Supplementary Results

I can See, Hear, and Smell your Fear: Comparing Olfactory and Audio-Visual Media in Fear Communication

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Supplementary Results Study Part I: Senders

The effectiveness of the emotion induction procedure was determined by sweat donors' self-reported feelings. Because Shapiro-Wilk tests indicated that normality assumptions were violated, self-reported feelings data was subjected to non-parametric tests.

A Wilcoxon-signed ranks test revealed that donors reported significantly stronger feelings of anger ($Z = 2.03$, $p = .042$, $r = .72$) and disgust ($Z = 2.39$, $p = .017$, $r = .84$) in the fear condition compared to the neutral condition. Since self-reported anger ($Mdn = 2$) and disgust ($Mdn = 3.5$) scores fell in the lower half of the self-report scale (ranged 1-7), the experienced magnitude of these emotions was relatively weak. Furthermore, the fear and neutral condition did not differ significantly with regard to self-reported happiness ($Z = 1.54$, $p = .125$), sadness ($Z = .41$, $p = .680$), neutral feelings ($Z = .00$, $p = .999$), and surprise ($Z = .71$, $p = .481$). The abovementioned results should be interpreted with caution given the small sample size ($n = 8$). Nonetheless, the combined results (cf. main text) indicate that above all fear ($Mdn = 4$) was triggered in the fear condition, whereas above all calmness ($Mdn = 6.5$) was induced in the neutral condition.

Supplementary Results Study Part II: Receivers

Next, we conducted a further examination of EMG activity averaged over the complete duration of the task (~12 min) as a combined function of olfactory (fear, no fear) and audio-visual (fear, no fear) input. Planned paired t-tests were performed on facial muscle activity (*medial frontalis*, *corrugator supercilii*) indicative of emotional contagion. Relative to the olfactory and audio-visual no fear condition, *medial frontalis* and *corrugator supercilii* activity was increased in the olfactory fear, audio-visual no fear (*medial frontalis*: $t(29) = 2.29$, $p = .03$, $d = .26$; *corrugator supercilii*: $t(29) = 1.82$, $p = .079$, $d = .29$), olfactory no fear, audio-visual fear

(*medial frontalis*: $t(29) = 2.28$, $p = .024$, $d = .19$; *corrugator supercilii*: $t(29) = 3.34$, $p = .002$, $d = .45$), and olfactory and audio-visual fear condition (*medial frontalis*: $t(29) = 4.23$, $p < .001$, $d = .48$; *corrugator supercilii*: $t(29) = 3.54$, $p = .001$, $d = .54$). Interestingly, there were no significant differences between the conditions that contained a single fear signal (olfactory fear, audio-visual no fear vs. olfactory no fear, audio-visual fear condition: *medial frontalis*: $t(29) = .75$, $p = .46$; *corrugator supercilii*: $t(29) = -.72$, $p = .475$). Finally, when fear-inducing audio-visual information was presented together with olfactory fear signals, *medial frontalis* and *corrugator supercilii* activity was increased relative to the olfactory fear, audio-visual no fear condition ($t(29) = 1.66$, $p = .108$; $t(29) = 1.79$, $p = .083$, $d = .21$) and the olfactory no fear, audio-visual fear condition ($t(29) = 3.50$, $p = .002$, $d = .32$; $t(29) = 1.30$, $p = .204$). Although not every comparison yielded a statistically significant difference, the combined results suggest that fear-related information communicated by different media adds up to create an enhanced fear response.

Besides measuring emotional contagion via facial EMG, the Chinese symbol task was used to measure implicit affect. While being exposed to olfactory signals (fear, no fear), each clip (audio-visual fear, no fear) was followed by Chinese symbols that were rated as either less or more threatening than the average symbol. Participants rated significantly more Chinese symbols as threatening ($M = .57$, $SD = .13$) after seeing the fear-inducing audio-visual scenes compared to the no fear scenes ($M = .47$ $SD = .13$) ($F(1,29) = 7.47$, $p = .011$, $\eta_p^2 = .21$). While participants consciously processed audio-visual information, the manipulation that ostensibly escaped their conscious awareness—the presence of sweat—did not significantly impact Chinese symbol ratings ($F(1,29) = .65$, $p = .426$).

To explore whether fear sweat played a role in receivers' reactions toward in- and out-group members, we created a subcategory for the audio-visual fear and no fear condition by

varying the man's group-membership as being either in-group (Caucasian) or out-group (Afro-American). Because there were no significant differences in facial muscle activity between different levels of group-membership (*corrugator supercilii*: $F(1,29) = .06$, $p = .803$; *medial frontalis*: $F(1,29) = .32$, $p = .579$) and the interaction between group-membership and sweat exposure did not reach significance (*corrugator supercilii*: $F(1,29) = .37$, $p = .548$; *medial frontalis*: $F(1,29) = 2.69$, $p = .112$), the levels of the subcategory group-membership were collapsed in the final 2 (olfactory signal: fear, no fear) x 2 (audio-visual signal: fear, no fear) repeated measures analyses.

In sum, olfactory fear signals produced by senders induced fear in receivers, as was evidenced by a fearful facial expression that emerged in a receiver irrespective of the audio-visual information that was co-present in the environment.