

Comment on the Preliminary Report of the Committee of Initial Inquiry (CII)

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We are very grateful to the Committee of Initial Inquiry (CII) for giving us the opportunity to review all files and documents relevant to this case. We believe that openness and transparency is warranted and necessary to successfully resolve this delicate situation. Having examined the report of the CII, we greatly appreciate the attention and time the committee has given this serious matter. The documents that the committee has released to us confirm our initial concerns, but also revealed additional data issues and apparent ethical breaches that must be addressed to ensure an effective investigation of misconduct in this case.

We are disappointed that Dr. Whitaker, for whatever reason, chose not to communicate with the CII, as this would make it a lot easier to clarify many of the inconsistencies left to speculation and guesswork. Nevertheless, we support the CII's decision to recommend a retraction of the article in question. From the very beginning of this affair, our primary interest was the credibility of the scientific literature on video game effects, and hence, we believe that a retraction, independent of whether Dr. Bushman chooses to replicate the study, is absolutely necessary for the sake of the integrity of the scientific record given that the flawed study has already been used in public settings to support policy positions.

That being said, upon examining the documents we have uncovered new surprisingly conclusive material evidence contradicting some of the statements that were made by the Respondents to the committee, and some new documents contained on Dr. Bushman's computer which provide strong evidence that data were in fact manipulated intentionally. We believe that the CII's conclusions should be informed by all available evidence, and are deeply concerned that parts of the CII's preliminary report might be based on counterfactual testimonials and incomplete evidence. Thus, it is imperative that the CII's investigation take into count this evidence when assessing the integrity of the Respondent's initial claims and which we fear might be missed by the CII if we do not call attention to it.

We acknowledge that, in light of Dr. Whitaker's decision not to provide any raw materials or even a testimonial, evidence is somewhat incomplete, and many of the conclusions have been based on personal statements made by the Complainants and the Respondents. Nevertheless,

there are in fact a number of inconsistencies in the report's materials and we considered them important enough to raise them in a further comment to the CII. Given the superb handling and assessment of the situation by the CII, we do not do this lightly, but at the same time the gravity of this new information necessitates a re-evaluation of the case. We hope that that the CII will share out concern elicited by the new evidence presented.

We categorized our comment into "minor concerns" and "major concerns". Minor concerns can be considered inaccurate characterizations of the history of events during the interview with Dr. Bushman. Major concerns are statements made in the interview or conclusions in the CII's preliminary report contradicted by new material evidence uncovered in the files sequestered from Dr. Bushman's computer (*Attachment 6, folder "20150219 – Sequestered Bushman Files"*).

MINOR CONCERNS

1. Provision of the data set by Dr. Bushman

Transcript of interview with Dr. Bushman (Attachment 19), page 49 line 14 to page 50 line 6

DR. BRAD BUSHMAN: When Jodi was noncommunicative, as she has been in the past, I provided the data for him.

First, I asked Andrew Hayes, was a colleague in communication, and he's now in psychology, an expert statistician. So initially, Dr. Markey raised some questions about statistical analyses, and I said, oh, I'll give the data set to Andrew Hayes. He's an expert statistician. And he can tell you about these statistical issues.

And then that wasn't good enough for – Dr. Markey wanted the data set himself. Asked Jodi to send it to him. I corresponded with the editor who also suggested we sent him the data. So since Jodi didn't send him the data, I sent him the data.

Dr. Bushman claimed that he provided the data to Dr. Markey because Dr. Whitaker was noncommunicative, after asking Dr. Hayes for help regarding initial statistical questions that Dr. Markey had. This characterization does not match the actual timeline as displayed in the email communications. Dr. Bushman himself was asked multiple times for the data set on 9/11/13, 12/1/13, and 3/1/14 to which Dr. Bushman failed to respond. The data were not given to Dr. Markey until after the editors at the journal (Dr. Roloff) emailed Dr. Bushman directly (once Dr. Markey informed them about his concern) and asked for Dr. Bushman's

cooperation on 4/9/14. At this point, Dr. Bushman initially refused to send the data and instead indicated he would the reanalysis himself along with Dr. Hayes. Dr. Hayes then suggested to Dr. Bushman (via email on 4/14/14) that he send Dr. Markey the data, and Dr. Bushman finally complied on 4/15/14 (7 months after the initial request).

2. Reanalysis of initial claims by Dr. Andrew Hayes

Transcript of interview with Dr. Bushman (Attachment 19), page 50 line 19 to page 51 line 6

DR. JENNIFER YUCEL: Did you give the data to Andrew Hayes, and did he look at it?

DR. BRAD BUSHMAN: Yes.

DR. JENNIFER YUCEL: And what was his assessment?

DR. BRAD BUSHMAN: That nothing – there’s nothing seriously wrong with it. He doesn’t look for – he didn’t do the kind of analysis that Dr. Markey did about all these cases were miscoded. He didn’t do any of that – those analyses.

We were not informed that Dr. Hayes actually looked at the data. The only emails we have from him on this topic simply indicate that Dr. Bushman asked him about Dr. Markey’s initial concerns but never actually shared the data with him. If Dr. Bushman did share the data with Dr. Hayes, we have not seen any evidence that he actually checked them for Dr. Markey's initial concerns (which were different than those reported in our complaint). It therefore remains unclear whether Dr. Hayes actually conducted any reanalyses at the behest of Dr. Bushman.

MAJOR CONCERNS

1. Number of data sets available to Dr. Bushman

Transcript of interview with Dr. Bushman (Attachment 19), page 37 line 13 to page 38 line 23

DR. COURTNEY DEVRIES: So the -- there's a date stamp on the data set containing the errors that you sent to Dr. Markey.

DR. BRAD BUSHMAN: Right.

DR. COURTNEY DEVRIES: Which is more recent --

DR. BRAD BUSHMAN: I know, I saw that. 2013.

DR. COURTNEY DEVRIES: -- than the data set --

DR. BRAD BUSHMAN: -- versus 2011.

DR. COURTNEY DEVRIES: Which suggested the -- that there might have been a -- another uncorrected data set with an even earlier time stamp, because you would expect that temporal relationship to be reversed.

DR. BRAD BUSHMAN: Yes.

DR. COURTNEY DEVRIES: But you're not aware of any copies of that data?

DR. BRAD BUSHMAN: No, I --

DR. COURTNEY DEVRIES: You did not receive it by e-mail at any point?

DR. BRAD BUSHMAN: No. No. I sent in the data set I had. Because -- because he asked -- I asked Jodi to send it to him, and she didn't do it.

DR. COURTNEY DEVRIES: Right.

DR. BRAD BUSHMAN: This is a serious allegation. And so I didn't -- actually, I didn't even know if the data set that I -- I only knew that I had one data set, but I, to be honest, didn't know if it was clean or dirty, if it had been checked line by line or not.

In the interview with the CII, Dr. Bushman stated that a) he only had one data set (dated March 27, 2013), b) that he sent all the data he had to Dr. Markey (the Original Data in our initial complaint), and c) that he did not have a data set with different values. This is also in accordance with an email that was sent by Dr. Bushman to Dr. Markey and Dr. Roloff on 4/15/14 stating “*This is the only data set I have.*” At the time, it did not seem implausible, as all other data sets were provided by Dr. Whitaker.

However, examining the files sequestered from Dr. Bushman’s computer, this statement is directly contradicted by the existence of two further data sets named “Shooter Study VU 2.sav” and “Shooter Study VU 3.sav”, herein called *VU2* and *VU3* (VU is a common abbreviation for Vrije Universiteit Amsterdam, Dr. Bushman’s second affiliation). Neither of these two data sets are identical to the data set Dr. Bushman had initially sent to Dr. Markey on 4/15/14, and they are not identical copies of each other (one includes revised, the other original values, see Major Concerns 2 and 3). Therefore, Dr. Bushman possessed at least two data sets in addition to that which he sent Dr. Markey, contradicting his earlier claims: a) He had more than one data set, b) he did not send all data that he had to Dr. Markey, and c) he had data sets with different values.

2. Additional evidence data were intentionally miscoded

There are three broad ways data can be manipulated: 1) all the data could be fictitious (data were never actually collected); 2) data can be collected but some values are dropped or

changed afterwards (e.g., subject 10’s condition code might be simply been changed from a 4 to a 2); or 3) data can be collected and codes are “switched” between subjects (e.g., subject 10’s condition code of 4 is switched with subject 143’s condition code of 2). Although we were initially certain that #1 did not occur (i.e., we believe data were actually collected), we were unsure whether the observed coding inconsistencies were due to #2 or #3. However, given the new data files *VU2* and *VU3* found on Dr. Bushman’s computer it now clearly appears that the data were collected and the codes were “switched” between subjects.

For example, subject 10 and subject 143 appear to have been “switched” at least one time between *VU2* and *VU3* (note: the codes in *VU3* are similar to the Original Data initially sent by Dr. Bushman).

	<i>VU2</i>	<i>VU3</i>
Subject	Condition	Condition
10	4	2
143	2	4

Table 1. Example of an alteration between the data sets *VU2* and *VU3*.

As Table 1 shows, in *VU2* subject 10 was coded in condition 4 while subject 143 was coded in condition 2. However, in *VU3* subject 10 is now coded as being in condition 2 and subject 143 is now coded in condition 4. In other words, these values were altered between these two subjects between *VU2* and *VU3* (it should be noted that the covariate variables reported for these subjects do not change between these two data sets suggesting the conditions were “switched” between these subjects).

If this was the only case in which both subjects “switched” to match each other it might be explained away as a simple coincidence¹. However, this pattern of “switching” subjects holds true for multiple pairings of data as shown in Table 2.

¹ There were 5 condition codes in total (1 correct and 4 incorrect codes for each case). If errors in coding were caused by random human error, the probability for subject 10’s code in *VU2* to have been randomly changed in *VU3* to the same code as subject 143 is 1 in 4 (25%). Therefore, the chance that the pairing of subjects 10 and 143 codes in *VU2* were both randomly switched in *VU3* to perfectly match their paired counterpart’s code is 6.25% ($\frac{1}{4} \times \frac{1}{4} = \frac{1}{16}$ or $p = 0.0625$).

Subject	<i>VU2</i>	<i>VU3</i>
	Condition	Condition
10	4	2
143	2	4
30	5	4
144	4	5
40	5	4
145	4	5
50	5	2
146	2	5
70	5	2
147	2	5
80	1	3
148	3	1
90	1	2
149	2	1
100	1	2
150	2	1
130	1	3
151	3	1

Table 2. Alterations of subjects between the data sets *VU2* and *VU3*.

In addition to being able to perfectly match the miscoded cases to each other the table above also reveals a clear pattern in the subject numbers themselves. Recall that the CII noted the unusual pattern in subject numbers of miscoded cases, which were divisible by 10 (10, 30, 40,

50, 70, 80, 90, 100, 130) and the unusual number of miscoded cases which occurred at the end of the study (143, 144, 145, 146, 147, 148, 149, 150). By observing the table above it is evident that when the subject numbers divisible by 10 are ordered from lowest to highest (as in the left column) they match perfectly with the subject they were “switched” with when one orders the end of the study subject numbers from lowest to highest (as seen in the right column). Table 3 displays exactly which subject pairs appear to have had their codes “switched” with each other.

Subject		Subject
10	↔	143
30	↔	144
40	↔	145
50	↔	146
70	↔	147
80	↔	148
90	↔	149
100	↔	150
130	↔	151

Table 3. Subjects pairs which appear to have had their codes “switched” with each other.

None of the explanations provided by the authors previously would account for the observed “switching” of data or the pattern in subject numbers related to these alterations present in the data files sequestered from Dr. Bushman’s computer. Additionally, the probability that this pattern would perfectly happen by chance for 9 pairings is 1 in 68,719,476,736 (or 1 in 68 billion; $p = .0625^9$). We are unable to think of a single explanation that involves errors in data entry or errors during the execution of the study which could account for these findings occurring by random human error.

3. The question of miscoded dependent variables

There were further discrepancies between data sets *VU2* and *VU3*. In 19 cases, there are notable changes in the three dependent variables *Headshots*, *Non.Headshots*, and *Total.Hits*.

This is the first time we see evidence that not only the independent variables/condition codes were edited, but also the dependent variables. The question whether dependent variables were changed came up at several points during our own interview with the committee (e.g., Attachment 18, page 6 line 7-16), and the interview with Dr. Bushman (e.g., Attachment 19, page 11 line 10-18). Dr. Bushman suggested that without the raw data it would not be possible to determine whether dependent variables were changed in addition to the independent variables (Attachment 19, page 18 line 16 to page 19 line 10). It appears that using files that were on his computer it would not only have been possible to determine whether dependent variables were changed, but also which, and how.

Dr. Bushman stated that he checked a number of computers for additional material relevant to this case (Attachment 19, page 34 line 21-23). It is curious that his search did not yield these two discrepant data sets stored on his own computer in the folder named “gun study” that could have potentially shed light on some of the questions that the committee asked him. These additional differences between the data sets on his own computer corroborate our belief that it was unlikely Dr. Bushman had not been aware of the error rate in the study.

4. More miscoded variables: Shooting Game and Violent Shooting Game errors

In addition to the discrepancies between the independent and dependent variable codes in *VU2* and *VU3* there are further coding errors between these two documents which appear to have occurred while the manuscript was being revised for publication at *Communication Research*. In the cover letter for revision 2 of this manuscript (file: “Whitaker & Bushman – Boom Headshot CR_R2_Cover Letter.doc” dated 12/28/11), Reviewer 3 (comment 3) asks whether participants general play of violent video games (outside of the lab) is related to accuracy of headshots. The authors reply:

Participants were asked to list their top three favorite video games. We now count how many of these games were shooting games. This is a more direct measure than the number of M-rated games listed. However, neither the number of M-rated games (previous revision of this manuscript) nor the number of shooting games (present version of this manuscript) were significant covariates in our analyses.

This variable is called *Shooting.total* in *VU2* and represents the number of their favorite games which are shooters (highest score = 3). As indicated by the authors this variable was unrelated to the number of headshots. In response to this new information the cover letter for

revision 3 of the manuscript (file: “Whitaker & Bushman – Boom Headshot_CR-R3_Cover Letter.doc” dated 3/9/12), Reviewer 3 (comment 3) points out that the new findings presented above (i.e. that long-term violent game exposure did not seem to be related at all to firing accuracy) is “*completely against the authors’ expectation, and doesn’t this raise serious questions about the meaningfulness of the effect?*” The authors reply:

We realized that to better examine this link, it was necessary to distinguish violent video games from violent shooting video games. We examined the number of violent shooting games participants listed as their favorites as a measure of preferred exposure to violent shooting games.

The authors created a new data set that includes the variable *Preferred.shooting*. This is the data set *VU3*, whose creation date (March 9, 2012) coincides with the creation dates of the new response letter and manuscript version. Using this variable, the authors found that the number of *violent* shooting games participants indicated among their total three favorites was significantly related to number of headshots.

Reiterating what occurred, the authors created two variables in a similar manner:

Number of shooting games: Which is the number of shooting games participants played out of the 3 games they listed.

Number of violent shooting games: Which is the number of *violent* shooting games participants played out of the 3 games they listed.

These two variables are going to be extremely similar to each other (as almost all shooting games are violent and all violent shooting games are, by definition, shooters). Consistent with this reasoning, 90% of the scores are identical between “number of shooting games” (coded as *Shooting.total* in *VU2*) and “number of violent shooting games” (coded as *Preferred.shooting* in *VU3*). However, an examination of the 13 codes which do not match show substantial error in the data.

It is impossible to have a higher score on “number of violent shooting games” than simply “number of shooting games” since the former is a subset of the latter. However, out of the 13 cases that had different values for the two variables, 10 had higher “violent shooting game” scores (subjects 5, 17, 38, 54, 74, 91, 109, 148, 149, 151). For example, subject 74 is coded as playing zero “shooting games” but somehow played three “violent shooting games.” Of these 10 subjects, 9 reported never playing any shooting games but their codes indicate on average that 2 out of 3 of their preferred video games were violent shooters. Such codes are

impossible given the nature of these variables (i.e. all violent shooting games are, by definition, shooting games). It is also worth noting that the variable *Shooting.total* in *VU2* appears to have been deleted from all subsequent data sets.

In the same response letter (file: “Whitaker & Bushman – Boom Headshot_CR-R3_Cover Letter.doc” dated 3/9/12), the authors also indicated that they created a second dichotomous variable in which a high score represented people who played violent shooting games at least once a month and a low score was for people who played violent shooting games less than once a month. In the response letter the authors provide statistics indicating this dichotomous variable was significantly related to number of head shots. The authors further conclude that this finding provides “*evidence for a long-term link between violent shooting video games (...) and firing accuracy.*” However, this finding is not reported in the published manuscript itself (only the finding concerning the number of games they played which were violent shooters is reported). This is likely because this variable was not actually assessed as described to the reviewer.

In looking at a summary of the study protocol (file: “Video Game Survey (Researcher Created).doc”, dated 10/25/2013) sequestered from Dr. Bushman’s computer it is evident that the researchers never asked about the monthly game habits of *violent* shooting games. The closest variables they assessed simply asked if subjects liked to play shooting games (violent not specified, nor is time mentioned), and a separate question which asked how often subject play video games (unspecified type) in general. It appears the authors seriously mischaracterized their data for the purpose of convincing Reviewer 3 to believe they assessed “monthly-violent shooting game” because of this reviewers concern stated above. This is evidence that nonrandom coding errors occurred even beyond the dependent and independent variables, and that this happened during the review process, long after the data had been collected. Given these errors were uncovered by using files sequestered from Dr. Bushman’s computer, we consider it unlikely in the extreme he was not aware of them at the time he (the corresponding author) and Dr. Whitaker revised the paper.

5. Dr. Bushman’s involvement with the data analysis

Preliminary Assessment (Attachment 7), page 2

On February 19, 2015, we met with Dr. Bushman to review the allegations (attachment 2) and discuss his role in the project. During that meeting, Dr. Bushman indicated that his role on the paper in question was in helping with the design of the research, obtaining IRB

approval, and mentoring and training of Dr. Whitaker but that all of the data collection and analysis were done by Dr. Whitaker.

Dr. Bushman suggested throughout the interview that he was supervising Dr. Whitaker and was not involved in the actual analyses reported in the paper. However, in an email (dated April 22, 2014) that Dr. Bushman saved on his computer (see file: "Data analysis.pdf" dated 4/22/2014), Dr. Whitaker indicates that he conducted some analysis. Specifically, she notes:

I have reviewed all 37(!) iterations of this paper that I have. These results were first reported in a version of the paper dating 10/2/2011, and they were added by you, as detailed by the track changes option. I have attached this version of the paper to this email, titled CR Revision.4. The R-squared values were also added by you in a later revision, titled CR 2-2, also attached to this email.

Dr. Whitaker adds further:

I know that you used the master set of data to conduct these analyses; I remember going over them in your office together.

Consistent with the statements made in this correspondence, the file "Whitaker & Bushman CR Revision.4.doc" (dated 2/10/2011) located on Dr. Bushman's computer also has tracked changes indicating Dr. Bushman added in analyses. It should be noted that this statement both a) implies Dr. Bushman conducted the primary analysis and b) that he had a "master set of data." Therefore, in addition to his supervision, there is good reason to believe Dr. Bushman conducted some of the analyses which ended up in the paper. This directly contradicts his statements made to the CII.

6. Awareness of error rate in the study

Preliminary Report of the CII, September 4 2015, page 4

"However, there were no communications or any other types of evidence presented that refute Dr. Bushman's claims that (1) the "data cleaning" was performed entirely by Dr. Whitaker (Attachment 19, page 10 lines 4-7) and (2) that he was unaware of the number of corrected database errors (Attachment 19, page 22, line 2-11)."

"[H]e was not aware of the abnormally high number of dataset errors in this study (Attachment 19, page 22, line 2-11) (...)"

Preliminary Report of the CII, September 4 2015, page 6

However, the committee found no evidence that Dr. Bushman knew that the primary data for this manuscript had been extensively altered by Dr. Whitaker and the majority of the committee voted that Dr. Bushman did not knowingly publish falsified data.

Transcript of interview with Dr. Bushman (Attachment 19), page 21 line 2 to page 22 line 23

DR. JENNIFER YUCEL: Following along on that, just -- so you saw this was an atypically -- atypically high number of errors in this study. Did you talk to Jodi about trying to figure out what the cause of the errors were, or try to address it as the study was progressing?

DR. BRAD BUSHMAN: Oh, I didn't learn about it until the very end, right? So yeah -- so that's also a problem, you know, if you have -- if you have a careless experimenter at the beginning of a study, chances are that experimenter will be careless throughout the entire study. So, no, we -- she just -- before we submitted it for publication, she checked with the raw data, the data in the computer file that we analyzed, but I don't have those raw data.

DR. JENNIFER YUCEL: And did -- at any time, did you have any concerns about publishing a data set that had such a high error rate that had to be manually corrected, given that it was very atypical for the studies that you -- you allowed typically in?

THE COURT: I -- I didn't know about it until this case came up. I didn't know about the errors. I tell -- I tell -- I mean, Jodi is a seasoned researcher. I tell her to clean the data set, double check for errors. But I didn't -- I didn't -- I wasn't aware of the errors during the experiment or after. I -- after this study was conducted.

DR. JENNIFER YUCEL: So it was not until after it was published and brought to your attention by Dr. Markey --

DR. BRAD BUSHMAN: Yes, correct.

DR. JENNIFER YUCEL: -- did you learn that there was extensive errors in the data?

DR. BRAD BUSHMAN: That's correct.

Based on the statement by Dr. Bushman during the interview, the CII concluded that he was not aware of the unusually high error rate in the coding of the conditions until it was brought to his attention by Dr. Markey. Again, at the time, the only person who could either confirm or contradict this statement in an interview was Dr. Whitaker, who did not communicate with the committee. Based on the statements the committee collected, it was only plausible to conclude Dr. Bushman had no knowledge of the large number of errors.

However, examining the history of the manuscript using the files sequestered from his computer, this statement is not consistent with earlier versions in which the group means reported across the manuscripts dramatically shift. For example, the first version (“Whitaker & Bushman – Boom Headshot.docx”, dated 3/16/2011) shows that Dr. Bushman edited table 2 with different mean values for the 5 conditions (see Figure 1). It is particularly noteworthy that the edited values entered by Dr. Bushman do not match any of the data files we have had access to. What is clear, however, is that this document indicates Dr. Bushman either had

access to the data set that would produce these group means, and/or that he was aware that there were potential significant discrepancies with the mean values given that these mean values do not match those eventually reported in the published manuscript.

Figure 1. Screenshot from “Whitaker & Bushman - Boom Headshot.docx” (3/16/2011).

The screenshot shows a Microsoft Word document with a table and a list of data points. The table is titled 'Table 2. Total hits on target and number of head shots by game type and controller.' and includes a note that standard deviations are in parentheses. The table has three columns: 'Video Game, Controller', 'Total Hits on Target', and 'Head Shots'. The data points to the right list 'Brad Bushman' with 'Gelöscht' (Deleted) values for each row of the table.

Video Game, Controller	Total Hits on Target	Head Shots
Violent Shooting, Pistol 1	8.40 ^a (3.28)	1.00 ^b (1.39)
Violent Shooting, Standard 2	6.52 ^b (3.48)	0.90 ^b (1.29)
Non-violent Shooting, Pistol 3	6.63 ^b (3.22)	1.10 ^b (1.16)
Non-violent Shooting, Standard 4	5.73 ^b c (3.00)	0.73 ^b (0.78)
Non-violent Non-shooting, Standard 5	4.86 ^c (2.00)	0.56 ^b (0.94)
Non-violent non-shooting pistol		

Note. Standard deviations are in parentheses.

Brad Bushman Gelöscht: 8
 Brad Bushman Gelöscht: 2.29
 Brad Bushman Gelöscht: 26
 Brad Bushman Gelöscht: 56
 Brad Bushman Gelöscht: 0
 Brad Bushman Gelöscht: 0
 Brad Bushman Gelöscht: 39
 Brad Bushman Gelöscht: 65
 Brad Bushman Gelöscht: 0.70
 Brad Bushman Gelöscht: 82
 Brad Bushman Gelöscht: 34
 Brad Bushman Gelöscht: 0
 Brad Bushman Gelöscht: 88
 Brad Bushman Gelöscht: 0.99
 Brad Bushman Gelöscht: 6
 Brad Bushman Gelöscht: 38
 Brad Bushman Gelöscht: 14
 Brad Bushman Gelöscht: 81
 Brad Bushman Gelöscht: 83
 Brad Bushman Gelöscht: 5
 Brad Bushman Gelöscht: 2
 Brad Bushman Gelöscht: 1.48
 Brad Bushman Gelöscht: 7
 Brad Bushman Gelöscht: 9

In addition to these changes made in the manuscript file, the SPSS data sequestered from Dr. Bushman’s computer, “Shooter Study VU 2.sav” (VU2) and “Shooter Study VU 3.sav” (VU3), provide additional evidence that contradicts the claim he was not aware of any errors in the data set.

VU2 is dated December 28, 2011. It contains a subset of variables collected in this study (but far from all), among them *Condition* codes; *Realism.Targets*, *Pistol.Controller* (the two independent variables); *Headshots*, *Non.Headshots*, and *Total.Hits* (the three dependent variables). VU3 is dated March 9, 2012 and includes the same variables as VU2 except for *Preferred.Shooting*.

The values for the independent and dependent variables reported in VU3 are identical to the first data set sent by Dr. Bushman on 4/15/14, labelled Original Data in our initial complaint. That is: For 20 cases, VU3 contains Condition codes that do not match with the independent variables (or vice versa), and that, according to the Respondents, were revised when the error was caught (resulting in the data set labelled Revised Data in our initial complaint).

VU2 is a unique data set because it is different in many ways from all other data sets we have seen thus far. First, the values for the independent variables (*Realism.Targets* and *Pistol.Controller*) are identical to those reported in *VU3* (or “original data set”). This time, however, the condition codes perfectly match those values. That is, the condition codes are consistent with the original, unrevised independent variable codes (“correct condition codes” in our initial complaint). We are puzzled by this finding since we now have two data sets that are unequal, but in which independent variable codes match condition codes. This should not be possible if the codes needed revising as indicated by Dr. Whitaker in order to match.

Taken together with Dr. Whitaker’s email mentioning that Dr. Bushman had a “master set of data” that they used in his office (see Major Concern 5), this new evidence contradicts earlier statements:

The respondents claimed that the Original Data contained a number of discrepancies between codes in the variables *Condition*, *Realism.Targets* and *Pistol.Controller* caused by random human error that were caught, corrected, and published as Revised Data. Neither random human error, nor the revision procedure described by Dr. Whitaker can explain why another data set (*VU3*) exists that reports independent variable codes identical to the Original Data and that are consistent with condition codes different from the allegedly correct Revised Data. There is no explanation why there are two different data sets that both have no apparent mismatch between independent variables and condition codes. The finding indicates that conditions codes were revised for other reason than to correct random human error

The discrepancies between data sets were uncovered through two data sets, *VU2* and *VU3*, that have been sequestered from Dr. Bushman’s computer, named in a way that seems to identify Dr. Bushman (since Dr. Whitaker is not affiliated with VU Amsterdam). Dr. Bushman used yet another data set (that we had no access to so far) to compute means that he entered in a manuscript file. These means do not match those eventually reported in the published manuscript. We therefore consider it unlikely that Dr. Bushman himself was not aware of the large discrepancies between them.

Conclusion

- 1) The fact that this paper is still cited in public policy advice makes us concerned that it is important for the sake of public knowledge that this committee's findings be publicized without excessive delay. The new evidence corroborates and deepens our initial concerns about the study.
- 2) There are numerous errors in the coding of the condition which have been confirmed by Drs. Bushman and Whitaker.
- 3) There is statistical evidence suggesting these errors were extremely unlikely to be the consequence of random human error.
- 4) There are now two different data files between which the codes for the dependent variables (headshots, bodyshots, and total shots) have been altered (*VU2* and *VU3*).
- 5) The variable *Preferred.Shooting* in *VU3* contains values that are both arithmetically and logically impossible and appear to be added to the data set post hoc, indicating that variables other than the independent and dependent variables were altered.
- 6) Most importantly, it is clear that at different times both the independent variable and dependent variables were changed between pairs of subjects and that this occurred in a manner which supported the authors' hypotheses and which for which we are unable to come up with an explanation. Therefore we ask that the committee contact Dr. Bushman, Dr. Whitaker, the journal or publisher directly within 2 weeks (**October 5, 2015**) in order to retract this paper. Given that Drs. Bushman and Whitaker have fought our calls for retraction for several months now despite admitted errors and inconsistencies, we are concerned they might not voluntarily retract the paper based on a confidential recommendation from the committee. A recommendation issued by the CII may be necessary to correct the scientific record with a retraction.
- 7) We kindly ask CII to reconsider their assessment of Dr. Bushman's possible role in this situation, given that their conclusions were partially based on counterfactual statements in terms of his communications, his handling of data, his knowledge of the errors, and his involvement in the analysis. Much of the new evidence directly contradicts the statements

made by Dr. Bushman during the investigation. Notably, this new evidence was only uncovered by using manuscript files, data sets, and stored emails sequestered from Dr. Bushman's own computer.

Dr. Patrick Markey, Villanova University

Dr. Malte Elson, Ruhr University Bochum