

## Effects of Justifications Presented in Children's Stories on Students Following Descriptive Rules

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### Abstract

The present study investigated the justifications' effects, presented in children's stories, on the installment and maintenance of targeted behaviors: to copy, to answer and to present the exercise and competitive activities. Four children were exposed to three phases. In Phase 1, baseline, the registration of the target behaviors' events was made. Phase 2 was constituted of six steps. In each step, at the beginning, the experimenter would read a children's story with Type 5 justification that indicated the advantages of studying mathematics in the Steps 1, 2 and 5, and portuguese in the Steps 3, 4 and 6. Then, the teacher would write the exercise on the board and would request the students to copy, to answer and to present the exercise finished. Afterwards, the registration of the target behaviors' events was made for 30 minutes. In Phase 3 (Follow-up), fulfilled two months after Phase 2, it wasn't presented stories with justifications. The registration of targeted behaviors was made. In Phase 2, it occurred higher duration of activities to copy and to answer the exercise and lower duration of competitive activities. In Phase 3, occurred the opposite. It's suggested that, besides justifications, other variables contributed to maintain the observed behaviors.

**Keywords:** Rule governed behavior, reinforcement contingencies modeled behavior, justifications, immediate consequences, children's story.

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## Efeitos de Justificativas Apresentadas em Histórias Infantis sobre o Seguir Regras Descritivas por Alunos

### Resumo

O estudo investigou os efeitos de justificativas, apresentadas em histórias infantis, sobre a instalação e manutenção dos comportamentos alvos: copiar, responder e apresentar o exercício e atividades concorrentes. Quatro crianças foram expostas a três fases. Na Fase 1, linha de base, era feito o registro de eventos dos comportamentos alvos. A Fase 2 era constituída de seis passos. Em cada passo, no início, a experimentadora lia uma história infantil com justificativa do Tipo 5 que indicava as vantagens de se estudar matemática, nos Passos 1, 2 e 5, e português, nos Passos 3, 4 e 6. Depois, a professora escrevia o exercício na lousa e pedia para os alunos copiarem, responderem e apresentarem o exercício respondido. Em seguida, era feito um registro de eventos dos comportamentos alvos durante 30 min. Na Fase 3 (*Follow-up*), realizada dois meses após a Fase 2, não eram apresentadas histórias com justificativas. Era feito um registro de eventos dos comportamentos alvos durante 30 min. Na Fase 2, houve elevação da duração das atividades de copiar e responder o exercício e diminuição da duração das atividades concorrentes. Na Fase 3, ocorreu o inverso. Sugere-se que, além de justificativas, outras variáveis contribuíram para manter os comportamentos observados.

**Palavras-chave:** Comportamento governado por regras, comportamento modelado por contingências de reforço, justificativas, consequências imediatas, histórias infantis.

## Efectos de Justificaciones, Presentadas en Historias Infantiles, sobre el Seguir Reglas Descriptivas por Alunos

### Resumen

Se investigó los efectos de justificaciones sobre la instalación y mantenimiento de los comportamientos objetivos: copiar, responder y presentar el ejercicio y actividades concurrentes. Cuatro niños fueron expuestos a tres fases. En Fase 1, línea de base, se hacía el registro de eventos de los comportamientos objetivos. Fase 2 estaba constituída de seis pasos. En cada paso, al principio, la experimentadora leía una historia infantil con justificación del Tipo 5 que indicaba las ventajas de estudiar matemáticas en Pasos 1, 2 y 5, y portugués en los Pasos 3, 4 y 6. Después, la profesora escribía el ejercicio en la pizarra y pedía a los alumnos copiar, responder y presentar el ejercicio respondido. En seguida, se hacía el registro de eventos de los comportamientos objetivos durante 30 min. En Fase 3 (*Follow-up*), realizada dos meses después de la Fase 2, no se presentaban historias con justificaciones. Se hacía el registro de los comportamientos objetivos. En Fase 2, hubo elevación de la duración de las actividades de copiar y responder el ejercicio y disminución de la duración de las actividades concurrentes. En Fase 3, ocurrió lo contrario. Se sugiere que, además de justificaciones, otras variables contribuyeron a mantener los comportamientos observados.

**Palabras clave:** Comportamiento gobernado por reglas, comportamiento modelado por contingencias de refuerzo, justificaciones, consecuencias inmediatas, historia infantil.

Rules are verbal antecedent stimuli that can describe behavior and its control variables, thus establishing the topography of the behavior, changing the likelihood of such behavior occurring and being maintained, and changing

the functions of stimuli. These changes may occur regardless of the immediate consequences produced by the behavior and the space-time contiguity between stimulus-behavior and stimulus-stimulus (Albuquerque & Paracampo,

2017a; Albuquerque, Paracampo, Matsuo, & Mescouto, 2013). Rules are mainly followed because of (a) stories of the listener, such as the stories of control through immediate consequences and control through differential justifications to follow and not follow rules, and (b) current environmental variables, such as the immediate consequences and the current justifications for following and not following rules (Albuquerque & Paracampo, 2017a, 2017b).

Immediate consequences are events immediately produced by the behavior after it is exhibited. Justifications are constitutive stimuli of a rule that can alter the function of stimuli and determine the topography of behavior and its likelihood of occurring and being maintained (Albuquerque & Paracampo, 2017a). Rules may have no justification (e.g., the rule "Stay here at X; do not go to Y") or may have justification (e.g., "Stay here at X, do not go to Y. At Y you will have no support; however, here at X you will have everything you need and still have your family to help you"). In this example, the differential justifications for staying at X and not going to Y would change the likelihood of the listener staying at X. Thus, in general, rules can evoke behavior for the first time, determine its topography, and change the function of stimuli. However, unlike when rules have no justification, when rules do have justifications, such justifications can select and maintain behavior (Albuquerque & Paracampo, 2017a, 2017b; Lima, Albuquerque, & Paracampo, 2017).

There are five main types of justifications. Type 1 is verbal antecedent indicators of possible consequences – such justifications can be observed in narratives that may indicate whether the consequences are aversive or reinforcing, of great or small magnitude, impending or future, likely to be produced or not. Type 2 justifications are verbal antecedent indicators of possible approval – such justifications can be observed in narratives that may indicate whether the speaker or other people approve or disapprove of the rule being followed. Type 3 justifications are verbal antecedent indicators of the listener's confidence in the speaker, expressed in narratives such as

"I think," "I have experience," "I am confident," and "Trust me," which can indicate whether the consequences reported will in fact be produced by following the rule. Type 4 justifications are verbal antecedent indicators of the form of the rule, observed in narratives that can indicate whether the rule has the form of a promise, order, threat, agreement, speech, advertising, documentary, law, etc. Type 4 justifications are the various manners in which a particular justification can be presented to the listener. Finally, Type 5 justifications are verbal antecedent indicators of what to observe: narratives that may indicate examples of behaviors to be followed and examples of behaviors not to be followed.

For example, a speaker may state the rule, "Do not be so disobedient; try to be a more obedient person," and add the following justifications: "And you will notice that being obedient will make it easier for you to get the things you want" (Type 1 justification); "Being obedient, you will see that people will be prouder of you and like you more" (Type 2 justification); "If you start being more obedient, your life will change for the better, and the people around you will be happier. I guarantee it. Trust me" (Type 3 justification); "This is my advice to you" (Type 4 justification); "Look at the example of so-and-so; he has always been obedient, and now he's doing so well in life. Now, look what happened to this other person: he has always been disobedient and now he's in jail" (Type 5 justification). What all these examples have in common is that the justifications are verbal antecedent stimuli that can alter the functions of stimuli and interfere in the selection and maintenance of following or not following rules (Albuquerque & Paracampo, 2017a, 2017b; Albuquerque et al., 2013; Lima et al., 2017; Paracampo, Albuquerque, Mescouto, & Farias, 2013).

In addition to this practical evidence, there is also experimental evidence supporting the definition of justifications previously presented (see Albuquerque & Paracampo, 2017a, 2017b; Matsuo, Albuquerque, & Paracampo, 2014). For example, with the objective of investigating the effects of justifications on following rules, Matsuo et al. (2014, Experiment 2) subjected

six university students to a match-to-sample procedure. The task was to point to each of the three comparison stimuli in sequence. Each comparison stimulus had only one dimension – color (C), thickness (T), or shape (S) – in common with the sample stimulus and differed in the others. Phase 1 began with the minimum rule, without justifications. Phase 2 began with the Type 1 justification rule, which specified the same promise of awarding points for the choice of both the simple sequence (TSC) and the complex sequence (TSCSCT). Phase 3 began with the rule with Type 1 additional justification, which specified that if the participant chose the complex sequence, he would earn double the points. Phase 4 began with the rule with Type 2 additional justification, which specified that if the participants chose the complex sequence, the other participants in that study would also earn points; therefore, the participants would be helping other people. Points were only awarded at the end of the study, after Phase 4. In Phase 1, when there was no justification, the participants issued different sequences of responses. In Phase 2, when the justification was the same for emission of TSC and TSCSCT, they began emitting the TSC sequence. In Phase 3 and Phase 4, when the justification was for the emission of TSCSCT, they began emitting this sequence. These results show that justifications can alter the function of stimuli as well as determine the topography of behavior and the likelihood of its occurring and being maintained, to the extent that the topographical characteristics of the behavior and the functions of the dimensions of the comparison stimuli changed due to the changes in the justifications.

The justifications may describe possible future events and future events that are not clearly likely to be produced by the rule-following behavior. An example of the first case would be a Type 1 justification (verbal antecedent indicators of possible consequences), which indicates that maintaining the rule following to provide service Y will produce monthly salary X. An example of the second case would be a Type 2 justification (verbal antecedent indicators of possible approval), which indicates that maintaining the rule fol-

lowing for one person to be good and forgive others will produce group admiration and divine protection. In both cases, the justifications – such as verbal antecedent stimuli – exert control at the moment in which the rule is presented, after the listener reads and/or hears the rule. The future event described in the justification (the salary in the first case and the admiration of the group and the divine protection in the second case), as a future event, does not exercise control because this event is not produced by the behavior specified by the rule at the moment the rule is presented. In the first case, when the event described is produced by the rule following, it is not produced as a future event, but rather as an immediate consequence of the behavior, and this is how it can exert control. Thus, in the first case, when the behavior specified by the rule – under the prior control of Type 1 justification – produces the described event (the listener receives the salary), the rule following is controlled by the interaction between the justification (the antecedent narrative indicating that the listener will receive the salary) and the immediate consequence produced (the salary received by the listener). In the second case, because the described event (group admiration and divine protection) is not clearly produced by the rule following, this behavior would be under the control of the antecedent approval through justification (Albuquerque & Paracampo, 2017a, 2017b).

Thus, when the behavior is controlled by rules, it is the justifications that alter the functions of the stimuli and determine the topography of the behavior and the probability of it occurring and being maintained. However, when the behavior is controlled by reinforcement contingencies, it is the immediate consequences that exert these functions (Albuquerque & Paracampo, 2017a, 2017b).

Rules may be prescriptive or descriptive. The prescriptive rule specifies the behavior that a particular listener should exhibit; although the descriptive rule describes relationships and/or regularities between events, it is not directed to a particular listener and may or may not specify the behavior to be exhibited (Chase & Danforth, 1991; Reese, 1989). According to Paracampo

et al. (2013), the main difference between these rules is that a prescriptive rule always specifies the behavior to be exhibited by a particular listener, for example, "You must do your math exercise." Conversely, a descriptive rule never specifies that the behavior should be exhibited by a particular listener (e.g., "Do the math exercise," etc.). In all cases, the effects of rules, whether prescriptive or descriptive, depend on current environmental variables and the listener's history (Albuquerque & Paracampo, 2017a, 2017b; Paracampo, Souza, & Albuquerque, 2014).

Most studies investigating the functions of rules have evaluated the effects of prescriptive rules (Albuquerque & Paracampo, 2017c; Albuquerque et al., 2013; Arismendi & Yorio, 2015; Catania, Shimoff, & Matthews, 1989; Chase & Danforth, 1991; Costa, Calixto, & Banaco, 2017; Fox & Pietras, 2013; Galizio, 1979; Hayes, Brownstein, Zettle, Rosenfarb, & Korn, 1986; Miller, Hirst, Kaplan, Reed, & Reed, 2014; Newman, Buffington, & Hemmes, 1995; Skinner, 1969). This may occur for two main reasons: (a) because the effects of prescriptive rules are easier to identify and evaluate because such rules indicate which listener should exhibit the specified behavior and (b) because when investigating the effects of prescriptive rules, studies in the area reproduce what happens in people's daily lives because the verbal community generally exercises control by prescriptive rules with justifications, presented in the form of instructions, guidelines, advice, requests, warnings, suggestions, orders, promises, threats, etc. (Paracampo et al., 2013).

However, the verbal community also has descriptive rules with justifications. This generally occurs when rules with justifications are presented on radio and TV stations, in newspapers and magazines, in movies, on the Internet, in books, etc. Thus, the listener can see, read, or hear stories about people and characters that are examples to be followed because the people are admired for being critical, questioning, innovative, etc. In addition, the listener can see, read, or hear stories about people and characters who are examples to be followed – because they gen-

erally do what is directed to be done, that which is correct, licit, ethical, moral, and valued; consequently, they live without major difficulties. Stories such as those about exposure to various justifications for following and not following rules in certain situations can contribute to the formation of a repertoire in which the individual can be a follower of rules in one situation and a non-follower of rules in another (Albuquerque & Paracampo, 2017c). According to this proposition, it is by presenting Type 5 justifications that children's books (as well as films) contribute to transmitting cultural practices. Consequently, children could learn what they know by rules with justifications without necessarily coming into contact with the future events described by the stories (Albuquerque & Paracampo, 2017a; Paracampo et al., 2013). This proposition thus contributes to clarifying some suggestions from studies in the area of children's stories that indicate that children's books contribute to transmitting knowledge, values, traditions, and customs (Cunha, 1985; Tortella, Souza, Faria, & Zapio, 2016).

For example, in Aesop's children's story "The Boy Who Cried Wolf," one may assume that the shepherd learns that one should not lie, due partly to a story of control through the immediate differential consequences of the behaviors of lying and not lying. The listener who has heard or read this children's story learned that one should not lie, partially because of the specific story of control by Type 5 justifications, which indicates to the listener that people tend not to believe a person who has a history of telling lies, even when the person is telling the truth (Albuquerque & Paracampo, 2017a).

In support of this analysis, there is experimental evidence indicating that Type 5 justifications (verbal antecedent indicators of what to observe) contained in children's stories may alter the likelihood of rule following occurring and being maintained (Paracampo, Albuquerque, Carvalló, & Torres, 2009; Paracampo et al., 2013). For example, Paracampo et al. (2009) evaluated the effects of Type 5 justifications presented in children's stories on the following descriptive rules. Ten

children tasked with sharing chocolates were divided into two groups, and each group was subjected to three phases. The groups differed by the story told in Phase 2. For the experimental group, in Phase 2, a story was told of a boy who had difficulty giving and sharing food; consequently, his friends distanced themselves from him. Throughout the story, the boy begins to see that other children who give and share food have friends to play with. From then on, the boy changes his behavior and begins giving and sharing food. The Type 5 justification indicated that sharing is cool, sharing is good, and those who share and give away food have more friends to play with. For the control group, in Phase 2, a book on animal poetry was read. In Phase 1 and Phase 3 for the two groups, the number of chocolates given away was measured. All five participants in the experimental group, 100%, gave in Phase 3. For the control group, only 40% (2 of 5) of the participants gave in this phase. These differences in results between the groups – together with the results for the experimental group in Phase 1 and Phase 3, which showed that two of the five participants in this group gave away more in Phase 3 than in Phase 1 – suggest that Type 5 justifications may affect the likelihood of following a descriptive rule (Albuquerque & Paracampo, 2017a).

Similar results were observed by Almeida, Almeida-Verdu, and Cavalcante (2016) and by Paracampo et al. (2013). For example, researchers investigated the effects of children's stories with Type 5 justifications, examples of behaviors that should or should not be exhibited during the preparation of a party. Almeida et al. (2016) observed that Type 5 justifications interfered with behaviors regarding candy at a party. More specifically, those authors observed that behaviors directed toward candy were more frequent in the test situation preceded by the story with Type 5 justifications that did not indicate possible aversive consequences for the behavior of taking candy. There were fewer behaviors directed toward candy in the test situation preceded by the story with Type 5 justifications that indicated possible aversive consequences for the behavior of taking candy before the

party. However, these studies did not investigate whether the effects of such justifications would be maintained after the conclusion of the study.

Focusing on this analysis, in the present study, the idea was to continue the investigations conducted in the studies of Almeida et al. (2016), Paracampo et al. (2009), and Paracampo et al. (2013). Different from these previous studies, the present study sought to investigate the effects of Type 5 justifications (verbal antecedent indicators of what to observe) presented in children's stories on establishing and maintaining children's behavior in the classroom.

## Method

### *Participants*

Four children, aged 8 to 9 years, from the second grade of a private elementary school in the city of Belém-PA-Brazil, participated in the study. All the children were authorized beforehand, by their guardians, to participate in the study by Free and Informed Consent. Only the children who agreed to participate in the study in fact participated.

### *Ethical Procedures*

In general, the Free and Informed Consent stated that the study sought to investigate learning processes common to all people and any participant who felt uncomfortable for any reason could withdraw his or her consent and leave the study at any time. The project was approved by the Research Ethics Committee.

### *Materials*

Cursive recording forms and event recording forms, a recorder, and six books of children's stories were used.

### *Procedure*

The study was conducted in two stages. The first stage was the identification and definition of target behaviors, i.e., the behaviors investigated in the second stage. In this stage, the teachers were requested, in semi-structured interviews, to identify the behaviors exhibited by their students

that they found relevant and irrelevant to learning (defined below) as well as the frequency and the situations in which such behaviors occurred. At the end of the interview, the teachers were told the purpose of the study and were requested to indicate who among their students generally displayed behaviors irrelevant to learning.

In the interview, the teachers generally indicated that paying attention to the lessons and performing the assigned tasks were behaviors relevant to learning, and they emphasized that these behaviors occasionally occurred during the lessons for history, geography, science, and the arts. The teachers also indicated that aggressive, agitated behavior, inattention to the lessons, and chatter were behaviors irrelevant to learning – these behaviors occurred many times during the portuguese and mathematics lessons.

The teachers' reports specified that during the portuguese and mathematics classes, the exhibiting of behaviors irrelevant to the learning or activities competed with the behaviors relevant to learning more frequently. Based on this, a 30-minute session of cursive recording was conducted with the children indicated by the teacher. During the cursive recording, the children engaged in competing activities such as walking around the classroom, talking with classmates, and standing in front of and looking in the direction of their colleagues; and they rarely exhibited the following range of behaviors: copying, responding to, and presenting the exercise for the teacher to check.

Based on the correspondence between the teachers' reports and the cursive recorded data of the children's behaviors, the following target behaviors were selected and investigated in the second stage of the study: Copying the Exercise (CE), Responding to the Exercise (RE), and Presenting the Exercise (PE). The occurrence and duration of CE and RE were recorded when the participant remained seated and (a) looked in the direction of the blackboard and then wrote in the notebook (CE) and (b) faced toward the exercise, writing (RE). The occurrence of PE was recorded when the participant delivered the completed exercise to the teacher. These behaviors were selected because they were considered by the

teachers to be relevant to learning and because they occurred at a low frequency, as observed during the cursive recording sessions. The behavior referred to as "Competing Activities" was also selected because the teachers deemed it irrelevant to the learning and because it occurred frequently. Competing Activities was exhibiting any behavior of not following the rules for copying, responding to, and presenting the exercise.

From among the students indicated by the teachers, four children were also selected in this stage – those who had a low frequency of exhibiting behaviors relevant to learning (Copying the Exercise, Responding to the Exercise, and Presenting the Exercise) and a high frequency of displaying behavior irrelevant to learning (Competing Activities) during the cursive recording sessions.

The second stage investigated the effects of Type 5 justifications presented in children's stories on the students' target behaviors. Four participants were exposed to three phases. During each phase, two independent observers recorded events of the four target behaviors displayed or not displayed by each of the four participants individually: (a) Copying the Exercise, (b) Responding to the Exercise, (c) Presenting the completed exercise to have the teacher check it, and (d) Competing Activities. Each event recording session for these four target behaviors lasted for 30 min and was conducted during the period in which the participant studied. In the morning period, the target behaviors of Participant P1 and then Participant P2 were recorded. In the afternoon period, the target behaviors of Participant P3 and then Participant P4 were recorded. The durations of the behaviors of Copying the Exercise, Responding to the Exercise, and Competing Activities were recorded. In the case of the Presenting the Exercise behavior, only its occurrence was recorded. The criterion of 90% agreement between observers' records was established for the results to be considered for analysis. Thus, the three phases differed primarily with regard to the presentation (Phase 2) or lack of presentation (Phase 1 and Phase 3) of the stories with Type

5 justifications (verbal antecedent indicators of what to observe).

In Phase 1 (baseline), the recording of events during portuguese and mathematics lessons with regard to the four target behaviors exhibited or not exhibited by each of the four participants was conducted prior to the introduction (in Phase 2) of the stories with Type 5 justifications.

Phase 2 comprised six steps. Each step began with the experimenter reading to students a story with a Type 5 justification, which indicated the advantages of studying mathematics (in Steps 1, 2, and 5) and studying portuguese (in Steps 3, 4, and 6). The stories were told before the classes in which the recording of events would be conducted in a room in the school library (a pre-selected quiet environment for this purpose), in which only the experimenter and the participants were present. The stories were slowly read aloud by the experimenter, who showed the figures in the book. Before beginning reading, the experimenter invited the children to listen to a story and agreed with them that conversations should not occur during the reading. In general, the stories were about children (characters in the story) who did not like to study, did not pay attention in class, and did not do the assigned exercises. In a given situation, the characters had difficulty performing a task that required some prerequisites, such as knowing how to add and reading correctly. After failure, the children (characters) began to study and, later, began to successfully perform the activities that required them to study.

One step per week was conducted. Therefore, the four participants were exposed to six stories – one per week. At each step, after reading the story, when the participants were already in the classroom, the teacher (speaker) presented an exercise on the blackboard (for mathematics in Steps 1, 2, and 5 and portuguese in Steps 3, 4, and 6) and asked (i.e., presented rules) the students (listeners) to copy the exercise, then respond to the exercise, and finally present the completed exercise for the teacher to check. Subsequently, recording events of the four target behaviors was conducted.

Step 1 began with reading the story “*O Troco Certo*” (“*The Right Change*”) before math class. This story contained the Type 5 justification “Studying math is good. By studying mathematics, we can learn how to use money correctly.” Step 2 began by reading the story “*Lanche de Domingo*” (“*Sunday Snack*”) before math class. This story contained the Type 5 justification “Studying math is good. By studying math, we can learn addition.” Step 3 began by reading the story “*Aprender Sempre é Bom*” (“*Learning Is Always Good*”) before portuguese class. This story contained the Type 5 justification “Studying portuguese is good. By studying portuguese, we can learn to read better.” Step 4 began by reading the story “*O Concurso*” (“*The Public Exam*”) before the portuguese lesson. This story contained the Type 5 justification “Studying portuguese is good. By studying portuguese, we can learn to spell words and write correctly.” Step 5 began by reading the story “*Aprender para Também Ensinar*” (“*Learn So You Can Also Teach*”) before the math lesson. This story contained the Type 5 justification “Studying is good. By studying, we can learn new things and teach others.” Step 6 began by reading the story “*Um Belo Futuro*” (“*A Beautiful Future*”) before the portuguese lesson. This story contained the Type 5 justification “Studying is good. Studying can help us obtain a profession that makes us happy.”

Phase 3 (Follow-up) occurred two months after the end of Phase 2 and involved an additional 30-minute session of recording events of the four target behaviors during a portuguese lesson. During this phase, no stories with justifications were presented. This phase was conducted with the objective of verifying the effects of the Type 5 justifications – previously presented in Phase 2 – on maintaining or not maintaining the four target behaviors.

### *Data Analysis Procedures*

The behaviors exhibited by each individual participant during Phase 1 (baseline), Phase 2 (introduction of the Type 5 justifications), and Phase 3 (follow-up) were compared.



## Results

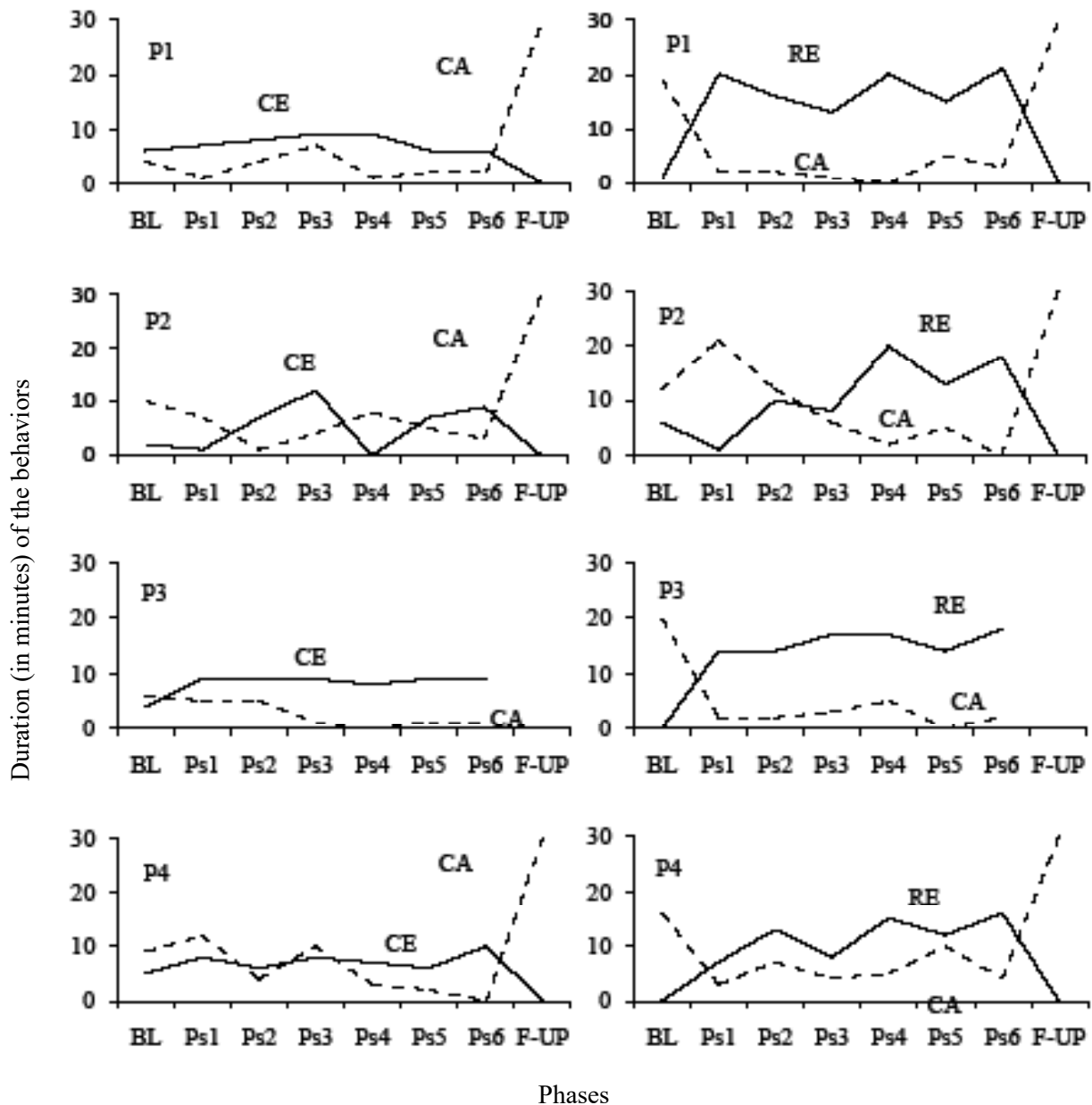
Figure 1 shows the duration, in minutes, of the occurrence of the behaviors of Copying the Exercise, Responding to the Exercise, Presenting the Exercise, and Competing Activities exhibited by Participants P1, P2, P3 (P3 did not participate in Phase 3 because he was no longer studying at the school when this phase was conducted), and P4, during Phase 1 (baseline), Phase 2 (introduction of the stories with justifications and recording of the behaviors observed), and Phase 3 (follow-up).

P1 – in Phase 1 (baseline) – exhibited the Copying the Exercise behavior for 6 minutes and exhibited the Competing Activity behavior for 4 minutes. In Phase 2, when a story with Type 5 justifications (verbal antecedent indicators of what to observe) was read at the beginning of each step, the duration of the Copying the Exercise behavior was approximately 6 to 9 minutes throughout the six steps. The time spent on Competing Activities decreased from 4 minutes in Phase 1 (baseline) to 0 minutes in Step 6 of Phase 2. This decrease in time spent on Competing Activities only began to occur from Step 4 onward. The duration of Responding to the Exercise increased from 1 minute in Phase 1 (baseline) to 21 minutes in Step 6 of Phase 2 (presentation of the stories with Type 5 justifications). The duration of the Competing Activity behavior decreased from 19 minutes in Phase 1 to 3 minutes in Step 6 of Phase 2. With regard to Presenting the Exercise, in Phase 1, P1 did not go to the teacher to present the exercise. In Phase 2, the Presenting the Exercise behavior was exhibited in five of the six steps (the exception was Step 3). However, in Phase 3 (follow-up), conducted two months after the end of Phase 2, the observers were present in the classroom, but the story with Type 5 justifications was not read before the lesson. At this time, P1 exhibited the Competing Activity behavior during the 30 minutes of recording. Thus, in Phase 3, the participant did not exhibit the range of behaviors of Copying the Exercise, Responding to the Exercise, and Presenting the completed exercise to the teacher.

The behaviors exhibited by Participants P2, P3, and P4 were quite similar to those exhibited by P1. Thus, Figure 1 indicates that with regard to Phase 1 (baseline), all participants (P1, P2, P3, and P4) increased the amount of time spent on the activities of Copying the Exercise and Responding to the Exercise and decreased the time spent on Competing Activities after the introduction of stories with Type 5 justifications in Phase 2. A single exception occurred with regard to the Copying the Exercise behavior shown by P1: at baseline and in Step 6, this participant spent 6 minutes copying the exercise. The results also indicated that the four participants (P1, P2, P3, and P4) did not exhibit the behavior of Presenting the Exercise at baseline; however, they began to exhibit this behavior in Phase 2 (particularly from Step 4 onward) after the introduction of the stories with Type 5 justifications. In summary, all the participants in Phase 2 began exhibiting the range of behaviors (Copying the Exercise, Responding to the Exercise, and Presenting the Exercise), which had not occurred in Phase 1. However, in Phase 3 (follow-up), which was conducted two months after completing Phase 2 and had no presentation of Type 5 justifications, all four participants exhibited only the Competing Activity behavior.

## Discussion

The present study sought to evaluate the effects of Type 5 justifications presented in children's stories on the behaviors of copying, responding to, and presenting exercises (considered by the teacher of the students to be relevant to the learning) and "Competing Activities" (considered by the teacher of the students to be irrelevant). Type 5 justifications are verbal antecedent indicators of what to observe: narratives that may indicate examples of behaviors to be followed and examples of behaviors not to be followed. The results of Step 6 of Phase 2, in conjunction with the Phase 1 (baseline) results of the present study, are similar to results obtained in other studies that have shown that Type 5 justifications – in the form



**Figure 1.** Duration (in minutes) of Copying the Exercise (CE), Responding to the Exercise (RE), and Competing Activity (CA) behaviors exhibited by the participants (P1, P2, P3, and P4) during Phase 1 (baseline - BL), Phase 2 (steps Ps1, Ps2, Ps3, Ps4, Ps5, and Ps6), and Phase 3 (Follow-up - F-UP).

of children's stories – may affect the likelihood of the behavior occurring in the future (Almeida et al., 2016; Paracampo et al., 2009; Paracampo et al., 2013). Additionally, such results from the present study also suggest that Type 5 justifications may increase the likelihood of favorable behaviors and decrease the likelihood of behaviors not favorable to learning, even when the task required of the participating students has been considered in the literature

to be a “difficult task” (Henklain, Carmo, & Haydu, 2017) and even when such students are considered by the teacher to be “problem students” who tend to exhibit less task-oriented behavior (Bartholomeu, Néia, & Silva, 2016).

These results suggest that in the present study, the Type 5 justifications may have indicated that the behavior of studying mathematics and portuguese is beneficial and the behavior of not studying these subjects is not beneficial.

The behavior is beneficial in the sense that this behavior of studying is consistent with cultural practices recommended by Type 5 justifications and because such behavior may produce immediate reinforcing consequences in the future, as indicated by Type 5 justifications, which indicate that when it was exhibited by other people or characters in the past, it eventually produced such consequences.

Thus, Type 5 justifications, in addition to the presence of the observers in the classroom, may have contributed so that in Phase 2, the students dedicated more time to the requested activities and less time to the activities not requested by the teacher. This analysis is consistent with the proposition that stories of control containing Type 5 justifications may enable the listener to learn from the narratives of the stories of others; that is, the listener learns from justifications contained in the narratives of the stories of other people or characters from books, movies, and soap operas (Albuquerque & Paracampo, 2017a).

Concerning the range of behaviors considered by the students' teacher to be relevant to the learning (Copying the Exercise, Responding to the Exercise, and Presenting the Exercise) observed in Phase 2, one problem involves explaining why the effects of the Type 5 justifications did not persist two months later in Phase 3, when the children's behaviors were observed again in the absence of described justifications. It is not clear why the behaviors did not persist, but some suggestions may be made with a view to conducting further studies.

One possibility is that the effects of the Type 5 justifications previously presented in Phase 2 did not persist in Phase 3 because the formal properties of such justifications did not clearly indicate that it was important to continue following the rules presented by the teachers. This possibility could be tested by manipulating different formal properties of Type 5 justifications in systematic replications of the present study (Albuquerque & Paracampo, 2017a). Such studies could assess the effects of Type 5 justifications on the performance of the participants in

Phase 3. Examples in these studies could include children who persisted, sought help, and learned to perform difficult tasks. Examples could also include children who followed the advice of parents and friends and embraced mathematics and portuguese, finding it easier to learn to solve problems and enjoy these subjects.

Future studies could also test whether Type 5 justifications exercise their functions as members of combined variables (Albuquerque et al., 2013). Thus, in addition to evaluating the effects of Type 5 justifications, future studies could also assess the effects of teachers' actions on students' verbal and nonverbal behaviors. Such actions generally function as the student's social-verbal environment. For example, studies could evaluate the effects of explanations (which function as rules with justifications) about how to perform the task before its execution and the effects of comments after the task has been performed. Such comments can function as justifications and as immediate consequences.

Some authors emphasized that the interventions referred to as School-Wide Positive Behavior Support (McIntosh, Filter, Bennett, Ryan, & Sugai, 2010) may also contribute to reducing the number of students with behavioral problems in a given school, to the extent that all school personnel identify and reinforce appropriate behaviors (Flores, 2017; Sprague & Walker, 2005). However, it must be considered that the "goals" – generally reported in proposals for such interventions – are justifications that indicate future events that are likely and not clearly likely to be attained. Additionally, previous reports of similar successful or unsuccessful interventions also function as rules with Type 5 justifications in determining subsequent behaviors of the school staff and students.

In all cases, future studies could test whether the rules presented are understood. This is important because for a behavior specified by a rule to occur, the rule must first be understood. Understanding a rule is the behavior under the control of the relations between the constituent stimuli of the rule and the stimuli reported by

the constituent stimuli of the rule, consistent with the cultural practices of a particular verbal community. For example, the rule “Always do \*\*\* so that you will pass” can begin to be understood only when the student begins the exercise, consistent with community practices. The listener could learn this through a story of differential reinforcement of the answers to the question “What is \*\*\*?” or by the rule “\*\*\* means exercise in this region.” In other words, the people who understand the rule are only those who respond to the relationships between \*\*\* and exercise, “Doing” and doing, etc., consistent with the cultural practices of the community (Albuquerque & Paracampo, 2017c ; Albuquerque et al., 2013). In addition to the practical importance of identifying specific variables involved in maintaining complex behaviors such as studying mathematics and portuguese, such studies would also be important because they could contribute to clarifying theoretical controversies about how the social-verbal environment functions.

Finally, the data from the present study – which show that justifications may influence complex behaviors – indicate that future studies should seek to make a distinction 1. between the behavior selected and maintained via prior approval indicated by justifications and the behavior selected and maintained via subsequent approval indicated by immediate consequences; 2. between consequent verbal stimulus that functions as an immediate consequence of behavior and, simultaneously, as a justification for future behavior, depending in part on its formal properties; and 3. between the effects of the listener’s stories of (a) control via immediate consequences, (b) control via justifications, and (c) control via the interaction between immediate consequences and differential justifications for following and not following rules. Such studies would be important because they would allow us to identify how the social-verbal environment functions (Albuquerque & Paracampo, 2017a, 2017b).

In summary, research aimed at identifying the contributions of Behavior Analysis to explaining and changing behavior in practical

situations, such as at school, in the clinic, and in organizations, should consider the distinction between what should be attributed to the effects of immediate consequences (positive reinforcement, negative reinforcement, punishment, extinction) and what should be attributed to the effects of justifications of Types 1, 2, 3, 4, and 5 in the selection and maintenance of the behavior and in the alteration of the stimulus functions. This distinction should be considered because when it is not considered, whether in an experimental analysis or in a non-experimental analysis of behavior, it is not clear whether the behavior under examination is selected by justifications or is selected because of its immediate consequences. Thus, it is also unclear whether such behavior should be included in the category of rule-controlled behavior or in the category of behavior controlled by reinforcement contingencies. In practical terms, this distinction should also be considered to the extent that when the professional says that what is manipulated is the consequences of the behavior, in fact, what is often manipulated — in clinical interventions, in schools, in organizations, etc. — is justifications (Albuquerque & Paracampo, 2017a).

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