September 12, 2016

FROM: Elizabeth L. Davis, Parisa Parsafar, Laura E. Quinones-Camacho, & Emily W. Shih

TO: JoVE editorial staff

SUBJECT: Author response to reviewer comments for JoVE manuscript 55200\_R1\_072716

Dear JoVE Editors,

Thank you for the reviewer comments provided for our manuscript, JoVE 55200, *Psychophysiological Assessment of the Effectiveness of Emotion Regulation Strategies in Childhood*. We believe we have addressed all of comments and have made the requested changes and edits. The editorial and reviewer comments are pasted below, with our responses to each underneath. Please let us know if further revisions are necessary. We look forward to hearing from you soon.

Best,

Liz

**Editorial comments:**

**FORMATTING**

**1. Please include spaces between all steps and substeps for consistency. For instance, 9.2 and 9.2.1.**

We have added spaces between all steps and substeps of the protocol as requested.

**2. Lines 439 – 471 of the results section should either be reformatted so that imperative tense is not used, or moved from the results section to make a separate section of the protocol for data analysis.**

We have moved this section to the end of the protocol, to a new “Data Analysis” section (p.10-11).

**3. Length is currently at the maximum highlighted limit.**

After making the requested changes to the manuscript, we carefully checked that our highlighted sections (~2.75 pages) did not exceed the maximum length for the filmed portion of the protocol.

**GRAMMAR**

**4. 4.1 – Please use imperative tense or convert to a note.**

We changed the language used for step 4.1 to use imperative tense.

**5. In the notes, use “Instructor says” rather than “Instructor say.”**

We have changed this throughout the protocol for all relevant notes.

**VISUALIZATION**

**6. 1.1 – It is not clear how we would visualize this for filming. Please unhighlight or provide a visual representation (chart, diagram) as a supplementary file.**

We un-highlighted section 1.1

**7. 9.5.1, 9.6 – Spreadsheet manipulations are not suitable for filming and should not be highlighted.**

We un-highlighted steps 9.5.1 and step 9.6 from the protocol on page 10, lines 419-425.

**ADDITIONAL DETAIL IS REQUIRED**

**8. 10.1 – What are XX methods?**

We have rewritten this sentence to clarify that we are referring to the methods of calculating RSA reactivity described in the subsequent steps.

**9. If your figures and tables are original and not published previously, please ignore this comment. For figures and tables that have been published before, please include phrases such as “Re-print with permission from (reference#)” or “Modified from..” etc. And please send a copy of the re-print permission for JoVE’s record keeping purposes.**

We do not include any previously published tables or figures in this manuscript.

**10. JoVE reference format requires that the DOIs are included, when available, for all references listed in the article. This is helpful for readers to locate the included references and obtain more information. Please note that often DOIs are not listed with PubMed abstracts and as such, may not be properly included when citing directly from PubMed. In these cases, please manually include DOIs in reference information.**

We checked the references to ensure DOIs were included for all references listed in the article when available.

**11. IMPORTANT: Please copy-edit the entire manuscript for any grammatical errors you may find. The text should be in American-English only. This editing should be performed by a native English speaker (or professional copyediting services) and is essential for clarity of the protocol and the manuscript. Please thoroughly review the language and grammar prior to resubmission. Your JoVE editor will not copy-edit your manuscript and any errors in your submitted revision may be present in the published version.**

We have carefully reviewed the manuscript for grammatical and typographical errors.

**Reviewers' comments:**  
**Reviewer #1:**  
*Manuscript Summary:*  
This is an interesting manuscript that presents novel information on measuring emotion regulation in children. It is challenging to assess emotional states in children while collecting physiologic measures. The authors present a logical protocol that is complex in nature. There are several aspects of the manuscript that need to be clarified so the reader can follow the protocol more clearly.  
  
*Major Concerns:*  
**One over-riding concern is the use of a baseline or resting measure that is not a video yet the emotion-evoking videos are used as a comparison state. It is known that autonomic nervous system and physiologic measures differ based on the context of the condition. Attending to a video monitor will decrease heart rate and thus, increase RSA. This study limitation should be addressed in the manuscript. (for example, see Bush, N et al., Journal of Experimental Child Psychology. 110: 62-79, 2011). The lack of a video baseline will overestimate the physiologic response attributed to any emotion evoked during a video.**

This is an excellent point, and highlights the imprecision in interpreting the absolute magnitude of physiological change as informative in its own right. This, however, is not the aim of the current protocol--the overestimation of physiological response is somewhat less concerning (in our opinion) when comparing magnitude of reactivity within experimental conditions to that within a control condition. Though the representative data we present in the manuscript comes from a study in which the baseline episode did not involve viewing a video clip, we have added the suggestion to use a neutral video as a baseline in our Limitations section (p.13, lines 553-555), and do not make claims about the absolute magnitude of the physiological response to the videos.

*Minor Concerns:*  
**1. P. 2 line 76 - include specific outcomes of interest with citations. What types of 'social, emotional, and cognitive outcomes'?**

We added examples of social, emotional, and cognitive outcomes with citations to page 2, line 76 of the introduction.

**2. P. 3 line 119; Ref #18 is not appropriate here; it is not a key RSA reference - there are better references on RSA; This article is about RSA reactivity and not a descriptive study of RSA measures. (See Berntson articles)**

We substituted our original citation for two more relevant papers (p.3). We also updated the reference section to reflect this change (and other changes to the references throughout the revised manuscript).

**3. P. 3 lines 128-133 should be moved up in the paragraph so you explain RSA resting before you explain RSA reactivity;**

We appreciate this suggestion for revising this section of the text, because it also allowed us to address R2’s minor comment #6. We moved the two sentences explaining resting RSA on page 3 to appear before the sentences on RSA reactivity.

**4. P. 4 line 159 - who is in the control group? It is unclear if there is a control or baseline condition or a control group.**

We clarified (page 4, lines 156-159) that step 1.1 of the protocol refers to a control condition in which no ER strategy instructions are given. We also added to the note accompanying this step of the protocol that equal numbers of children should be assigned to each condition.

**5. Use the term baseline or rest but they are used interchangeably in the manuscript**

We edited the manuscript so that we use the term “baseline” RSA consistently throughout.

**6. P. 6 line 234 'listen to their hearts'; the Mindware acquisition software and the electrodes will monitor the child's heart rate but there is no person listening to the child's HR so it is incorrect to say 'listen'. You monitor or watch the child's HR on the computer screen.**

We changed the word “listen” to “monitor” (page 6, line 238) in the text to address this.

**7. P. 6 line 250 'a few moments'; be specific; it is necessary to wait 5 minutes while the electrodes adhere to the skin to provide an accurate conduction before you collect CVR data;**

We edited the text to specify that researchers should give children 5 minutes to acclimate to wearing the sensors before acquiring the baseline measure (page 6, line 253).

**8. P. 6 line 265-6; the electrodes includes a gel with chemicals and it is recommended that children not play with the gel and for parents or researchers to wash their hands with soap and water after touching the electrodes; thus, it is not recommended that children take off the electrodes at home without adequate supervision and handwashing;**

We deleted the step describing the option to allow children to keep the electrodes to be taken home from this page.

**9. P. 9 lines 379-381; RSA is not just a measure of HR, it accounts for respiration (inhalation and expiration) which changes HR;**

This is an excellent point. We deleted reference to “heart rate” in our description of the software program and clarified that the software program is Mindware Heart Rate *Variability* (page 9, line 386). We also explain elsewhere (p.3, lines 118-119) that RSA is derived from the measurement of HRV within the respiratory cycle, as noted by the reviewer.

**10. P. 10 lines 423-426; the calculation of reactivity is nicely stated here but the tasks involved with rest and challenge is not clear here;**

We edited the text (10.1.1) to clarify the tasks involved in baseline (sitting quietly) and challenge (viewing an emotion-eliciting film) tasks for the RSA reactivity calculations.

**11. Figures 2, 3 - Are there different children in each bar; include the # of children in each bar and if they are the same children with comparison conditions or comparison children;**

We edited the figure labels for Figures 2 and 3 to clarify that data are presented for between-subjects experimental conditions, so bars represent different children. As noted in our response to R1’s 4th minor point, we have clarified that children are equally distributed across the six different emotion and ER conditions. Because we present representative data for descriptive purposes in the figures only, we have opted not to include the exact number of children described by each bar in the graphs. However, the total sample size from which these representative data are drawn is N = 184, and approximately 30 children are represented by each of the 6 experimental condition bars. If advised to add this specific quantitative information to the manuscript, we will do so.   
  
*Additional Comments to Authors:*  
N/A  
  
**Reviewer #2:**  
*Manuscript Summary:*  
N/A  
  
*Major Concerns:*  
**1) I think the introduction could do a better job of differentiating this protocol from what has been done in prior work. Specifically, the authors mention examples of how RSA reactivity on various paradigms predicts emotion regulation but not how RSA during the act of emotion regulation might track regulatory ability (which the protocol described purports to do). I think it's important to make this point clearer.**

We agree that this important contribution of the protocol should be made clearer. We have revised the last paragraph of the introduction (p. 4, lines 143-146) to more explicitly highlight the novelty and innovation of the methodology we present.

**2) The introduction ought to more clearly describe why sad and scary clips were used and why no neutral stimuli are used. Are the authors suggesting that experimenters could use one or the other? Are there different hypotheses regarding RSA for sad or scary emotions? And why no neutral clips? The latter of these points is particularly important because it is a marked deviation from typical reappraisal and distraction paradigms.**

As described on p.2 of our introduction, sadness and fear are negative emotions that are commonly experienced by children, so understanding children’s regulation of these experiences is of interest to developmentalists. We present the paradigm as using a between-subjects design, but in previous work from our group we have utilized a within-subjects design (each individual experiences each emotion, while receiving only one set of emotion regulation instructions; Davis, Quinones-Camacho, & Buss, 2015). We edited the note appearing after step 1.1 of the protocol to clearly explain that other experimental conditions and configurations can be used, depending on the research question of interest. Given the preliminary nature of this kind of work (very little is known about the physiological effects of children’s active regulation of negative emotions), we do not have specific hypotheses pertaining to sadness versus fear.

We also edited the note appearing after step 7.1 of the protocol (p.8, lines 324-328) to emphasize that any emotion of interest could be examined, rather than suggesting that this approach be limited to sadness and fear.

**3) Either the introduction or the protocol needs to more fully address the significance of participant age. Right now, "children" are described as a broad category in the introduction and the protocol section does not indicate what ages this procedure is suitable for, save to say that verbal assent is preferred for children under 7. Do the authors have recommendations for what the youngest ages are that a child can learn to reappraise? Are there certain pitfalls that scientists should be aware of with regards to collecting RSA in young children (e.g., greater propensity for motion-related artifacts)? What ages qualify as "younger" or "older" children in the protocol steps? These are just a few of the kinds of questions that ought to be addressed by the authors.**

As developmental psychologists, we agree that these are important issues to consider when undertaking physiological assessment of children’s emotion regulation. To address the reviewer’s suggestions, we have added a clarification about the age at which children are expected to be able to use distraction and reappraisal (age 5-6; p. 2, lines 86-87) to the text. We have added a statement that the use of films and a seated baseline episode in this paradigm are likely to minimize movement artifacts (p. 13, lines 579-580). We have removed reference to “younger” and “older” children in step 5.3.1 of the protocol (in which we previously advised researchers to allow older children to place the electrodes on themselves with guidance, but to consult with parents about their preference for applying electrodes to younger children). These changes have hopefully clarified the issues pertaining to child age and methodological challenges of working with children raised by the reviewer.

**4) I may have missed something, but I wasn't clear on what the specific software package was that the authors used. If someone were trying to replicate these exact steps, it would be helpful to know what the authors used. I also didn't see any notes about how to insert event markers into the physio data to indicate what part of the experiment is happening at different points in time.**

We added more information about the specific software package used in this protocol to the text, along with more detailed explanation of the options for incorporating event markers for specific procedural or behavioral occurrences on p.9, lines 386-388.

**5) Both reappraisal and distraction are cognitively demanding tasks, at least to some extent. Might this alter RSA? If so, this ought to be mentioned in the Discussion as a caveat.**

We added this point to the limitations section of the discussion (p. 12, lines 551-553).  
  
*Minor Concerns:*  
**1) "or alleviating" in second paragraph seems redundant**

We took out the redundant wording from the paragraph (page 2 line 81).

**2) "how one is thinking about an emotion" is a bit clunky - maybe "how one interprets an emotion" is clearer?**

We changed the wording of this sentence (page 2 line 82) as recommended by the reviewer.

**3) This is strangely worded "Following recommendations to be clear about what aspect of emotion regulation is being studied"**

We deleted the confusing portion of the sentence (page 3, lines 93-4).

**4) I don't follow the sentence beginning with, "Similarly, ostensibly more objective" on lines 104-107**

We re-worded this sentence (page 3, lines 103-106).

**5) There are several places that ought to include citations. These include:  
a. Final sentence of the first paragraph  
b. Final sentence of second paragraph  
c. The paragraph on lines 99-113**

We added citations for the sentences in each of these places (a: p.2, line 76; b: p.2, lines 86-87; c: p.3, lines 101-102).

**6) I'm unclear from the introduction about whether higher or lower RSA reactivity to tasks is thought to index better emotion regulation (this is clarified later on, but should be clearer from the start)**

We have revised the section of the introduction describing RSA patterns (p.3, lines 122-130) to provide an earlier explanation of RSA reactivity.

**7) This sentence is confusing: "For example, RSA suppression (decrease from resting level) is linked to experiencing fear and sadness, but augmentation (increase from resting level) when sadness and fear are evoked via film clips"**

We revised this sentence to be clearer (p.3-4, lines 137-140).

**8) What do the authors deem to be acceptable interrater reliability?**

We added a sentence explicitly stating that we recommend reaching 85% interrater agreement to page 10, line 421.