A Relational Frame Analysis of Defusion Interactions in Acceptance and Commitment Therapy. A Preliminary and Quasi-Experimental Study with At-Risk Adolescents

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ABSTRACT

The present study aims to analyze the interactions involved in some of the Defusion exercises that are typical of Acceptance and Commitment Therapy according to a Relational Frame Theory analysis. Two protocols were compared. Defusion I protocol was built with deictic framing trials while Defusion II protocol added hierarchical framing plus the function of regulating one's own behavior. Fifteen adolescents (12-15 years old) with high scores in the impulsivity or in the emotional subscales of the Behavior Assessment System for Children (BASC) volunteered to participate during the three tutorial classes formally available. In a first session, after responding to questionnaires on psychological inflexibility (AFQ-S) and on problematic behaviors, the three classes followed a values-oriented session. Two weeks later, 9 Low-risk participants (with less than 6 problematic behaviors) received either the Defusion I (*n*= 4) or the Defusion II (*n*= 5) protocols. Six High-risk participants (more than 6 problematic behaviors) received the Defusion II protocol. The comparison of both protocols with Low-risk participants showed that only Defusion II produced relevant changes that were improved at the 4-month follow-up. High-risk participants only received the Defusion II protocol and the results obtained replicated, in part, the effect obtained with Low-risk participants. The limitations of this preliminary study are indicated and further studies are emphasized.
Key words: Acceptance and Commitment Therapy (ACT), Relational Frame Theory (RFT), defusion, deictic relations, hierarchical relations, self, values, functional analysis.

RESUMEN

El presente estudio tiene como objetivo analizar las interacciones en algunos de los ejercicios de *defusion* típicos de la Terapia de Aceptación y Compromiso de acuerdo a un análisis basado en la Teoría de los Marcos Relacionales. Se compararon dos protocolos. El protocolo *Defusion* I se construyó sobre la base de ensayos de enmarcación deíctica mientras que el protocolo *Defusion* II añadió enmarcación jerárquica más la función de regulación del propio comportamiento. Participaron quince adolescentes (12-15 años), procedentes de tres clases de tutoría, con puntuaciones altas en la escala de impulsividad o en el índice de síntomas emocionales del *Behavior Assessment System for Children* (BASC). En la primera sesión, los participantes respondieron cuestionarios de inflexibilidad psicológica (AFQ-S) y conductas problemáticas, bien impulsivas o emocionales, y recibieron una sesión orientada a valores. Dos semanas más tarde, 9 participantes en Bajo riesgo (con menos de 6 conductas problemáticas) recibieron bien el protocolo de *Defusion* I (*n*= 4) o el *Defusion* II (*n*= 5). Seis participantes de Alto riesgo (más de 6 conductas problemáticas) recibieron el protocolo *Defusion* II. La comparación de ambos protocolos

con participantes de bajo riesgo mostró que sólo *Defusion* II produjo cambios relevantes que fueron incrementados en el seguimiento a los 4 meses. Los participantes de alto riesgo sólo recibieron el protocolo *Defusion* II y se replicó parcialmente su efecto. Se indican las limitaciones de este estudio preliminar y se enfatiza la necesidad de estudios adicionales. *Palabras clave*: Terapia de Aceptación y Compromiso (ACT), Teoría de los Marcos Relacionales (RFT), *defusion*, relaciones deícticas, relaciones jerárquicas, yo, valores, análisis funcional.

Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999) is one of the most representative and empirically supported therapies of the so-called contextual therapies (Hayes, 2004; Ruiz, 2010). ACT is explicitly rooted in a functional analysis of human language and cognition known as Relational Frame Theory (RFT; Hayes, Barnes-Holmes, & Roche, 2001). The ACT model is oriented to disrupt destructive experiential avoidance and to increase psychological flexibility with increasingly experimental evidence supporting the relevant role of defusion and values components (see reviews in Hayes, Levin, Plumb, Boulanger, & Pistorello, in press; Ruiz, 2010; Törneke, 2010). However, the RFT experimental analyses of the ACT methods (as metaphors or experiential exercises) are still very scarce.

When looking at the commonalities of clinical ACT methods from an RFT perspective, we find that they consist of multiple interactions mostly built on deictic and hierarchical framing, which are used to change the context of the participants' thoughts and feelings in order to transform their avoidance behaviors. For example, in the early clinical interaction usually known as creative hopelessness, the person is oriented to respond to what s/he wants (usually to be away from pain or discomfort), what s/he is doing to get it (usually some type of avoidance behavior), and the results of his/her behavior in the short term (typically a partial relief of discomfort) and the long term (typically an extension of the discomfort and a reduction in valued actions). These exercises involve cues to guide the person back and forth in time in order to realize the consequences of his/her behavior and to differentiate their private events (e.g., fears, lack of confidence, negative expectations, etc.) as something different from themselves and their behavior. According to RFT, it seems that the functions of the person's behavior and discomfort will be transformed by the application of comparison, deictic and hierarchical framing (e.g., I-NOW *vs*. I- THEN). For the present study we have identified these kinds of transformation as type A trials.

Defusion interactions in ACT are oriented to promote the discrimination of the ongoing process of having any thought or feeling as well as to discriminate the person who is having each of them. These interactions aim to promote the experience of self-as-context as a consistent perspective in order to alter the functions of those thoughts and feelings. Similarly to the interactions that aim to promote creative hopelessness, the specific type of transformations of functions involved in defusion exercises are still not very well established from an RFT perspective. However, based on previous analyses (e.g., Barnes-Holmes, Barnes-Holmes, McHugh, & Hayes, 2004; Luciano,

Rodríguez-Valverde, & Gutiérrez-Martínez, 2004; Luciano, Valdivia-Salas, Cabello, & Hernández, 2009; Törneke, 2010), and mainly in Luciano, Valdivia Salas, and Ruiz (2011) we might differentiate the interactions in defusion exercises as follows. Some interactions involve deictic framing to verbally discriminate the ongoing process of "I as always being here" and "moving any thoughts/feelings showing up to there" (e.g., I-HERE-NOW /v/ I-THERE-THEN). For the present study, we name these interactions as type B. Other interactions involve questions with hierarchical cues to derive an explicit relation of INCLUSION between the person and all his/her thoughts, that is, to promote the experience of perspective of the self as a consistent locus for all private events (e.g., to derive thoughts as "I am more than all my thoughts," "without me, no thoughts," "I am always here no matter what my thoughts/feelings/memories are," etc.). This hierarchical network might be derived after multiple deictic experiences with type B trials, albeit its training can be more explicit. For the present paper, we name these kinds of interactions as type C. Finally, some interactions involve questions that are added to promote the relevant function of the perspective for effective regulation of behavior. In other words, a perspective that allows the person to choose in accordance with the rules that specify what is important in one's life (i.e., values). For the present purposes, we name these kinds of interactions as type D. Based on this analysis, defusion and values-oriented interactions would become connected to promote effective regulation from self-as-context.

The current study was designed as a preliminary and quasi-experimental analysis of these types of interactions. For the present study, 15 adolescent students (pertaining to three natural school tutorial classes), who were identified with problematic behaviors, received a single values-oriented session built upon interactions with deictic cues (type-A trials). Upon this session, each class received one of the two Defusion protocols that were designed with the interactions mentioned above. Defusion I involved interactions built upon deictic framing (type-B trials) while Defusion II was built with type B examples plus hierarchical framing examples (type C interactions) and with examples for promoting the function for the regulation of behavior (type D as values-oriented interactions). That is, Defusion II involves all the three types of interactions (type B, C and D) which means that although these interactions have been theorically differentiated, they were not isolated in this study. In this sense, this study is only a preliminary and quasi-experimental design. However, it is the first attempt to explore what is a very complex interplay of variables.

METHOD

Participants

Fifteen adolescents (8 girls), aged 12-15 years (M= 13.66, SD= 0.9) participated. All were students in a local secondary school. Seven were in grade 1, and four were, respectively, in grades 2 and 3. They all showed high scores (one standard deviation above the mean) in either of two sub-scales (the impulsivity sub-scale and emotional symptoms index) of the Behavior Assessment System for Children (BASC; Reynolds

& Kamphaus, 2004). All the participants showed problematic behaviors based on the information provided (see details below). Participants were categorized as high risk participants (those participants with 6 or more problematic behaviors, n= 6) and low-risk participants (those with fewer than 6 problematic behaviors, n= 9).

Setting and Apparatus

The study was conducted in a room at the secondary school. Paper and pencil and a computer were used to respond to the protocols. When the experimental protocol did not require the use of the computers, participants sat in their respective chairs and formed a semi-circle around the experimenter.

Instruments

Behavior Assessment System for Children (BASC, Spanish adaptation; Reynolds & Kamphaus, 2004). The BASC aims to evaluate adaptive and non-adaptive behaviors (impulsivity, somatization, anxiety, depression, etc.) through the participants' self-report and their teachers and parents' reports. In the present study, we only used the participants' reports and the impulsivity and emotional sub-scales.

Spanish Avoidance and Fusion Questionnaire (AFQ-S). The AFQ-S is a 9-item questionnaire that was constructed with 5 items of the *Avoidance and Fusion Questionnaire* (AFQ-Y; Greco, Lambert, & Baer, 2008) and 4 items of the *Willingness and Acceptance Measure* (WAM; Greco, Murrell, & Coyne, 2004). The AFQ-Y is a 17-item, 5-point Likert scale (0-4), self-report measure of psychological inflexibility engendered by high levels of cognitive fusion and experiential avoidance. The internal consistency of the AFQ-Y is high (α= .90 to .93) and the convergent validity is good. The WAM is a 14-item, 5-point Likert scale (0-4), measure of experiential acceptance with an emphasis on children's ability to take action and engage in meaningful activities when experiencing private events. Findings from school and medical samples support its internal consistency (α= .89 to .91) and convergent validity. Both the AFQ-Y and the WAM were translated into Spanish by the first two authors and were administered to the initial sample of 81 students (see procedure section). The internal consistencies obtained were acceptable (AFQ-Y: α= .82; WAM: α= .79), but the factor structures were deficient. Based on the factor structures obtained, we proceeded to reduce the number of items and to combine both questionnaires considering that they mostly appeared to be the two faces of the same coin (i.e., the WAM items seem to be the inverse items of the AFQ-Y). Nine items were selected from both questionnaires (5 from the AFQ-Y and 4 from the WAM). The preliminary psychometric properties of this combined questionnaire (that we will call AFQ-S), as they emerge from isolating the specific selected items in the application of both the AFQ-Y and the WAM to the whole pool of 81 participants, were good (e.g., α= .80, one-factor solution, and strong correlations with clinical subscales from the BASC as, for example, with clinical symptoms: r= .66).

Accepting whithout Judgment Scale of the *Kentucky Inventory of Mindfulness Skills* (KIMS; Baer, Gregory, & Allen, 2004). A brief version of the KIMS was used. The KIMS is a 39-item, 5-point Likert scale, self-report used to measure four mindfulness skills: observing, describing, acting with awareness and accepting without judgment. Only a brief version with 4 items of the accepting without judgment scale was used based on the good internal consistency (α= .84) and the one-factor structure founded in a previous study (Ruiz, Langer, Luciano, Cangas, & Beltrán, under review). Total

scores in AFQ-S and KIMS were converted into a scale from 0 to 10 by multiplying the total scores by 0.28 and 0.50, respectively.

Impulsive Behavior Inventory (IBI) and *Emotional Behavior Inventory* (EBI) were specifically designed for the current study. They consisted of two lists of behaviors occurring in different contexts (28 items referred to impulsive reactions and 28 items referred to reactions to depressive or anxious thoughts, respectively). Examples of the IBI items are "I do things to be expulsed from the class," "I insult or reply in a bad way to my parents or brother." Examples of the EBI items are "I do not ask questions because I am afraid of others' laughs," "I hide from my classmates at the break." Each item of the lists is rated on a scale from 0 ("I never do that") to 10 ("I frequently do this"). Initial data obtained with the whole pool of 81 participants (see procedure section) showed a good internal consistency (α= .85 and α= .87) for the IBI. No psychometric properties are available for the EBI.

Self-perceived utility of the protocol. Participants were asked "To what extent (1 to 10) do you think that the things we have practiced here will help you in doing the things you want to do?"

Design

A quasi-experimental design with repeated measures was used with between-subject comparisons (Defusion I Protocol and Defusion II Protocol) and within-subject comparisons. Participants were distributed in three tutorial classes according to the school organization. Although the participants differed in the number and type of problematic behaviors, no other option was available to organize the groups of participants. Consequently, one of the protocols was implemented in two groups while the other in only one of them. Firstly all the three classes received the values-oriented session and, subsequently, the participants in grade 2 (aged 13-14) received the Defusion I protocol while those in grade 1 (aged 12-13) and in grade 3 (aged 14-15) received the Defusion II protocol. The same experimenter administrated all of the protocols.

Protocols

Values-oriented session. The protocol was made with type A trials. After responding to the EBI or IBI, participants were asked to do a paper-and-pencil task that included the following questions:

(1) "Write down two of the problematic behaviors you said (according to their response to the EBI or IBI) that you do often at school and another two at home."
(2) "How do you feel immediately after doing that?"
(3) "Now, imagine that you continue doing these things during a long period of time. What do you think will happen if you continue doing that during five or ten more years?"
(4) "Now, imagine that you stop doing these things. What do you think would happen?"
(5) "What do you think would happen within five or ten years if you stop doing these things now?"
(6) "Now that you realize what may happen if you continue doing these things and what may happen if you stop doing that, what do you choose to do: to continue or to stop doing these things?
(7) "If you have chosen "stop doing the things that you do often" please, respond to "what actions do you want to stop doing?"

Defusion-oriented Protocols

Defusion I protocol comprised the type-B defusion trials (as defined in the introduction), and Defusion II protocol added the types-C and D trials (as defined in the introduction). The next paragraph includes a descriptive summary of both protocols (the whole transcription is available upon request). Both protocols were administered in group and had two parts. Part 1 consisted of multiple-exemplar training (MET) with neutral thoughts and memories (e.g., private events as thoughts, memories, etc.) while Part 2 dealt with problematic thoughts and sensations. Both protocols were focused in the same private events; however, Defusion II incorporated additional questions (the italicized sentences differentiate what was added to the Defusion II protocol, that is, C and D trials were added to type B trials; see below). There were at least 14 exercises and most of them were presented in an experiential-computerized format.

> *Part 1*: MET to verbally discriminate neutral thoughts, sensations and memories when they surface. Participants were reminded that they were there voluntarily. Then, the experimenter invited one participant to answer aloud to the question she was going to ask and invited the others to reply it silently. She asked all participants (1st exercise): "Are you breathing?... Now, do it with more intensity, take a deep breath and now, let it go…, once again, (…)" (Participants in the Defusion II condition were then asked: *Tell me, do you notice your breathing? Exhale again and tell me if you can notice that you are the one who is noticing the breathing*).
> The 2nd and the 3rd exercises were the same but asking about "noticing the movement of the stomach when taking deep breathing" and about "joining both hands and pushing strongly one against the other to see what it looks like (…)" (In Defusion II protocol, the experimenter added: *Who is noticing the hand over the stomach? And, do you feel that you are noticing the pressure of one hand against the other?*).
> In the 4th and 5th exercises they were asked: "What are you thinking right now… and let your thoughts show up… whatever these may be..., if the thought that shows up is that you are tired or that this afternoon you will do some particular thing, or that you remember what someone told you yesterday, or if it comes to your mind that you are thinking nothing, please, just notice whatever thoughts might show up." The experimenter approached one of the participants while asking all the others to follow the questions and respond to themselves as in previous trials: "What thought do you have?" (…) (In Defusion II they were also asked, *tell me if you realize that it is YOU who is having that thought…*). Now, imagine that you write it down. Now, put what you wrote in front of you and watch it; contemplate it as if it were a painting. Just observe it. (In Defusion II, the experimenter asked: *Who is contemplating that thought? Can you realize that you can watch the thought?*)
> The experimenter approached a different participant and told all of them to follow her (6th exercise): "Now, think about something that happened last weekend… has everyone got it? (…) Now, notice what is coming to your minds (you do not need to tell me aloud)… (in Defusion II, she added; *Ask yourselves, who is having the memory…*)". They were then asked to write down a word related to the thought and imagine that they put what they have written in front of them… They were told that "this is a thought. You do not need to do anything with the thought. Just contemplate it as you do when you contemplate a painting. (In Defusion II, she added: *Please, realize that you are here and the thought that you are contemplating is there, written in front of you…*)". The 7th and 8th exercises were the same but with two memories of something

that they had done that morning.

The next exercise (9th exercise) aimed to let the participants imagine what they might feel if they were without having eaten anything during a long day. The experimenter asked the participants to respond to themselves while she asked directly to one of the participants: "What sensation would you have, how would your stomach be: full or empty? (…)" "Now, imagine that you can see that sensation of emptiness in your stomach… Can you imagine it?… (In Defusion II, participants were asked: *Now, ask yourselves who is imagining that sensation?*) Imagine that you can take a picture of the emptiness in your stomach…, now, take the picture and put it in front of you… (In Defusion II, *tell me who is watching that picture of emptiness in the stomach?… Now, tell me -and the rest, respond to yourselves- if you can imagine yourselves, so big as to have room for all the thoughts that you have had today, for all the sensations, all the memories… Now, think about you as the captains of a big boat and your thoughts and feelings as the passengers… Even more, imagine yourselves as being big and imagine that your thoughts and sensations are like your body moles or freckles… Can you imagine yourselves in that way? Do not say anything but raise your hand when you have the image. Think that we all can have moles and we all can walk wherever we want with them on our body… Imagine that the thoughts and feelings are like moles in the body... Now, respond to yourself, if you can see that you are who are having that image of yourself with your thoughts and sensations like moles in your body?... Can you see that you are more than your moles?…, can you see that you are more than your thoughts and sensations?…*" The 10th and 11th exercises were the same but asking about studying a boring subject and doing the homework they did not like.

Then, participants were asked to seat in front of their respective computers to continue doing more exercises. They were asked to notice the thought showing up in such a moment and to write a word of such thought down on the computer… (In Defusion II, *they were asked to realize who had the thought and who wrote it on the computer…*) Then, they were asked to contemplate the thought on the screen. (In Defusion II, *they were asked to realize that they had enough room to have whatever thought, that they were much bigger than any thought*). Participants were then instructed to press the enter key. When they pressed it, the thought they had written disappeared (In Defusion II, *a folder appeared in the top of the screen and the thoughts that the participants had written moved slowly to the folder and disappeared while the experimenter said: "let the thought move to enter into a folder that will contain all the thoughts you may have"*. Then, a new blank space for writing appeared. The same procedure was repeated asking the participants about the sensations they usually have when eating an omelet (13th exercise). Then, they were invited to (14th exercise) pinch themselves and keep the squeeze for a short time while feeling the sensation and, then, let out the pinch and notice the sensation going away. In the two last exercises, they were also asked to imagine that they could take a picture of the sensation and put it on the screen.

Part 2: MET with problematic private events. The experimenter changed the focus by asking (15th exercise): "Now, think in one of those moments in which you feel bad or angry or sad or feeling insecure or loneliness or… Put in one word what is showing up… Where do you notice the sadness, loneliness or whatever it is? Write this in one word… Imagine that you can take a photograph of that… Put the picture in front of you, on the screen. Now, write down what does it looks like.., what is the shape.., the color.., is it big or small?... is it strong enough or just a little?… is it hot or cold?... Now press the enter key (when they pressed it, the space in which they had written went blank).

In Defusion II condition, the experimenter continued saying: *Now, look at this photograph*

on the screen and answer, who is looking at this feeling of anger, loneliness or whatever?… Now, try to see yourself when the irritation (or the anger or loneliness) is in charge of what you do… Take a picture of what you do when you let these feelings to be in charge... Write a word that comes to your mind when you see the photo of what you do when you feel loneliness or you feel angry... Ask yourself who is in charge when you do that… Do you think it is you or your feelings?... Now, imagine that you are who is in charge instead of your irritation or loneliness… Imagine, now, that you place yourself over your angry. Take a photo of what comes to your mind when you see yourself over your irritation, over your loneliness, and see yourself being on charge of what you do instead of your feelings... Can you see yourself?... Write a word of what comes to your mind… Now, can you see that you are big enough and that you have room for any feeling, for the irritation, the loneliness or whatever..., that they are like body moles and that you are the ones in charge?... Write what comes to your mind when you think on that... Now ask yourselves who do you want to be in charge of what you do: you or your feelings?... Write it and press the key. In that moment, the experimenter asked the participants to respond to the next question on the screen: *What do you really want to do?... To put the anger in its place, in the folder, and to be in charge… or... do you want to stay fused with your feelings and allow them to be in charge, instead of you?* Two options appeared on the screen: (a) To stay fused to my feelings and to do what I usually do, and (b) to put the feelings on its place and to be in charge of what I want to do. If participant chose option "a" the message stayed in the screen for a few seconds. Then, the screen was blank and a new trial began. If participant chose option "b" all the thoughts that the participant had written on the screen moved to the folder, the screen was blank and a new trial began.

Three more similar examples with problematic thoughts or feelings were conducted. In the next sessions, the Defusion protocols were implemented similarly to the previous description and with at least 4 and 8 exercises of the parts 1 and 2, respectively.

Integrity of Protocols

The protocols were scripted word-by-word and video-taped. Two observers checked the occurrence of the key elements of the protocols, in the experimenter's instructions and in the participants' responses. Inter-observer agreement (A/A+D x 100) was 100% for the general instructions provided by the experimenter during the values-oriented session. In addition, inter-observer agreement for the participants' adherence to written responses to the questions in the values-oriented session was 93%. Regarding the implementation of the defusion protocols, six sessions (two sessions per each class, the first and third sessions), out of the 13 total sessions (46.2 %), were checked for inter-observer agreement. Six exercises per session were checked (three for each part, respectively). Again, inter-observer agreement regarding the instructions given by the experimenter was 100%. Participants' written responses in the computers adhered to the protocols instructions up to 95%.

Procedure

First, parents of the 81 potential participants were asked for informed consent to allow their children to participate in a research study to address self-control behavior. BASC, IBI, AFQ-Y and WAM were administered to the whole pool of students (Figure

1 shows an overview of the procedure). Fifteen participants, pertaining to three grades, were selected on the basis of their high scores in either of two BASC sub-scales (the impulsivity and the emotional symptoms indexes) and on the teachers' complaints about these students' behavior. Sessions were conducted during the respective one-hour tutorial classes for each grade. The first 25 minutes in each session were used to respond the questionnaires. The last 30-35 minutes were used to implement the respective protocols. Session 1 was used, first, for pre-intervention assessment and, then, for implementing the values-oriented protocol (see Figure 1 for the overview of the whole procedure). The second session was done two weeks later and the Defusion protocols were implemented. Two or three weekly sessions followed with additional implementation of the Defusion protocols. The whole intervention was implemented along one month and three weeks. A follow-up session took place after four months. The same experimenter implemented weekly the protocols with the three grades, a different day of the week with each class. Next, a description of the sessions follows:

Pre-Intervention assessment and values-oriented session. The experimenter explained the participants that whatever would happen in these classes would be of interest only for the researchers and that no personal information would be provided to parents or teachers. It was emphasized that although their parents had given permission for them to participate and to videotape the sessions, their consent to collaborate was the most important factor for the study. They were told that all written responses were anonymous and asked the participants to select a personal key throughout the study. Permission to videotape the sessions with the camera focused on the experimenter was also requested. All participants accepted. Then, they individually responded the AFQ-S and IBI or EBI (respectively, for those qualified with impulsive or emotional styles according to the corresponding BASC sub-scales). Responding again to these questionnaires was required because of the time spent from the initial evaluation indicated above. When they finished, each participant responded to the values-oriented protocol that lasted 30 minutes approximately (see Protocols description section). Then, they were thanked for their participation and were invited to come back to the next session.

Post-Values session Assessment and Defusion protocols implementation. Two weeks later participants responded to the questionnaires (KIMS, IBI or EBI). Then, the Defusion protocols were implemented. Second grade participants received Defusion I while first and third grades received the Defusion II protocol. Six high-risk participants (6 or more problematic behaviors) belonged to the 1st and 3rd grades (both grades receiving Defusion II protocol), and nine low-risk participants (fewer than 6 problematic behaviors) belonged, four, to the 2nd grade (receiving Defusion I protocol) and, five, to the other grades (receiving Defusion II).

During the next three or two sessions (one session was lost due to adventitious school activities), the process was always the same: participants responded to the questionnaires and, then, they responded to the Defusion protocols as described in the preceding protocol section.

Post-Defusion Session Assessment. Two weeks later, participants responded to all the questionnaires including the questions about the protocol (see measures section). Then, they were thanked for their participation with the invitation to apply during the summer break what they have learned in these sessions.

Follow-up assessment. Four months after the post-defusion session assessment, participants were invited to respond to the questionnaires.
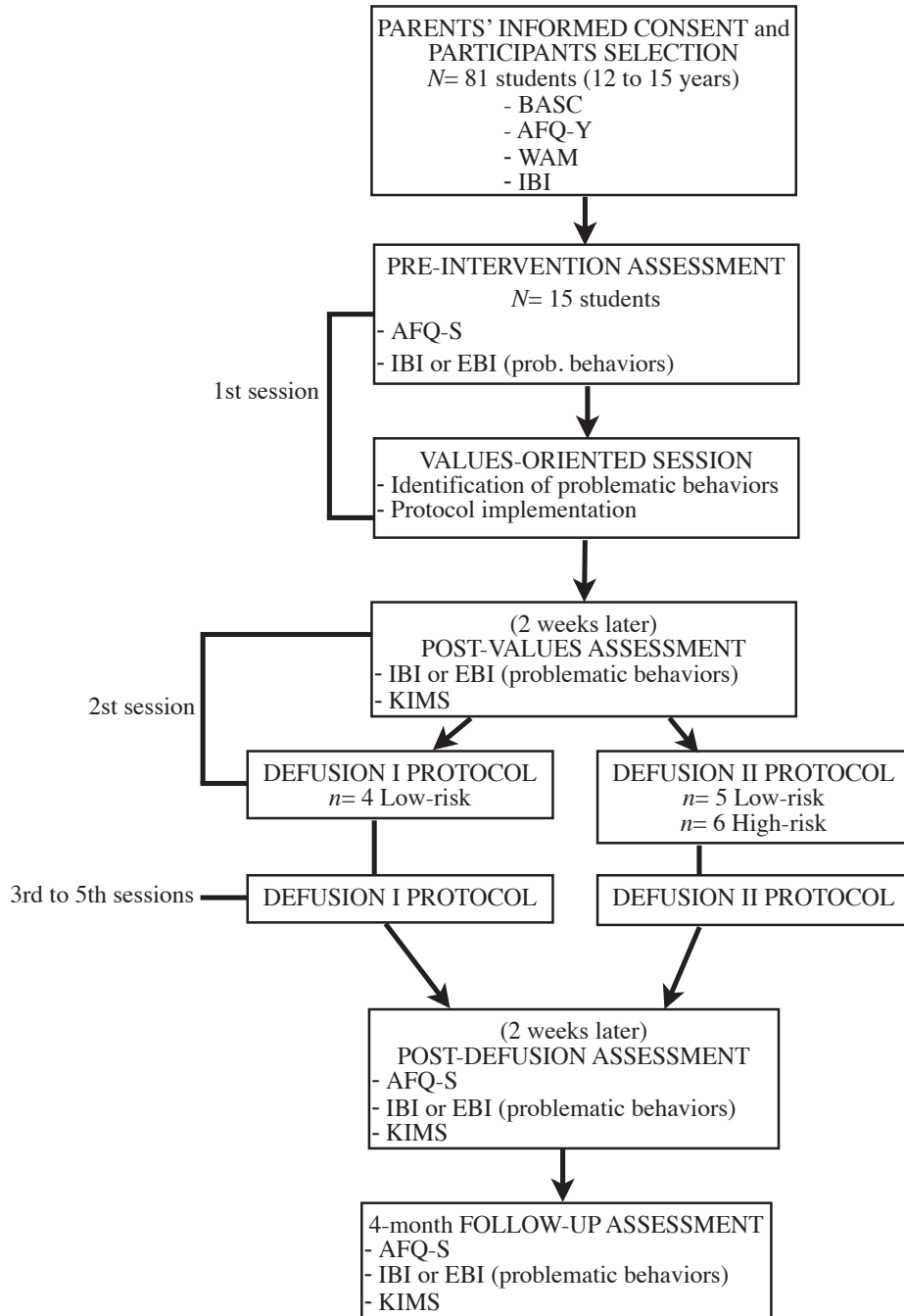
Figure 1. Procedure Overview.

Results

Data are presented phase to phase. When analyzing between-participant data, we used non parametric tests (Wilcoxon's Z and Mann-Whitney's U for within and between-condition results, respectively).

Participants who scored high in the BASC impulsivity subscale did not differ from those who scored high in the BASC emotional symptoms index in the number of problematic behaviors (Impulsive: M= 6.14, SD= 4.74; Emotional: M= 5.88, SD= 5.69; U= 27.5, p= .48) and the AFQ-S scores (Impulsive: M= 4.29, SD= 1.47; Emotional: M= 4.34, SD= 1.88; U= 25, p= .36). Accordingly, the results are presented without differentiating participants on the basis of the topography of their behavior.

Figures 2 and 4 show that, overall, the values-oriented session did not show a significant effect in reducing the number of problematic behaviors (Pre-intervention: M= 6.00, SD= 5.09; Post-values: M= 6.13, SD= 5.06 Z= -.16, p= .87). At the individual level, half of the participants reduced the number of problematic behaviors, however most participants with a high number of problematic behaviors at pre-intervention still showed a high number after the values-oriented session.

Prior to the implementation of the Defusion protocols, no significant differences were found between the low-risk participants who received the Defusion I protocol and those who received the Defusion II protocol (number of problematic behaviors: U= 10.00, p= .50; psychological inflexibility, AFQ-S: U= 4.00, p= .08; accepting without judgment, KIMS: U= 5.50, p= .14).

Figures 2 and 3 show individual and average data for all measures in Low-risk participants. With respect to the Defusion I protocol, Figure 2 (bottom graphs) shows that the number of problematic behaviors decreased during and immediately after the protocol implementation. There was an almost large effect size (d= .73), although the difference does not reach statistical significance (Post-Values: M= 2.75, SD= 2.22; Post-defusion: M= 1.25, SD= 1.89, Z= -1.34, p= .09). At the 4-month follow-up, problematic behaviors increased slightly (M= 2.00, SD= 2.16, Z= -.82, p= .20, d= .34). No significant changes were found in psychological inflexibility (AFQ-S) at post-defusion and at the 4-month follow-up (Pre: M= 3.31, SD= 1.43; Post-defusion: M= 3.38, SD= 1.61, Z= -.27, p= .38, d= -.04; 4-month FU: M= 3.75, SD= 1.74, Z= -.73, p= .23, d= -.31). Regarding the accepting without judgment scores (KIMS) no significant changes were found at post-defusion (Post-values: M= 8.00, SD= 1.29; Post-defusion: M= 8.88, SD= 1.10, Z= -1.34, p= .09, d= .73) nor at follow-up (4-month FU: M= 8.50, SD= 1.32, Z= -.74, p= .23, d= .60).

With respect to the Defusion II protocol, Figure 2 (top graphs) shows significant reductions in the number of problematic behaviors with four participants out of five early achieving the zero level and maintaining it at follow-up (Post-Values: M= 2.60, SD= 2.30; Post-defusion: M= 0.40, SD= 0.89, Z= -1.63, p= .05, d= 1.26; 4-month FU: M= 0.00, SD= 0.00, Z= -1.84, p= .03, d= 1.60). All participants decreased their scores in psychological inflexibility significantly (AFQ-S; Pre: M= 5.00, SD= 2.21; Post-defusion: M= 3.05, SD= 1.07, Z= -2.03, p=. 02, d= 1.12; 4-month FU: M= 1.20, SD= .60, Z=
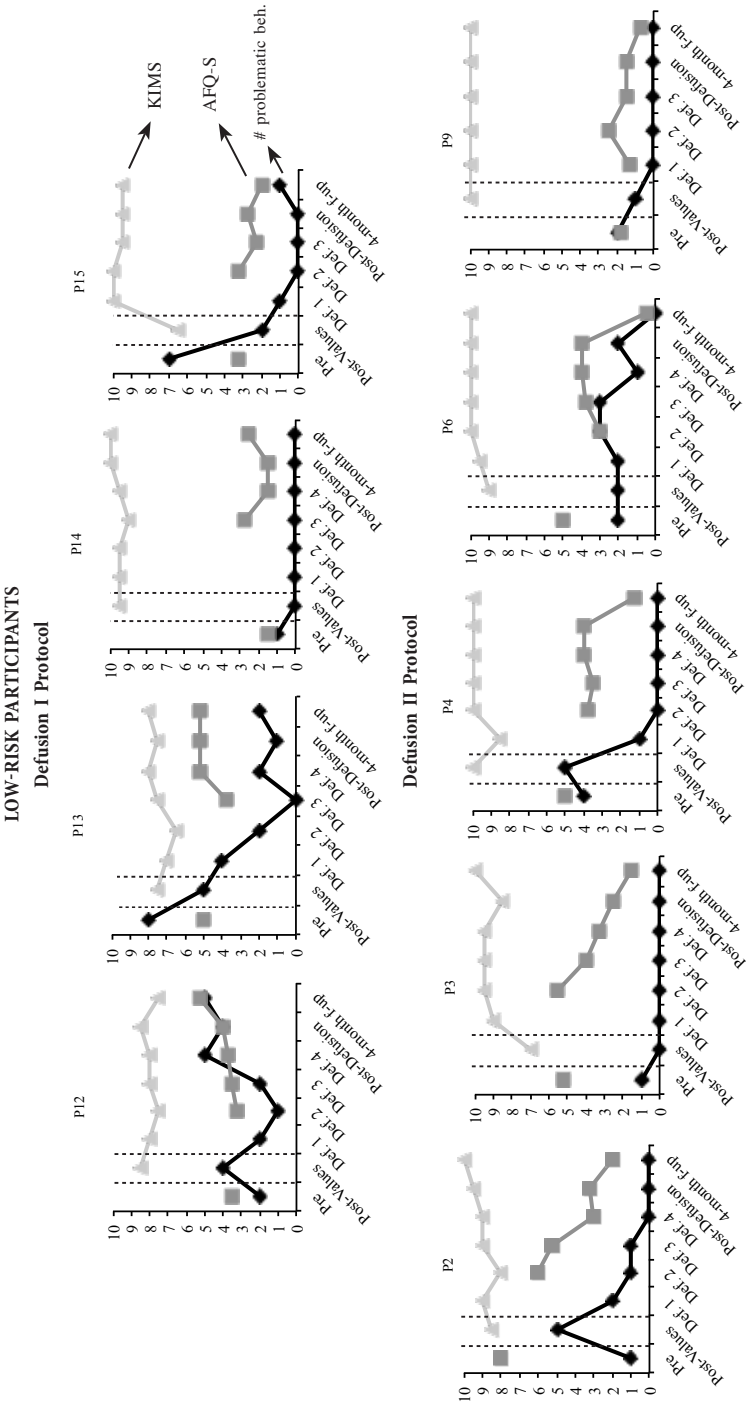
Figure 2. Results of the Low-Risk participants. AFQ-S (psychological inflexibility), KIMS (accepting without judgment), and number of problematic behaviors (EBI or IBI). The upper graphs correspond to the five participants who received Defusion I Protocol. The botton graphs correspond to the four participants who received Defusion II Protocol.
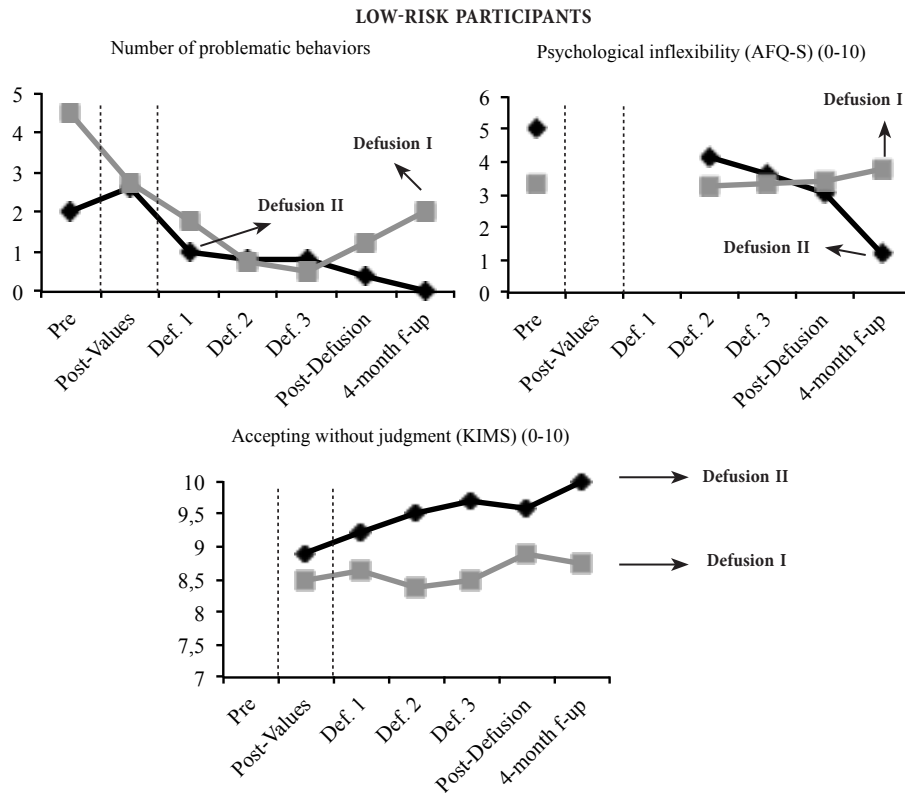
LOW-RISK PARTICIPANTS

Figure 3. Defusion I and Defusion II comparison for the Low-risk participants across the three measures: AFQ-S, KIMS, and problematic behaviors.

-2.03, *p*=. 02, *d*= 2.62). The increases in accepting without judgment scores (KIMS) were also significant and maintained over time (Post-values: *M*= 8.90, *SD*= 1.24; Post-defusion: *M*= 9.60, SD = 0.65, *Z*= -1.63, *p*= .05, *d*= .93; 4-month FU: *M*= 10.00, *SD*= 0.00, *Z*= -1.6, *p*= .05, *d*= 1.24).

The comparison between the two protocols (Defusion I vs. Defusion II) implemented to Low-risk participants showed statistically significant differences at follow-up (see Figure 3): participants in the Defusion II condition showed less number of problematic behaviors (*U*= 2.50, *p*= .03, *d*= 1.31), lower scores on psychological inflexibility (*U*= 0.50, *p*= .009, *d*= 1.96) and higher scores on accepting without judgment (*U*= 2.50, *p*= .01, *d*= 1.49) than participants in the Defusion I condition. Also, participants in the Defusion II condition rated the intervention utility between 6 to 10 points (*M*= 7.80, *SD*= 2.05) while participants in the Defusion I condition rated it between 2 to 6 (*M*= 4.75, *SD*= 1.89; *U*= 2.00, *p*= .03, *d*= 1.55).

All six High-risk participants (see Figure 4) showed a reduction in the number of problematic behaviors (but one of them did not maintain it at the 4-m FU). These reductions were statistically significant at post-defusion and at follow-up: Post-values:
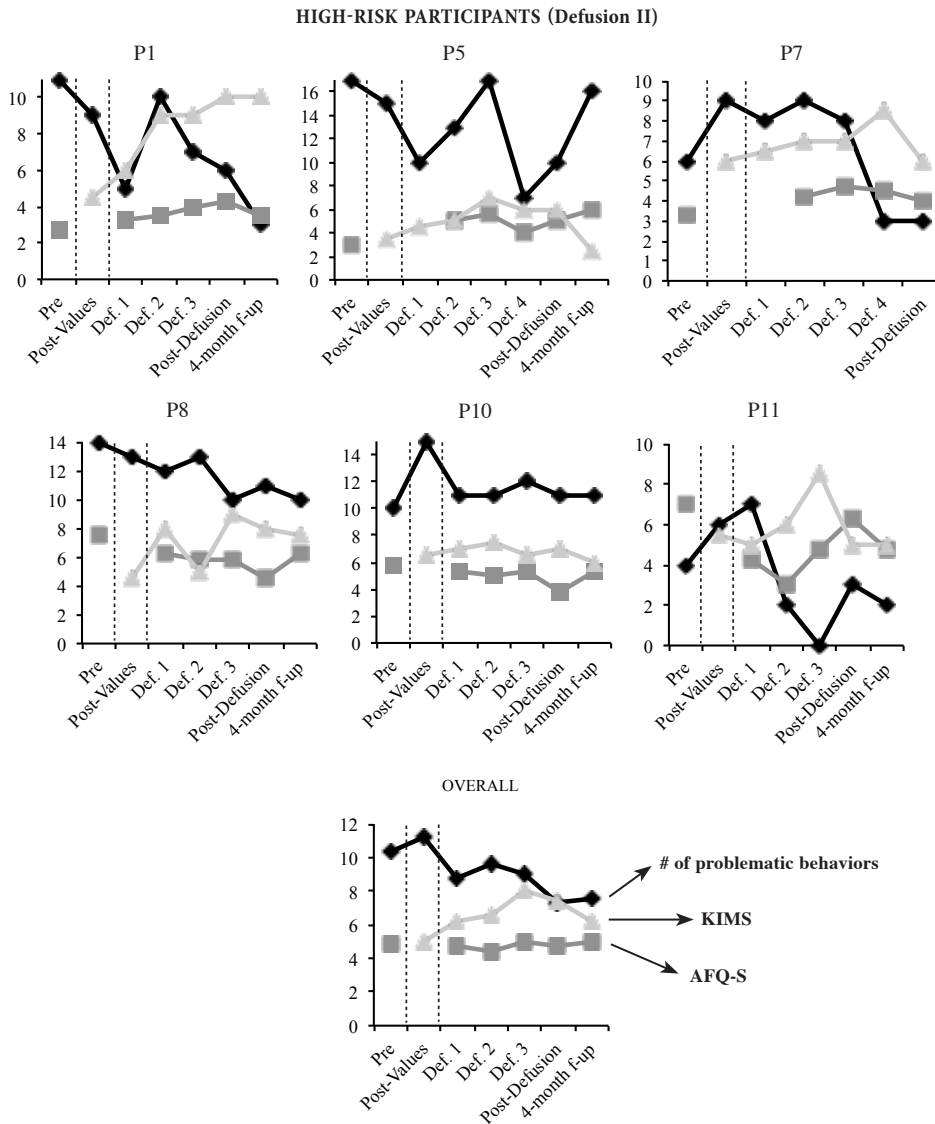
HIGH-RISK PARTICIPANTS (Defusion II)

Figure 4. Results of the High-risk participants. AFQ-S (psychological inflexibility), KIMS (accepting without judgment), and number of problematic behaviors (EBI or IBI). All the six received Defusion II Protocol.

M= 11.17, *SD*= 3.71; Post-defusion: *M*= 7.33, *SD*= 3.83, *Z*= -2.21, *p*= .01, *d*= 1.02; 4-month FU: *M*= 7.50, *SD*= 5.68, *Z*= -2.00, *p*= .02, *d*= 0.77.

Likewise, accepting without judgment scores (KIMS) increased significantly at post-defusion (Post-values: *M*= 5.08, *SD*= 1.11; Post-defusion: *M*= 7.42, *SD*= 1.80, *Z*= -1.90, *p*= .02, *d*= 1.56), but the difference was attenuated at follow-up (*M*= 6.17, *SD*=

2.50, $Z= -.41$, $p= .34$, $d= .67$). No changes were observed in psychological inflexibility scores (AFQ-S) (Pre: $M= 4.88$, $SD= 2.14$; Post-defusion: $M= 4.71$, $SD= .86$; 4-month FU: $M= 4.96$, $SD= 1.09$). All but one participant rated the intervention between 5 to 8 points ($M= 5.83$, $SD= 2.56$).

Discussion

The question addressed in this study was to evaluate the impact of two Defusion protocols that were designed on the basis of some typical interactions in Acceptance and Commitment Therapy. According to a preliminary analysis of the transformation of functions involved in defusion interactions (Luciano, Valdivia-Salas, & Ruiz, 2011), one of these protocols, Defusion I, was built with interactions type B (mostly deictic examples) while the other, Defusion II, involved not only interactions type B but type C (hierarchical examples) and D (regulation function).

Fifteen at risk adolescents were selected because of their high scores in the BASC sub-scales and on the teachers' complaints about these students' behavior. Participants were categorized as High or Low risk on the basis of the number of problematic behaviors. This latter measure as well as the psychological inflexibility (AFQ-S) and the acceptance without judgment scales (KIMS) were the main measures used throughout the study. The natural distribution of the participants in three pre-organized tutorial classes resulted in that the high-risk participants were mostly in one class while the low-risk participants mostly pertained to the other two classes. This distribution of the participants prevented the evaluation of each Defusion protocol across High and Low risk participants. Consequently, the comparison between both protocols was only possible with Low-risk participants. Results showed that Defusion II had a higher effect than Defusion I on all measures. In regard with High-risk participants, Defusion II replicated, in part, the effect obtained with this protocol. These results are discussed next.

Before introducing any of the Defusion protocols, participants received a brief and non-experiential values-oriented protocol to promote a motivational context for behavior change. This brief protocol was built with multiple successive questions (with deictic interactions, as I-NOW and I-THEN in different moments, and a functional cue to choose to behave based on that) for the participants to realize -or transform- the immediate consequences of the problematic regulation behavior. Of course, this brief protocol that we have named as values-oriented protocol was not designed to be a values clarification protocol (see Hayes *et al*., 1999) but only to set the stage for responding under the control of what might be important for the participants instead of under the unique control of impulsive feelings or problematic thoughts. Half of the fifteen participants reported a reduction in problematic behaviors after two weeks since the implementation of this protocol. Perhaps, an experiential protocol with more examples would have had more impact. However, this was not the goal but only to equalize, at least formally a context for behavior change to, then, implement the Defusion protocols whose impact was the main focus of the study.

As indicated above, comparisons between both Defusion protocols were only conducted with Low-risk participants. Defusion I protocol showed a reduction in the number of problematic behaviors that was not maintained over time, and very small changes in psychological inflexibility (AFQ-S) and accepting without judgment (KIMS). On the contrary, Defusion II protocol showed the reduction to zero level of problematic behaviors, an increase in the accepting without judgment scores to the maximum level and a relevant decrease in psychological inflexibility. Although these results have to be taken with precaution, they suggest that Defusion II protocol seems to have transformed the avoidance functions of private events. In addition, participants who received the Defusion II protocol evaluated the usefulness of this protocol more positively than did Low-risk participants receiving the Defusion I protocol.

Regarding High-risk participants, only the Defusion II protocol was implemented. Results showed a reduction in the number of problematic behaviors and an increase in the accepting without judgment scores (KIMS). These results partly replicated the data obtained with Low-risk participants. However, no significant change was obtained in the psychological inflexibility scores (AFQ-S). The lack of change in the latter measure might be due to the need of a higher or stable reduction in the problematic behavior for the participants to change self-reports in the AFQ-S. The High-risk participants evaluated the usefulness of the protocol positively in the same way that Low-risk participants who received Defusion II protocol did. As a working hypothesis, these positive evaluations might be related with the discrimination of having practiced the exercises between sessions. In addition, improvements continued at follow-up.

Overall, the pattern of results suggests that the effects of Defusion I protocol (with type B, or deictic, interactions to discriminate the ongoing behavior) were strengthened by the addition of C and D interactions in Defusion II protocol (with hierarchical cues and regulation function). The type-B interactions were exemplar training of multiple successive interactions to discriminate the ongoing thoughts and sensations. Although these interactions might have established the conditions for the person to experience that these events were occurring in a consistent locus, it seems that adding the hierarchical cues (type C interactions) while the ongoing interactions were taking place might be a worthy step. However, Defusion II differed from Defusion I in one more interaction. That is, Defusion I did not incorporate the questions for promoting the function of regulating the behavior from a consistent perspective (choosing what to do, from I-Here, with both, the impulsive or problematic thoughts and with the thoughts about what is important, all in I-There) (as described in Luciano *et al*., 2009, 2011). These interactions for regulating the behavior were clearly incorporated in Defusion II as type-D trials. As said, Defusion II protocol was composed not only by type B, as Defusion I was, but by type C and D interactions, and participants showed a relevant change. However, the influence of the latter two kinds of trials was mixed in the actual design and specific studies are underway to separate all these interactions.

The present results should be considered as preliminary because the study has important limitations. For example, the small number of participants prevented the comparison of both protocols with High-risk participants. The constraints of the school forced us to implement the protocols per tutorial class of each grade and this precluded

the ramdom distribution of participants to the two conditions. Also, the sessions were not long enough to incorporate an experiential avoidance and psychological flexibility experimental tasks that might have offered a direct measure of the impact of the protocols. In addition, the AFQ-S was a combined questionnaire that, although shows preliminary good psychometric properties, needs to be validated. In spite of these limitations, this current preliminary study is the first attempt to analyze some of the interactions involved in defusion exercises. Specifically, in this study we have analyzed the impact of deictic interactions versus deictic interactions plus hierarchical and regulatory functions to alter the dominance of literal functions of thoughts and feelings. Further research is emphasized to overcome the limitations of this study and to extend and refine this RFT analysis of defusion methods. It is expected that the knowledge about the processes responsible of the effects of these methods will empower the efficacy of ACT methods as has been repeatedly advocated (Hayes *et al*., in press; Ruiz, 2010; Törneke, 2010; Wilson & Luciano, 2002).

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