

SHORT COMMUNICATION

Concealing Facial Evidence of Mood: Perspective-taking in a Captive Gorilla?

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ABSTRACT. A captive female lowland gorilla was observed repeatedly to hide or inhibit her playface by placing one or both hands over the face. When this behaviour was seen play usually did not follow immediately, even if other signals associated with play were simultaneously being made by the gorilla. By contrast, a playface predicted that play would follow within a few seconds; this difference was statistically reliable. Several levels of interpretation of the behaviour are possible: hiding the playface may have functioned as a form of deception, a meta-communication, or merely an attempt to suppress the playface. However, by any of these interpretations, the behaviour implies that the gorilla is aware of her spontaneous facial expressions and the consequences they entail. Among the great apes, manual suppression of a facial expression has previously been reported once for chimpanzees but never for gorillas.

Key Words: Gorillas; Deception; Facial expression; Nonverbal communication; Gestures; Self-awareness.

INTRODUCTION

DE WAAL's observation of facial self-correction in a zoo-dwelling chimpanzee (DE WAAL, 1982) has to our knowledge never been replicated, despite extensive requests to the research community (BYRNE & WHITEN, 1985; WHITEN & BYRNE, 1988). This valuable report has been used as evidence for chimpanzee intentionality (JOLLY, 1991; DE WAAL, 1986; GOODALL, 1986). In this paper we report observations of facial self-correction of the "playface" in a lowland gorilla that bear similarity to DE WAAL's unique chimpanzee observation. The actions, which we label Hide Playface (though they show some variation in form), appear sometimes to be useful in deception; in other cases they may function as meta-communication modifying the more spontaneous and less controllable message of the playface, or merely reflect unsuccessful attempts at inhibition of the playface. Whatever precise interpretation is warranted, the actions seem to imply awareness by the gorilla of her facial expression and the behavioural results it produces.

METHOD AND SUBJECTS

Videotaped observations were made of the lowland gorilla group at the San Francisco Zoo in the course of a study of the untaught gestures of captive lowland gorillas (TANNER & PATTERSON, 1992). None of the San Francisco gorillas have received any deliberate instruction in human modes of communication.



Fig. 1. *Zura* hides her playface.

At the midpoint of the observations in March 1989, the San Francisco group consisted of six gorillas. The two adult males, *Kubie* (age 13) and his father *Bwana* (age 31), had been engaged in conflict over dominance in the group for several years. *Kubie* was at this time capable of displacing *Bwana* without much effort. However, when *Kubie* sometimes acted too aggressively toward one of the females (*Zura*, age 7; *Bawang*, age 8; *Pogo*, age 31) or *Bawang's* infant *Shango*, *Bwana* would actively intervene, often with the support of other group members. With this support, *Kubie* would lose (i.e. back away) in interactions. *Zura* was at the time of the study *Kubie's* most frequent play partner and the two occasionally mated.

Twenty-two hr of videotape, recorded between October 1988 and September 1989, were examined. The behaviour categorized as Hide Playface was noted 26 times, during 10 separate episodes of social interaction on 8 different days scattered over an 8-month period. Of the group only *Zura*, the 7-yr-old female, performed this action, and it occurred during play sessions with *Kubie*, the younger male.

Hide Playface was performed by placing one or both open, curved hands over the mouth and lower face area and holding the hands in place for a variable length of time, from less than one sec to six sec, with median length between one and two sec (see Fig. 1). In 24 out of the 26 instances of Hide Playface recorded, it was possible either to see the appearance of a playface before the hands were raised to the face, to see a portion of a playface beneath the hands, or to see a playface after the hands were dropped.

RESULTS

We feel confident in the intentional nature of Hide Playface because, of the 22 instances where the animals' relative positions could be ascertained, 21 were performed when *Kubie* and *Zura* were directly in each other's line of vision. We hypothesized that Hide Playface is a means of delaying onset of play or preventing resumption of play after a break, whereas Playface alone is a good predictor that play will begin soon. In the course of rough and tumble wrestling and mock-biting play, which was the usual mode of play for the two gorillas in these episodes, the animals often break contact at intervals. Therefore, in order to test the hypothesis, the 26 instances of Hide Playface were compared with 26 control

Table 1. Effect of Hide Playface on the timing of play onset.

Delay to play onset	After Playface	After Hide Playface
4 sec or less	24	8*
5 to 10 sec	0	2
10 sec or greater	2	16
	$n = 26$	$n = 26$
chi-square = 20.889	$p < 0.001$	

*In three of these cases, *Kubie* "play attacked" *Zura* even though she was attempting to back away at the same time.

instances of Playface which occurred after pauses in play between the two gorillas. Control instances were chosen for each Hide Playface, so that each instance was as close as possible to a Hide Playface. Usually a suitable control instance was found on the same day of observation as the Hide Playface; where several were found, that nearest in time to the Hide Playface was used. If none were found on the same day, an instance near the following Hide Playface was chosen, but no instance was used twice. Thus, underlying motivational state was likely to be similar for both Hide Playface and control, and any effect found should be due to the act of hiding the playface. The time between appearance of each Playface or Hide Playface and onset of play (i.e. physical contact) was noted. The results appear in Table 1, and confirm that Hide Playface was significantly associated with delayed play. (Note that the statistical test is made on acts of one individual, thus the

Table 2. Context and sequel of Hide Playface signals.

Case No.	Rough play	Third party interference	Seconds delay to play	Approach by <i>Zura</i>	Approach by <i>Kubie</i>
17	+	-	12	+	-
18	+	-	8	-	+
19	+	-	Long	-	-
20	+	-	1	+	-
23	+	-	Long	-	-
24	+	-	1	+	-
25	+	-	Long	-	-
8	+	+	4	+	-
2	-	+	Long	-	-
3	-	+	Long	-	-
4	-	+	Long	-	-
5	-	+	3	-	+
6	-	+	60	+	-
7	-	+	25	+	-
13	-	+	2	-	+
1	-	-	2	-	+
9	-	-	Long	-	-
10	-	-	Long	-	-
11	-	-	4	+	+
12	-	-	10	+	-
14	-	-	7	+	-
15	-	-	60	-	+
16	-	-	4	+	-
21	-	-	Long	-	-
22	-	-	60	-	-
26	-	-	Long	-	-

Long: Cases in which no play occurs during the rest of the episode, or at least up until the next instance of Hide Playface. +: Behaviour seen; -: behaviour absent.

finding is only reliable for the future acts of this one individual, and cannot generalize to other gorillas.)

We provide descriptions of two episodes where Hide Playface was used. More detail of all 26 instances are given in Table 2, which explores the possibility that Hide Playface is used where play is becoming too rough or a third party threatens to interfere.

In the first episode, the function of Hide Playface seems to be deception, as part of play itself, in order to get the best of the play partner.

Episode 1: (Context: *Zura* and *Kubie* pause after a long series of play interactions, in which *Zura* has several times attempted to surprise *Kubie* by oblique approaches but has been unable to get the best of him.) *Kubie*, whose back is turned to *Zura*, now sits toying with a branch. *Zura* sits near the doorway of the gorilla house, about 6m from *Kubie*. A min and a half later, *Zura* Hides Playface quickly with a "wiping-off" motion; when she removes her hand the playface is gone. At the same instant she stands quadrupedally. She waits for about 15 sec and then runs to a rock ledge which is slightly closer to *Kubie*'s location. There she again Hides Playface quickly. After five more sec she looks decidedly away from *Kubie*'s location, then suddenly runs to *Kubie*, who is now reclining on his elbows facing her, but with his gaze toward the ground. She jumps onto his back, slides down and off of it, and runs back to the spot she started from. *Kubie* appears to be surprised, sits up, and looks in her direction pursing his lips. *Zura* gets a playface again when *Kubie* looks at her but immediately Hides Playface, "wiping" the playface off. The playface does not appear again; in fact, six sec later she lifts and intently studies her foot. A little later, both make play signals, wrestle, and play intermittently for about a min. They then separate but remain facing each other. When *Zura* gets a playface, she Hides Playface briefly and the playface is gone. Immediately the two gorillas separate and go off in different directions.

Possible Interpretation: *Zura* appears to try to deceive *Kubie*, in order to surprise him with her play "attack." She does this partly by her ability to very rapidly manage the disappearance of her playface and also by her method of movement and direction of gaze in approaching *Kubie*, evidence that *Zura* is concerned about his visual perspective. The last Hide Playface functions as a mutually understood signal that no more play is desired.

In the second episode, which took place about eight months earlier than **Episode 1**, Hide Playface is apparently performed because of the presence of a third party. In spite of his interruption, which inhibits play, the two interactants are quite able to see each other's signs of play motivation.

Episode 2: (Context: *Kubie* and *Zura* have initiated play in a favorite location, an artificial rock structure which affords some visual privacy both from other gorillas and to some extent from zoo-goers.) *Kubie* and *Zura*'s play session, involving wrestling with chuckling vocalizations, is interrupted by the appearance of *Bwana*. Both *Kubie* and *Zura* show ambivalence about continuing play. *Kubie* scratches and glances around nervously. *Zura* begins to leave the area, but returns and makes an arm-shaking play signal, at which *Bwana* moves out of view. *Kubie*, facing *Zura* but seated perhaps 2m away, also begins to make play signals, such as chest-knocking (a silent, playful version of chestbeating). *Zura* continues to make play gestures and gets a playface, but immediately Hides Playface, and neither gorilla approaches the other. Both gorillas make more play gestures during the next 30 sec but do not approach each other. At one point *Kubie* makes a playful fingerbiting gesture with one hand, but raises his other hand and pushes the gesturing hand away from his mouth. *Zura* gets a playface three times but each time Hides Playface. Then *Zura* begins to move away from *Kubie* and he approaches her, making play gestures. *Zura* gets a playface but Hides Playface and continues to back away. *Kubie* grabs her and they begin to play wrestle with soft hooting vocalizations. A few seconds later *Bwana* reappears and the wrestling immediately stops.

Possible Interpretations: Hiding the playface may here have been: (1) intended as a communication to *Kubie* that play is undesirable in the current situation, in spite of the conflicting (unintentional)

message given by accompanying play-associated gestures; and (2) intended as meta-communication on the message that play is desired, but at the moment needs to be controlled or postponed in order to prevent further interference from *Bwana*.

In **Episode 2**, *Kubie* as well as *Zura* suppressed play signals; *Kubie* by knocking away with one hand a Bite gesture done by the other hand, and both gorillas by using nearly silent gestures such as chestknocking and armshaking rather than other common gestures that have a strong auditory component, such as chestbeating or slapping and knocking on the rock surfaces. Though suppression of vocalizations by gorillas has previously been reported (BYRNE & WHITEN, 1990), we cannot assess vocal suppression in the present episodes, as our methods were not suitable for reliable recording of vocalization.

DISCUSSION

Concealment and sometimes consequent inhibition of the "playface" was a frequent behaviour of a captive gorilla. The effect of the facial hiding was to delay onset of play. For humans, hiding the face with a hand appears in every culture (EIBL-EIBESFELDT, 1972) and has been observed in children as early as the age of 19 months (V. REDDY, pers. comm). It seems to function to attempt to prevent inappropriate but uncontrollable emotions from being visible. It can also be an action of ambivalence in situations where there is a conflict between approach and flight. *Zura's* usage appears to be very similar to these human ones, yet with the exception of DE WAAL's chimpanzee observation, manual concealing or suppression of facial expression has not been described in other primates. Observations of a group of young captive chimpanzees has shown that these apes are aware of the visual effect of the facial expressions on others, for they use attention-getting gestures to get play partners to look at their playfaces (TOMASELLO et al., 1989).

The behaviour Hide Playface was seen in only one individual in the group. An important question raised when an innovation is observed in non-human primates is that of the conditions which promote such behaviour (KUMMER & GOODALL, 1985). *Zura* fits several of the circumstances which KUMMER and GOODALL suggest may favor innovation. She was the youngest, smallest, and most subordinate member of her group, presumably in need of forming a successful alliance with a potential mate but with problems of size and age differences and of interference from other members of the group. She was in a captive group with the time and energy available for play and for exploration of alternative routes of action, and in a physical situation which for a zoo is quite spacious and environmentally varied.

The gorilla's usage of hands to conceal her expression, whether it functioned as deception or meta-communication, suggests knowledge by the animal of the consequences of certain muscle tensions in its face. Further, the association of this manual concealment with delay or non-occurrence of play suggests awareness that the playface can cause a certain behavioural outcome, so alteration of the signal might change the result. However, no such interpretation would be warranted if the gorilla had simply learned to associate her gesture with a favorable outcome in certain circumstances, after an original coincidence of happening to cover her face at just the time when play was unwanted: an interpretation as operant conditioning would be more parsimonious. We believe this unlikely, for two reasons. Firstly, covering the face is not a normal part of the gorilla behavioural repertoire; only behaviours that occur at a baseline rate can be selected by operant conditioning (except by the deliber-

ate "shaping" techniques devised by humans). Secondly, she was not seen to hide her face when solitary (though she often gestured in idiosyncratic ways when alone), but only when she was in the line of sight of her play partner. Thus, the gorilla's behaviour seems to imply that she was able to take the mental perspective of others into account; she understood that facial expression reveals motivation to others.

Though some information has called into question any such higher order behavioural capacities in the gorilla (GALLUP, 1988), recent evidence may resolve the conflict. This includes confirmation that at least one human-reared gorilla can appropriately use mirrors (PATTERSON & COHN, in press); the account of a young gorilla developing from treating humans as objects to treating them as causal agents (GOMEZ, 1991); and reports of numerous cases of deception, some suggesting an intent to deceive (MITCHELL, 1989, 1991; BYRNE & WHITEN, 1990, 1992). Facial self-correction (when conditioning explanations can be ruled out), like these abilities, implies "second order" representation or intentionality (WHITEN & BYRNE, 1991; DENNETT, 1983). The fact that the alteration is made manually means that for the gorilla, at least at a certain stage of development, the hands are under more voluntary neurological control than the facial muscles (as has been argued for the chimpanzee on the basis of a similar observation, DE WAAL, 1986). This lends support to the argument that if we are to seek evidence of the evolutionary origins of human language in the great apes, we should move away from vocalization and look to gesture and development of thought processes (KENDON, 1991).

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