials typically appear after T minutes of a television program which results in intermittent reinforcement of observation behavior. Commercials are easily discriminable from regular programming and thus serve to cue periods of low reinforcement probability. It has been demonstrated that cued periods of S- result in adjunctive behavior when the opportunity allows. Therefore, adjunctive behavior may be observed when such a schedule is arranged using a television. Since eating commonly occurs during television viewing, it seems reasonable to suspect that some eating is adjunctive in nature.

The present study will investigate the effects of both cartoon and commercial program material on the eating occurring during this program material. In this way, the present study will determine if intermittent cartoons will produce adjunctive eating in children.
CHAPTER II

METHOD

Participants

Three children, two age 5 and one age 6 were employed as subjects. Each was experimentally naive.

Apparatus

A Setchell-Carlson IC-100 television monitor was used. The video portion of this monitor could be turned on or off by a relay. The program material presented on the television monitor consisted of videotaped segments from a Sony SL7200 videocassette recorder. A chair was approximately 3.5 feet from the monitor and turned in a manner to allow viewing. A television lever and a food lever were located on a table in front of the chair within arms reach. A universal feeder with a trough leading to a bowl was also within arms reach of the chair. Data were recorded by digital counters and an event recorder.

Procedures

Sessions were 30 min long and usually occurred four times per week at approximately the same time of day. Throughout each session, a subject was seated in the chair while the television monitor played pre-taped cartoons from the videocassette recorder. The reinforcing properties of cartoons is supported by Ward et al. (1971) who reported...
that children ages 5-7 years old watch television on Saturday mornings more than children who are 8-12. The introductory portion of the cartoons which display credits were omitted to avoid providing a potential S-period during the cartoon. In general, a cartoon was not rerun with the same subject but occasionally a few were repeated after a minimum of 15 sessions. During each session, subjects had the opportunity to eat breakfast cereal (Froot Loops) by first responding on the television lever and following it with a response on the food lever. Each response on the television lever turned off the video portion for 10 seconds. However, the videotape continued to run and the audio portion remained on. A response on the food lever had to occur within 10 sec after a response on the television lever to produce cereal. Initially, all responses on the food lever during the 10 sec video blackout produced two Froot Loops. Later, a change was instituted which allowed only one response on the food lever per 10 sec video blackout to produce cereal. With this change, four Froot Loops were dispensed instead of two. Throughout the experiment, an observer located behind a two-way mirror would depress a lever to deflect an event pen when programming changes occurred (e.g. new cartoon).

Each subject was given verbal instructions describing the consequences of depressing each lever. The instructions first involved a demonstration of the downward
pressure needed to close the switch on the lever. Next, a verbal description of the consequences which followed each lever press accompanied an actual demonstration. Then each subject was provided with a verbal question for which the answer consisted of depressing the correct lever (e.g. "What do you press to turn off the picture?" followed by the response of depressing the lever which turned off the picture).

Upon completion of 5 correct responses without an error, sessions 30 min in duration occurred during which cartoons were played without commercial interruption to determine the base rate of turning off the video portion of the television and responding on the food lever. The first part of this phase is where all responses on the food lever produced food while the picture was off. However, the high base rates of two subjects nearly exhausted the cereal capacity of the universal feeder so a change was made in order to prevent subjects from attaining a behavioral ceiling. Thereafter, only one response on the food lever per 10 sec video blackout produced food as described above.

In the next phase, commercials occurred between cartoon showings which resulted in commercials appearing after 5-6 min of cartoons (commercial 1). The commercials were of a variable duration with an average of 2 min of commercial appearing before the onset of a different cartoon. Total commercial time per session averaged 8 min. The
commercials consisted of message monologues with themes directed at adult audiences. Thus, commercials with banking, herbicide, medicine, household products and other similar themes were used. No food commercials were used. Commercials were occasionally repeated to approximate home television viewing whereby commercial reruns frequently occur.

Following the commercial 1 phase, cartoons again appeared without commercial interruption as in the original baseline condition. For subjects S-2 and S-3, the commercial 1 phase was reinstated following the return to baseline.

Following this commercial 1 phase, a parameter change occurred for S-3 which consisted of sessions during which 60 sec of commercial interruption appeared after 170 sec of cartoon. The total commercial time per session remained at approximately 8 min but the frequency of a commercial interruption changed from approximately one every 5-6 min to one every 170 sec. This frequency is supported by evidence which suggests that polydipsia as an adjunctive behavior is found in schedules up to FI 180 sec (Falk, 1966). The thematic content of the commercials in this phase remained the same as in the first commercial phase.
CHAPTER III

RESULTS

The top panel of Figure 1 displays total television off and food responses per session for subject S-1. Sessions 1-5 show the data for the first part of the baseline phase where all responses on the food lever during a 10 second blackout produced cereal. Television and food responses show an initially high rate followed by a gradual decrease to session 5. At this point, the change was made for all three subjects to the condition where only the first response per 10 sec video blackout produced cereal. Data beginning with session 6 display responses on the television lever that are followed within 10 sec by a response on the food lever. Sessions 6-9 show that food responses occurred approximately 2 times per session. After commercials were introduced, responses did not change in frequency during sessions 10-15 but then an increase occurred at session 16 to a frequency of approximately 10 responses per session. Following the return to baseline, the frequency of responses gradually declined to the level obtained in the initial baseline phase.

The middle panel of Figure 1 shows that S-2 had only one session in the original baseline condition (all food responses per video blackout producing food) emitting a total of 70 food responses and 9 television responses.
Figure 1. The total number of television off and food responses per session as a function of uninterrupted cartoons and intermittent cartoons with commercials.
Sessions 2-43 display the total number of television off responses that are followed within 10 sec by a response on the food lever. S-2's responding was variable throughout the first baseline and commercial phases. Similar to S-1, S-2's first 6-8 sessions with commercials resulted in little change relative to baseline but increased in the subsequent sessions. This increase resulted in 9 of the 10 data points thereafter being above all previous baseline levels. The return to baseline resulted in an abrupt drop in frequency stabilizing below previous baseline levels. The return to commercial 1 resulted in an abrupt increase in frequency that started at approximately the same level that the first commercial 1 phase did and began to stabilize in the last three sessions.

In the bottom panel of Figure 1, sessions 1-5 represent data for subject S-3 from the original baseline condition and all other data points represent television responses followed within 10 sec by a response on the food lever. Sessions 6-17 display data when cartoons occurred without commercial interruption and show a frequency averaging approximately 30 times per session. When commercials occurred between cartoons there was an abrupt drop in frequency that stabilized below baseline levels. The first session following the return to uninterrupted cartoons resulted in no responses but sessions were halted thereafter for 8 days due to S-3's illness. Upon the subject's return,
response frequency rose to approximately the same level attained in the first commercial 1 phase. The level of responding remained at this level in the return to commercial 1 phase. This was followed by the commercial 2 phase where 60 sec of commercials occurred after 170 sec of cartoon. The level of responding in the commercial 2 phase initially remained the same as in the previous phase but eventually decreased in the final four sessions.

The top panel of Figure 2 illustrates data showing the frequency of responses made during cartoons as opposed to commercials for S-1. Responses during cartoons occurred approximately 2 times per session when only cartoons were shown with little change in frequency when commercials appeared. Note that responses during commercials occurred at approximately the same rate as responses during cartoons throughout sessions 10-15. However, beginning with session 16, an increase in responses during commercials occurred to a level above baseline cartoon responses. The return to uninterrupted cartoons resulted in responses during cartoons starting at the same frequency commercial responses did during sessions 20-22, but then decreasing gradually to the first baseline level.

The middle panel of Figure 2 displays the frequency of responses made during cartoons and commercials for S-2. When cartoons only were shown, responding during cartoons was variable with an average of approximately 15 responses
Figure 2. The total number of responses that occurred during cartoons and the total number of responses that occurred during commercials per session as a function of uninterrupted cartoons and intermittent cartoons with commercials.
per session. When commercials occurred, the frequency of responses during cartoons decreased abruptly to an average of approximately 3.5 per session with most data points below previous baseline levels. Responses during commercials occurred more frequently than responses during cartoons in the commercial 1 phase. However, responses during commercials occurred at a similar rate to cartoon responses during the previous baseline until session 24. Then an increase occurred which resulted in 6 data points above baseline cartoon responding. A reinstatement of baseline conditions resulted in responses during cartoons continuing at the level established in the first commercial 1 phase. That frequency continued when commercials were reinstated while responding during commercials steadily increased to levels attained in the first commercial 1 phase.

For S-3, the bottom panel of Figure 2 shows that during baseline, approximately 30 responses occurred during cartoons. The introduction of commercials resulted in the frequency of responses during cartoons abruptly decreasing to a level of zero. Responses during commercials increased to levels considerably higher than the level of responding maintained during cartoons in the commercial 1 phase but remained considerably below the level of responding during cartoons in the baseline phase. The reinstatement of the baseline phase resulted in the frequency of responses during cartoons increasing to the level of responding maintained
during commercials in the commercial 1 phase. Reinstating the commercial 1 phase again resulted in an abrupt decrease in responses during cartoons to near zero levels while responding during commercials stabilized at approximately the frequency of responding during cartoons maintained in the previous baseline phase. When commercials began to appear more frequently (commercial 2 phase), responses during commercials decreased abruptly following session 43 while responses during cartoons continued at a near zero level.

Table 1 describes the temporal placement of responses during cartoons for all three subjects. Responses during the first 30 sec of a cartoon were classified as occurring at the beginning while responses during the last 30 sec of a cartoon were classified as occurring at the end. For S-1 and S-2, more responses were emitted at the beginning of cartoons than at the end during the baseline conditions. The introduction of commercials for S-1 and S-2 resulted in slightly more responses made during the end of the cartoon than the beginning. The reinstatement of commercials for S-2 resulted in slightly more responses made during the beginning than at the end. However, the difference in frequency between responses made during the beginning relative to the end of a cartoon in commercial phases were small in comparison to differences obtained in baseline conditions. Responding was similar for S-3 but the ratio of responses
Table 1
The Mean Number of Responses During Cartoons and their Temporal Placement

<table>
<thead>
<tr>
<th></th>
<th>End</th>
<th>Beginning</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>S-1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>( \bar{X} ) &amp; 0 &amp; 2.12 &amp; 3.47</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range &amp; 0 &amp; 0-4 &amp; 1-8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial 1</td>
<td>( \bar{X} ) &amp; .92 &amp; .54 &amp; 1.92</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range &amp; 0-3 &amp; 0-1 &amp; 0-4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>( \bar{X} ) &amp; .1 &amp; 1.4 &amp; 3.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range &amp; 0-1 &amp; 0-4 &amp; 0-8</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>S-2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>( \bar{X} ) &amp; .78 &amp; 2.6 &amp; 15.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range &amp; 0-4 &amp; 1-5 &amp; 6-23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial 1</td>
<td>( \bar{X} ) &amp; .39 &amp; .11 &amp; 3.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range &amp; 0-2 &amp; 0-1 &amp; 0-17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>( \bar{X} ) &amp; 0 &amp; .40 &amp; 2.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range &amp; 0 &amp; 0-2 &amp; 0-5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial 1</td>
<td>( \bar{X} ) &amp; 0 &amp; .40 &amp; .6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range &amp; 0 &amp; 0-2 &amp; 0-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>S-3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>( \bar{X} ) &amp; 2.16 &amp; 2.91 &amp; 29.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range &amp; 1-5 &amp; 1-5 &amp; 22-40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial 1</td>
<td>( \bar{X} ) &amp; 1.2 &amp; 1.2 &amp; 8.28</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range &amp; 0-4 &amp; 0-5 &amp; 0-25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>( \bar{X} ) &amp; .78 &amp; 1.77 &amp; 10.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range &amp; 0-1 &amp; 0-3 &amp; 0-17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial 1</td>
<td>( \bar{X} ) &amp; .28 &amp; 0 &amp; 2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range &amp; 0-1 &amp; 0 &amp; 0-7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial 2</td>
<td>( \bar{X} ) &amp; 0 &amp; .14 &amp; .142</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range &amp; 0 &amp; 0-1 &amp; 0-1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
during the beginning relative to the end of a cartoon during the baseline phases wasn't as high as it was for S-1 and S-2. Similar to S-1 and S-2, S-3 also had smaller differences in the frequency of responses occurring during the beginning as opposed to the end of cartoons when commercials occurred.

In addition to the lever pressing, a variety of other behaviors were observed during this study. During commercials, the subjects were noted to jump in the chair, play with the cereal, press the levers with their feet, and look frequently in the mirror. S-2 also was noted to frequently press the food lever during a video blackout after a food response had already been made and the food lever had no function. Few of these behaviors were observed during cartoons.
CHAPTER IV

DISCUSSION

The present study investigated the possibility that some eating is adjunctive in nature by using television programming as a schedule of reinforcement while providing the opportunity to eat during television viewing. The total number of food responses and their temporal placement were examined. The data indicate that when commercials occurred, 2 of 3 subjects showed total response increases and all subjects responded considerably more during commercials than cartoons. These results suggest that most responding during commercial phases was under the control of commercials. Also, these data suggest that the commercials used did serve as an S- for observation of television programming. Responses that turned off the video portion and produced cereal increased for S-1 and S-2 when commercials were shown and the temporal placement of responding displaced considerably to commercials for all subjects. Since commercials had no messages dealing with food, there is nothing to suggest they were an S+ for eating. Additional behaviors (playing with food lever, jumping in seat, playing with cereal, looking in the mirror, pressing the levers with their feet) were noted to occur primarily during commercials that were similar to behaviors observed (finger and foot tapping, pressing a bar with feet, tearing
paper, hand wringing) when reinforcement probability was low in a study by Wallace et al. (1975). Additional support comes from the fact that during commercials each subject was noted to turn off the video portion without a subsequent response on the food lever on 2 or 3 occasions. Since it is likely that the commercials used were an S- and that commercials did control most responding during commercial phases, it seems reasonable to conclude that some responding that obtained cereal during this study was adjunctive.

The fact that more responses occurred during the beginning than the end of cartoons during baseline conditions may further support the contention that some eating is controlled by S- variables. During baseline conditions, a discriminable change occurs in programming only at the onset of a new cartoon. With this change, a period of perhaps 30 sec may be provided which has less reinforcing value for the observation of television programming for thematic reasons than the remainder of the cartoon. Perhaps other S- periods exist during a cartoon but it is unlikely that they are as discriminable or predictable as the beginning of the cartoon. Since more eating occurred during the beginning relative to the end (which is usually indiscriminable, less predictable, and more reinforcing) some eating during baseline conditions may also be under the control S-variables. Support for this comes from studies which show
that as S- becomes less predictable, adjunctive behavior is less reliably found (Millenson, Allen, & Pinker, 1977; Staddon, 1977). Also, this notion is consistent with the fact that only small differences in the frequency of responses occurring during the beginning relative to the end of a cartoon resulted during commercial phases for all subjects because it is likely commercials then had the S- properties.

Studies investigating polydipsia as an adjunctive behavior note that it usually takes a few sessions to develop (Hawkins, Schrot, Githens, & Everett, 1972; Staddon & Ayres, 1975). Responding by S-1 and S-2 was consistent with this phenomenon since total television responses followed by food responses didn't increase until 6-8 sessions after commercials first occurred (see Fig. 1). Furthermore, responses during commercials did not increase above cartoon responding in baseline conditions until 6-8 sessions after commercials were introduced (see Fig. 2) whereas responding during cartoons remained low. This also suggests that the total response increases above baseline were mostly a function of increases in the frequency of responding during commercials rather than during cartoons. Combined, these data demonstrate that the adjunctive eating in this study found took time to develop as noted in other studies of adjunctive behavior.

Interesting for S-1 and S-2 is the different trends
that responding during cartoons showed throughout each phase. For S-1, Figure 2 shows that responses during cartoons when uninterrupted cartoons were shown occurred at the same rate as when commercials were shown. However, the return to uninterrupted cartoons resulted in an increase in responses during cartoons close to the level of responses which occurred during commercials. These responses account for the gradual decline in total responses in Figure 1 following the return to baseline. Similar occurrences were noted in a study by Kachanoff et al. (1973) when schedule-induced pacing continued to occur but gradually declined during extinction sessions. For S-2, responses during cartoons instead decreased abruptly when commercials were shown and continued at that same frequency throughout the return to baseline conditions and the reinstatement of commercials. This resulted in an abrupt decrease in total responses (see Fig. 1) following the return to baseline conditions rather than the gradual decline demonstrated by S-1's responding (see Fig. 1). The variables controlling these different trends following the return to baseline conditions for these subjects are uncertain.

Studies which investigate polydipsia in rats provide constant access to a waterbottle in the home cage in order to assure the animals are not water deprived during experimental sessions. Some control of food deprivation was exercised in this study by attempting to conduct sessions
at the same time each day. Since the children were either at a day care center or school prior to each session, their meals were eaten at the same times each day. With sessions and meals occurring at consistent times, the deprivation level of food should be approximately the same across baseline and commercial phases. However, S-2 was not at the day care center every day and occasionally had to be picked up from home. This could have changed his deprivation level for food and thus may account for response variability during the first baseline and commercial phases. Later, when a more consistent schedule could be established, S-2's response frequency became more stable.

The contingencies in this study are analogous to those existing in many home environments. When viewers in many homes get something to eat, they perform a chain of behaviors that lead them to the kitchen away from the television. During this time, they often can hear the program material even though they may no longer be able to see the picture. However, caution must be exercised. Television programs have different reinforcing value for different people and the programs in the present study may have a different reinforcing value for children than adult programs have for adults. This may account for differences in response frequency and the fact that S-3 exhibited no increases during commercial phases. (Also, as mentioned earlier, different levels of deprivation may have influenced
the frequency of responding.) However, the nature of these conditions need further investigation in order to determine what kinds of commercials, programs and what time parameters lead to adjunctive eating. Since this study shows that some eating may be adjunctive and also supports Stuart and Davis' (1972) observation that television viewing can increase occurrences of eating, some of the variables controlling overeating may be identified in order to facilitate weight control.
REFERENCE NOTES

REFERENCES


Muller, P. G., Crow, R. E., & Cheney, C. D. Schedule-induced locomotor activity in humans. Journal of the
Experimental Analysis of Behavior, 1979, 31, 83-90.


Wallace, M., Singer, G., Wayner, M. J., & Cook, P.
Adjunctive behavior in humans during game playing.

*Physiology and Behavior, 1975, 14, 651-654.*