

A Behavioral Effect of a Fable

Yumiko Baba*

1. INTRODUCTION

Bruner (1990) stated on pp.28 that “Saying and doing represent a functionally inseparable unit in a culturally oriented psychology” and on pp. 29 that people and cultures were governed by shared meanings and values. Further, Bruner (1990) described on pp. 77 an experiment by Lucariello. She used 4-5 years old kindergarteners as her subjects, told them either a canonical or anticanonical version of a birthday girl’s story, and asked them some questions. She found that those who heard an anticanonical version created more narrative inventions than those who heard the canonical version. In other words, young children tried to span a reasonable bridge between their culture and an anticanonical situation they heard and tried to interpret the anticanonical version in the most logical way possible given their culture.

We used an experiment to examine whether a fable had a significant effect on a human’s behavior. At the same time, our experiment investigated whether saying and doing were inseparable. We focused on fables because they were read to us many times by adults close to us when we were young, and we read them many times by ourselves once we were able to read on our own. Furthermore, each fable had a moral lesson to learn. To attract young children’s attention and let them learn the moral lessons smoothly, fables use animals as

* The author appreciates a former Professor Masaki Nakagome for introducing Bruner’s work, Professor Dan Ariely and Professor Kazuo Maki for their helpful advice on the experiment, and Professor Alvin Roth for his insightful comments on the implications of this paper. The author also appreciates seminar participants at BABEEW 2023 in San Jose and those at CTE 2023 in Reading for their comments. Thanks also go to the financial aid from the Institute of Economics at Aoyamagakuin University.

the main characters and characters act like humans in the stories. Each culture has its own popular fables most people read, and the moral lessons are shared among them. For example, “Peach Taro,” “The Crab and the Monkey,” etc. in Japan, “Clash of Titans,” “The Three Sisters of Fate,” etc. in Greece, “Hensel and Gretel,” “Rumpelstilzchen,” in Germany and so on. The moral lessons adults learn from the books they have been exposed to since young childhood have been absorbed into them and constituted an important part of their culture and social norms in society. Culture, organizations, institutions, and religions are all complementarities in the sense of Historical and Comparative Institutional Analysis as in Grief (1998).

Usually, close relatives regularly read story books to a child before s/he goes to sleep. Hence, there is the term “bedtime story.” “Bedtime story” usually starts before a baby celebrates his/her 1-year-old birthday. Around 3 years old, each child has several favorite stories and requests the readers to read the same story again and again. Also, a child starts reading a simple book by him/herself. Then, they read their favorite books again and again. Usually, parents buy books for their children and parents significantly influence the book range a child can reach till s/he can select books by him/herself after starting his/her school life. In an early stage, parents read fables to their kids very often. Aesop, the Grimm brothers, and Andersen are the most famous authors of fables. A fable uses animals as the main characters to attract young children’s attention and teaches a moral lesson to readers. We used “The Ant and the Grasshopper” in our experiment because it had 2 very different endings. In the original ending, the ant refused to share its food when the starving grasshopper visited the ant’s house in the winter, knocked on the front door, and begged for food. In the Disney or the Japanese version, the ant welcomed the grasshopper and shared the food it collected by working hard all the time including the hot summer. The original version tells a reader that one should work hard to prepare for the future, and one is in trouble if one does not do what one can do. On the other hand, a reader can do only what s/he wants to do if s/he read the Disney or the Japanese version because someone will help him/her when s/he is in trouble. In the USA, charity is very popular among affluent people and the government helps poor people financially well in Japan. Their culture and the moral lessons in their version of “The Ant and the Grasshopper” are complementarities. The moral lesson in the

original ending is lost in the Disney or the Japanese version.

There are many previous works that considered moral development in a child across cultures. Wainryb & Recchia (2014) denied “cultural psychology” which treats culture as a pre-requisite and assumed that culture determines a person’s moral development because it could not explain varieties of persons’ moral concepts under the same culture, similarities among persons’ moral concepts across different cultures by explaining the example of United States, Canada, Western Europe, Australia, and New Zealand expressed as individualistic orientation observed vs. Asia, Africa, and South America expressed as collective orientation. They claimed that morals and cultures were continuous variables and competing multiple morals and cultures led a person to have a point in the continuous set. We agree with them that culture is not given ex-ante but oppose their interpretation of “cultural psychology” from Bruner’s (1990) point of view. Bruner used the word “cultural psychology,” but he did not treat culture as an exogenously given environment. Rather, culture was a shared value and meaning of a community and people and their culture mingled with each other and evolved together from Bruner’s perspective. Therefore, a culture would change over time. In our opinion, culture can be explained by Historical Comparative Institutional Analysis. As Greif (1998) claimed, different institutions could be explained as multiple equilibria of a meta-game, and we can apply the method to culture. Culture, organizations, legal system, and education are complementarities. Our work showed that subjects understood the moral lesson in a fable well, but they did not implement it to the extent that it made a difference in the outcomes. Of course, each subject behavior varied continuously as Wainryb & Recchia said, but still a moral lesson s/he just learnt gave a crucial impact on his/her planning.

Vaish and Tomasello (2014) p. 283 stated that even 12-month-old infants offered help to show the location of the item an adult was searching for. Also, rewards from adults turned out to be negative over time while children under a non-reward condition maintained their help level. This was very common in behavioral economics and was explained in Ariely (2016). Monetary rewards decreased motivations due to loss aversive effect while motivations were maintained when the rewards were given by appreciation words. Further, Vaish and Tomasello (2014) p. 285 mentioned that 5 to 6 years old children shared

food due to their acquiring equality and fairness senses while 3 to 4 years old children were selfish and did not share food. Their experimental analysis using the data from reading a fable, “The Fox and Crow, The Fox and the Goat” by Aesop and answering the comprehension questions including the moral lesson in the fable implied Grades 5 and 6 (11- and 12- year-olds) captured the moral lesson in the fable in a general context. Narvaez et al. (1998) conducted experiments across Grades 3, 5, and college students and showed that almost all college students were able to extract the moral message common to different stories, whereas Grade 5 students were able to identify the story specific moral theme but had difficulty extracting the moral messages common to different stories. Their work supported our choice of university students as a reasonable one, but it was better if we had an opportunity to compare Grades 3, 5, and university students as they did. Unfortunately, we could not find any elementary school which permitted us to use their students as our experimental subjects. Thus, conducting similar experiments for Grades 3 and 5 students and comparing the results with those of the current research remains for the future.

The educational value of fairy-stories and myths was mentioned by Gruden (1903). In these days, reading fables and asking questions about students’ understanding of them has been used in many countries for lower grades students. Quizizz.Inc (2023), Study.com (n.d.), and Teachers Pay Teachers (n.d.) are examples among many. For example, when we typed the keyword “The Ant and the Grasshopper” on the website of Teacher Pay Teacher (n.d.), it offered tests even for pre-K children and they were composition books clip art with 33 pieces or so. Quizizz. Inc (2023) and Study.com (n.d.) offered varieties of multiple-choice questions. Among them, Study.com (n.d.) asked the moral question as the 1st question in their tests for Grade 2 students. Teachers Pay Teachers (n.d.) showed several end-of-year test preparation tests for Grade 3 students. Both teachers and students understood that fables were used in class to teach moral lessons to students, and it was serious because they could be used in the end-of-year test and the outcome mattered for students, teachers, and schools due to resultism.

Yalçın (2021) used the data obtained from observation, semi-structured interviews, story completion, and children’s drawings and concluded that 4-5 years old children already acquired two important concepts of benevolence and

responsibility. Among 4 tasks, story completion included answering comprehensive questions about each of the 2 stories. The themes of the stories were benevolence for one story and responsibility for the other story. 3 questions for each story were asked during and after subjects listened to the story.

As Bruner (1990) noted in IV in Chapter 3 on pp. 76 to pp. 90, parents played the main role in children's acquisition and development of narrative skills in their early stages. His statement still stands today. In the earliest stage when babies are less than 1 year old, parents choose stories and read them to their babies. When babies grow to 2-3 years old, they show their preferences for books read to them. Young children request readers to read their favorite books repeatedly. Eventually, they even memorize each sentence in their favorite books. The impact of parents on their children in the early stages is very significant. Parents choose books they read to their children and their choices reflect their preferences and moral values.

Sadovnikova (2016) showed by the data obtained from the questionnaire answers from 161 students aged 13-18 years, those who had "secure" attachments to both parents showed statistically significantly higher self-esteem than those who have "unsecured" attachments to their parents and concluded that secure attachment to parents was important for an adolescent to develop high self-esteem. In her study, subjects with low IPPA (Inventory of Parent Peer Attachment) scores were classified into an insecure group.

After our first manuscript, T. Baba (2022) conducted a similar experiment by using Grades 4 to 12 students as subjects. He adapted the main properties of our experiment but used an opposite criterion to evaluate the effects of reading "The Ant and the Grasshopper." He compared the number of helps each subject offered in the week before and after the experiment. There was an important difference between the story of "The Ant and the Grasshopper" and his work. In the story, the ant worked hard, collected food, and saved it for the coming winter all for itself and its family members while a subject who helped others did not directly receive the outcome of their work and those who received help enjoyed the outcomes of help instead. Still, he added very important components. Firstly, the subjects were young, and he classified them into 3 groups; the 1st group was Grades 4-6 subjects, the 2nd group was Grades 7-9 subjects, and the 3rd group was Grades 10-12 students, examined each group separately, and compared 3 groups to examine the age effect. We are happy about his

complementary experiment to ours due to his subjects being Grade 4-12 students. Science Pinterest.com (n.d.), Quizziz.Inc (2023), Study.com (n.d.), and Teachers Pay Teachers (n.d.), etc. produced various vocabulary, comprehensive, and moral lessons quizzes targeted at Grade 2-3 students, Grade 4-12 were somewhat too old. Although T. Baba requested his subjects' school to let him use kindergarteners to Grade 3 students, the vice president rejected his request. Secondly, he could use international school students as his subjects and could include piety as one of the variables because there were multiple different religions believed among the students and piety varied among his subjects, which was not the case for our subjects. He measured piety in his questionnaire and showed that religion was the only mildly statistically significant ($p < 0.1$) variable for Grades 7-9 students. He used the same set of regression variables as we did except including piety and including both ex-ante (before the story reading) and ex-post (after the story reading) FD1 and FD2 (future discount rates), Risk (risk attitude), and Altruism because there were no significant correlations among ex-ante and ex-post variables in his experiment. In our case, the answers before and after the story reading were almost the same and they were highly correlated. Therefore, we needed to discard either ex-ante, or ex-post variables and we deleted ex-post variables. Details are available in the next section. We believed that FH (either friendly or harshly acting ant version a subject read) was not statistically significant in his experiment because his dependent variable was how many times a subject offered help to others for a week before and after his experiment. Those who received help were the ones who got the benefit in his case while those who studied hard received full benefit of the effort in our case. We believe that our dependent variable reflects the moral lesson in "The Ant and the Grasshopper" better than his one and it might cause the difference. He tried to mimic our experiment except using younger subjects and requested the international school to offer some test before and after story reading like ours, but giving any kind of quizzes with scores was again rejected by the vice president and there was little he could do. Replacing our dependent variable of the differences in deviation values of 2 quizzes' scores before and after reading "The Ant and the Grasshopper" by his dependent variable of the number of offering help before and after reading "The Ant and the Grasshopper" and comparing the result with his ones is a meaningful future research topic because we can examine the age effects as examined by Narvaez

et al. (1998) and we can also examine the effect of the dependent variable. It is very important to compare the dependent variable reflecting the moral precepts of Aesop's original story (our experiment) with the dependent variable reflecting the moral precepts of the Disney and Japanese endings (Baba Toshihide (2002)) to analyze the influence of the choice of the dependent variable on subjects' behavior.

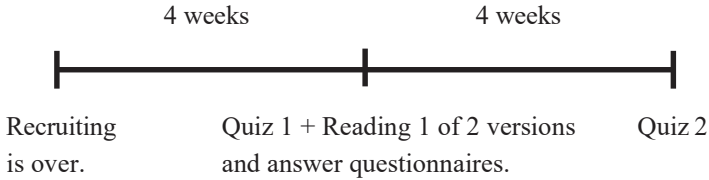
Based on the previous works, our experiment was the first one to examine whether a fable can teach a moral lesson to readers effectively. In our case, "The Ant and the Grasshopper" was chosen because it had two opposite conclusions; the ant shared its food with the grasshopper in one version and the ant refused to share its food with the grasshopper in the other version. Accordingly, our experiment also showed the difference between "meant to do" and "act." We can interpret subjects' "meant to do" as their "saying." Therefore, our experiment claimed that "saying" and "doing" were separable while Bruner said they were inseparable. As we said, test materials were available on fables and their moral lessons mostly for kindergarteners through grade 3 elementary school students. We need to find a way to keep their motivation high and let their motivations cause desirable outcomes.

2. LABORATORY EXPERIMENT

We conducted a laboratory experiment at our university. 58 females and 157 males joined. We chose "The Ant and the Grasshopper" because it had 2 very different conclusions. In the Aesop's original story, the ant didn't open the door when the starving grasshopper visited the ant's home and begged the ant to share the food in the winter. As a result, the grasshopper died in a snowing field. In the Disney or the Japanese version, the ant opened the door, welcomed the grasshopper, and shared its food. These revisions occurred because the ending of the original fable was perceived undesirable educationally in Japan, and because the conclusion of the original fable was not appropriate for the ending of a Disney film targeted at families with young children in the USA.

We let 109 of the subjects read the original version (we call it H (harsh) in our data analysis, but the subjects did not know about it) and 106 read the Disney or the Japanese version (we call it F (friendly) in our data analysis, but the subjects did not know about it). The timeline of our experiment is expressed in Figure 1.

Figure 1: Timeline of the experiment



(Source: made by the author)

Figure 1 describes the timing of the experiment. Firstly, each subject solved an applied math quiz. They learned the material to answer the quiz in the past. Since we announced that the experiment would involve an applied mathematics quiz and set the date of the first quiz as four weeks after the end of recruitment, we also asked how many hours per week on average they had studied for the first quiz in the past four weeks before the applied mathematics quiz. After submitting their Quiz 1 answer sheets, they answered a questionnaire. This questionnaire consisted of 3 parts. Part 1 asked about their altruism (Altruism), risk attitude (Risk), future discount rates (FD1 and FD2), and gender (Gender). In part 2, each subject read one of 2 versions of “The Ant and the Grasshopper” and answered 3 questions, namely, how they judged the ant’s behavior in the story (SubEnd), their opinions about the ant’s appropriate behavior (ApproEnd), and whether they knew the other ending (OtherEnd). For SubEnd and ApproEnd, there were 11 alternatives numbered from 0 to 10. 5 meant that the ant was neutral, 10 meant that the ant was very friendly, and 0 meant that the ant was very harsh. A subject chose one alternative respectively based on what he evaluated the ant’s behavior toward grasshopper in the version s/he read in SubEnd and based on how s/he determined the ant should act to the grasshopper in ApproEnd. One of two version was randomly assigned to each subject. In part 3, again, Altruism, Risk, FD1, and FD2 were asked. Their answers in part 1 and part 3 were essentially the same. Thus, the consistency of their characters was held. 19 subjects knew the other ending. 4 weeks after Quiz 1, each subject answered Quiz 2 which was also an applied mathematics quiz with the same difficulty level as Quiz 1. Our Japanese questionnaire is available upon request.

We now explain why we included each question. Firstly, FH, the version a subject read, is the main purpose of this paper. Secondly, Altruism is an individual property which can be the main factor to affect how a subject behaves through correlation with SubEnd and ApproEnd. Thirdly, if you are an extreme risk lover, it is rational for you to take a risk. Accordingly, you might take a huge risk of starving in the winter while playing around the whole summer without working. Our questionnaire measured each subject's risk attitude by the method introduced by Holt and Laury (2002). Fourthly, if you only cared about the current moment and did not care about the future at all, it was rational for you to do whatever made you happiest at that moment and it was optimal for you to take a different behavior from those who cared about the future. Both the ant and the grasshopper took the optimal behavior if the ant cared about the future considerably and its future discount rate was close to 1 while the grasshopper's future discount rate was close to 0. Each subject's future discount rate (FD1) was measured by letting a subject choose how much Japanese yen received immediately was equivalent to receiving 10,000 yen 6 months later. We also measured each subject's future discount rate (FD2) by letting a subject choose how much Japanese yen received 1 month later was equivalent to receiving 10,000 yen 7 months later. These 2 questions were the same in the time span of 6 months, but the starting times were different.

3. EMPIRICAL ANALYSIS OF EXPERIMENTAL DATA

We conducted 2 regression analyses with the same independent variables, but different dependent variables. Firstly, we ran the regression analysis with Q21Study as the dependent variable and FH, Altruism, Risk, FD1, Gender, SubEnd, ApproEnd, and OtherEnd as independent variables. Since FD1 and FD2 were highly correlated, we discarded FD2. In addition, all the answers to the questions in Part and those in Part 3 were essentially the same and we took only answers in Part 1. There were no noticeably high correlations among the independent variables, but we checked multicollinearity by VIF in Tables 2 and 4. Table 1 summarizes the outcome.

Table 1: Regression outcomes for Study hours

Q21Study	Coefficient	Std. err.	t	P> t
FH	1.456***	0.471	3.09	0.002***
Altruism	-0.235	0.237	-0.99	0.324
Risk	0.070	0.766	0.91	0.362
FDI	-0.062	0.486	-0.13	0.899
Gender	-0.533	0.326	-1.64	0.103
SubEnd	0.091	0.090	1.02	0.310
ApproEnd	0.010	0.681	0.15	0.878
OtherEnd	0.172	0.668	0.26	0.795
cons	0.394	0.677	0.58	0.561

*** is 1% statistically significant
(Source: made by the author)

Table 1 shows that FH is strictly positive and statistically significant at 0.2% and it is the only variable that was statistically significant. Note that we set the value of the dummy variable to 1 for H (a subject read the harsh ending version) and to 0 for F (a subject read the friendly ending version). Therefore, Table 1 demonstrates that subjects decided to work harder and to study more hours after reading a harsh ending of the Aesop's original version than those who had read the friendly and generous ending of the Disney or the Japanese version. Since we let our subjects read only one version of a specific fable, this outcome was expected because Narvaez et al. (1998) showed even Grade 5 students could identify the story specific moral lesson. The important point of this result is that the subjects correctly learned the moral lesson of the story and made plans to work harder, but whether or not they put those plans into action is not known at the time in question.

Table 2: VIF values for Table 1

Q21Study	Coefficient
FH	1.57
Altruism	2.01
Risk	1.94
FDI	1.20
Gender	1.08
SubEnd	1.58
ApproEnd	1.17
OtherEnd	1.02
Mean VIF	1.45

(Source: made by the author)

Table 2 tells us that the mean VIF is $1.45 < 2.50$. Therefore, we don't need to consider the multicollinearity problem.

Secondly, we changed the dependent variable of the regression analysis to Q21Score and obtained Table 3. Q21 score is the difference in deviation values between Quiz 2 and Quiz 1 scores.

Table 3: Regression outcomes for Quiz scores

Q21Score	Coefficient	Std. err.	t	P> t
FH	-1.671	1.749	-0.96	0.341
Altruism	-0.845	0.886	-0.95	0.342
Risk	0.372	0.286	1.30	0.194
FD1	0.284	0.181	0.16	0.876
Gender	-1.744	1.213	-1.44	0.152
SubEnd	-0.029	0.334	-0.09	0.931
ApproEnd	0.189	0.254	0.74	0.458
OtherEnd	-0.993	2.495	-0.40	0.691
cons	1.762	2.530	0.70	0.487

*** is 1% statistically significant
(Source: made by the author)

Table 3 shows that no variable is statistically significant. Again, we need to investigate whether our regression suffers from the multicollinearity problem.

Table 4: VIF values for Table 3

Q21Study	Coefficient
FH	1.56
Altruism	2.01
Risk	1.94
FD1	1.20
Gender	1.08
SubEnd	1.58
ApproEnd	1.18
OtherEnd	1.02
Mean VIF	1.45

(Source: made by the author)

Table 4 tells us that the mean VIF is $1.45 < 2.50$. Therefore, we don't need to

consider the multicollinearity problem.

A comparison of Table 1 and Table 3 demonstrates that subjects learned the story's moral lesson appropriately and they intended to work harder, but the outcomes did not follow. They "planned" to act, but they didn't act to cause differences in the outcomes.

4. INTERPRETATION OF OUTCOMES

As we mentioned in Introduction part, Bruner (1990) said that "saying and doing are functionally inseparable units" and "people and cultures are governed by shared meanings and values." We tested this statement by having each subject read one ending of the same fable with two completely opposite endings and creating two different cultural improvisations. Each subject read only 1 randomly chosen version. Table 1 showed that those who read the harsh endings of the original learnt the moral lesson in the fable well and planned to make more effort and the effect was statistically significant at 0.2%. Unfortunately, Table 3 shows that the outcomes of their planned efforts were not statistically significantly different from those who read the friendly and generous ending of the Disney or the Japanese version. Table 3 showed that they did not act, namely, they planned to work harder, but they did not carry out their plan and the differences of the deviation values of Quiz 2 and Quiz 1 between those who read the harsh ending (H) and those who read the friendly ending (F) were not statistically significantly different. There was another interpretation which was in favor of subjects: they carried out the plan, but they could not yield the desirable outcome of significantly higher deviation values in Quiz 2. Since they already learnt the materials covered in the quizzes in the university, making more effort should have yielded higher deviation values. It is the fact from more than 20 years of various in class quizzes' outcomes. Therefore, we concluded that they did not carry out the plan of working harder after reading "The Ant and the grasshopper" with the harsh ending of the original. Accordingly, our experiment claims that the harsh ending of the original changed what they meant to do (they planned to work harder), but they didn't act (the differences in the deviation values between Quiz 2 and Quiz 1 of those who read the harsh

ending were not statistically significantly higher than those who read the friendly ending version).

5. CONCLUSIONS AND EXTENSIONS

We obtained two important conclusions in our experiment. Firstly, subjects learnt the moral lesson in “The Ant and the grasshopper” and planned to execute the moral lesson they learnt; however, they did not execute the plan. It means that fables successfully taught the moral lesson to readers, but they did not act and left us educators find a way to let our students keep their motivations high and to execute their plans so that they would be able to achieve the desirable outcomes. That is our contribution regarding fables and moral lessons from an educator’s point of view. Secondly, we showed that “saying” and “doing” were separable because we could interpret our subjects planning to work harder as their “saying” to work harder and their carrying out their plan of working harder as “doing”; however, they “said” that they would work harder while they “did not” carry out their plan in our experiment. This contradicted the Bruner’s statement (1990) of “Saying and doing represent a functionally inseparable unit in a culturally oriented psychology.”

There are several important extensions for future research. Firstly, as I mentioned above, the moral lesson in Aesop’s original conclusion of “The Ant and the Grasshopper” motivated readers to work harder, but they did not act. Thus, we educators need to find additional methods to keep their motivation high enough to attain their goals. Secondly, we need to investigate narrative effects mentioned in T. Baba (2022), but we did not carry it out. This topic is prominently important in this digital era because most young children have access to digital materials where the same speaker reads a variety of fables, and that particular speaker can have a significant impact on children’s morality that can continue into adulthood. Examining narrative effects is important in the non-digital world as well because young children are confronted with fables for the first time in their lives by having someone close to them read stories to them repeatedly. Later when they start education, teachers often read them fables in class as shown by Pinterest.com (n.d.), Quizziz.Inc (2023), Study.com, and

Teachers Pay Teachers (n.d.). Further, as Sadovnikova (2016) showed, for young children in particular, the family environment played an important role, and its influence continued into adulthood. To help listeners successfully learn about fables and their moral lessons, it is critical to effectively examine the effects of narrative effects. Thirdly, we would like to find subjects from different grades and cultures as in T. Baba (2022), to run a regression on the dependent variable in line with our experiment, and to compare the results with those of T. Baba (2022) and with those of this paper so that we can examine the influence of religions and the ages of the subjects on the results. Most of our subjects were non-religious or they could be classified as Buddhists but were not pious: we could not examine the effect of religion in our experiment, but it was an important component.

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A Behavioral Effect of a Fable

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