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Delayed Gratification Behavior Among Elementary School Children: An Intervention Model

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Keywords

delayed gratification behavior, elementary students, intervention



DELAYED GRATIFICATION BEHAVIOR AMONG ELEMENTARY SCHOOL CHILDREN: AN INTERVENTION MODEL

Nadine A. Joseph

Abstract

In the 1960s, Walter Mischel conducted the first study on delayed gratification behavior (Goleman, 1995; Mischel, Shoda & Rodriguez, 1989). Since then, many other follow-up studies have been done to prove what sociologists call ‘the delayed gratification pattern’ (see Funder, Block & Block; Logue & Chavarro 1992). These studies propose that participants who are able to delay gratification around of the age of four were better adjusted and more dependable during their adult lives. Studies conducted to assist participants who were unable to delay gratification could not be uncovered. In this study, researchers invited parents and teachers to use intervention techniques over a one school year period to shape waiting behavior among 100 first year elementary school children who were unable to delay gratification for 20 minutes in an initial experiment. Eight follow-up experiments/observations were conducted increasing waiting time from 20 minutes by intervals of 5-minutes in each new observation period up to 1 hour one school year later to assess whether intervention techniques used by parents and teachers were effective. Using basic descriptions statistics, findings reveal that there was an overall increase of participants’ ability to wait for 20 minutes by 58% at the 4th week, 86% at the 21st week, and 70.96% at the 34th week.

Key words: intervention, delayed gratification

Introduction

Decades of research have been done on the possible connection between delayed gratification in children and their success in adolescent years. Walter Mischel conducted a study in the 1960s, the ‘marshmallow experiment’ using a group of four-year olds who were tested by being given one marshmallow, and then promised another if they could wait 20 minutes before eating the first one. Some children waited and others did not. The researchers then followed the progress of each child into adolescence, and demonstrated that those who were able to delay short-term gratification for long-term gain were found to be more socially and scholastically advanced than their peers ten years later (Goleman, 1995; Mischel, Shoda & Rodriguez, 1989). Four decades after that first experiment, Casey, Somerville, Gotlib, Ayduk, Franklin, Askren, Jonides, Berman, Wilson, Teslovich, Glover, Zayas, Mischel and Shoda, (2011) examined self-control behaviors of 59 subjects who participated in Mischel’s first study. Researchers found that those who were able to wait as children still had exemplary will power as adults, and those who had been unable to wait performed poorly on self-control tasks even as adults.

Funder, Block and Block (1983) conducted a similar study in the 1970s, the “gift delay experiment.” In their experiment, one hundred and sixteen (116) 4-year-old children were shown

a wrapped present and told they could open it as soon as they completed a puzzle. The researchers helped the children with their task, and then spent 90 seconds shuffling papers before telling the kids to open their present. After each go-round, the researchers calculated a “delay score”. It was a composite of how many times each child mentioned the gift while toiling away, how long it took the child to grab the gift after completing the puzzle, and whether or not the child unwrapped the gift immediately.

When these examiners (Mischel, Shoda, & Peake, 1988) interviewed the kids seven years later, they found significant personality differences between the patient test subjects and the impatient ones, by using a California Q-set, which consisted of 100 character descriptions. The examiners reported that boys who had delayed gratification were deliberative, attentive, and able to concentrate, while those who had not delayed were irritable, restless and aggressive, and generally not self-controlled. Likewise, girls who displayed restraint under laboratory conditions seemed intelligent, resourceful, and competent, while those who had not, tended to go to pieces under stress, to be victimized by other children, and to be easily offended, sulky and whiny. Similarly, Logue and Chavarro (1992) conducted an experiment to measure impulsivity in children using stickers instead of marshmallows. In this experiment, the children were brought into a room and given the option of having one sticker immediately, or two later, which required them to wait alone for an unspecified amount of time until the instructor returned. When Houck and Lecuyer-Maus (2004) conducted longitudinal studies to further test the effects of the ability to self-regulate in early childhood, they found that “Longer self-imposed delay of gratification durations in childhood have been linked to later social, cognitive, and academic competence. Children with longer delay durations at age four were found better able to plan, think ahead, use reason, and cope with stress in adolescence, and they had higher SAT scores” (p. 33). These findings again reflected the conclusions of previous studies.

Though the findings of these studies are significant when establishing the value of delayed gratification behavior and its long-term benefits, studies done to teach delayed behavior to children who were unable to wait seem non-existent. Interestingly, the literature suggest that training in self-control is useful to assist children in having better academic performance, social interactions with peers and personal success such as high self-esteem (Copeland 1985; Houck & Lecuyer-Maus, 2004). Accordingly, the purpose of the study was to examine whether it was possible to teach first year elementary school children delayed gratification behavior after they were unable to wait in an initial experiment by testing their abilities in a follow-up of eight observations over a one school-year period.

Literature Review

This study aimed at uncovering the effectiveness of intervention in teaching children to delay gratification. While accessing literature dealing specifically with intervention techniques was not available, appropriate literature pertaining to delayed gratification experiments were reviewed to appropriately guide this research.

According to Mischel (1974), delaying gratification is a two-component process. He noted that the first component is the initial selection of a deferred reward over an instantaneous reward (e.g., putting money in a savings account). This component, according to Toner and Smith (1977), can be labeled ‘delay-choice’. Mischel (1974) branded the second component as ‘experimental tasks’. The test for this component alone can be labeled ‘delay-choice tasks’. This second component entails maintaining a decision to delay gratification, even if the instantaneous reward is made available later during the delay (e.g. refraining from withdrawing money from the savings account to purchase luxuries). Mischel (1974) also referred to this component as ‘bridging the delay interval’, but Toner and Smith (1977) referred to it as ‘delay maintenance’. Referring to tasks that test for this component can be considered as delay maintenance tasks.

Consequently, making a distinction between delay choice and delay maintenance was essential to the present study. Literature has suggested that tasks that test for delay choice are clearly different in methodology from tasks that test for delay maintenance. Such distinction revealed that in delay-choice tasks, subjects are given a discrete choice between an immediately available but less preferred outcome, and a delayed, but more preferred outcome. In this instance, researchers train subjects to make a simple response to indicate each option (e.g., press a left button for the immediate reward, or press a right button for the delayed reward) (Addessi, Paglieri, Beran, Evans, Macchitella, De Petrillo & Focaroli, 2013; Evans & Beran, 2007; Evans, Beran, Paglier & Addessi, 2012). Notably, in such tasks, after subjects give an isolated response, they have no further opportunity to change their response during the experiment. Subjects cannot choose the delayed reward and then revert to the immediate reward partway, through the delay interval. Therefore, the level of difficulty associated with this task is directly related to the level of self-control required to initially delay gratification (Evans & Beran, 2007).

A few studies have been conducted, in which subjects were given opportunities to alter their choice -- from self-control to impulsivity or vice versa -- during the course of the experiment. In a modification of a delay-choice procedure, Rachlin & Green (1972) and Siegel & Rachlin (1995), provided pigeons with distinct opportunities to change their response during experiments, to assess commitment to initial selections. The researchers found that this often led to more self-control responses. Additionally, when Rachlin, Castrogiovanni, & Cross (1987) conducted similar studies with humans, they reported that when there is an opportunity for subjects to change their selection of an immediate or delayed reinforcer, performance sometimes differs from when there is only a single response point, and a single response that leads to a specific contingency.

Beran (2002) discusses a second test situation with two rewards traditionally used with children. The children were offered the more preferred reward only if they waited for a period of time, whereas they could receive the less preferred reward at any time. Children delay gratification in this situation, but their delay maintenance is significantly affected by their age, and by what they attend to, or what they say during the delay interval. Toner and Smith (1977) discussed yet another type of delay-maintenance task, whereby researchers present subjects with a series of valuable items, one by one, as long as they refrain from taking the increasingly larger reward pile. Once they take the accumulated reward, no further items are presented. In one example, an experimenter successively places candies on a table in front of a child until the child takes the candies, tells the experimenter to stop, or the experimenter runs out of candies (Toner & Smith, 1977). Thus, every time an experimenter adds a new item to the reward pile, the subject has the choice of either taking what has been presented (or ending the trial), or continuing to wait, potentially maximizing the amount of reward items to be obtained.

Evans & Beran (2007) therefore concluded that the comparison is not between a more-preferred reward type and a less-preferred reward type, as in delay-choice tasks and the aforementioned first type of delay-maintenance task. Rather, the comparison is between some amount of reward that is available now, and a greater amount of the same reward type that is available in the future. Hypothetically, refraining from selecting a lesser reward would become more difficult each time an item is added to the accumulation. However, this increase in difficulty is most likely not a linear function. According to Evans and Beran (2007), researchers have tested multiple non-ape primate species for self-control in delay-choice tasks, including marmosets and tamarins (*Callithrix jacchus* and *Saquinus oedipus*; Stevens, Hallinan, & Hauser, 2005), rhesus monkeys (*Macaca mulatta*; Anderson & Woolverton, 2003; Szalda-Petree, Craft, Martin, & Deditius-Island, 2004), and long-tailed monkeys (*Macaca fascicularis*; Tobin, Logue, Chelonis, & Ackerman, 1996); and Chimpanzees (*Pan troglodytes* and 1 orangutan (*Pongo pygmaeus*) (Beran, 2002).

After reviewing previously reported studies where researchers tested the ability of animals and human subjects to delay maintenance tasks or exhibit choice delays, and findings of Mischel (1960s), Funder, Block & Block (1970s), and Logue and Chavaroo (1992), researchers in this study implemented a series of intervention techniques. The aim was to teach children who were not able to delay gratification in an initial experiment, to do so, at or by the end of a one-school year period. Some of the techniques used were guided by Mischel's study to include, suggesting things for children to do while waiting; teaching them to distract themselves during the waiting time; rewarding them with something they want; and, parents engaging in projects with children, which require both parent and child to be patient (Bell, 2006).

Importantly, researchers in this study adopted the 'modified delay choice approach' used by Rachlin and associates, which gave subjects opportunities to alter their choice -- from self-control to impulsivity or vice versa -- during the course of the experiment, after making an isolated choice. Additionally, researchers tested delay maintenance capability by allowing children the choice of the more preferred reward, only if they wait for a stipulated period of time, whereas they can receive the less preferred reward at any time (by ringing a bell). This study intends to add a new dimension to literature on whether it is possible to teach delayed gratification behavior to children through intervention strategies used by both parents and teachers and observed by research assistants in eight observational periods.

Research Design

This study used a quasi-experimental design since this approach is used to evaluate interventions using non-randomized samples to establish causality between an intervention and an outcome. Specifically, a single-group, simple time series post-test only design (Cook & Campbell, 1979; Creswell, 2014) was used because measurements were taken at various points in time after the initial experiment was done for selection of participants ($X \rightarrow XO_1 XO_2 XO_3 XO_4 XO_5 XO_6 XO_7 XO_8$). The non-randomized sample group derived from a population of 255-all first year students- from four schools in the East/West corridor of Trinidad. The time series design took effect after the selection of participants. Eight follow-up experiments (X_{1-8}) were conducted concurrently with observations (O_{1-8}) during the school year, increasing the waiting times of each experiment by five minutes up to one hour by the eighth experiment/observation. On all experimental/observational days, waiting times of each participant was recorded, and at the end of the experimental/observational period, a 20-minutes base time was calculated to assess whether participants' waiting time improved over the one school-year period.

A version of the variable interval schedule of operant conditioning was used in an attempt of produce a consistent pattern of behavior. Snowman & Biehler (2006) suggests, "with the variable interval schedule, the length of time between reinforcements is essentially random but averages out to a predetermined interval" (p. 217). In this study, researchers did not use an average time during the experiment intervals, but rather, used the same variable interval set in the beginning and at the end of the project. As such, researchers returned to the schools three weeks between 2nd and third observation, four weeks between 3rd and fourth observation, six weeks between 4th and fifth observation, seven weeks between 5th and 6th observation, six weeks between 6th and seventh observation, four weeks between 7th and eighth observation and 3 weeks between 8th and ninth observation.

Population and Sample

The population for this study was all first year elementary students from four schools in the East/West corridor of Trinidad registered for the academic year 2009/2010. They numbered 40, 70, 45, and 100, respectively, totaling 255. All 255 students were given a chance to choose whether they would accept a reward instantly (one marshmallow), or wait 20 minutes for a

greater reward (two marshmallows). Participants were only eligible to be part of the study if they were unable to wait for 20 minutes during the baseline or observational experiment. The waiting time of all students was recorded, and the 100 students with the lowest recorded times were labeled, 'unable to delay gratification' and formed the sample for this study. Of the 100 participants, seven dropped out of the study during the school year, by either dropping out of school or moving to a higher class. As a result, the actual study sample was 93 participants. . Informed consent was sought from all parents and participation was voluntary, even after the selection process was completed.

Validity

The literature suggests a number of threats relevant to quasi-experimental designs to include history, maturation, instrumentation, testing, mortality, and regression to the mean (Cook & Campbell, 1979; Campbell & Stanley, 1963). In controlling for internal validity threats for this study, researchers were not able to identify any historical events that could have accounted for the changes in the waiting behavior of the participants during the experimental period. Researchers also noted that students may have naturally matured during the experimental process, and as a result, increased the waiting time by five minutes when a new experiment was being conducted. To address the issue of instrumentation, research assistants' became better at observing over time and ensured that on each experimental/observational day, all activities of the individual participants were recorded, regardless of how little that waiting behavior activity seemed. Though seven participants dropped out during the experimental/observational period, that number did not impact the overall findings since students were assessed individually.

Data Analysis

The data were analyzed through content analysis for the purpose of classification, summarization, and tabulation. Descriptive statistics was used in an effort to answer the overall research question. On each experimental/observational day, research assistants' recorded the desired targeted waiting time, actual waiting time; activities participants had done before the experimental/observational period and the activities participants engaged in while waiting. For the latter, research assistants used the following codes 0= did not wait, 1= covered eyes, 2=talked to self, 3= talked to other students, 4=played games/fixed puzzle, 5= tried to sleep, 6=read, and 7= sat quietly; 8= sang/danced/ fidgeted, 9= wrote/drew, and 10= watched television - where such options were available (form 3). When all forms were sorted, reviewed and coded, data from parental demographic form (form 4) and background information forms (form 5) were also coded. Information was entered into SPSS 17.0 for Windows (SPSS Inc., Chicago, IL), now Predictive Analytical Software – PASW, to assist in analyzing the descriptive data.

Results

Of all the 93 participants, 44 were male (47%) and 49 (53%) were female (Table 1), and seven dropped out before the end of the experimental/observational period. Participants' ages ranged from four- six years. The largest number of participants, 59 (63.4%), were Afro-Trinidadians; 8 (8.6%) Indo-Trinidadians, 24 (25.8%), and 2 (2.2%) Spanish. Students all lived in East-West corridor of Trinidad ranging from Port of Spain to Valencia.

Table 1 Descriptive Statistics

Characteristic	Frequency	Percentage
Gender		
Male	44	47
Female	49	53
Total	93	100.0
Age: years		
4	6	6.46
5	67	72.4
6	20	21.5
Total	93	100.0
Household Structure		
One-parent	25	26.9
Two-parent	56	60.2
Other	11	11.8
Missing	1	1.1
Total	93	100.0
Race		
Afro-Trinidadian	59	63.4
Indo-Trinidadian	8	8.6
Spanish	2	2.2
Mixed	24	25.8
Total	93	100.0
Address		
Maracas Valley	28	29.8
St. Augustine	13	13.8
Dinsley/Trincity	24	25.5
D’badie to Arima	4	4.3
Mt D’or/Port of Spai	9	9.6
Arouca/Five Rivers	10	10.6
Valencia	2	2.1
Missing	3	3.2
Total	93	100.0
Salary range of parents		
\$8000-25000	34	36.6
\$25001-55000	19	20.4
\$550001-75000+	19	20.4
Not indicated	19	20.4
Total	93	100.0

Overall Increase in Actual Waiting Time

After conducting the first experiment to select the sample for the project from the population of 255, (by selecting those who were unable to wait for 20 minutes for a greater reward) 69 (74.2%) of the 93 sample did not wait for any part of the 20 minutes; the other 24 (25.8%) waited for 1-10 minutes. Researchers then assumed that the children’s behavior on that

day was typical; since no information was collected as to whether individual children had problems in waiting prior to the first experiment.

When researchers returned one week later for the first experiment/observation to test whether students were able to wait 25 minutes, 65 of the participants were able to wait for 25 minutes. As such, another assumption was made, suggesting that possibly, student behavior on the initial experiment may not have been typical; or that students had a better understanding of what they were being asked the second time; or possibly, though researchers' had met with parents before the initial experiment, they were not told what researchers' would measure on the initial or selection experimental day.

On the other hand, before the first experimental/observational day, parents were informed that their participation would be required in assisting children in learning to delay gratification by using intervention techniques at home. A battery of techniques was developed by the principle researcher and given to both parents and teachers during the experimental period. These included both short term and long term techniques such as the teacher stating expectations periodically at the beginning of his/her class telling children when it was appropriate to wait- when standing in line, raising their hand and waiting their turn to be called, etc.; giving proximity praise when child waits his/her turn or exhibited any form of waiting behavior; giving minimal attention to undesired behaviors, using 'stop' or 'go' labels when the teacher sees antecedents of undesirable behaviors such as interrupting the teacher without waiting to be called out. Other behavior modification techniques included positive reinforcement after a target behavior- which could be used by both teachers and parents – such as providing positive feedback such as a pat on the back, verbal praise, a hug (by parents); provide opportunity for free play. The other positive reinforcement technique suggestion was the use of token economies for teachers such as distributing checks, gold stars, or happy faces that students can cash in later for credit or other prizes, or earn tickets toward free time. Negative reinforcement strategies for both the home and school were also included in the batter of techniques. This could account for the drastic increase in waiting behavior on the first experimental/observational period.

When research assistants returned for the second experiment/observation three weeks later (4th week), they recorded that a total of 55 participants waited for the full 30 minutes, making it 55 who actually were able to wait for 20 minutes, but had not been able to do so four weeks earlier. Researchers then returned four weeks later for the experiment/observation (8th week) to test whether participants would wait for 35 minutes. Fifty-five participants waited for the full 35 minutes, while 21 chose not wait for any part of the time. Researchers assistants again returned six weeks later for the fourth observation (14th week) to test whether children could maintain waiting for 20 minutes. At that point, 63 waited for the full forty minutes - maintaining a waiting period of 20 minutes. When researchers returned 7 weeks later for the fifth observation (21st week), students had maintained behavior because 80 participants had waited for the full 45 minutes - maintaining waiting time of 20 minutes.

By the actual 27th week when researchers returned six weeks later for the sixth observation, 76 out of the 84 participants present on those experimental/observational days waited for 50 minutes (81.7%). When researchers returned four weeks later for the seventh observation (31st week), 18 participants were absent. Of the 75 who participated, 70 waited for the full 55 minutes. Only five did not wait for any time at all. When researchers returned for the final (and eighth) experiment to observe whether children would wait 60 minutes, 20 students were recorded as absent or did not wait for any time at all. Sixty-seven waited for the full 60 minutes, thereby maintaining the actual waiting time of 20 minutes - a striking improvement from the first experiment, where 69 did not wait for any part of 20 minutes (Figure 1).

Activities while Waiting

Results of the study indicated that the most common activity students did while waiting was to play with games or puzzles. In the few instances where students were observed in large rooms with one other student present, 18.91% of the time, they would talk to other student; while the least activity done was to watch television. In this research, we looked for some similarities in observations made in Mischel's experiment, where some children (about two thirds) managed to wait, using strategies such as covering their eyes, talking to themselves, playing games, and even trying to go to sleep in order to avoid eating the marshmallow (Mischel, Shoda & Rodriguez, 1989). Similarly, researchers' in this study found that participants used a variety of waiting/coping methods as reported by Mischel, Shoda and Rodriguez (1989) such that, 33.35% of them used playing games and fixing puzzles as the greatest distraction, followed by 18.91% - talking to the other student, and 7.66% - talking to self (Figure 2).

Waiting Improvements by Gender

Differences in the waiting behavior were found between the waiting behaviors of boys and girls. Consistently, girls outperformed boys in their ability to maintain their waiting behavior on days of experiments/observations (figure 3). Findings revealed that while 37 (53.63%) males and 32 (46.37%) females waited for no part of the 20 minutes in the initial experiment, by the end of the final experiment, 32 (47.76%) males and 35 females (52.23%) had waited for twenty minutes. Notably, Silverman (2003) conducted a meta-analysis to test Bjorklund and Kipp's (1996) hypothesis, which stated that due to selection pressures operating during evolution, women and girls are better able than men and boys to delay gratification (Bjorklund & Kipp, 1996). Using an effect size of 38 derived from 33 studies in which participants made one or more choices between a small (or less preferred) immediate reward, and a large (or more preferred) one, Silverman (2003) concludes that there was a small female advantage ($r = .058$), and no evidence was found for the gender gap changing systematically with age. However, in this study, researchers found a consistent pattern in the waiting behavior of both males and females, with females having a higher outcome for long-term waiting behavior (Figure 3), supporting the hypothesis of Bjorklund and Kipp (1996).

Waiting Behavior, Parents Salary Range, Household Structure

Researchers also found differences in the waiting behavior of children from one-parent to two-parent households. Figure 4 shows that children in two-parent households consistently "out-waited" those from one-parent households on all experimental/observational days. Another interesting finding pertains to waiting behavior of participants' according to the recorded salary range of their parents. Figure 5 indicates that on most experimental/observational days, parents of children whose parents reported earnings in the lowest salary bracket had better waiting times than participants whose parents had reported higher earnings, except on the third observational day. This general finding does not seem to be an implied view from previous literature however. For example, Chavkin and Williams (1993) suggest that poor and minority parents are commonly portrayed as under-involved in their children's schooling processes, parental involvement seems to be an important issue, given that their children, especially males, are disproportionately referred to for disciplinary action.

Summary and Conclusion

Michel's study followed the progress of each child into adolescence and demonstrated that those who were able to delay short-term gratification for long-term gain were found to have had better coping skills; were more socially competent, self-assertive, trustworthy, and dependable. They were academically successful, better able to cope, more socially competent

and self-assertive, trustworthy, and more academically successful. The “grabbers” however, suffered low self-esteem, and were viewed by others as stubborn, prone to envy, and easily frustrated (Mischel, Shoda, & Peake, 1988; Higgins, 2012).

As such, teaching delayed gratification behavior, if effective can have long-term implications for the children who are taught to do so, especially since Lopatto and Williams (1976) suggest that teaching children self-concept and self-regulation may assist them in delaying gratification. Notably, Butler (2002) and Zimmerman (2001) revealed that self-regulation is fundamental to the ways in which individuals manage their own learning and behavior. Further, Saarni, Mummer, and Campos (1998) also asserted that children who experience harmonious interactions at home under the guidance of supportive and competent parents most effectively learn that self-regulation. As such, engaging parental participation in the teaching of delayed gratification may be fundamental in developing a model for teaching delayed gratification over time.

Overall, researchers found that some form of intervention could assist in teaching delayed behavior. It is therefore recommended that future research could use a relatively small homogenous sample to enable researchers to conduct experiments under strict controlled conditions using experimental groups to monitor more closely actual strategies that work versus other strategies that were not as successful. This could assist in creating an effective model for strategies that would help in teaching delayed gratification to children.

Limitations

Three major limitations must be taken into consideration when reading the findings of this research. Firstly, researchers did not look at quality control with use of techniques, but rather, the execution (e.g. teachers may use visual cues differently). Secondly, there was no inter-rater reliability- such as recording sessions on cameras and having other research assistants mark observations against that of the researcher observing in the room. Achenbach, McConaughy and Howell (1987) reported that higher correlations were observed between raters within the same setting or under the same conditions, than those across settings.

Thirdly, even though children were observed in rooms as in other studies, they were on few occasions observed in twos. In those instances, they were observed at opposite ends of a table in a large room, but at some point gravitated toward each other to play. This could have influenced the decision of some to wait because their peer waited, and could have also influenced those who chose not to wait because their peer would not wait.

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Appendices

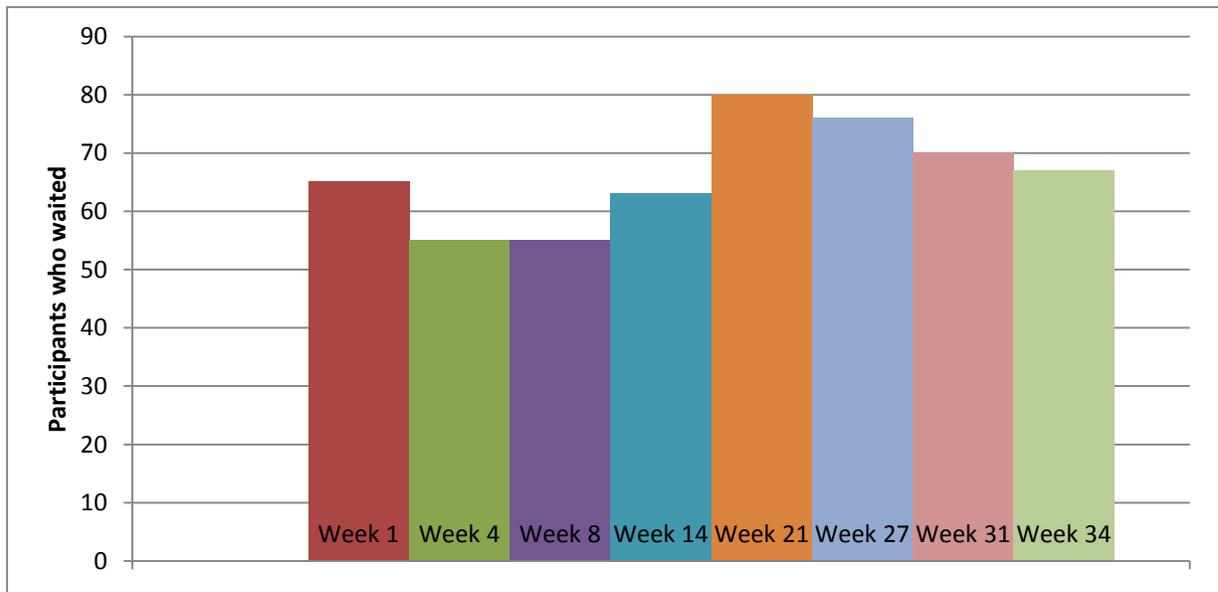


Figure 1. Overall increase in actual waiting time of all participants

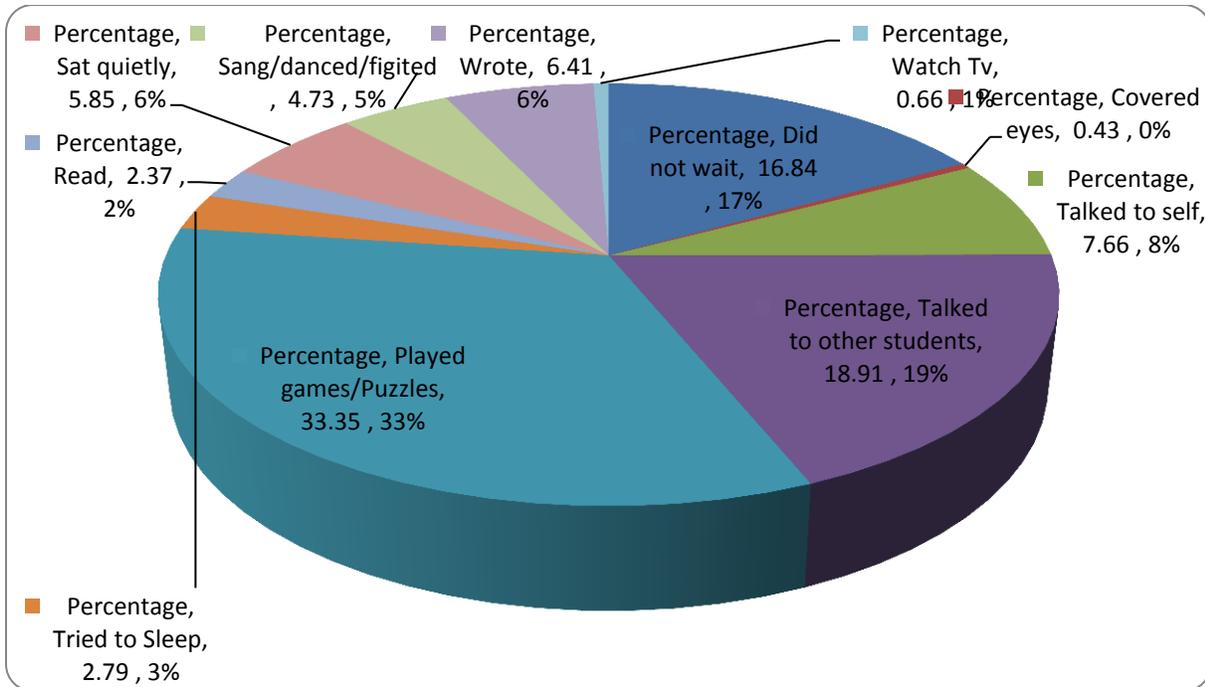


Figure 2. Activities while waiting

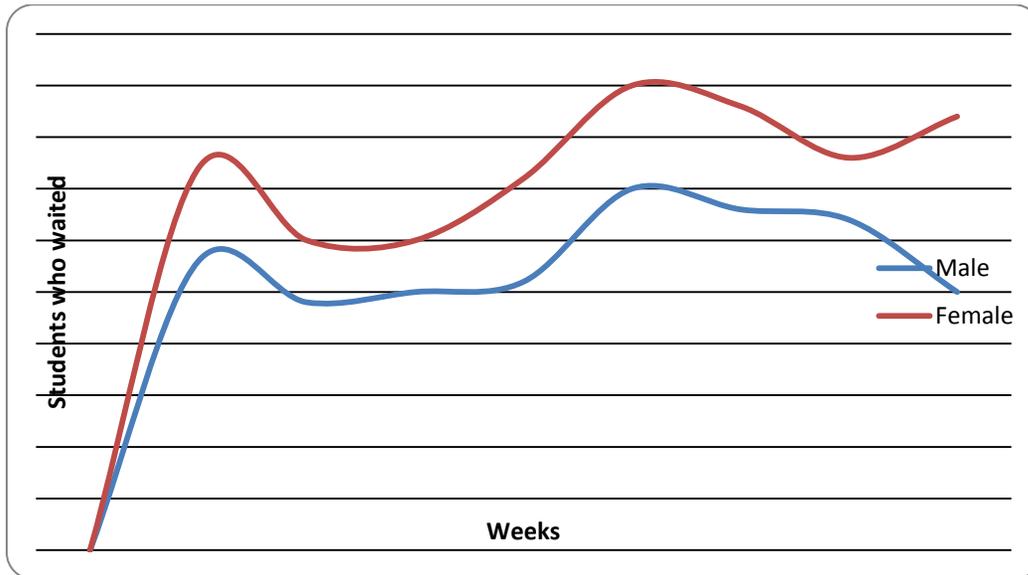


Figure 3. Waiting improvements by Gender

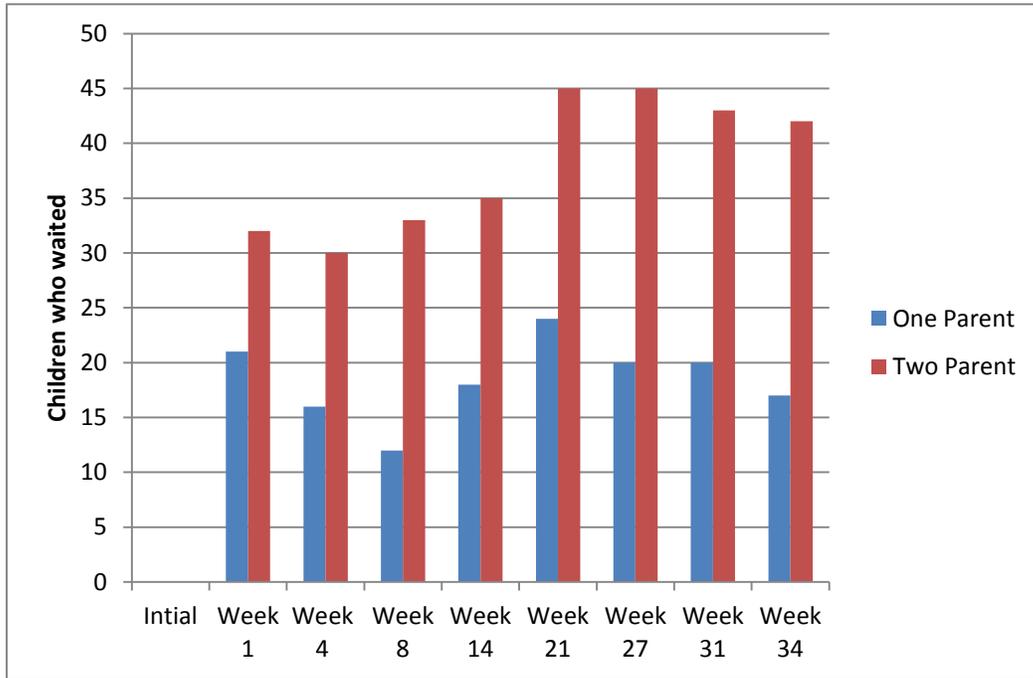


Figure 4. Waiting Behavior by Household Structures

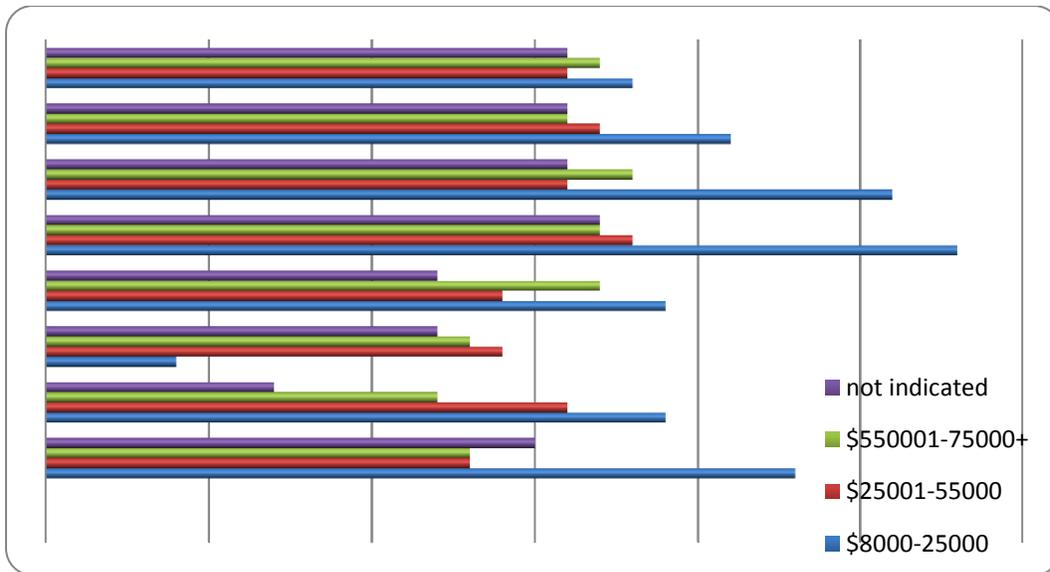


Figure 5. Waiting Behavior and Parents' salary range