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Smile authenticity and trustworthiness in a one-shot trust game

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The aim of this study was to examine the effects of temporal aspects of facial expressions on strategic choices in a bargaining game. Past research has shown that facial expressions can serve as a signal for cooperative behaviour in social dilemma paradigms (see Boone & Buck, 2003) and sequential trust games (see Eckel & Wilson, 2002). In particular, smiling facial expressions have been found to positively affect cooperation and trust (Scharlemann, Eckel, Kacelnik, & Wilson, 2001). However, previous studies have been limited with respect to the quality of the facial expressions involved. Given that humans have the ability to produce false smiles, the role played by the smile expression in games that have financial stakes may depend on much more than the ability to *recognise* an expression such as a smile. The present research aimed to address this limitation by studying how smiles with different temporal qualities influence behaviour in a one-shot trust game.

Ninety students (50 females, 40 males) at Cardiff University were presented with a trust game in which they had to decide whether to keep a specified amount of money (endowment), or exhibit "trust" by passing the choice to a second player. The structure of the game was similar to that of Scharlemann et al. (2001). If the participant chose to pass the money to the other player, there were potential gains for both players provided they engaged in reciprocal trust. The participant's initial "trusting" move was crucial because the second player then had an incentive to quit, leaving the first player (participant) worse off; but if that trusting move was reciprocated, then both players would be better off. At the end of the study, participants were paid in cash the amount of money they earned.

Before participants made their decisions about whether or not to cooperate they were shown one of several short video sequences of their apparent counterpart. They were led to believe that they would be playing with this person, although the 'other player' was in fact a pre-programmed strategy and always reciprocated. The other player shown in the video sequences was one of three different actresses who posed either a neutral expression or one of two dynamic smile expressions that differed in onset-, apex-, and offset durations. Smiles with long onset- (20 frames) and offset-durations (53 frames) and a relatively short apex-

duration (47 frames) were classified as *authentic* smiles. *Fake* smiles were characterised by short onset- (9 frames) and offset-durations (10 frames) and a long apex-duration (101 frames). Parameters were derived from two previous studies (Krumhuber & Kappas, 2005; Krumhuber, Manstead, & Kappas, in press) showing that the perceived genuineness of smiles increased as a function of onset- and offset-durations, and decreased as a function of apex-duration. All smiles were computer animated and lasted 120 frames (i.e., 4 seconds).

We measured cooperative behaviour in the trust game (keeping the endowment or passing the choice to the other player). In addition, participants rated their counterpart with respect to each of 13 attributes and reported how trusting, how uncertain and how relaxed they felt during the game. They then rated a) how much they would like to be paired with the same counterpart or a different one if they were to play the bargaining game again (prefer same), b) how likely it was that they would make the same decision again (same decision), and c) how much they would like to meet the counterpart outside the context of this research (meet).

Using principal components analysis the 13 attributes including the self-report measures were grouped into two scales: *trustworthiness* ($\alpha = .89$) and *positive emotionality* ($\alpha = .75$). A 2 x 3 x 3 (Sex x Encoder x Condition) MANOVA was performed on these two factors and on the 3 behavioural intention measures (prefer same, same decision, meet). Results revealed a significant multivariate effect only for Condition, $F(10, 136) = 23.09$, $p < .001$. It was univariately significant for trustworthiness, $F(2, 72) = 160.75$, $p < .001$, positive emotionality, $F(2, 72) = 85.05$, $p < .001$, prefer same, $F(2, 72) = 37.58$, $p < .001$, and meet, $F(2, 72) = 29.12$, $p < .001$. Counterparts displaying an authentic smile received higher ratings on measures of trustworthiness and positive emotionality than did their fake smiling or non-expressive counterparts. Participants with authentically smiling counterparts also expressed more willingness to be paired with the same counterpart again and to meet outside the context of the research.

A chi squared analysis showed that participants were more likely to cooperate with counterparts when they displayed an authentic smile than a fake smile or neutral expression $\chi^2(2) = 25.62$, $p < .001$. Ninety-three percent of participants with an authentically smiling counterpart trusted her; 63.3% of participants with a fake smiling counterpart trusted her; and 30% of participants with a non-expressive counterpart trusted her.

To explore the possibility that perceived trustworthiness of the counterpart mediated the effects of condition on cooperative behaviour, a series of regressions was conducted. Condition was found to be a significant predictor of cooperative behaviour ($B = .66$, $p < .05$)

and trustworthiness (B = .29, $p < .01$). Similarly, trustworthiness predicted cooperative behaviour significantly (B = 1.84, $p < .001$). However, when controlling for the mediating role of trustworthiness, condition no longer predicted cooperative behaviour significantly (B = .50, $p > .05$).

The results of this study clearly show that the temporal quality of facial expressions influenced participants' cooperative choices in the bargaining game. When paired with a counterpart who displayed a fake smile or a neutral expression, participants cooperated less often than when they were paired with an authentically smiling counterpart. They also attributed less positive emotion to these counterparts, preferred a different counterpart, and were less inclined to meet them after the study. This suggests that the temporal quality of facial displays acts as a powerful cue in influencing cooperation and future behavioural intentions. Further analyses showed that this link is mediated by the perceived trustworthiness of the counterpart. These findings are novel in showing for the first time that trustworthiness mediates the influence of facial expressions on cooperation. Future research on the influence of facial displays on trust behaviour in cooperative situations needs to take account of dynamic properties of these displays.

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