RUNNING HEAD: Cross-Modal Integration of Facial and Auditory Cues

Faces and Sounds Becoming One:

Cross-Modal Integration of Facial and Auditory Cues in Judging Trustworthiness

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Abstract

Face processing has mainly been investigated by presenting facial expressions without any contextual information. However, in everyday interactions with others, the sight of a face is often accompanied by contextual cues that are processed either visually or under different sensory modalities. Here, we tested whether the perceived trustworthiness of a face is influenced by the auditory context in which that face is embedded. In Experiment 1, participants evaluated trustworthiness from faces that were surrounded by either threatening or non-threatening auditory contexts. Results showed that faces were judged more untrustworthy when accompanied by threatening auditory information. Experiment 2 replicated the effect in a design that disentangled the effects of threatening contexts from negative contexts in general. Thus, perceiving facial trustworthiness involves a cross-modal integration of the face and the level of threat posed by the surrounding context.

Keywords: Trustworthiness, Face perception, Person perception, Threat, Sounds

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Deciding whom to trust is a key task people have to manage throughout their life (Ames, Fiske, & Todorov, 2011). A good deal of work has shown that one extremely influential source of evidence to ascribe trustworthiness to others is a person's face (for a review, Todorov, Olivola, Dotsch, & Mende-Siedlecki, 2015). Indeed, people rapidly evaluate trustworthiness after minimal time exposure to facial cues and such an evaluation predicts important social outcomes (Willis & Todorov, 2006; Todorov, Pakrashi, & Oosterhof, 2009). For instance, people invest less money with partners who look untrustworthy (Chang, Doll, van't Wout, Frank, & Sanfey, 2010; Rezlescu, Duchaine, Olivola, & Chater, 2012; Stirrat & Perrett, 2010) while trustworthy-looking individuals have a higher chance of being granted loans (Duarte, Siegel, & Young, 2012). Facial trustworthiness also affects decisions about guilt in court, as defendants who have untrustworthy-looking faces are more likely to receive the death penalty (Porter, ten Brinke, & Gustaw, 2010; Wilson & Rule, 2015). Eventually, facial trustworthiness relates to the extent to which a social target is perceived as an opportunity or a threat (Freeman, Stolier, Ingbretsen, & Hehman, 2014) and drives approach/avoidance behaviors (Slepian, Young, Rule, Weisbuch, & Ambady, 2012). In short, perceived facial trustworthiness has far-reaching consequences (Jaeger, Evans, Stel, & van Beest, 2019). Critically, however, the human ability to accurately identify trustworthiness from facial cues is generally poor (Efferson, & Vogt, 2013; Rule, Krendl, Ivcevic, & Ambady, 2013). In this context, defining the factors that push people to perceive human faces as (un)trustworthy would be key to better understanding the role of face perception in shaping impression formation and person perception. Here, we argue that the perceived trustworthiness of a face is influenced by the auditory context in which that face is embedded.

In most studies examining facial trustworthiness, faces are flashed on the computer screen, and evaluation of trustworthiness quickly ensues (for a review, Todorov et al., 2015). Indeed, the evaluation of facial trustworthiness is often thought to be based almost exclusively on facial features and to be relatively immune to the surrounding context. However, in real life, faces are rarely encountered in isolation, and the context in which they appear is often very informative. In line with this reasoning, it has been shown that the interplay between facial and visual contextual cues influences the perception of both emotions (Aviezer, Hassin, Grady, Susskind, Anderson, Moscovitch, & Bentin, 2008; Barrett & Kensinger, 2010; Righart & De Gelder, 2008) and ethnicity (Freeman, Ma, Han, & Ambady, 2013). Thus, disgust, fear, and happiness are more easily recognized in facial stimuli shown against backgrounds of natural scenes with congruent emotional significance (Righart & De Gelder, 2008). In a similar vein, presenting Asian faces in a Chinese-typed scene context eases their categorization as Asian faces, as opposed to presenting the same faces in an American-typed scene context (Freeman et al., 2013). A recent experimental work has also shown that contextual cues influence the processing of facial trustworthiness (Brambilla, Biella, & Freeman, 2018). This study reveals that the evaluation of facial trustworthiness is influenced by the level of threat conveyed by the visual scene in which faces are embedded. Thus, untrustworthy faces are more easily categorized as such when surrounded by threatening visual contexts. By contrast, threatening backgrounds disrupt the categorization of trustworthy faces. These findings build on the link between untrustworthiness and threat (Brambilla & Leach, 2014; Todorov et al., 2015; Willis and Todorov, 2006) and speak to the malleable nature of perceived facial trustworthiness when contextual visual information is available.

The present research sought to extend prior work by investigating whether auditory contexts may impact the perception of trustworthiness. Indeed, in the social environment, the sight of a face is often accompanied by cues that are processed either visually or under different sensory modalities. However, the few studies on the interplay between facial and contextual cues in shaping face perception have focused on visual contexts (Hehman, Stolier, Freeman, Flake, & Xie, 2019) overlooking the auditory features embedded in the context. Thus, it remains unclear how cues coming from different sensory modalities, such as those hitting the visual and auditory systems, are integrated in shaping face perception. Studies have investigated face-voice integration (for a review, Campanella & Belin, 2007) revealing for instance that the categorization of stimuli based on gender is facilitated when the gender of the face and voice is congruent (Freeman & Ambady, 2011; Smith, Grabowecky, & Suzuki, 2007). In a similar vein, the identification of emotions in the face is biased in the direction of the simultaneously presented tone of voice (de Gelder & Vroomen, 2000). Yet, all these studies focused on cross-modal integration of visual (i.e., face) and auditory (e.g., voice) cues inherently tied to targeted human identity (Rezlescu, Penton, Walsh, Tsujimura, Scott, & Banissy, 2015), leaving unexplored the role of the broader social context in which a face is embedded. In other words, how contextual auditory information and facial cues are combined in face perception is poorly understood. The present research aimed to fill this gap by investigating whether the evaluation of facial trustworthiness is biased by the auditory contextual features that surround human faces. This might help to extend prior findings on the factors that affect the processing of facial trustworthiness. Investigating the cross-modal integration of trustworthy-relevant cues is also useful to extend prior work on how information from different sensory channels integrates in person perception. As such, prior work has poorly tested whether auditory contextual cues bias the evaluation of facial features in general and a personality trait (e.g., trustworthiness) in particular.

Considering that prior research has shown that facial trustworthiness and perception of threat are inherently linked (for reviews, Brambilla & Leach, 2014; Todorov et al., 2015), we expect that auditory cues associated with threat could alter the attribution of trustworthiness to faces. Indeed, a good deal of work has shown that the more a social target is perceived as untrustworthy, the more such a target is seen as a source of threat in the eyes of the social perceiver (Brambilla, Sacchi, Pagliaro, & Ellemers, 2013). For instance, untrustworthy ingroup members are perceived as threatening to the image of their group (Brambilla et al., 2013; Leach, Ellemers, & Barreto, 2007; van der Toorn, Ellemers, & Doosje, 2015), while untrustworthy outgroup members are perceived as posing a real and concrete danger to the ingroup's survival possibilities and represent a threat to the group's safety (Brambilla et al., 2013; Brambilla, Sacchi, Rusconi, Cherubini, & Yzerbyt, 2012; Leidner & Castano, 2012). Along this line, functional neuroimaging studies show that detection of trustworthiness in a face is a spontaneous, automatic process linked to activity in the amygdala (Winston, Strange, O'Doherty, & Dolan, 2002), a subcortical brain structure that tends to be implicated in the detection of potentially dangerous and threatening stimuli (Engell, Haxby, & Todorov, 2007; Freeman, Stolier, Ingbretsen, & Hehman, 2014; Todorov, MendeSiedlecki, & Dotsch, 2013; Todorov, Said, Oosterhof, & Engell, 2011; Phelps & LeDoux, 2005).

If auditory contextual cues influence the evaluation of facial trustworthiness, one would expect that perceivers integrate the information conveyed by the context with that carried by the face. Thus, faces would appear more untrustworthy when accompanied by threatening auditory information. This would be in line with prior insights suggesting that threat and facial untrustworthiness are linked and conceptually similar (Todorov et al., 2015; see also Brambilla et al., 2018). In a similar vein, the predicted effect would also be consistent with the notion that “perceiving is for doing” (Fiske, 1992) and that its primary purpose is to guide people in avoiding potentially harmful individuals (Dunning 2004; Zebrowitz & Collins, 1997). As a consequence, when judgments are made under uncertainty and threat, people adopt defensive reactions (Haselton & Buss, 2000). Thus, people should be motivated to perceive faces as more untrustworthy when accompanied by threatening information as a result of an over-protecting strategy (Hammond, 2007). We conducted two experiments to test this hypothesis. The studies that are reported in this paper were approved by the local ethics committee and were conducted according to the guidelines that were established in the Declaration of Helsinki. In the experiments we report all measures, manipulations, and exclusions. Moreover, in the experiments sample sizes were determined before any data analysis.

Experiment 1

Experiment 1 was designed as a first test of our hypothesis that the evaluation of facial trustworthiness is influenced by the auditory context in which the face is embedded. To do so, we asked participants to rate the trustworthiness of faces that were surrounded by either threatening or non-threatening auditory contexts. We predicted that faces would appear more untrustworthy when accompanied by threatening auditory information.

Method

Participants

Fifty-eight Italian students (M_{age} = 23.05, SD_{age} = 4.03, 44 female) volunteered to participate in the study. We advertised the study on campus and all the students who responded within 4 weeks were involved in the study. A sensitivity analysis conducted with G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) showed that our sample was sufficient to detect small-to-medium effects of f = 0.19 (η_p^2 = 0.03) assuming an α of 0.05, and power of 0.80 for a within-participants ANOVA (observed correlation among repeated measures, r = 0.49).

Stimuli

We employed 24 computer-generated identities (12 trustworthy, 12 untrustworthy) borrowed from a set of photos previously validated for facial trustworthiness (Todorov, Dotsch, Porter, Oosterhof, & Falvello, 2013). Specifically, trustworthy and untrustworthy faces had the highest and the lowest levels of trustworthiness, respectively. Given that the stimuli portrayed disembodied faces, we modified them to increase their ecological validity. Thus, we added hairs, necks, and shoulders to the faces (see Figure 1; for a similar procedure, see Brambilla et al., 2018, Experiment 3).

Auditory stimuli (4 threatening, 4 non-threatening) were obtained from public domain websites (soundbible.com, finsound.com). Because we did not want the auditory cues to be somehow attributed to the facial identities, none of the selected stimuli was humanly produced (*threatening sounds:* ambulance siren, bombs exploding, civil defense siren, tornado approaching; *non-threatening sounds:* waves on the beach, chirping birds, seagulls on the seashore, wetlands animals; see Supplementary Materials). Each sound was normalized in its intensity and lasted for 9 seconds. A pretest confirmed that the sounds were perceived as intended. In particular, independent raters (N=32, M_{age} = 23.68, SD_{age} = 4.33) were asked to indicate the extent to which each auditory stimulus was threatening using a scale ranging from 1 (not at all) to 7 (extremely). Results showed that threatening sounds were perceived as more threatening (M = 5.71, SD = 1.21) than non-threatening sounds (M = 1.12, SD = 0.31), t(31) = 21. 94, p <0.001, d = 3.87, 95% CI [2.85, 4.89]. Importantly, scores of perceived threat were above the midpoint of the scale only for threatening sounds, t(31) = 7.97, p < 0.001.

Procedure

Participants were asked to participate in a study on face perception. Once in the lab, they were invited to wear headphones. Participants were told that they would be presented with images of individuals and asked to rate each person on perceived trustworthiness using a 7-point Likert scale (-3: *Untrustworthy*; +3: *Trustworthy*). The experiment consisted of 4 blocks, 2 blocks for each sound condition, alternated in pairs between subjects. Each block was composed of 24 trials, one per each facial identity. Random sequences of 4 homogeneous sounds (all threatening vs. all non-threatening) were played contingently with the onset of faces on the computer screen. The auditory context's sequences were played throughout the entire block without interruption. No time limit was set even though participants were kindly reminded to provide their judgments as fast as possible.

Results and Discussion

One participant was removed from the analyses due to a technical error (i.e., the same sound condition was presented twice). We performed a 2 (Face: Untrustworthy, Trustworthy) × 2 (Auditory Context: Threatening, Non-threatening) within–subjects ANOVA (see Table 1 for descriptive statistics).

The analysis yielded the main effect of the face. Thus, untrustworthy faces ($M = 3.06$, $SD = 1.46$) were rated as more untrustworthy than trustworthy faces ($M = 5.52$, $SD = 1.19$), $F(1, 56) = 199.74$, $p < 0.001$, $\eta_p^2 = 0.78$. We also found the main effect of the context, $F(1,56) = 12.34$, $p < 0.001$, $\eta_p^2 = 0.18$. Indeed, faces embedded in threatening auditory contexts ($M = 4.18$, $SD = 1.84$) were rated as more untrustworthy than faces embedded in non-threatening auditory contexts ($M = 4.39$, $SD = 1.78$). The interaction between the two factors was not significant, $F(1, 56) =1.34$, $p = 0.25$, $\eta_p^2 = 0.02$.

These findings provide initial evidence that the auditory context alters the evaluation of a face's trustworthiness. Indeed, we found that faces appeared more untrustworthy when accompanied with threatening auditory information.

Experiment 2

Experiment 2 was designed to replicate and extend the findings of Experiment 1 by investigating whether the effects we found are specific to threatening contexts or indicate more general effects of negative auditory contexts. To do so, we included a further experimental condition and asked participants to evaluate the trustworthiness of faces that were embedded in either threatening, negative but unthreatening, or neutral auditory contexts.

Method

Participants

Fifty-six Italian students (M_{age} = 22.89, SD_{age} = 2.26, 40 female) volunteered to participate in the study. We advertised the study on campus and all the students who responded within 4 weeks were involved in the study. A sensitivity analysis conducted with G*Power (Faul et al., 2007) showed that our sample was sufficient to detect small-to-medium effects of f = 0.18 (η_p^2 = 0.03), assuming an α of 0.05, and power of 0.80 for a within-participants ANOVA (observed correlation among repeated measures, r = 0.47).

Stimuli

We used the same 24 computer-generated identities (12 trustworthy, 12 untrustworthy) of Experiment 1. To increase the validity and robustness of our findings, Experiment 2 employed a different set of auditory contexts. The stimuli (3 neutral, 3 negative, and 3 threatening) were either taken from online repositories (findsound.com; *negative sound*: jackhammer) or extracted from the International Affective Digitized Sounds (IADS-2, Bradley & Lang, 2007; *negative sounds:* broken car, drill*; threatening sounds*: traffic jam, house explosion, laser beam*; neutral sounds:* pinball sounds, claps, doorbell). Each sound was normalized in its intensity and lasted for 6 seconds (see Supplementary Materials).

Two pretests confirmed that the sounds were perceived as intended. In particular, independent raters (N=31, M_{age} = 28.10, SD_{age} = 5.08, 18 female) were asked to indicate the extent to which each auditory stimulus was threatening using a semantic differential ranging from -3 (threatening) to +3 (reassuring). A second sample (N=29, M_{age} = 29.05, SD_{age} = 8.05, 20 female) rated the stimuli on valence using a scale ranging from -3 (negative) to +3 (positive).

For the sake of consistency with Experiment 1, scores were reversed, meaning that for both scales higher scores indicated a more threatening or negative evaluation. Moreover, scales were transformed to range from 1 to 7. Thus, sounds differed significantly on threat, *F*(2, 60) = 83.54, *p* = <0.001, η_p^2 = 0.73. Threatening sounds were perceived as more threatening (*M* = 5.92, *SD* = 0.95) than negative sounds (*M* = 5.26, *SD* = 0.97), *t*(60) = 4.00, *p* = 0.005, *d* = 0.51, 95% CI [0.24, 0.77], and neutral sounds (*M* = 3.83, *SD* = 0.83), *t*(60) = 12.64, *p* <0.001, *d* = 1.61, 95% CI [1.23, 1.99]. Negative sounds were perceived as more threatening than neutral sounds, *t*(60) = 8.64, *p*<0.001, *d* = 1.10, 95% CI [0.78, 1.42]. Importantly, scores of perceived threat were above the midpoint of the scale for threatening sounds, *t*(30) = 11.19, *p* < 0.001.

Moreover, the sounds differed in valence, *F*(2, 56) = 72.39, *p* = <0.001, η_p^2 = 0.72. Threatening (*M* = 6.08, *SD* = 0.85) and negative sounds (*M* = 5.80, *SD* = 0.80) were perceived as not different from each other, *t*(56) = 1.38, *p* = 0.51. By contrast, both threatening and negative sounds were rated as more negative than neutral sounds (*M* = 3.87, *SD* = 0.94), *ts* > 9.66, p*s* < .001, ds > 1.27. Confirming that neutral sounds were perceived as intended, their scores did not differ from the midpoint of both the threat and valence scales, *t*(30) = 1.07, *p* = 0.29 and *t*(28) = 0.72, *p* = 0.47, respectively. To summarize, threatening and negative sounds were comparable in terms of valence, but differed in perceived threat. Neutral sounds were perceived as neutral on both dimensions. The selected sounds were then elaborated to recreate 5 pseudo-random sequences per category.

Procedure

As in Experiment 1, participants were asked to participate in a study on face perception. The procedure of the experiment closely resembles the procedure used in Experiment 1, except for two differences. First, although no time boundaries were set, whenever participants took longer than 6000ms to respond, a message appeared on screen reminding them to provide a response as fast as possible. Second, the experiment consisted of 3 blocks of 24 trials, 1 block for each sound condition. Because the inclusion of an additional experimental condition to the design of Experiment 1 would have led to 144 trials, we decided to administer one single block for each sound condition. Thus, the experiment included a total of 72 trials.

Results and Discussion

We conducted a 2 (Face: Untrustworthy, Trustworthy) × 3 (Auditory Context: Threatening, Negative, Neutral) within–subjects ANOVA (see Table 2 for descriptive statistics).

As expected, we found the main effect of face trustworthiness, $F(1, 55) = 241.18$, $p = <0.001$, $\eta_p^2 = 0.81$. Untrustworthy faces (*M* = 2.95, *SD* = 1.26) were rated as less trustworthy than trustworthy faces (*M* = 5.15, *SD* = 1.25). More importantly, the analysis yielded the main effect of context, $F(1, 110) = 6.17$, $p = 0.002$, $\eta_p^2 = 0.10$. Pairwise comparisons with Bonferroni adjustment showed that faces were rated as more untrustworthy when surrounded by threatening sounds (*M* = 3.92, *SD* = 1.68) than negative sounds (*M* = 4.12, *SD* = 1.65), $t(110) = -3.13$, $p = 0.006$, $d = -0.30$, 95% CI [-0.49, -0.11]. Moreover, faces were rated as more untrustworthy when surrounded by threatening sounds than neutral sounds (*M* = 4.10, *SD* = 1.67), $t(110) = -2.93$, $p = 0.01$, $d = -0.29$, 95% CI [-0.47, -0.09]. However, scores did not differ between negative and neutral contexts, $t<1$. As in the previous experiment, the interaction was not significant, $F(2, 110) = 0.67$, $p = 0.50$, $\eta_p^2 = 0.01$.

General Discussion

Two experiments showed that the auditory context in which a face is encountered alters trustworthiness evaluation. Experiment 1 showed that faces were judged as more untrustworthy when presented with threatening rather than non-threatening auditory cues. Experiment 2 corroborated these findings in a design that enabled us to disentangle the effects of threatening contexts from negative contexts in general. The results of this study confirmed that untrustworthiness and threat are inherently associated, as faces appeared more untrustworthy when accompanied by threatening rather than negative or neutral contextual sounds. Thus, the contextual effects we found were specific to the compatibility of a face's trustworthiness with the threatening nature of the auditory context rather than a mere negative valence associated with context.

Our findings extend prior research on the factors influencing the detection of facial trustworthiness. A good deal of work has shown that people evaluate trustworthiness after minimal time exposure to faces without any contextual information (for a review, Todorov et al., 2015). More recent research has considered the role of environmental cues in shaping the evaluation of facial trustworthiness. As a case in point, Brambilla and colleagues (2018) proved the importance of considering the visual context, showing that faces are more easily categorized as untrustworthy when surrounded by threatening scenes. The data from the present investigation add further evidence in support of the idea that judgments of facial trustworthiness can be modified when individuals perceive the context at the same time. Thus, our findings reveal that the perception of trustworthiness from faces is malleable, as it is readily pushed around by the surrounding context. In shedding light on the importance of contextual information on face processing, we complement prior insights by revealing that extraneous information tied to a different sensory modality (i.e., auditory context) may influence the evaluation of personality traits from faces.

Our work further extends prior work on cross-modal integration in shaping face perception and person impressions. Indeed, most studies in this area have considered face-voice integration (for a review, Campanella & Belin, 2007) overlooking the role of the broader context in which a face is embedded. Our data reveal that the cross-modal integration of facial and contextual auditory cues influences person perception. Thus, our findings suggest that extraneous information untied to human identity is likely to influence impressions. To fully capture how face perception influences social relationships, it would be key to consider the broader environment in which the faces are embedded.

Importantly, our research supports prior insights revealing that trustworthiness and threat are inherently linked (for a review, Brambilla & Leach, 2014). This idea is corroborated by research showing that the perception of trustworthiness involves the amygdala, which is also involved in the detection of potentially threatening stimuli (Willis & Todorov, 2006). We broaden previous findings by showing that the interplay between threat and facial trustworthiness emerges even when considering threatening information related to different sensory modalities. Furthermore, we examined in depth the idea of a preferential link between trustworthiness and threat: we showed that negative auditory context stimuli pretested to be matched with threatening stimuli in negativity, but not in threat, did not influence the evaluation of facial trustworthiness. Therefore, our results suggest that only when threatening cues are integrated into the processing of a facial stimulus, the trustworthiness attributed to such stimuli vary accordingly. Based on these findings, an intriguing avenue for future research would be to test whether the effects obtained generalize to other traits inferred from faces (e.g., competence and dominance) or if they are specific to trustworthiness which may provide an additional evidence of the specificity of the threat-trustworthiness linkage.

The present work relied on a framework that theorizes the dimensions of social perception (including trustworthiness) as inherently continuous (Todorov et al, 2015). Thus, we asked participants to rate facial trustworthiness explicitly by using Likert scales. Naturally, one may ask whether the effects obtained may influence other processes, including the binary categorization of faces as untrustworthy or trustworthy. This would have implied asking participants to evaluate faces in a dichotomous, forced-choice design. Future research might explore this possibility, even considering more subtle and indirect measures. In Experiment 1 we attempted to explore this possibility by further asking participants to evaluate faces by using a mouse-tracking paradigm

(Freeman & Ambady, 2010). However, such findings were inconclusive. For the sake of clarity and transparency, we reported those findings in the supplementary materials and offered explanations for the inconsistencies. Clearly, how implicit and explicit ratings are influenced by face-context integration remains an interesting topic that should be investigated by future research.

In sum, our work highlights the importance of embracing the role played by environmental cues in perceiving trustworthiness from faces. In fact, judging someone as either trustworthy or untrustworthy has relevant consequences (Porter, ten Brinke, & Gustaw, 2010; Wilson & Rule, 2015). Importantly, we show that the attribution of trustworthiness can be biased by the auditory environment in which a person is encountered, such that people tend to misattribute the threat carried by the auditory (irrelevant) stimulus, to one's identity. This phenomenon has major implications for daily life situations in which an unknown individual happens to be encountered in a threatening environment, where the threatening component has nothing to do with the individual. For instance, some environments are inherently characterized by threatening cues (i.e., in neighborhoods with high crime rates, the sound of police sirens is often heard) and can therefore negatively affect our tendency to help an unknown passerby asking for directions. In a similar vein, interacting with people in a traffic jam (which is perceived as a source of threat and distress, see the reported pretest) might influence our perception of and disposition toward them. Being aware that such an evaluation might follow from a misattribution process can dramatically change our tendency to jump to hasty conclusions with regard to forming impressions about others.

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Supplementary Materials

The materials are publicly available at https://osf.io/6t2sm/

Figure 1. Sample face stimuli. A trustworthy (left) and an untrustworthy (right) facial stimuli.

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Table 1. Means and standard deviations for responses as a function of face and auditory context (Experiment 1)

	Face	
Sound	Untrustworthy	Trustworthy
Threating	2.93 (1.45)	5.44 (1.23)
Non-Threatening	3.19 (1.46)	5.59 (1.16)

Note: Standard deviations are reported in parenthesis.

Table 2. Means and standard deviations for responses as a function of face and auditory context (Experiment 2)

	Face	
Sound	Untrustworthy	Trustworthy
Threatening	2.83 (1.23)	5.00 (1.33)
Negative	3.05 (1.30)	5.20 (1.21)
Neutral	2.97 (1.24)	5.24 (1.20)

Note: Standard deviations are reported in parenthesis.