International Journal of Psychology & Psychological Therapy, 2013, *13*, 3, 373-388

An Empirical Investigation of Hierarchical versus Distinction Relations in a Self-based ACT Exercise

Mairéad Foody*, Yvonne Barnes-Holmes, Dermot Barnes-Holmes
National University of Ireland, Maynooth, Ireland

Carmen Luciano
Universidad de Almería, España

Abstract

Since its inception, ACT has placed a significant emphasis on the use of self-based techniques, and the self was defined initially through the three selves (i.e., self as content, self as process, and self as context). In addition, RFT provided a more technical account of self in terms of the deictic relational frames. However, the overlap between ACT's mid-level terms (e.g., self as context) and RFT's derived relations has been the subject of limited empirical scrutiny. The current study investigated the relative utility of manipulating distinction deictic versus hierarchical deictic relations in a self as context exercise designed to reduce experimentally induced emotional distress. The findings demonstrated superiority of the intervention that focused on hierarchical, rather than distinction, deictic relations in terms of reducing distress. The implications of the data for the potential overlap between ACT and RFT are discussed.
Key words: ACT, RFT, Mid-level terms.

Acceptance and Commitment Therapy (ACT) places a significant emphasis on the use of self-based techniques (Hayes, Strosahl, & Wilson, 1999), often with the therapeutic aim of facilitating 'self as context'. Self as context is one of the 'three selves' (along with 'self as content' and 'self as process'; see Hayes, 1995), a multi-dimensional non-technical (i.e., middle level) concept ACT employs to refer to the broad term 'self'. In short, ACT employs specific therapeutic techniques (e.g., the observer exercise) to move clients away from self as content and towards self as process and ultimately self as context. In doing so, the therapist attempts to reduce the hold that psychological content exerts over a client's sense of self. Specifically, in self as content, the client's thoughts, feelings etc. are easily attached to her perspective, hence compromising her broader sense of self and strongly influencing her behavior. In contrast, self as process and context are designed to reduce this hold, thus separating the self from the content. The result is a more secure sense of self which promotes psychological and behavioral flexibility, and values-oriented behavior.

Although there is sound outcome data to suggest that ACT, when comprising self-based techniques, is effective in achieving its therapeutic aims (Hayes, Luoma, Bond, Masuda, & Lillis, 2006; Levin, Hildebrandt, Lillis, & Hayes, 2012), two clear gaps are present in the relevant literature. First, there is little or no published evidence

* Correspondence concerning this article should be addressed to: Mairéad Foody, Department of Psychology, National University of Ireland, Maynooth. Email: Mairead.foody@nuim.ie.

demonstrating that these techniques are active ingredients in these outcomes. Second, the concept of the three selves is a middle level term and thus does not yield readily to functional analysis. Given that self is argued to play such a pivotal role in ACT, this is something of a weak scientific position for that therapeutic paradigm.

Relational Frame Theory (RFT; Hayes, Barnes-Holmes, & Roche, 2001) has been suggested as a solution to a number of middle level term problems inherent in the language of ACT, and self is the most obvious of these (Luciano, Valdivia-Salas, & Ruiz, 2012). In short, RFT appears to offer a functional contextual account of the behavioral and verbal processes that define a sense of self (Barnes, Stewart, Dymond, & Roche, 2000). The RFT definition of self relies on three core deictic or perspective-taking relations, known as I-YOU, HERE-THERE, and NOW-THEN; and a sizeable body of empirical evidence supports this definition and its various predictions (e.g., McHugh, Barnes-Holmes, & Barnes-Holmes, 2004; McHugh, Barnes-Holmes, Barnes-Holmes, Whelan, & Stewart, 2007).

Much of the empirical evidence regarding the deictic relations has involved various adaptations of the same relational protocol (based on Barnes-Holmes, 2001) and has been developmental in nature. For example, McHugh *et al*. (2004) investigated a developmental age-based profile with regard to deictic relation type and relational complexity. Furthermore, Rehfeldt, Dillen, Ziomek, and Kowalchuk (2007) used the protocol for assessment purposes with a sample of children with autism. More recent studies have also begun to explore clinical applications of the deictic protocol, for example, by exploring potential deictic deficits with individuals with schizophrenia (Villatte, Monestès, McHugh, Freixa, & Loas, 2010).

Only one published study has investigated the way in which deictic relations may be altered using ACT-based techniques, such as defusion and self as context (i.e., Luciano, Ruiz, Vizcaíno-Torres, Sánchez-Martín, Gutiérrez-Martínez, & López-López, 2011). In their 'defusion I' condition, these researchers attempted to facilitate defusion or separation between the self and content with adolescents at high or low risk of conduct difficulties. For example, participants in the defusion I intervention were instructed to "Just contemplate your thought as if you were contemplating a painting". With a similar but naïve sample, their 'defusion II' condition employed a more extensive protocol of ACT-based techniques that specifically attempted to establish hierarchical relations between the self and the content (e.g., "Imagine yourself so big as to have room for all of the thoughts you have had today"). The findings indicated superiority on a range of measures of clinical improvement (including reductions in problem behavior) for defusion II over defusion I. In short, it was more beneficial for the participants to learn to adopt a hierarchical perspective with regard to their content, rather than a simply distinct perspective. These outcomes not only provided insight into the middle level concept of defusion, but illustrated its potential overlap with the deictic relations and self.

Because both are middle level terms, it is very difficult in ACT to distinguish defusion from self as context techniques. For example, Luciano *et al'*. (2011) defusion research protocols I and II could readily be described as containing self as context techniques and both place heavy emphasis on the deictic relations. In other words, one might describe their defusion I protocol as distinction deictics and their defusion II

protocol as hierarchical deictics. The current research attempted to extend the original research by Luciano et al. and to explore further the potential role of the deictic relations in self as context techniques.

The present study attempted to modify Luciano *et al.'s* (2011) interventions by specifically targeting distinction versus hierarchical deictic relations. The term preferred for the brief protocols employed here is self as context rather than defusion to emphasize that the interventions were heavily focused on the self. The following examples illustrate the difference between deictic distinction versus deictic hierarchical relations. Consider the common ACT leaves on a moving stream exercise in which clients are instructed to: "Notice that you are here and your thoughts are there on a leaf floating down the stream". The deictic relations of YOU and HERE-THERE are explicitly stated, but the distinction relation between you and your thoughts via the HERE-THERE relation is implicit (i.e., YOU are here is distinct from your thoughts there). Now consider an instruction from the Observer Exercise: "You are not just your body, your roles, your emotions, your thoughts. These things are the content of your life, while you are the arena, the context, the space in which they unfold". Again, the deictic YOU is explicitly stated, but in this case the relation between you and your content is clearly hierarchical (i.e., you are the context in which your thoughts exist).

The current study employed two brief self as context interventions with a non-clinical sample of undergraduates, asked to generate a negative self-criticism. The interventions were abbreviations of those developed by Luciano *et al*. (2011), but one more explicitly emphasized the distinction between self and content, while the other emphasized a hierarchical relation between these. Specifically, we investigated the relative impact of these two manipulations on levels of discomfort, anxiety, and stress associated with the self-criticism.

METHOD

Participants

Forty-four naïve adults participated in the current study. All were undergraduate or postgraduate students at the National University of Ireland, Maynooth (NUIM). A screening measure was employed to exclude any potential participant who reported a history of psychological distress. This yielded a final sample of 36 participants (14 males and 22 females), aged between 18 and 21 (M= 19.78 years). Participants were allocated randomly across two conditions denoted as distinction self as context (*N*= 18) and hierarchical self as context (*N*= 18).

Setting and Materials

All aspects of the study were conducted in an Experimental Room at NUIM. Two explicit measures were employed: an Experimental Screening Questionnaire (ESQ, developed for current purposes); and the Acceptance and Action Questionnaire (AAQ-

II; Bond et al., 2011). Two sets of rating scales were also employed: Visual Analog Scales (VASs) were used as distress ratings and assessed discomfort, anxiety, and stress associated with the experimental manipulation; and a Reactions Questionnaire (RQ, developed for current purposes) assessed various other participant reactions.

The ESQ was specifically designed to exclude participants who reported a history of psychological suffering that may be adversely affected by the experimental manipulation. Participants responded by selecting YES or NO to one or more of five listed categories (e.g., anxiety disorder). Any item ticked with YES resulted in immediate exclusion from the experiment.

The AAQ is a 7-item self-report measure of experiential avoidance (e.g., "I worry about not being able to control my feelings"). Participants responded on a 7-point Likert scale that ranged from 1 (never true) to 7 (always true). The reported mean for the AAQ with a non-clinical student sample is 17.34 (Bond et al., 2011). The mean alpha coefficient is .84, and the 3- and 12-month test-retest reliability is .81 and .79, respectively.

The VASs were employed as distress ratings of discomfort, anxiety, and stress. For example, participants were asked "How much discomfort do you feel right now?" They indicated their level of distress on each scale by placing an X on a printed line that ranged from 0% (e.g., no discomfort) to 100% (e.g., very much discomfort).

The RQ comprised four questions that assessed believability, vividness, guilt, and distraction regarding the experimental manipulation (e.g., "Please rate how much you believe this thought to be true of you"). Participants responded to each scale by placing an X on a 16cm line from 0% (e.g., not believable) to 100% (e.g., very believable). See Table 1 in Results section for a full list of the questions. The questions in the RQ were included in the study to explore whether changes in any of these measures mediated outcomes recorded with the interventions on the dependent variables.

Interventions

The aim of the two self-based interventions (distinction self as context and hierarchical self as context) was to explore the comparative utility of each in reducing experimentally induced distress. Both interventions were brief adaptations of those reported by Luciano*et al*. (2011), in which defusion techniques assisted participants in identifying target thoughts and feelings and then shifting their perspective on these. The condition referred to by those researchers as defusion I manipulated the deictic relations primarily as distinction relations. In contrast, the condition referred to as defusion II manipulated the deictic relations as hierarchical relations. In their focus, both conditions appeared to encourage self as context, although each explicitly manipulated different relations. Hence, for current purposes, adaptations of these interventions are referred to as distinction self as context and hierarchical self as context.

Distinction self as context. In this condition, participants were presented with an intervention similar to Luciano *et al's*. (2011) defusion I. The deictic relations of I-YOU and HERE-THERE were explicitly enhanced in order to facilitate the distinction between self and content. Participants were instructed as follows:

For this part of the experiment, try to relax yourself in the chair and get comfortable. When you're ready, I want you to close your eyes and just listen to the sound of my voice. For now, focus your attention on your breath. Try to feel the rise and fall of your stomach with each in-breath and out-breath you take. Now... just nod if you can notice your breathing. Inhale and exhale again and nod if you can notice that you are the one who is noticing your breathing. When you are ready, bring your attention to the thoughts going through your head in this very instance. Let the thoughts show up, whatever kind they are and let them go again. For example, you might be thinking of what you did yesterday. Try, if you can, to just notice that you are having this thought, observe it, and then let it go again.

Now, pick any one of these thoughts….any thought at all, good or bad will do. When you have one, try to imagine that you are taking this thought out of you and writing is down on an imaginary piece of paper in front of you. Imagine now that it's in front of you and just watch it…contemplate it as if you were contemplating a painting… just try to observe it.

Now try to think of something that happened last week…notice what is coming into your mind. Ask yourself, who is having that memory? Now think of a word that is related to the memory… and with this word, do the same thing again…imagine yourself taking the word and writing it down. Put it out in front of you and just observe it… contemplate it as if you were contemplating a painting. Remember that this is just a thought or just a memory…you do not need to do anything with it, just observe it. Try to notice that you are here and the thought that you are contemplating is there, written in front of you. Again, just notice that it is you who is watching that thought.

Now imagine how you would feel if you had nothing to eat all day. What feeling or sensation would you have? Now imagine that you can see that sensation or feeling of emptiness in your stomach. Imagine in your mind's eye that you can take a picture of the emptiness in your stomach and put this picture out in front of you. Do as before, just notice this feeling out in front of you, just contemplate it like a painting and when you're ready let it go again.

Now try if you can to focus your attention on the negative thought you wrote down earlier in the experiment. Try to write down one word which describes how you feel when you have this thought. Maybe it's sadness…maybe it's anger… any feeling that comes to mind. Then when you are ready, open your eyes and write down that word on this piece of paper. Now put the word in the envelope and hand it to me. Closing your eyes again, focus your attention once more on that feeling that is in the envelope... imagine that you can take a picture of this feeling or emotion which is showing up for you and imagine placing the picture out in front of you. Now, look at this picture in front of you and notice who is looking at this feeling of (word that describes reaction).

Hierarchical self as context. In this condition, participants were presented with an intervention similar to Luciano et al.'s. (2011) defusion II. This intervention varied from the distinction self as context condition in that hierarchical relations were targeted to provide an even greater distance between self and content. Specifically, participants were instructed to see themselves as higher than their psychological content. Participants in this group were instructed as follows:

For this part of the experiment, try to relax yourself in the chair and get comfortable. When you're ready, I want you to close your eyes and just listen to the sound of my voice. For now, focus your attention on your breath. Try to feel the rise and fall of your stomach with each in-breath and out-breath you take. Now... just nod if you can notice your breathing. Inhale and exhale again and nod if you can notice that you are the one who is noticing your breathing. When you are ready, bring your attention to the thoughts going through your head in this very instance. Let the thoughts show up, whatever kind they are, and let them go again. For example, you might be thinking of what you did yesterday. Try, if you can, to just notice that you are having this thought, observe it, and then let it go again.

Now, pick any one of these thoughts….any thought at all, good or bad will do. When you have one, try to imagine that you are taking this thought out of you and writing it down on an imaginary piece of paper in front of you. Imagine now that it's in front of you and just watch it…contemplate it as if you were contemplating a painting… just try to observe it. Nod if you can realize that it is you who is contemplating this thought? Can you realize that it is you who is watching this thought?

Now try to think of something that happened last week…notice what is coming into your mind. Ask yourself, who is having that memory? Now think of a word that is related to the memory… and with this word, do the same thing again…imagine yourself taking the word and writing it down. Put it out in front of you and just observe it… contemplate it as if you were contemplating a painting. Remember that this is just a thought or just a memory…you do not need to do anything with it, just observe it. Try to notice that you are here and the thought that you are contemplating is there, written in front of you. Again, just notice that it is you who is watching that thought. Now, try to imagine yourself so big that you can have room for all the thoughts that you have had today, for all the sensations, feelings and memories. Now, try to imagine yourself as being the captain of a boat and your thoughts and feelings as being the passengers. Again, imagine yourself so big that you have room for all of these thoughts and feelings. Imagine that your thoughts and feelings are like moles or freckles on your body. We all have moles or freckles and we can all walk wherever we want with them on our bodies. Imagine that your thoughts and feelings are like moles or freckles on your body. Now nod if you can notice that it is you who is imagining yourself with your thoughts and feelings like moles or freckles on your body. Can you see that you are more than your moles or freckles? Can you see that you are more than your thoughts and feelings?

Now try if you can to focus your attention on the negative thought you wrote down earlier in the experiment. Try to write down one word which describes how you feel when you have this thought. Maybe it's sadness… maybe it's anger… any feeling that comes to mind. Then when you are ready, open your eyes and write down that word on this piece of paper. Now put the word in the envelope and hand it to me. Closing your eyes again, focus your attention once more on that feeling that is in the envelope... imagine that you can take a picture of this feeling or emotion which is showing up for you and imagine placing the picture out in front of you. Now, look at this picture in front of you and notice who is looking at this feeling of (word that describes reaction). Try to imagine yourself when this (word that describes reaction) is in charge of what you do. Take a picture in your mind's eye of what you do when you let this feeling be in charge. 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 (word). Imagine, now, that you place yourself over and above your (word). Take a photo of what comes to your mind when you see yourself over and above your (word). Try to see yourself as being in charge of what you do, instead of your feelings being in charge. Now, can you see that you are big enough to have room for any feeling, for any (word) and see that they are like moles or freckles and that you are the one in charge?

Procedure

The procedure comprised of seven stages always conducted in the same order.

Stage 1: Pre-experimental measures. Participants were presented with the ESQ in Stage 1. When the exclusion criteria applied, participants were thanked and debriefed. All others completed the AAQ and subsequently proceeded to Stage 2.

Stage 2: Baseline VAS ratings. Participants were presented with three VAS ratings to assess their baseline subjective ratings of discomfort, anxiety, and stress.

Stage 3: Distress induction task I. The distress induction task involved participants writing and saying a negative self-referential thought. All were instructed to think of one aspect of themselves they disliked the most. They were then instructed to write one sentence in the third person that described this aspect. For example, if a participant disliked her weight, she may have written "Ann is fat". The experimenter then read this sentence aloud and the participant was instructed to repeat it. The written sentence remained on the table for the duration of the experiment. All participants were presented with the following instructions:

> Before we begin, I want to explain to you that some of what I will ask you to do in this experiment could be difficult for you. I am not going to ask you to disclose any personal information, but this task could present you with a considerable emotional challenge. At this point, I am not able to tell you what that will be because that would defeat the purpose, but I do want to assure you that you will not be made to do anything you do not want to do. If, at any point, you feel that you have reached your level of distress and want to stop what we are doing, please let me know and we will stop immediately. Is that ok with you?
>
> Participant responds.
>
> Ok, so what I want you to do is try to think of one negative thing about yourself. I know this is difficult to do, but I want you to try as hard as you can to think of the one thing you really dislike about yourself. When you have this in mind, I want you to write it down on that page in front of you. However, I want you to write it from someone else's point of view or in someone else's words. Do you understand what I am asking you to do?
>
> Participant answers.
>
> OK, now in case you have any worries at this stage, I want to assure you that as soon as this experiment is over, I will be dumping that page in front of you. So you have no need to worry about anything you write on it, is that ok?

Participant answers.

OK, so when you're ready go ahead and write it down there.

Participant writes the sentence down.

Ok thank you for doing that. I appreciate that it is probably difficult for you to do. Now for the next part I will read out the sentence and I want you to repeat it after me. Ok, let's begin.

Experimenter says the sentence aloud.

Participant repeats the sentence.

Stage 4: Post-task VAS and RQ. Immediately after the distress induction task, participants were presented with a second set of VASs to determine the potential impact of writing and saying the distressing sentence on levels of discomfort, anxiety, and stress. Participants also completed the RQ at this time to assess other potential reactions to the experimental task.

Stage 5: Interventions. Participants were randomly allocated to one of the two interventions outlined above. Each intervention took approximately 30 minutes to deliver. They were both administered by one experimenter who was a trainee ACT therapist and was naive to the purpose of the study.

Stage 6: Distress induction task II. Stage 6 involved a second exposure to the distress induction task, which involved the experimenter re-reading the written self-criticism aloud and the participant repeating it.

Stage 7: Post-intervention distress and RQ. Stage 7 was identical to Stage 4, and assessed the potential impact of the second self-criticism on discomfort, anxiety, and stress, as well as participants' reactions to the experimental task.

RESULTS

The primary aim of the current study was to compare the relative utility of the two self-based interventions (distinction versus hierarchical relations) in reducing participants' discomfort, anxiety, and stress after exposure to the distress induction task.

Participants in both conditions scored within the normal range on the AAQ and did not display any pre-experimental differences at baseline with regard to their propensities towards avoidance [distinction self as context: M (*SD*)= 16.2 (6.3); hierarchical self as context: M (*SD*)= 18.2 (6.4)]. This was supported by an independent t-test which indicated no significant main effect for condition (p= .37).

The data from the three types of distress ratings were analysed separately and are presented below.

Both conditions recorded similarly low levels of discomfort (<11/100) at baseline and increased to the same point after the distress induction (distinction self as context:

+12.7; hierarchical self as context: +16.3; see Figure 1). Thereafter, distinction resulted in a very small increase in discomfort (+.76), while hierarchy resulted in a decrease (-7.57).

A mixed between within 3x2 ANOVA revealed a highly significant main effect for time [Wilkes Lambda = .53, F (2, 33)= 14.58, p= .000, partial eta squared= .47], but not for condition [F (1, 34)= 1, p= .32, partial eta squared= .03]. The interaction effect was also non-significant [Wilkes Lambda= .95, [F (2, 33)= .81, p= .45, partial eta squared= .05]. Two dependent t-tests investigated which time point was influencing the significant effect. The results showed a significant increase in discomfort from baseline to post-distress induction (p= .000), but not from post-distress induction to post-intervention (p= .31).

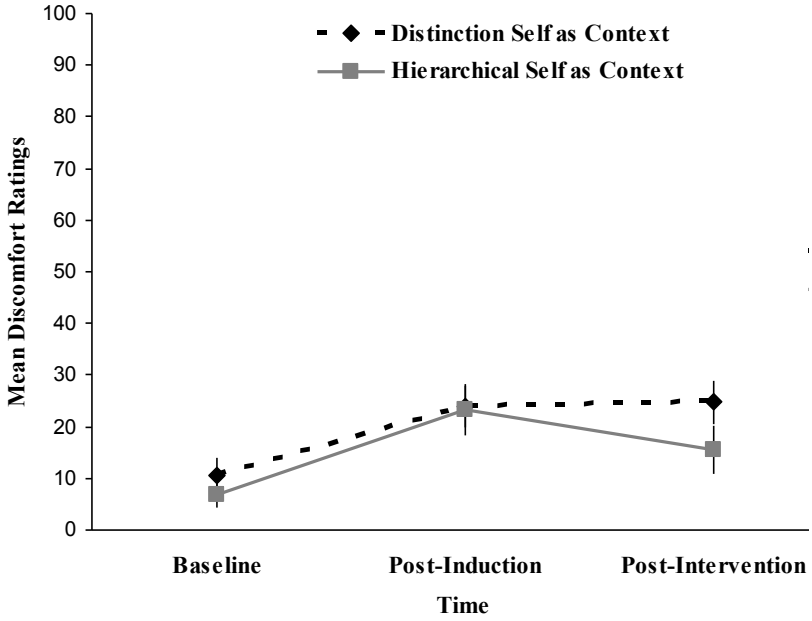

Figure 1. Mean VAS discomfort ratings per condition.

Both conditions recorded similarly low levels of anxiety (<10/100) at baseline, and both increased at post-distress induction (distinction: +8.06; hierarchy: +13.57; see Figure 2). Anxiety subsequently decreased for both conditions, although the larger change was recorded for the hierarchical intervention (distinction: -.03; hierarchy: -3.86).

A mixed between within 3x2 ANOVA revealed a highly significant main effect for time [Wilkes Lambda= .54, F (2, 33)= 14.12, p= .000, partial eta squared= .46], but not for condition [F (1, 34)= .021, p= .89, partial eta squared= .00]. The interaction effect was non-significant [Wilkes Lambda= .94, [F (2, 33)= .1.14, p= .33, partial eta squared= .07]. Two dependent t-tests showed a significant increase in anxiety from baseline to post-distress induction (p= .000), but not from post-distress induction to post-intervention (p= .46).

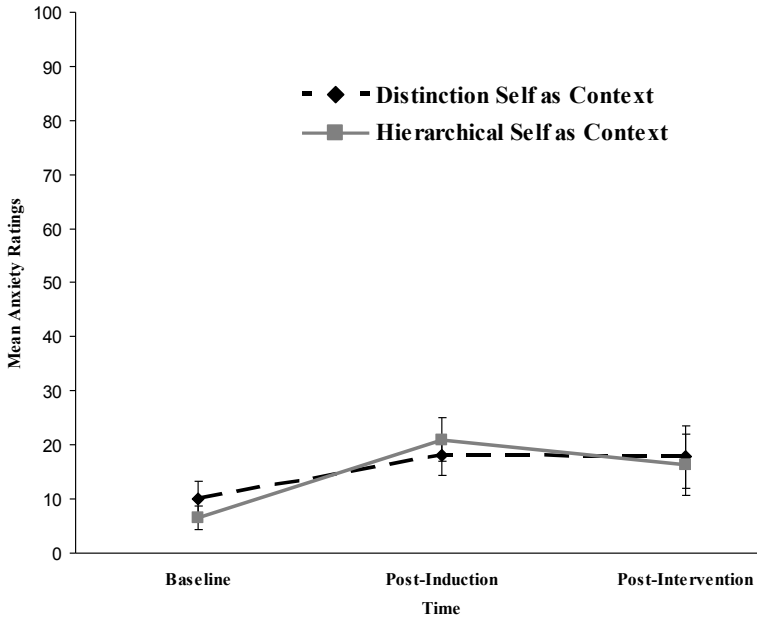

Figure 2. Mean VAS anxiety ratings per condition.

Both conditions recorded low stress (<11/100) at baseline, and both increased at post-induction (distinction: +7.43; hierarchy: +9.48; see Figure 3). Thereafter, however, distinction resulted in an increase in stress (+4.71), while hierarchy reduced stress (-8.82).

A mixed between within 3x2 ANOVA revealed a highly significant main effect for time [Wilkes Lambda= .65, F (2, 33)= 8.74, p= .001, partial eta squared= .35], but not for condition [F (1, 34)= .1, p= .76, partial eta squared= .00]. However, the interaction was significant [Wilkes Lambda= .83, [F (2, 33)= 3.46, p= .04, partial eta squared= .17]. Two dependent t-tests showed a significant increase in stress from baseline to post-distress induction for both conditions (both ps <.05). The increase in distinction from post-distress induction to post-intervention was not significant (p= .23), but the decrease for hierarchy at the same time point was significant (p= .02).

The four reaction questions were collated by condition and time, and the means for each are presented in Table 1.

The two conditions recorded high but different levels of believability at post-distress induction (see Table 1). However, this decreased in both conditions at post-intervention (distinction: -6.64; hierarchy: -12.29). A mixed between within 2x2 ANOVA revealed a highly significant main effect for time [Wilkes Lambda= .61, F (1, 34)= 21.55, p=.001, partial eta squared= .39], but not for condition or the interaction (both ps >.17).

The two conditions also recorded high but different levels of vividness at post-distress induction (see Table 1). Both conditions showed a subsequent decrease in vividness at post-intervention (distinction: -4.65; hierarchy: -3.06). A mixed between within 2x2 ANOVA revealed no significant effect for time, condition, or the interaction (all ps >.1).

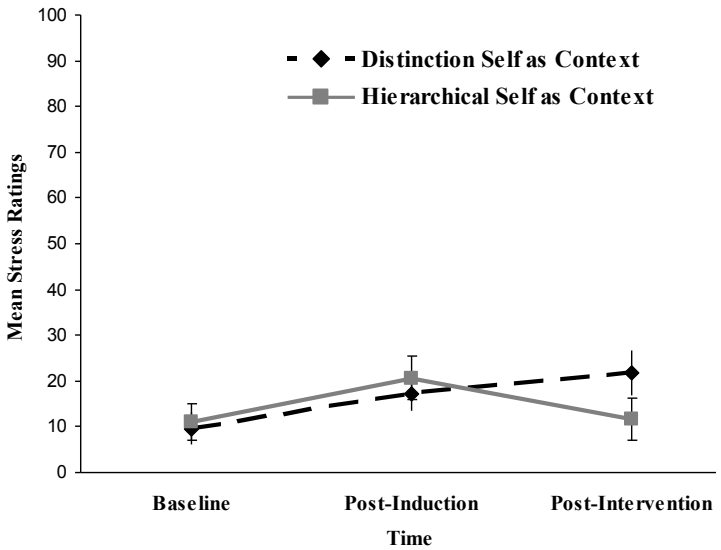

Figure 1. Mean VAS stress ratings per condition.

(see Table 1), and both decreased guilt at post-intervention (distinction: -2.29; hierarchy: -5.97). A mixed between within 2x2 ANOVA revealed that the effects for time, condition, and the interaction were not significant (all *ps* >.17).

Both conditions recorded moderately low levels of distraction at post-distress induction (see Table 1), and both decreased at post-intervention (distinction: -8.79; hierarchy: -5.76). A mixed between within 2x2 ANOVA revealed a significant effect

Table 1. Mean RQ ratings by Condition and Time Point.

Reaction Questionnaire	Time	Distinction self as context *M* (*SD*)	Hierarchical self as context *M* (*SD*)
Please rate how believable the accident scenario was to you	Post-induction	55.04 (37.44)	73.26 (28.56)
	Post-intervention	48.4 (36.3)	60.97 (31.24)
Please rate how vivid your thoughts and images were of the car accident	Post-induction	53.25 (27.07)	66.56 (21.7)
	Post-intervention	48.6 (29.9)	63.5 (27.18)
Please rate how much guilt you feel after saying and writing the sentence	Post-induction	29.02 (30.13)	22.78 (26.23)
	Post-intervention	26.73 (29.3)	16.81 (24.75)
Please rate how much you tried to distract from the sentence	Post-induction	29.15 (26)	23.23 (20.3)
	Post-intervention	20.36 (22.12)	17.52 (15.45)

for time [Wilkes Lambda= .88, F (1, 34)= 4.82, p= .04, partial eta squared= .12], but not for the interaction effect or condition (both *ps* >.49).

The results demonstrated that the self-criticism task significantly increased participants' levels of discomfort, anxiety, and stress, hence offering an effective method of experimental distress-induction for this non-clinical sample. Some differences were recorded between the two interventions in terms of their efficacy in reducing the dependent measures. Specifically, there was no reduction in discomfort after the distinction intervention, although a non-significant reduction was recorded for the hierarchical intervention. The same pattern was recorded with anxiety. In contrast, there was an increase in stress after the distinction intervention, but a significant reduction after the hierarchical intervention. No differences were recorded between the interventions on the RQ. However, both were associated with significantly less believability, less guilt, less vividness, and significantly less distraction.

DISCUSSION

The current research attempted to parse out the effects of distinction versus hierarchical relations in a self as context ACT exercise. On the whole, the research was a replication of a previous study by Luciano et al. (2011), except that we were able to use less intensive interventions with our non-clinical sample. Nonetheless, the superiority observed for the hierarchical intervention, relative to distinction, bore some overlap with the findings from the original study. One notable difference, however, between the two studies concerned the terminology used to describe the core component shared by both interventions. That is, we conceptualized these as self as context based interventions, while the original authors described these as defusion.

Two issues are raised by our choice to use the term self as context over defusion. First, the current study is part of a larger body of ongoing work that is concerned with the role of self in ACT, and is specifically focused on determining potential functional distinctions among the original conceptualization of the three selves (e.g., Foody, Barnes-Holmes, & Barnes-Holmes, 2011). Furthermore, the three selves, especially self as context, appear to coordinate more readily with RFT than the term defusion. Indeed, the research we have conducted to date suggests the potential for an RFT-based definition of the three selves. For example, Foody, Barnes-Holmes, and Barnes-Holmes (2012) proposed that in self as content your psychological content is coordinated with your sense of self because they are both HERE and NOW. Similarly, in self as process, content is also coordinated with the self in the HERE and NOW, although the experience in this case is on-going. In contrast, the authors proposed that in self as context the self or I is HERE and NOW, while the content is THERE-THEN, hence the self and content are not coordinated.

Second, and on balance, it is important to emphasize that the concept of the three selves is no less of a middle level term than the concept of defusion, in the sense that it is not a laboratory identified process. And, we recognize that there are limits to this type of translation exercise in which ACT-based middle level terms are translated into

RFT concepts. For us, the ultimate goal is to employ bottom-up RFT terms that will be subject to on-going scientific scrutiny and, where possible and useful, to replace untestable middle level terms with these more basic and organic scientific processes. From that scientific perspective, only bottom-up functional behavioral processes are an acceptable unit of investigation and analysis. While top-down concepts are pragmatically, heuristically and clinically useful, they have little or no scientific value.

The hierarchical intervention only resulted in a reduction in all three dependent measures, including a significant reduction in stress. This is consistent with Luciano et al.'s data (2011), in which the hierarchical intervention (defusion II) resulted in a significant reduction in problematic behaviors, along with a significant increase in mindfulness and psychological flexibility for the high-risk adolescents. The lack of effect for the distinction intervention is also similar to the findings from the original, in which Luciano et al. found only limited effects for the defusion I intervention. However, it is important to emphasize that there were some procedural differences between the two studies (including differences in the length and focus of the interventions) hence there are difficulties in drawing parallels between the two.

The current research relied entirely on the potential for the self-criticism to function as a distress-induction procedure and the data indicated that it did so very effectively. However, it may appear somewhat unusual to attempt to subject the resulting forms of distress (i.e., discomfort, anxiety, and stress) to ACT-based interventions, given that ACT makes no explicit attempt to reduce one's emotional content. There remains only limited published evidence on individual ACT components and their relative efficacy, and this type of componential analysis is best conducted with a tried-and-tested experimental preparation. Several existing studies have demonstrated the utility of the self-criticism procedure employed here as a robust distress induction tool (e.g., Foody et al., 2011), hence it offered one context in which the impact of individual ACT components may be observed. Furthermore, although ACT does not explicitly aim to reduce emotional distress as a therapeutic aim, it may be the case that this occurs as a by-product of the therapeutic techniques.

It was interesting in the current findings to note that the hierarchical intervention was significantly effective only in the context of stress, and not in discomfort or anxiety (although both of these were also reduced). Indeed, when a non-clinical sample is brought into an experimental room and asked to generate a random self-criticism, it is unlikely that individuals will provide one that is deeply troubling. In addition, in everyday language the word 'stress' is used to describe minor or fleeting troubles (e.g., a stressful day at college). If participants in the current context generated a recurrent and mildly troubling self-criticism, a common reaction they may have to this may be best described as stress from their perspective. As a result, the intervention would impact more on the stress measure than on the other two.

In addition to changes in the dependent variables, the data demonstrated that both interventions resulted in reductions in the believability, vividness, guilt, and attempts to distract, associated with the self-criticism. And both significantly reduced believability and distraction. This lack of difference suggests that none of these aspects likely accounted for the superiority of hierarhcy over distinction. For example, the hierarchical intervention

didn't work better just by reducing believability more. In any case, all of these outcomes for both interventions are consistent with broader ACT aims, for example, to reduce the believability of content and the need to distract from it (Hayes et al., 1999).

Previous studies have suggested that the types of outcomes recorded here may be mediated by levels of emotional distress. For example, Gutiérrez, Luciano, Rodríguez, and Fink (2004) found no differences in a "low-pain context" between an ACT versus a control intervention on participant's level of tolerance of pain generated by brief electric shocks. However, the efficacy of the interventions differed for the participants in the "high-pain context" as 71% of the ACT participants increased in pain tolerance, compared to only 11% in the control. In order to explore a similar possibility, we used a median split analysis to separate participants who scored high versus low on the discomfort, anxiety, and stress ratings at post-induction and then analyzed potential differences between the interventions. Although the data indicated no significant differences between interventions within either the high or low groups (probably as a result of limited statistical power); some interesting differences emerged. That is, participants who scored low in discomfort, anxiety, or stress and who were then subject to distinction always showed increased distress thereafter. In contrast, participants who scored low and who were then subject to hierarchy always showed decreased distress thereafter. On the other hand, participants who scored high and who were then subject to distinction always showed decreased distress thereafter. Similarly, participants who scored high and who were then subject to hierarchy also showed decreased distress, although this was considerably larger. In other words, only hierarchy appeared to be effective at reducing low levels of distress, while both interventions had some efficacy in reducing high levels of distress. These results point to the potential utility of the current interventions with a clinical sample.

Naturally, there is a range of methodological limitations within the current work, which have implications for future research. As noted above, the dependent variables chosen here may have limited applicability in an ACT context, whereas the use of a behavioral approach task may be a more appropriate outcome measure as in other studies (Gutierrez et al., 2004; Kehoe et al., in press). For example, Kehoe et al., (in press) used radiant heat apparatus as the distress induction procedure and this allows amount of heat tolerance in time to be measured. Doing so circumvents the reliance on self-report measures and supplements the work with more direct measures of functional processes. Furthermore, the inclusion of a behavioral task allows for the collection of more robust follow-up data than subjective measures as taken at any one point in time. This, in turn, potentially demonstrates the stability and generalization of outcomes across time and is also a better analogue of what happens in a therapeutic context.

One might argue that the continued written presence of the target self-criticism played a spurious role in the current outcomes. For example, perhaps this exposure itself mediated the levels of distress associated with the self-criticism task. Although the modest levels recorded across all subjective measures even after distress induction appear to support this possibility, on balance all three measures showed significant increases after the induction. Similarly, one might argue that this exposure may have mediated the effects of the interventions (because the written statement remained present

throughout). There is no way to determine if this was the case currently, although this methodological feature may be manipulated in future replications.

One methodological feature of the current study which differs from the original by Luciano et al. (2011) is the generation here of only one self-criticism as the distress induction procedure. In contrast, the original researchers required participants to generate several target thoughts and feelings as part of the intervention. At a methodological level, the distress induction procedure may be even more effective if several pieces or types of self-referential content were targeted. However, doing so may function as a type of exemplar training, which, in and of itself, potentially serves as an intervention. Again, future research might explore the potential utility of having multiple self-criticisms, while paying attention to their possible influence on selected interventions.

The current study is among the first to attempt to target specific relational frames in the context of ACT exercises. In doing so, it fits the broader research agenda of scientific bridge building between ACT and RFT, while recognizing the difficulties inherent in the use of middle level terms, such as self as context and defusion. One of the central ways forward in dealing with middle level terms is to replace them with more functionally sound, empirically tested concepts, such as replacing the terms self as context with distinction or hierarchical deictic relations. Although the present study is only one small step in that direction, it does suggest that RFT concepts may have more clinical application than might have been previously recognized.

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Received, September 20, 2012
Final Acceptance, July 21, 2013