

## **Additional file 1:**

### **A cross over trial to validate the difference in the level of emotion of intervention videos**

#### **Background**

We conducted a cross-over trial to examine the difference in the level of emotion that two videos aroused and ensure that the intervention video had more emotional content than the control video that were used in the main trial.

#### **Methods**

We randomly allocated participants to different orders to watch the two videos. Group 1 watched the control video first and the intervention video second. Group 2 watched the intervention video first. We asked the participants to score the level of emotion they felt while/after watching the videos using a nine-point Likert scale (0 is none and 8 is strongest) for each of five different types of emotion: happiness, interest, relief, surprise and tension. We adopted these five types of emotion that we intended to arouse with the intervention videos from two studies.(1,2) We used a paired t-test as the primary test of statistical significance of the difference in emotion the two videos aroused. We also conducted a t-test to compare the mean of score difference for each of the five emotions between the two groups and examined the effect of order to watch the videos on the evaluation of emotions.

#### **Results**

We randomised a total of 58 participants, who were researchers and research degree students at the London School of Hygiene & Tropical Medicine. All of them watched and evaluated both videos. One person was randomised, but withdrew because she did not have the internet access in order to watch the videos. She watched neither of the videos. There were no additional withdrawals apart from this participant. All the other participants evaluated both videos.

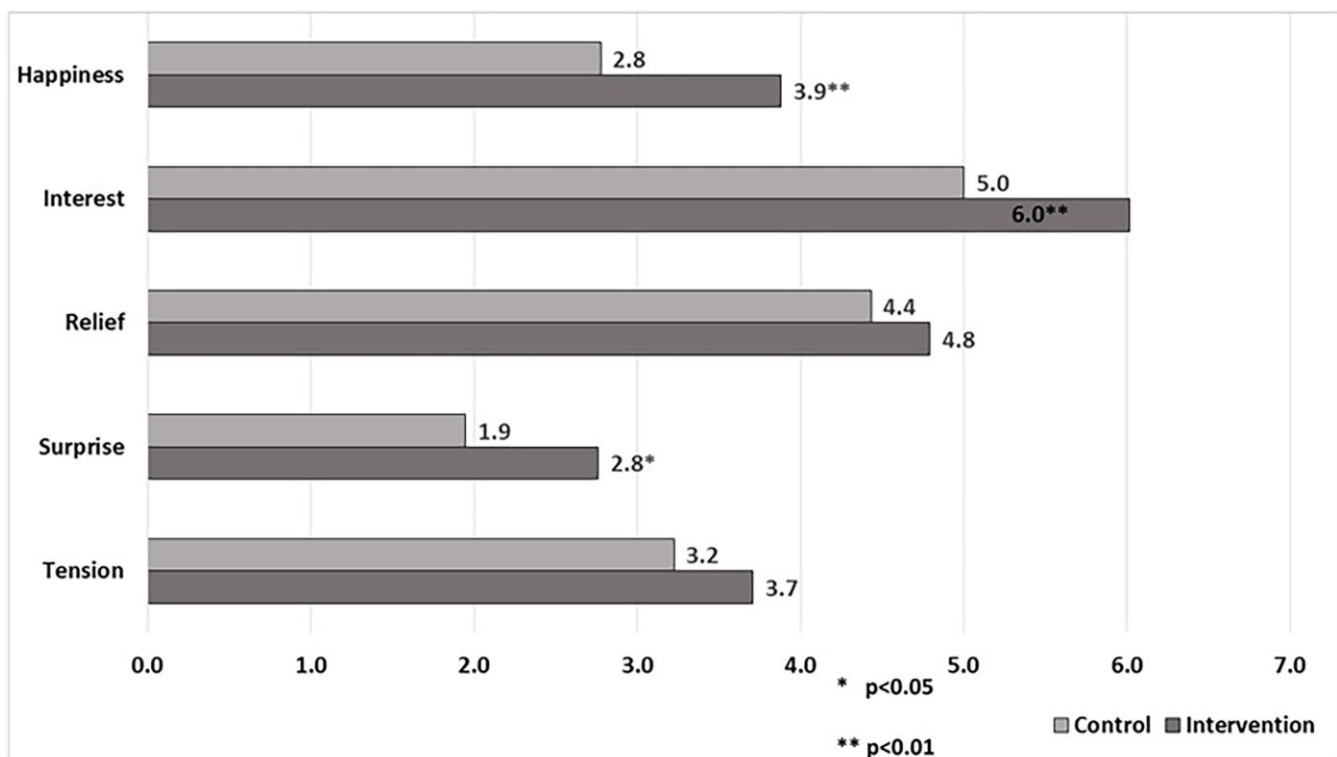
Table 1 presents the average emotion scores for the intervention video and control videos.

**Table 1 Average score for five emotions**

<b>Variable</b>	<b><i>Intervention video</i></b> <b><i>(95% CI)</i></b>	<b><i>Control video</i></b> <b><i>(95% CI)</i></b>	<b><i>Difference</i></b> <b><i>(95% CI)</i></b>	<b><i>P-value</i></b>
<b>Happiness</b>	3.9 (3.2 – 4.6)	2.8 (2.2 – 3.4)	1.1 (0.4 – 1.8)	<0.01
<b>Interest</b>	6.0 (5.6 – 6.5)	5.0 (4.5 - 5.5)	1.0 (0.4 – 1.7)	<0.01
<b>Relief</b>	4.8 (4.1 – 5.5)	4.4 (3.8 – 5.1)	0.4 (-0.5 – 1.2)	0.41
<b>Surprise</b>	2.8 (2.2 – 3.3)	1.9 (1.5 – 2.4)	0.8 (0.1 – 1.5)	0.02
<b>Tension</b>	3.7 (3.1 – 4.3)	3.2 (2.6 – 3.8)	0.5 (-0.4 – 1.3)	0.26

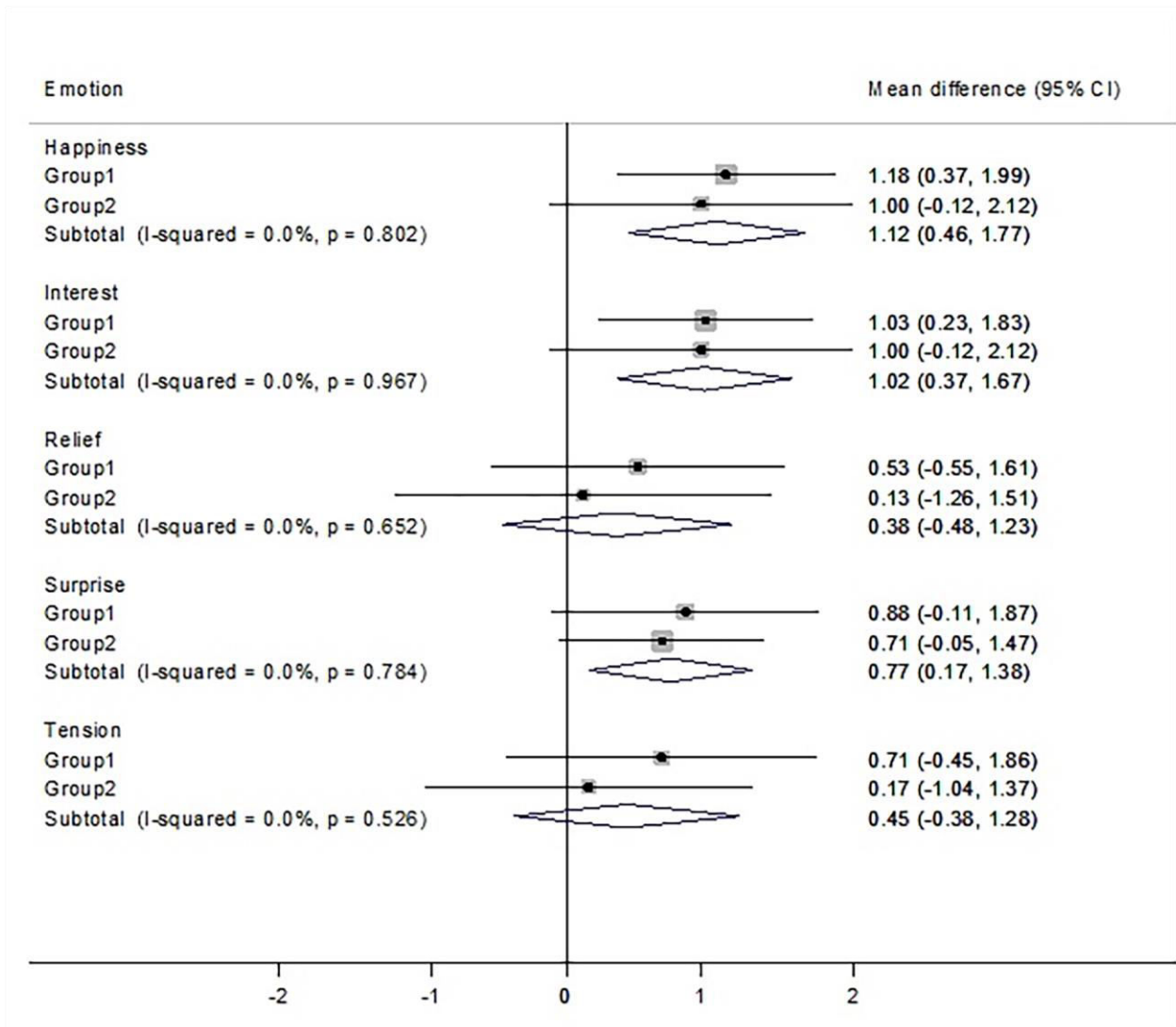
The intervention video aroused stronger emotions than the control video. Three out of five emotions in the intervention video scored approximately one point higher than the control video. This is more than a 10% increase in the level of emotion. Interest was the strongest emotion in the intervention video and showed the second largest difference

between the two videos (intervention video: 6.0 points [95%CI 5.6 to 6.5], control video: 5.0 points [4.5 to 5.5], difference: 1.0 point [0.4 to 1.7],  $p<0.01$ ). The scores for happiness were also high showing the largest difference between videos (3.9 points [3.2 to 4.6], 2.8 points [2.2 to 3.4], 1.1 points [0.4 to 1.8],  $p<0.01$ ). The scores for surprise were the lowest among the five emotions but showed the third largest difference (2.8 points [2.2 to 3.3], 1.9 points [1.5 to 2.4], 0.8 points [0.1 to 1.5],  $p=0.02$ ). There was less of a difference in relief (4.8 points [4.1 to 5.5], 4.4 points [3.8 to 5.1], 0.4 points [-0.5 to 1.2],  $p=0.41$ ) and tension (3.7 points [3.1 to 4.3], 3.2 points [2.6 to 3.8], 0.5 points [-0.4 to 1.3],  $p=0.26$ ). Overall, the intervention video scored higher in all types of emotion (figure 1) providing some evidence that the intervention video aroused more emotion than the control video.



### **Figure 1 Scores for five emotions in the intervention and the control videos**

The t-test did not show strong evidence that the order of watching the videos impacted on the evaluation of the emotions. However, figure 2 shows bigger difference between group 1 and 2 in the mean of score difference between the intervention video and the control video for relief (mean difference in group 1: 0.5 points [-0.6 to 1.7], group 2: 0.1 point [-1.3 to 1.6],  $p=0.65$ ) and tension (0.7 points [-0.5 to 1.9], 0.2 points [-1.1 to 1.4],  $p=0.54$ ).



**Figure 2 Results of the analyses for the five emotions**

## Discussion

This implies that the participants who watched the control video first might have felt relief and tension more strongly than those who watched the intervention video first.

Berger created a scale to measure arousal in three different dimensions (passive-active, mellow-fired up, and low-high energy) using three seven-point scales and averaged them

to compute an arousal index.(3) They asked their participants to evaluate different short films each of which was intended to arouse different types of emotion. Whereas, in the current study, we expected one video to arouse many types of emotion. Therefore, we aimed not to measure arousal in different dimensions but to evaluate the level of different types of emotion aroused. Christie and Friedman used a scale to measure discrete emotions (amused, fearful, angry, sad, disgusted and content) and dimensional emotions (good, calm, unpleasant, passive, excited, negative, relaxed active, positive, agitated, ad and pleasant).(4) They aimed to relate these two different categories of emotions, hence unique categorisation with many types of emotions. The current study aimed to prove that the intervention video and the control video were different in terms of level of emotion aroused. Therefore, we used the five simple but distinct types of emotion.

Table 2 summarises level of emotions aroused by short videos in other studies. The video used in Ekman's study successfully aroused negative emotions in participants. Whereas, the intervention video in the current study aimed to arouse more positive emotions.

**Table 2 Level of emotions in short videos**

<b>Study</b>	<b>Scale</b>	<b>Emotion</b>	<b>Intervention/ positive video</b>	<b>Control/ negative video</b>	<b>Difference</b>
Current study	9-point Likert	Happiness	3.9	2.8	1.1
		Interest	6.0	5.0	1.0
		Relief	4.8	4.4	0.4
		Surprise	2.8	1.9	0.8
		Tension	3.7	3.2	0.5
Ekman et al. (1980)	9-point Likert	Disgust	3.08	4.48	-1.4
		Surprise	3.13	5.14	-2.01
		Sadness	1.25	2.95	-1.7
		Fear	3.13	5.14	-1.01
		Pain	3.42	5.93	-2.51
		Arousal	4.33	6.24	-1.91
		Interest	3.75	4.83	-1.08
Berger & Milkman (2012)	7-point Likert	Mean of 3 feelings (positive/negative mellow/fired-up low/high energy)	3.73	2.92	0.81

## References

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