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## Application of a relational frame theory account of psychological flexibility in young children

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### Abstract

**Background:** Acceptance and commitment therapy (ACT) is a contextual behavior therapy based on relational frame theory (RFT), a functional-contextual approach to human language and cognition. The main aim of ACT is to promote psychological flexibility, which has been defined in middle-level terms. The current study proposes that a recently developed RFT account of psychological flexibility might facilitate the adaptation of ACT to the work with young children. **Method:** A case study with a 5-year-old boy presenting problematic anger is presented to illustrate the previous suggestion. The intervention consisted of a brief ACT protocol applied in four, 20-min sessions and a token economy at the service of promoting psychological flexibility. The ACT protocol involved a multiple-exemplar training in framing own ongoing experiences through deictic and hierarchical relations and transforming the discriminative functions of those experiences by relating them to rules that progressively specified longer term and symbolic, positive consequences. **Results:** The intervention was shown to be highly effective in reducing the anger episodes, and the results were maintained during the one year of follow-up. **Conclusions:** This study supports the feasibility of the RFT account of psychological flexibility to adapt ACT to the work with young children.

**Keywords:** Relational frame theory; Acceptance and commitment therapy; Psychological flexibility; Children.

### Resumen

**Aplicación de una aproximación a la flexibilidad psicológica basada en la teoría del marco relacional en niños. Antecedentes:** la terapia de aceptación y compromiso (ACT) es una terapia contextual basada en la teoría del marco relacional (RFT), una aproximación funcional-contextual al lenguaje y la cognición. El objetivo de ACT es incrementar la flexibilidad psicológica, que ha sido definida en términos de nivel medio. Este estudio propone que una aproximación a la flexibilidad psicológica basada en la RFT podría facilitar la adaptación de ACT en el trabajo con niños. **Método:** se presenta un estudio de caso con un niño de 5 años con ira problemática tratado con un protocolo de ACT aplicado en cuatro sesiones de 20 minutos y una economía de fichas al servicio de promover flexibilidad psicológica. El protocolo consistió en un entrenamiento en múltiples ejemplos en enmarcar la propia experiencia en curso a través de relaciones deícticas y jerárquicas y transformar sus funciones discriminativas al relacionarla con reglas que progresivamente especificaban consecuencias positivas, simbólicas y a más largo plazo. **Resultados:** la intervención mostró ser altamente eficaz en reducir los episodios de ira, manteniéndose los resultados durante el año de seguimiento. **Conclusiones:** este estudio apoya la viabilidad de la aproximación a la flexibilidad psicológica basada en la RFT para adaptar ACT en el trabajo con niños.

**Palabras clave:** Teoría del marco relacional; Terapia de aceptación y compromiso; Flexibilidad psicológica; Niños.

Acceptance and commitment therapy (ACT; Hayes, Strosahl, & Wilson, 1999) is a contextual behavior therapy rooted in a functional-contextual approach to human language and cognition named relational frame theory (RFT; Hayes, Barnes-Holmes, & Roche, 2001).

RFT suggests that relational framing is a generalized operant behavior that is learned through multiple-exemplar training (MET) and underlies human language and cognition. Relational framing means responding to one event in terms of another based on arbitrary relational cues. Examples of relational framing are relating stimuli in accordance with coordination (“is,” “same as”), distinction (“is

different from”), opposition (“is opposite to”), comparison (“more than,” “less than”), hierarchy (“is part of,” “includes”), deictic (I/ here/now vs. you/there/then), etc. For instance, consider the case of a boy with a dog phobia who is told that *perro* is the Spanish word for dog (i.e., dog is the same as perro). Later, he gets scared and runs away when hearing the sentence “there is a perro next-door,” because of the arbitrary relationships between *perro* and *dog*, and an actual dog. In RFT terms, the fear-eliciting and avoidance functions of the actual dog were transferred to the word *perro* because they were indirectly related through a relation of coordination.

Given an appropriate learning history (e.g., Luciano, Valdivia-Salas, Berens et al., 2009), relational framing soon becomes a predominant behavior that automatically relates myriad stimuli and provokes the transformation of their functions. This way, relational framing heavily influences behavior. For instance, the child now reacts to previously neutral or unknown stimuli (e.g., the word *perro*) in terms of another stimulus that was previously conditioned (e.g., the actual dog).

Due to their new abilities in relational framing, children soon begin to understand and produce rules and self-rules, which will eventually, under appropriate circumstances, facilitate the emergence of a self-regulation repertoire (e.g., Luciano, Valdivia-Salas, Cabello, & Hernández, 2009) that is called psychological flexibility. For example, children could learn to discriminate their ongoing thoughts and feelings (e.g., the automatic fear reaction to the word *perro*), to cease their initial reaction to them (e.g., to run away), and behave under the control of what is most important for them. This way, children display more flexible behavior because they are not entirely under the control of their automatic feelings and thoughts.

Precisely, ACT attempts to produce behavior change by increasing psychological flexibility (PF). PF has shown to be an important factor involved in psychological health and behavioral effectiveness (Ruiz, 2010) and was initially defined according to six interrelated middle-level terms: acceptance, cognitive defusion, self-as-context, contact with the present moment, values, and committed action (Hayes, Strosahl, Bunting, Twohig, & Wilson, 2004). Middle-level terms are constructs that serve as shortcuts to apply behavioral principles and theories to complex situations (Vilardaga, Hayes, Levin, & Muto, 2009). This way, PF has been defined as the ability to be in contact with the private experiences that surface in the present moment without needing to avoid and/or escape from them and to adjust one's behavior according to whatever the situation requires in order to pursue valued ends.

The former definition of PF was a useful step forward in the description and dissemination of ACT. However, influenced by recent research in deictic and hierarchical relational responding (e.g., Gil, Luciano, Ruiz, & Valdivia-Salas, 2012, 2014; McHugh & Stewart, 2012) and rule-governed behavior (e.g., Luciano, Valdivia-Salas, Cabello et al., 2009; Luciano et al., 2012; Plumb, Stewart, Dahl, & Lundgren, 2009), an account of PF based on behavioral principles has been developed during the past few years that strengthen the link between ACT and RFT (e.g., Luciano et al., 2011, 2012; Törneke, Luciano, Barnes-Holmes, & Bond, in press). According to this line of research, PF would consist of the generalized repertoire of framing one's own ongoing behavior, including thoughts and feelings, through deictic (I-HERE, BEHAVIOR-THERE) and hierarchical (I contain BEHAVIOR) relations, which reduces its discriminative functions and allows the derivation of augmental rules that specify abstract, delayed, probabilistic, and positively reinforcing consequences and behavior that is in accordance with them (Luciano et al., 2009, 2012; Törneke et al., in press). Firstly, deictic relations allow the individual to treat her ongoing behavior as something to be observed by symbolically situating it THERE while the individual is HERE. Secondly, the previous observation of one's own ongoing behavior can lead to differentiate between oneself and the behavior and to hierarchically frame it with the deictic "I" (I contain behavior, I am bigger than it, the behavior is only a part of me, etc.). Lastly, the latter relational framing typically provokes a reduction of the discriminative functions of the ongoing behavior, which can lead the individual to derive and behave according to appetitive augmental rules that specify abstract and positively reinforcing consequences (i.e., values) that hierarchically contain more concrete sources of reinforcement such as goals and tangible reinforcers (Luciano et al., 2012; Plumb et al., 2009).

To date, ACT has been successfully applied in multiple areas with adult participants (Ruiz, 2010) and it is beginning to be applied

with children and adolescents (Coyne, McHugh, & Martínez, 2011). However, to our best knowledge, no study has been published regarding the application of ACT with young children. In this study, we propose that the RFT account of PF might offer specific guidelines to adapt ACT with young children for several reasons. Firstly, the RFT account defines the relational repertoires necessary to shape PF (i.e., deictic and hierarchical relational responding, rule-following in accordance with comparative, deictic, and causality relations, etc.). In this sense, assessment tests of these relational repertoires could be developed to evaluate whether a child is prepared to receive an ACT intervention and, if this is not the case, to implement training protocols in the specific types of relational framing that are absent (e.g., Luciano, Valdivia-Salas, Berens et al., 2009). Secondly, the RFT definition of PF provides guidelines to design defusion and self-based exercises that can be applied to young children because of the specification of the main verbal processes involved in them (i.e., framing ongoing behavior through deictic and hierarchical relations). Lastly, values work with young children would involve progressively promoting behavior towards longer term, probabilistic, and abstract consequences that are meaningful because they hierarchically contain more concrete reinforcers for the children.

The current article presents a case study with a 5-year-old boy who presented problematic anger episodes, with the aim of illustrating how ACT can be adapted to work with young children according to the RFT account of PF.

## Method

### Participant

Samuel, a five-year and one month old boy, was the participant of this case study. He lived with his parents and two-year-old brother. Samuel was at the appropriate stage of social development and grade level for his age, being enrolled in Preschool during the period of the study.

Samuel's parents were worried because he presented excessive anger at home, which was a problem when interacting with him because they were afraid of provoking his disproportionate reactions. They reported that most of his anger episodes appeared when things were not done the way he wanted. In fact, they tried to avoid Samuel's anger episodes by not bothering him (e.g., trying to do things the way Samuel liked before he could get angry, not scolding him when he misbehaved, etc.), but this strategy was not fully successful, and they considered that it was not the best way to handle the problem. Samuel also made annoying comments when feeling jealous. For instance, when his little brother got a new bedroom, he said: "Bah, that doesn't bother me because it will be old in two days and then, it will not be new." Also, when a schoolmate showed him his new tennis shoes, he said: "They are ugly, I don't like them," although he actually liked them very much. Lastly, when one of his parents' friends found a job, he said: "Bah, he will lose it."

Samuel complained about getting angry too frequently and that he was not able to stop doing that. After every episode, he used to promise not to do it again because "it is better to be happy than to be angry."

The second author is Samuel's mother. She was a last-year teaching student in an online university in which the first author was a professor. Because both authors lived in different and

distant cities, all assessment and intervention procedures were implemented by the second author at home under the online supervision of the first author.

### *Instruments*

*Assessment of anger episodes.* The second author was instructed to register all Samuel's anger episodes when he was with his parents throughout the study and to videotape some anger episodes that occurred during the baseline (e.g., at home, the mall, etc.). The register of Samuel's anger episodes included the following data: hour, antecedent stimuli, anger intensity, Samuel's actions during the episode, other peoples' actions, and episode duration (in minutes). Anger episodes were defined as persisting complaints, crying, and tantrums (e.g., yelling, throwing things, etc.). Anger intensity was assessed by the mother on a 1-10 scale, where 1 and 10 reflected, respectively, the smallest and biggest anger episode she had ever seen in Samuel.

After the two weeks of baseline, the register and videos were reviewed. When the child was angry, some interactions of his parents seemed to intensify the episode (e.g., when the child was about to calm himself, some new reprimands "stoked the fire"). It was hypothesized that anger episodes were partly maintained by the parents' attention (positive reinforcement) and by the escape from rage sensations by means of anger explosion (negative reinforcement).

*Assessment of the derived relational responding repertoire.* During the two weeks of baseline, Samuel's mother was instructed to implement several exercises to evaluate his relational repertoire (see details in Luciano, Valdivia-Salas, Berens et al., 2009). The child seemed to be at least relatively competent in relational framing through coordination, opposition, distinction, comparison, and deictic relational cues. Abilities in relational framing through hierarchical relations, which were especially important for this study, were evaluated with exercises like the following one. Samuel's mother put eight animal toys on the floor, among them six horses, and asked: "Are there more horses or toys"? At the beginning, Samuel responded incorrectly to this type of exercise, indicating that there were more horses than animal toys. However, after providing explanations of the correct responses (e.g., the horses are part of the toys, so there are six horses and eight toys), Samuel began to answer correctly. Samuel's new abilities in hierarchical relational framing were considered sufficient to implement the intervention because the aim of introducing hierarchical cues in the defusion exercises was to promote Samuel's derivation that he "contained" and was "bigger" than his ongoing private experiences, which seems functionally equivalent to the above-mentioned exercises.

### *Procedure*

A single case experimental design (A-B) was used with a one-year follow-up. The intervention began after the two weeks of baseline and comprised two components that were implemented within three weeks: an ACT protocol based on the RFT definition of psychological flexibility (Luciano et al., 2012; Törneke et al., in press) and a token economy (Ayllon & Azrin, 1968), which was introduced to establish a motivational context for Samuel to stop displaying anger episodes.

*Psychological flexibility training.* The protocol consisted of four, 20-min sessions that commenced the first day of the intervention and were conducted approximately every three days so that the training was implemented within the ten initial days. The sessions were videotaped and supervised by the first author to ensure that they were conducted correctly.

A multiple-exemplar training was conducted in which Samuel was asked to: (a) relationally frame his ongoing experience through deictic relations (I-HERE, EXPERIENCE-THERE) by describing its form, painting it on a piece of paper, and noticing that the experience was THERE on the paper while he was HERE; (b) relationally frame the experience through hierarchical relations (I contain EXPERIENCE) by responding to several questions (e.g., Who is having that thought/sensation? Who is painting it? Who is bigger: Samuel or the thought/sensation? Who can do more things: the thought/feeling or Samuel?); and (c) transform the discriminative functions of the ongoing experiences by relating them to rules that progressively specified longer term and symbolic, positive consequences (i.e., augmentals) (see Luciano, Valdivia-Salas, Cabello et al., 2009, pp. 347-349).

As in previous studies (Luciano et al., 2011; Ruiz, Luciano, Vizcaíno-Torres, & Sánchez, 2012), the training commenced with neutral and slightly aversive private experiences in order to promote an errorless discrimination. Then, the training proceeded with more aversive events and finished with trials in which rage reactions were elicited. Before the beginning of the intervention, Samuel's mother told him that they were going to play some games that might help him to be in charge of his anger.

*Session 1.* The first session began with the discrimination of sensations (Trials 1 to 5) and finished with the discrimination of thoughts (Trials 6 to 9). The trial sequence was as follows (the experimenter's statements are transcribed):

- 1) Doing a difficult posture: "Let's play doing difficult postures. I do a complicated and uncomfortable posture and you try to imitate me... What do you notice, what do you feel? ... What is the form of the sensation? ... Who is noting it? ... Now, paint the sensation that you are having... Look at the sensation painted on the paper, where is the sensation now? ... And where is Samuel? ... Who is bigger: the sensation or Samuel? And in this moment, what does Samuel want to do: stop doing that posture or stay for a little more time and win a strawberry gum?"
- 2) Putting a cold bottle of water on his shoulder. This example was similar to the previous one.
- 3) Feeling like eating a candy: "I am showing you something that you like very much... Do you feel like eating it? Who is having that sensation? How big is your sensation? Now, paint the sensation... Do you realize that your sensation is now on the paper and that you are here? What do you choose to do: eat the candy now or wait and win two candies? (The mother left the room for a few minutes and Samuel did not eat the candy). Very well, Samuel. Who chose waiting? Who is bigger: you or the sensation of feeling like eating the candy? Who was in charge: the sensation or Samuel?"
- 4) Tickling on the shoulder: Samuel's mother provoked him by tickling him on the shoulder with a feather and asked: "What do you notice? What is the form of that sensation? Now paint the sensation. Do you see the sensation on the paper? Who is bigger: the sensation or Samuel?"

- 5) Feeling like drinking a beverage. This example was similar to the third one.
- 6) Thinking about playing soccer with Dad: "Do you remember playing soccer with Dad? ... Paint that memory on the paper... Who is bigger, who can do more things: the memory or Samuel?"
- 7) Samuel's best friend's birthday: "Do you remember Marco's birthday? ... Paint it... Where is that memory now? And where are you? Who is bigger: the memory or Samuel?"
- 8) Arriving at the finish line with Dad in a race. It was similar to the previous two examples.
- 9) Mom reads a story before he goes to sleep (similar to the previous examples).

*Session 2.* The second session was similar to the first one but involving the following new exemplars:

- 1) Feeling like jumping.
- 2) Feeling like playing hide-and-seek.
- 3) Going to have dinner at the burger bar.
- 4) Feeling like cooking with Dad.
- 5) Feeling like eating a chocolate.
- 6) Remembering going to the three king's parade.
- 7) Thinking about sleeping at Uncle David's home.
- 8) Thinking about spending the weekend in a farmhouse.
- 9) Thinking about going to the beach on holidays.
- 10) Thinking about catching spiders with Mom.

*Session 3.* In this session, elements that usually provoked anger episodes were introduced. The mother told Samuel the following rationale: "I propose something for you: we are going to play some games and sometimes, I will bother you in some way so you will feel rage. You have two options then: you can choose to get angry at me or you can paint the rage in your mind and not get angry. If you don't get angry, you will show the anger that you are the boss and that you are in charge of it." The following trials were conducted:

- 1) Samuel began playing videogames and when he was absorbed with them, he was asked to stop and switch off the videogame.
- 2) Samuel began making a construction with toy blocks and when he was about to finish it, he was asked to stop and put the toys back in their box.
- 3) Eating a chocolate bread roll: "I know you like chocolate bread rolls a lot. Do you want to eat one right now? ... Do you feel like eating one? ... Who is having that sensation? ... Paint that sensation on the paper. See now the sensation there on the paper and that you are here... Who can do more things: you or the sensations?... Now you can choose to take a bite of the chocolate bread roll or wait till the end and eat all of it. What do you choose? (Samuel chose to wait) Who was stronger: the 'feeling like' sensation or you?"
- 4) Writing words on notebook. Samuel was asked to write some words on a notebook but his mother erased the letters that were not perfectly written.

Samuel reacted very well to these exercises. At some moments, he almost exploded but he managed to keep calm. At the end of the session, Samuel said, "I only got angry a little bit, but not like

before when I would cry and yell. I just thought how I have to do the letters (in reference to the fourth exercise)."

*Session 4.* This session was similar to the last one but included more aversive elements than on previous occasions, which bothered Samuel very much. The following trials were conducted:

- 1) Playing videogames: Samuel was allowed to play a videogame of racing cars that he liked very much, but sometimes, especially when he was winning the race, his mother covered the screen with her hands for a few seconds.
- 2) Feeling like eating a chocolate bar. This trial was similar to the third one of Session 3.
- 3) Writing his name and date in the notebook. Samuel was asked to write his name, the date, and several other words in the notebook to show his Dad. His mother corrected some of the letters, and after some corrections, she finally tore the page out of the notebook and tore it up.

Samuel also reacted very well to the exercises of this session. He was about to get angry during the third exercise, but he managed to not react so he could tell his grandmother how strong he was.

*Token economy.* Token economy served to help Samuel to derive rules specifying the consequences for not behaving fused with rage after framing it through deictic and hierarchical relations (i.e., "If I don't get angry, I will win a token).

According to the data gathered in the assessment, the parents were instructed to avoid paying attention to Samuel's anger episodes and to wait until he calmed down to provide social reinforcement for this (e.g., "Well done, you managed to calm yourself"). The parents informed Samuel that he could obtain tokens if he managed not to get angry for some time intervals. A panel was hung in the kitchen on which Samuel could stick his tokens and see his progress. Those tokens could be exchanged for several reinforcers.

During the first week, a token was given to Samuel if he did not get angry in the following situations: (a) when awakening; (b) dressing, having breakfast and going to school; (c) having lunch; (d) tidying his bedroom; and (e) having a shower and putting on his pajamas. Every token could be exchanged for the following reinforcers: his mother would read him two stories instead of one at night, he could choose his dinner and his dessert, and he could watch a chapter of a TV show that he liked.

The token economy was faded during the following weeks. In the second week, Samuel could obtain two tokens per day: one for not getting angry in the morning and another one for not getting angry during the afternoon. At the end of the day, he could exchange the tokens for the dessert he desired and watching the TV show he liked. Lastly, during the third week, Samuel should not get angry the whole day in order to obtain a token. At the end of the week, he could exchange the token for the following reinforcers: 1 token – two stories instead of one; 2 tokens – two stories and choosing his dessert; 3 tokens – going to his favorite park; 4 tokens – having a bath with his chosen toys; 5 tokens – doing a children's theatre with marionettes; 6 tokens – playing with the mattress on the floor; and 7 tokens – choosing between going to the zoo, the theme park, or the river on the countryside.

### Data analysis

The nonparametric *Tau-U* statistic (Parker, Vannest, & Davies, 2011) was used to explore the presence of significant undesirable trends in the baseline phase and to quantify the effect of the intervention. *Tau-U* is a non-overlap effect size that does not require meeting the assumptions of parametric methods (e.g., normality, constant variance, etc.). It was derived from Kendall's rank correlation and the Mann-Whitney *U* between-groups test. *Tau-U* scores range from -1 to 1 and can be interpreted as the percentage of data that improved between two phases of a study (Parker et al., 2011). *Tau-U* values were calculated using the on-line calculator provided by Vannest, Parker, and Gonen (2011).

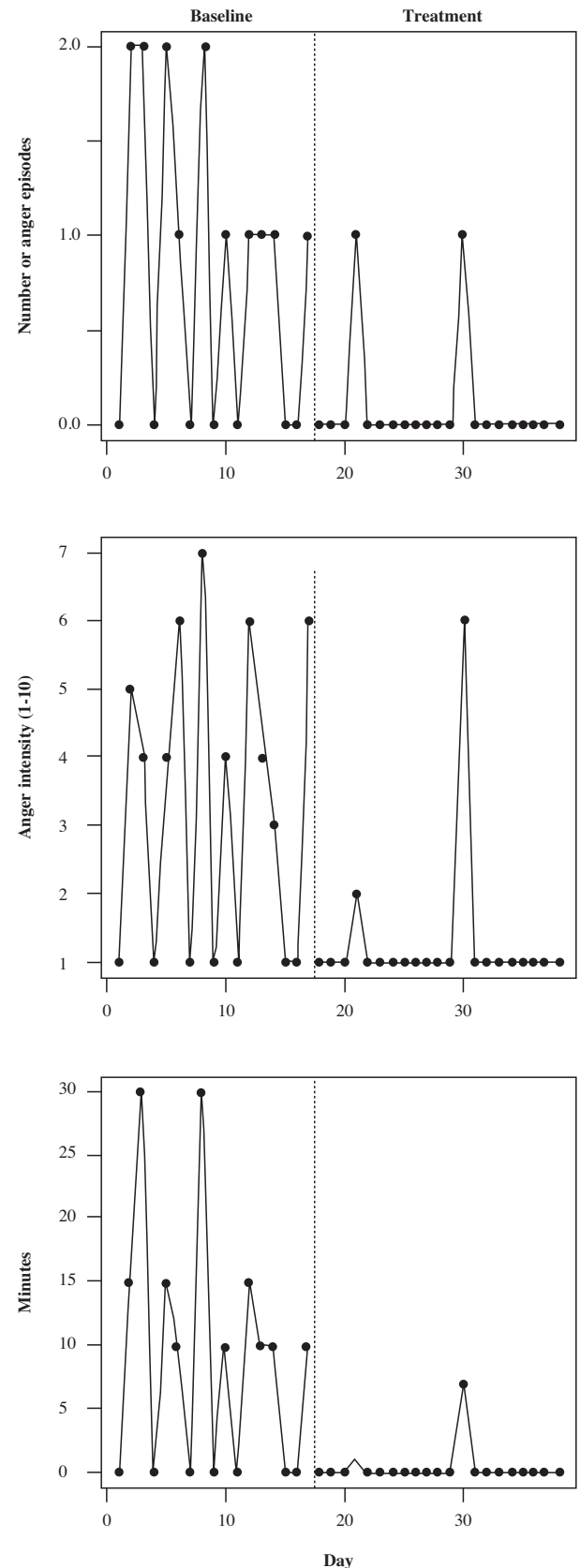
### Results

Figure 1 shows that, during the baseline, Samuel's anger episodes were relatively frequent (*median*= 1 per day, range 0-2), long (*median*= 10 minutes per day, range 0-30), and intense (*median*= 6.5, range 0-10). According to the *Tau-U*, no statistically significant trends during baseline were identified (duration: *Tau-U*= .209, *p*= .226; number: *Tau-U*= .229, *p*= .185; intensity: *Tau-U*= -.058, *p*= .753). However, all *Tau-U* values of the intervention effect were statistically significant (duration: *median*= 0, range 0-1, *Tau-U*= .574, *p*= .002; number: *median*= 0, range 0-8, *Tau-U*= .542, *p*= .004; intensity: *median*= 0, range 0-7, *Tau-U*= .476, *p*= .014).

During the one-year follow-up, Samuel only had one anger episode per month, on average, and they were considerably less intense than before. Samuel also stopped making annoying comments when he felt envious and angry.

### Discussion

This article presented a case study with a 5-year-old boy who showed problematic anger episodes, according to his parents. The intervention consisted of two components. The first component was a brief ACT protocol based on the previous RFT account of psychological flexibility and was applied in four, 20-min sessions. The protocol aimed at shaping psychological flexibility by providing a multiple-exemplar training in which the child was asked to relationally frame his ongoing experiences through deictic and hierarchical relations and to transform their discriminative functions by means of relating them to rules that progressively specified longer term and symbolic, positive consequences for not acting fused with the private experiences. As in previous studies (Luciano et al., 2011; Ruiz et al., 2012), the protocol proceeded from practicing with private neutral experiences to more aversive ones in order to promote an errorless discrimination. The second component of the intervention was a token economy that was introduced to establish a motivational context that would help Samuel to derive rules that specified the consequences for not behaving fused with rage after he had framed his ongoing experience through deictic and hierarchical relations. The consequences for not acting fused with rage were subsequently of longer term and more symbolic (e.g., telling his grandmother that he was in charge of the rage, behaving like a big boy, etc.). The intervention seemed to be highly effective in reducing Samuel's anger episodes and suppressing his annoying comments under the control of envy.



**Figure 1.** Number of anger episodes, intensity, and total duration during the baseline and the intervention

To the best of our knowledge, this is the first published application of ACT with a young child. This paucity of ACT studies could be due to the difficulty adapting ACT as described in middle-level terms to clients of this age. In this sense, the RFT definition of psychological flexibility seems to facilitate the adaptation of ACT in young children because it specifies the relational repertoires necessary to shape psychological flexibility (e.g., deictic and hierarchical relational framing and rule-following in accordance, at least, with comparative, deictic, and causality relations) and it provides guidelines about how defusion and values exercises can be implemented.

Some limitations of this study are worth mentioning. Firstly, due to the design of this study, it was not possible to isolate the effect of the ACT protocol from that of the token economy. As previously commented, the latter technique was implemented to establish a motivational context for Samuel to defuse rage. In this sense, traditional contingency management techniques are completely coherent with ACT and can be put at the service of shaping psychological flexibility (Ruiz et al., 2012). Further research might analyze the differential effect of incorporating the brief ACT protocol to the sole implementation of a token economy or exploring the efficacy of the ACT protocol alone. Secondly, the assessment and training of the relational repertoire was not conducted systematically. Further research might design and

validate measures of young children's relational abilities in order to better specify whether they have the prerequisite repertoires to receive the ACT intervention. Lastly, the intervention was implemented and evaluated by Samuel's mother, so experimenter bias is a threat to this study. However, this also shows that the ACT protocol can be implemented with minimal training by parents and teachers in a natural context for children. This seems especially important because behavioral interventions with young children are often applied by the parents. In this sense, the current ACT protocol might be adopted by behavior therapists as an addition to classical behavioral techniques.

In conclusion, this study provides a preliminary demonstration of the feasibility of ACT protocols based on an RFT account of psychological flexibility in young children. Further research should analyze the potential of this approach to design ACT interventions specifically tailored to children's problems such as anxiety, behavioral disorders, and attention and hyperactivity deficit disorder.

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