

From questions to stimuli, from answers to reactions: The case of Clever Hans

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Introduction

In this article, the significance of language use in the portrayal of animals is explored with the analysis of one of the most seminal works of behavioral psychology of this century, Oscar Pfungst's monograph *Clever Hans: A Contribution to Experimental Animal and Human Psychology*. This work is of particular interest not only because it has been widely influential, but as it presents a case of a reversal of assessment of an animal's performances from receiving 'questions' to being guided by 'stimuli', from providing 'answers' to emitting 'responses'. Hence, it provides a unique source for investigating the larger, background theme of the distinction between 'action' and 'behavior'. This distinction between action and behavior — even though a perennial source of debate and disagreement — is quite entrenched in the behavioral sciences. It is conceived as a division between two essentially different species of conduct, one originating in or connected with mental phenomena (or mental antecedents), the other deriving purely from physical operations upon, and/or states of, the body (White 1968). In this article, I argue that the distinction between action and behavior — sometimes rendered in terms of 'conscious' versus 'unconscious' behavior (Kennedy 1992) — is not a distinction between 'natural kinds' of conduct. Rather, it requires elaborate discursive construction: marshaling background assumptions, linguistic and argumentative resources, and rhetorical techniques. Here, I demonstrate this type of discursive construction at work. I investigate how Oskar Pfungst creates the division between 'action' and 'behavior', transferring the horse Clever Hans across the border, so to speak, from being deemed an intelligent actor to becoming assessed as a mindless reactor.

In his monograph, Pfungst put forth the case of the famous Hans, the horse that attracted a great deal of attention and publicity with his extraordinary feats. Clever Hans was owned and trained by Mr. von

Osten in Germany at the turn of the century. The horse acquired great fame as an uncommonly intelligent horse, and people traveled from far and wide to witness his mental feats. Clever Hans was a horse who could allegedly read, spell, count, and compute (that is, add, subtract, multiply, and divide). To give some examples of the mathematics Clever Hans commanded, if he were asked 'How much is $2/5$ plus $1/2$?' Hans would first tap 9 (the numerator) and then 10 (the denominator), thus providing the correct answer $9/10$; if Hans were asked 'What are the factors of 28?' he would tap out consecutively 2, 4, 7, 14, 28 (Pfungst 1911: 20–21). Hans also knew the value of all German coins, the entire yearly calendar, and he was able to indicate which notes to eliminate from a melody in order to make musical consonance out of dissonance. Moreover, he could often tap the correct answers to spontaneous questions, as, for example, 'how many gentlemen present are wearing straw hats?' If asked 'how many corners in a circle?' Hans shook his head side to side in the negative (Fernald 1984: 19). In the prefatory note to the English translation of Pfungst's *Clever Hans*, James Angell, professor of psychology at the University of Chicago at the time, wrote that 'no more remarkable tale of credulity founded on unconscious deceit was ever told, and were it offered as fiction, it would take high rank as a work of imagination' (1911: v).

Hans's extraordinary capacities did not fail to attract the attention of scientists. The zoologists Schillings and Heinrich, who were initially incredulous of Hans's alleged achievements, were greatly impressed by Clever Hans and became convinced of the horse's ability to think out, in human fashion, the problems presented him. At the same time, a self-appointed commission, after studying von Osten's interaction with his horse, arrived at the conclusion that no intentional fraud was involved. In Stumpf's words, in the introduction to Pfungst's work, as 'a group of reputable men, from different spheres of life, who could have no purpose in hazarding their reputation, believed that the case was one worthy of careful investigation' (1911: 8), a scientific team was put together to study Hans. The team was led by Oscar Pfungst. Since intentional fraud had been more or less excluded, the motivating question was the question of animal thinking. Could Hans, having been trained, actually read, spell, multiply, and so forth? If not, what was the basis of his performances? It is commonplace knowledge by now that Pfungst discovered that the achievements of Clever Hans depended upon small movements — which sometimes were quite imperceptible — of the experimenter posing the question. Pfungst's discovery and subsequent analysis were received as exemplary. His behavioral study of Hans had an immense impact on views of animal psychology both in terms of its methodology and substan-

tive conclusions. As Angell aptly declared and predicted, Pfungst's account of Hans was to be received 'as quite the final verdict' (1911: v). The impact of the study was such that it resulted in the coining of the phrase the 'Clever Hans Effect', understood to occur when an experimenter unwittingly supplies the cues that an animal picks up in providing appropriate responses or correct solutions. The 'Clever Hans Effect' came to represent a formidable phenomenon often invoked to discredit claims about mental processes as well as language use in animal life. As John Watson, the founder of behaviorism, put it in his review of the work, 'this careful and painstaking work of Pfungst may be prescribed as an antidote henceforth and forever to those untrained but enthusiastic observers who may be filled with the desire to describe the doings of pet animals in glowing anthropomorphic terms' (1908: 331).

Pfungst demonstrates with finality that the extraordinary performances of Clever Hans — which according to one circulating version of the horse's story resulted from his mastery of human language and mathematical skills — were due to unwitting movements of the experimenter, movements to which, Pfungst writes, 'Hans responded mechanically' (1911: 199). Thus, relying on the force of the experimental proof, and the incontrovertible discrediting of the naive understanding of Hans's feats, Pfungst effects a total inversion of the view of the horse as a cognizant or rational actor: rather than an agent capable of independent thinking, the horse is reconstituted by Pfungst as reacting mechanically to environmental stimuli. Pfungst's discoveries surrounding Hans's 'correct' responses to questions meaningful within the human form of life, were not only used to reject the claim that Hans's answers were meaningful within *that* context, but were used (and have been regularly used ever since) to reject that Hans's answers were meaningful *at all*.

Pfungst, along with those who have adopted his analyses in full, successfully wielded the 'Clever Hans Effect' (the discovery of the horse's reliance on cues) to advance — as an inexorable corollary — a mechanomorphic understanding of Hans's behavior. Thus, at the same time that the 'Clever Hans Effect' gave a novel and powerful boost to skepticism in the face of generous claims about, in Watson's words, 'supermundane powers' in animals (1908: 329), Pfungst's representation also bolstered a view of animal behavior as mechanical reaction to stimuli. Not only were charitable and anthropomorphic claims, especially regarding mental capacities, widely rebuked by this phenomenon, animal behavior was, moreover, reassessed as mere reactivity to sensory stimuli.

By tightly juxtaposing his analysis to the naive, non-scientific account, Pfungst advances the language of mechanism as capturing the scientific, objective, and final truth about Clever Hans. Using methods of experi-

mental science, Pfungst demonstrates, beyond doubt, Hans's reliance for his responses on visual cues. But Pfungst's next, subtle, and simultaneous move is not scientific, but metaphysical. He uses the discovery of the 'dependence on cues' to create and advocate a mechanical picture of Hans. Pfungst replaces the view of the horse-as-human with a view of the horse-as-machine. While he promotes this reassessment as scientific, in what follows I argue that the picture of horse-as-machine is no less metaphysical than the picture of horse-as-human that it replaces.

I examine Oskar Pfungst's monograph in detail. Rather than accepting Pfungst's implicit validity claim of truth with respect to his thesis of 'horse-as-machine', I critically dissect the tacit formulations of this claim. By focusing the analysis on the constitutive powers of language, my intention is to highlight how Pfungst's careful articulation and placement of the elements of the story of Hans effectively advocate that his is the 'definitively and finally true' story. I argue that neither the facts, nor logical reasoning about the facts, bear the burden of the conceptual move from the discovery of the horse's reliance on visual cues to the view of the horse's participation in terms of a mechanical connection between stimuli and reactions. What I show is that Pfungst must actively construct this move in and through particular and consistent uses of language. So in the first part of this article, I analyze Pfungst's modes of argumentation and his rhetorical style. In the second part, I present an alternative, interactional view of Pfungst's discoveries, in order to underscore that the modeling of Hans's participation on an automated relation of 'stimulus-response' is not the inevitable interpretation of the data — a proposal which is implicitly and steadily reiterated by Pfungst.

The overall aim, then, is (1) to demonstrate that Pfungst's account of Clever Hans as the 'final verdict' is largely an argumentative and rhetorical achievement of his mode of presentation. And, more substantively, the respecification of certain of Pfungst's experimental findings is meant to show that (2) the genuinely scientific-practical demonstration of the horse's response to visual cues does not amount to evidence for the metaphysical thesis of the animal as passive and mindless.¹ In contrast, on an interactional model, Hans's active engagements with his experimenters may be seen as remarkable achievements in his demonstrated mastery of interactional skills.

The understanding of Clever Hans has had a profound impact on thinking about animal psychology in this century. The naive view of a horse that knew the German language, basic mathematics, the days of the week, the yearly calendar, the notation system of music, and so on, was heralded as enunciating an unbroken continuity between humans and animals. Pfungst's refutation of the illusion of a 'human-horse', was

a major victory for the advocates of a hiatus between human and animal. By renewing and redirecting the focus on Clever Hans in terms of his interactional competence, the theme of human-animal continuity may be reopened at the level of (inter)action.

Modes of employment: Pfungst's (re)construction of Hans

Framing the question

Pfungst begins his essay with the widespread conception that 'animal consciousness cannot be directly gotten at, and the psychologist must therefore seek to appreciate it on the basis of the animal's behavior and with the assistance of conceptions borrowed from human psychology' (1911: 15). The problem of animal consciousness, and of Clever Hans, is thus devised as one to be resolved on the tenuous basis of indirect inference. From the start, therefore, the focus is shifted away from the level of action to a purported invisible phenomenon that (perhaps) generates it.

After briefly identifying different views that have been articulated by various thinkers on animal consciousness (from Descartes's mechanistic view to Haeckel's view of evolutionary continuity), Pfungst observes that there are two general philosophical tendencies: one, to distance the animal from the human 'psyche', and the other, to bring them closer together. He then introduces Clever Hans as the 'long sought for' candidate that promised to decide this question in favor of continuity. For here was 'a horse that could solve arithmetical problems — an animal which, thanks to long training, mastered not merely rudiments, but seemingly arrived at a power of abstract thought and which surpassed, by far, the highest expectations of the greatest enthusiast' (1911: 18).

Clever Hans is thus set up to address the central question of continuity or discontinuity between human and animal consciousness. Pfungst defines this question in terms of the presence or absence of 'conceptual thinking': 'It is undoubtedly true that many acts of the lower forms reveal nothing of the nature of conceptual thinking. But that others might thus be interpreted cannot be denied. But need they be thus interpreted? — There lies the dispute' (1911: 18). Hans's feats are therefore to be examined with respect to whether or not they bear the external marks of inner conceptual thinking. In this regard, *the marks themselves* — namely, the horse's actions in the context of their expression — become secondary and epiphenomenal to the (potential) underlying conceptual processes

they express and represent. On Pfungst's reasoning, if it turns out that they do not represent such processes, they lose all significance.

Having related some of Hans's impressive achievements and identified the central issue as whether or not conceptual thinking underlies the horse's responses, Pfungst briefly reports certain of the circulating explanations of Hans's feats. While some people were convinced that the horse exhibited (human) rational thought, others argued that the horse had an impressive, but mechanical rather than intelligent, memory capacity. Still others held the cynical view that the case was surely one of fraud. The effects of N-rays, telepathy, and suggestion were also proffered as explanations of Hans's feats. After listing the competing solutions to the riddle of Hans's achievements, Pfungst sets the stage for advancing his own position in contrast to the previous ones. Invoking the power of scientific methodology to produce objectivity, Pfungst concludes his introduction with a call for 'proof' rather than 'simple affirmation' (1911: 29).

It is important to remember that Pfungst's study has been handed down as an exemplar of methodological impeccability. Pfungst brought 'Science' to the scene of von Osten's and Clever Hans's courtyard. Hitherto, what had transpired in the courtyard was more of an event or a show, with onlookers gathering round to witness Hans's correct responses to complicated questions and problems, and occasionally to sneak a question to the horse when von Osten was not watching — often receiving a correct response to everyone's amusement and delight (see Fig. 1).

In the interests of objectivity, Pfungst transformed the scene into an experimental situation. Experiments were carried out in a canvas tent isolating the horse (controlling for error and interruption), and the questioners of the horse were carefully selected, Pfungst being one of them (while von Osten and Schillings were excluded from many experiments). Finally, when possible, Pfungst conducted a large number of tests, alternating two kinds of experiments, namely, posing problems to Hans 'with knowledge' and 'without knowledge' of the correct responses by the investigator (1911: 30–32).

The question Pfungst formulates from the outset as the central question of the investigation is 'whether or not Hans was able to think independently' (1911: 32). He succinctly reiterates this question as follows: 'What is it that determines the horse's movements? Independent thinking or external signs?' (1911: 88). The crux of the matter, therefore, is identified as whether Hans's actions are autonomous from the questioner's knowledge or dependent upon it. For Pfungst the litmus test is to present Hans with problems whose correct solutions the questioner does not know.

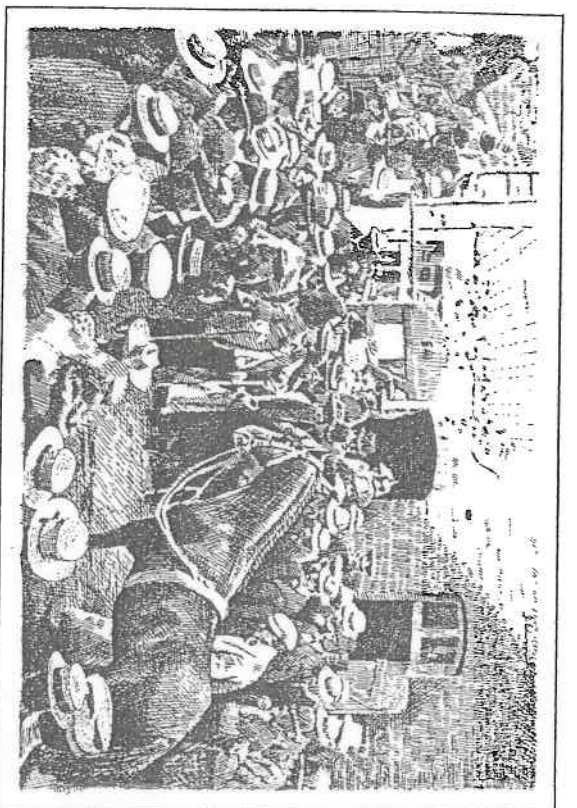


Figure 1. 'Crowds in the courtyard. As policemen kept order, Mr. Schillings displayed Clever Hans for an elegant audience from the west side of Berlin'. Reproduced from *The Hans Legacy* (Fernald 1984: 25) with permission of Lawrence Erlbaum Associates, Inc.

If ... Hans should fail in this test, then the conclusion that he could think was by no means warranted, but rather the inference that he was dependent upon certain stimuli received from questioner or the environment. (1911: 32)

Hans's performance is evaluated along the binary axis of 'independent thinking' versus 'external signs'. That is, Hans's responses are *either* the consequence of 'thinking' *or* the outcome of his dependence on 'certain stimuli'. Pfungst sets up the alternatives in such a way that they appear not only mutually exclusive, but also exhaustive of all possible explanations of the horse's responses. The horse is either automatically and mindlessly reacting to cues, or he is a rational agent who, through training, has learned such activities as reading, spelling, judging music, counting, computing, or telling the day of the week and of the calendar year.

In the first stage of experimentation, 'procedures with knowledge' and 'without knowledge' (of the expected answer by the questioner) were alternated. In the tests of 'procedure with knowledge' Hans responded correctly 90 percent to 100 percent of the time, while in those of 'procedure without knowledge' Hans was correct at best 10 percent of the

time. These results proved that 'Hans can neither read, count nor make calculations. He knows nothing of coins or cards, calendars or clocks, nor can he respond, by tapping or otherwise, to a number spoken to him but a moment before. Finally he has not a trace of musical ability' (1911: 40). Since the question has been framed in terms of *either* independent thinking *or* determination by external stimuli, and 'independent thinking' has now been excluded, the only alternative left is that Hans's movements are 'determined' by signals from his questioners. In Pfungst's words, 'it was evident that the horse was unable to work alone, but was dependent upon certain stimuli from the environment' (1911: 40).

Having established that 'dependence upon certain stimuli' is involved, the next stage of the investigation addressed the question: 'By means of which sense organ was [the cue] received by the horse?' (1911: 42). The formulation of this next central question in the passive voice is significantly associated with Pfungst's conceptual framing of the investigation and with his conclusions. The question is not 'How does Hans sense the cue?' but rather 'By means of which sense organ is the cue received?' It is noteworthy that the fact that Hans picks up the cues from the experimenter in itself leaves undecided the question of *how* he is doing so. In other words, the fact of his reliance upon visual cueing alone does not testify as to whether perception is an active achievement or a passive process. The option of posing the question in the passive rather than in the active voice contributes to deflecting the former possibility from the start. Thus, the two central, guiding questions, namely, 'What determines the horse's movements?' and 'By what sense organ is the cue received?' pave the way toward Pfungst's mechanomorphic and passive construal of Hans's behaviors. Beyond making the case that Hans cannot actually do the human activities he was alleged to do, Pfungst is actively preparing the grounds for the view that Hans has no rational processes whatever at his disposal, and that his movements are caused by his environment. In order to ascertain whether the operative cues were visual, blinders were put on Hans during his questioning. Pfungst describes Hans's reaction to the blinders as follows:

The questioner stood to the right of the horse, so that the animal knew him to be present and could hear, but not see him. Hans was requested to tap a certain number. Then the experimenter would step forward into the horse's field of vision and put the same problem again ... In the tests of the first kind, Hans would always make the most strenuous efforts to get a view of the questioner ... he would rave and tear at the lines. (1911: 42-43)

Hans ... made every attempt to see the questioner. (1911: 44)

The horse — in so far as it was at all possible to decide — never looked at the persons or the objects which he was to count, or at the words which he was to

read, yet he nevertheless gave the proper responses. But he would always make the most strenuous efforts to see the questioner (1911: 46).

Pfungst cites Hans's strenuous efforts to see the questioner as corroborating evidence of his 'dependence' on visual cues in order to respond. Thus, Hans's 'most strenuous efforts to see' are not considered as testimony that his intention and desire to respond are frustrated by his lack of capacity to see. In other words, Hans's 'efforts to see' and his 'raving and tearing at the lines' are not seen to signify the transparency of the horse's intention to see; nor are these actions viewed as an expressive indication that his desire to attend to his questioner is foiled by the blinders. Hans's attentiveness, as well as his intention or desire to attend, remain unacknowledged. All the forms and nuances of action that implicate Hans as an active participant have no place or relevance in Pfungst's setup. So Hans's 'strenuous efforts' do not signify a *presence*, but a *lack* — a total 'dependence on stimuli'. Noting that Hans gave only 6 percent correct responses when he could not see his questioner, as opposed to 89 percent correct responses when he could, Pfungst draws one conclusion: 'In other words, the horse was at a loss the moment he was prevented from seeing the questioner' (1911: 43).

Pfungst's use of causal explanation: The one-way determination of Hans's movements

Pfungst's question 'What is it that determines the horse's movements?' leads smoothly into his thesis that the horse's movements are *caused*. His attempt to formulate a causal explanation of behavior is supported by the use of semantic and syntactical structures that elide a view of Hans's actions as participatory, spontaneous, and, in general, authored. Thus, the very framing of the questions and problems already adumbrates the mechanomorphic picture of Hans that Pfungst is in the process of creating, namely, that Hans's movements are, in his words, 'nothing other than a reaction' (1911: 56). The view that Pfungst propounds goes much further than the demonstration that Hans cannot read, spell, count, tell the day of the month, or add fractions. Hans is the receptor (not the seeker) of the cue, and the cue impinges on his senses (his eyes, as it turns out) and 'determines his movements'. Pfungst does not even entertain the alternative possibilities that Hans's perceiving is an achievement (if not of seeking out the cues, then of his alertness of presence), or that he is coordinating his actions with the questioner's actions. The exclusion

of these possibilities is doubly ensured by the language of the text and the search for a deterministic explanation.

Throughout the entire monograph, Pfungst's ontological construal of Hans is based, tacitly or explicitly, on an understanding of his movements as caused by the movements of the questioner. Causal explanation is not only promoted in the principal question that Pfungst sets out to answer, it is also consistently interjected. Causal explanation fortifies Pfungst's argument by backing the picture of Hans as passively reactive to stimuli and lending that picture an aura of scientificity by engaging the type of explanation favored in the physical sciences. The view of Hans's movements as caused also facilitates Pfungst's ellipsis of the interactional context between the experimenter and Hans. The ellipsis of an interactive context amounts to a deflection of the experimenter's and Hans's engagement as communicative action, and its attendant implications of participants' active contributions, interest, and attention.

The view of Hans's movements as reactive and determined — as opposed to (alternatively) appropriately responsive, spontaneous, or rational — is tightly affiliated with Pfungst's oft-reiterated view of the experimenter's ability to *control* Hans's movements. Referring to Hans's mode of answering questions by tapping with his right foot, and occasionally and (hitherto) unpredictably adding one last tap with his left foot (as if it were an 'after-thought'), Pfungst writes:

It became possible for me to *cause him* to tap 1 right, 1 left, 1 right, 1 left etc. (1911: 61, emphasis added)

As Pfungst now knows the movements that Hans is responding to, he can manipulate them to make the horse move in particular ways. Here Pfungst's use of the notion of 'to cause' plays off two senses: that of 'determined', in the sense that the movements of a physical object are determined, and that of 'controlled', in the sense that a subject can be controlled by deliberate manipulation. This is indeed symptomatic of where 'causality' generally comes to grief in behavioral science, and especially in behaviorism. While the latter attempts to model its pursuit for causes after the physical sciences, it ends up also entangling the vernacular notion (and practices) of a subject's being caused to act in certain ways on account of circumstances beyond his or her control (either by force or manipulation). Thus, while Pfungst wants to make the point that the horse's moves are subsumed under an objective scheme of cause and effect, he ends up trying to make this point through the practice of causing Hans to act in certain ways by deliberate manipulation of the signs to which he responds.

The connection, in Pfungst's reasoning and experimental design, between mechanical reactivity, causation, and manipulation can be seen especially clearly in the following passage:

That the tapping — as well as all other movements of the horse — was *nothing other* than a reaction upon certain visual stimuli, was proved beyond a doubt by the fact that the voluntary execution of [the experimenter's] head-jerk ... *brought about* all the proper responses on the part of the horse. Thus artificial synthesis became the test of the correctness of analytic observation ... If, for instance I stooped forward after having told the horse to tap 13, and if I purposefully remained in this position until I had counted 20, he would without any hesitation, tap 20. (1911: 56, 57, emphasis added)

After identifying the movements of the experimenter that Hans is responding to, Pfungst proceeds to deliberately utilize them in order to manipulate the timing of Hans's responses. The capacity to 'bring about' the horse's movements upon purposeful execution of the appropriate cues is then deployed as proof ('beyond doubt') that the horse has been controlled by cues all along, that his movements are 'nothing other than a reaction upon certain visual stimuli'.

Pfungst's reasoning here — with respect to what he advances as 'proof' that Hans's tapping is 'nothing other than a reaction' which is 'brought about' — is based on a paradox and on an error. The paradox is that in order to demonstrate the objectivity of his assessment that the horse's movements are 'caused', Pfungst must attempt to control the horse's moves thus implicitly relying upon the horse as a manipulable subject.² Thus, to achieve proof 'beyond doubt' that Hans's movements are 'nothing other than a reaction upon certain visual stimuli', Pfungst must forfeit the evidences of spontaneous interaction, with their unpredictability of results. The error in Pfungst's reasoning is that he then proceeds to conflate qualitatively distinct kinds of interaction, namely, interaction in which gestures are deployed with the deliberate intention of directing another's course of action in some way, and interaction in which gestures are proffered and oriented to spontaneously in a local, episode-sensitive course of events.³

When the results of experiments agree with a causal type of explanation, Pfungst calls them 'good results'. Thus, for instance, in achieving a regular correlation between the angle of inclination of the experimenter's trunk and the speed of Hans's tapping, Pfungst writes:

Such good results, however, were possible only after a number of preliminary practice tests had been made. The experiment was especially difficult because the horse was often on the point of stopping in the midst of a test. This was probably

due to some unintentional movement on my part. In such cases I could induce him to continue tapping only by bending forward still more. (1911: 65–66)

Pfungst has to work to obtain the kind of data he is after; the results of spontaneous interaction are neither entirely predictable nor controllable, so in order to obtain 'good results' — that is, results that agree with his thesis of the horse's movements as determined — Pfungst must do a number of practice tests. He then projects the causal explanation warranted by the good results following the practice tests onto the entire range of Hans's performances. The 'good results' are the genuine indicators that Hans's responses are guided; the only reason this is not consistently clear is on account of various insignificant contingencies that are smoothed out by practice. In this example, Pfungst characterizes the experiment as 'difficult', because Hans was often on the verge of stopping. Rather than factoring this in with all the data, or considering it as a possible disproof of the explanation advanced (i.e., of Hans as 'controlled'), Hans's tendency to stop is instead viewed as *impeding* the experiment.⁴ Moreover, his inclination to stop is explained in accordance with Pfungst's thesis as 'probably due to' the questioner's unintended movements. Overall, Pfungst masterfully designs his questions and steers his experimental results to align with his thesis. He achieves 'good' data by practicing how to get that data ahead of time; he treats any deviation or murkiness as incidental rather than part of the data; and he accounts for any deviation or murkiness by some aspect of his thesis.

Because Hans's dependence on visual cues is conceived as a deterministic one, Pfungst takes the discovery of those cues as deprecating Hans, exposing him as something of a counterfeit. So Pfungst writes:

If Hans had chanced to possess so called 'glass-eyes' — in which the pigment is wholly or partly lacking, so that the black pupil is clearly defined against the lighter background — then no doubt could ever have arisen concerning the direction of the eye, and Hans never would have come to be regarded as the 'clever' Hans. (1911: 182–183)

Hans's dependence on his eyes for the responses expected of him is taken to demean him, exposing his capacities as 'merely' sensory, rather than 'truly' intellectual. Thus Pfungst builds into his argument the view of perception as passively happening to Hans, rather than actively accomplished by him. Perhaps there is an irony here, as Pfungst insinuates so plainly in this passage, but one which he appears never to have suspected: if the pupils of Hans's eyes were visible, maybe Pfungst would have, himself, *seen* the intelligent activity of the eyes' work, and conceded some degree of spontaneity and intelligence to Clever Hans; for, as Wittgenstein

aply puts it, 'when you see the eye, you see something go out from it. You see the glance of the eye' (1980: paragraph 1100).

Irony and reversal: As a matter of fact Hans' actions are 'nothing but ...'

The thesis of the horse's movements as caused and controlled by the experimenter is accompanied by the consistent use of the rhetoric of reversal. The major reversal that Pfungst advances as having effected is a displacement of the center of action from Hans to the questioner. His rhetoric of reversal transfers all credit from the horse (where it was previously focused) to his human interlocutors. This turning-of-the-tables is used by Pfungst as an additional technique to secure his argument. So, for instance, he claims that

we need hardly add that henceforth it was within the power of the experimenter to have the tapping executed entirely with the right foot or with the final extra tap of the left foot. Hitherto the view had been that this lay solely within the pleasure of the horse. (1911: 61)

The theme of control is not only important with respect to advancing a causal argument, it is also important in the reversal of the focus from Hans to the human factor. What was previously seen as the (not entirely predictable) result of the whim, will, or pleasure of the horse, is now shown to be an outcome which is under human control. The rhetoric of reversal gives a tremendous boost to Pfungst's argument. The forcefulness of negating what was previously thought to be the case works to shoulder, in part, what Pfungst is putting forth as the fact-of-the-matter.

All wonderful feats of counting and computation which were accomplished while thus experimenting with the horse are to be accredited not to the horse, but to the questioner. If such is the case, they certainly cannot be considered astonishing. (1911: 142)

Prior to Pfungst's scientific dissection, Clever Hans was seen as the source and center of action. He was the provider of answers and the originator of solutions to questions or problems posed. Hans was the protagonist, and therefore the center of attention or admiration, and the source of amusement, incredulity, and bafflement. In Pfungst's rewriting of the script the leading role is now passed to the human questioner. What was an asymmetry before (in the absence of the awareness of the unwitting role of the human participant in disclosing the appropriate responses to Hans), remains an asymmetry, albeit reversed. Now the focus is on the

human subject, qua protagonist, and Hans's presence and contributions recede as epiphenomenal to the cues that guide him. As Pfungst declares, if Hans is not counting, spelling, subtracting, identifying the position of musical notes, and so on, then his feats 'cannot be considered astonishing'.

The removal of Hans from center stage and his replacement by the human factor is reiterated again in the following:

As a matter of fact, it made no difference who desired an answer, for the only person upon whom the experiment depended was the questioner, that is, the one who asked the horse to tap. We have everywhere designated this person as the experimenter or questioner. It was he who gave the directions, and since *all that were involved* were visual signs, the drama in which Hans appeared as the hero, was *nothing but* a pantomime. (1911: 142, emphasis added)

Here Pfungst borrows the elements of a play, where the hero is no longer the horse but the experimenter, and which is not a drama but a pantomime. The expressions 'as a matter of fact' and 'nothing but' constantly recur in Pfungst's monograph (as do also the qualifying locutions 'nothing other than', 'merely', 'not even', and 'in truth', 'in actuality', etc.). For instance, Pfungst draws generously on this rhetoric in reversing the judgments of 'the peculiarities of character, highly humanized, which have been attributed to Hans' (1911: 198):

Hans's 'sympathies' and 'antipathies', so-called, were *nothing but* ... [1911: 198] ... The horse's supposed fickleness was *nothing but* ... [1911: 200] ... *In truth*, he was never stubborn ... [1911: 200] ... Hans's supposed distrust of the questioner ... was *nothing but* ... [1911: 201] ... his precipitancy ... was *nothing but* ... [1911: 202] ... Errors of one unit too few and one unit too many ... were easily interpreted as miscounts on the part of Hans, but *in truth* were the result of the poorly concentrated attention of the questioner [1911: 223–224] [Etc.]. (emphases added)

Such belittling expressions as 'merely' and 'nothing but', and authoritative qualifiers like 'in reality' and 'in truth', are locution types that fit well in the mode of argumentation that simultaneously negates and affirms; thus, Pfungst disparages the rival version (of Hans-as-human) as a method for promoting the truth of his own version (of Hans-as-machine). This rhetoric of reversal ('the last shall be first and the first shall be last') is found consistently in Pfungst's narrative. It is a powerful way to make a double argument. First, that what *was* believed to be the case, actually *is not* the case; and, second, that what *is now* being advanced as a matter of fact, *is* the fact of the matter. Tying negation and affirmation in this way has the effect of focusing the issue as if the choice between the

alternative positions were the only one available. That is, either Hans independently thinks out the solutions to problems or the questioner controls his movements. There is a silent foreclosure of any third possibility. The triumph of Pfungst's analysis must in part depend on this *de facto* exclusion of other explanatory options of Hans's accomplishments.

A significant component of the reversal of protagonist roles from Hans to his questioners is the central metaphor of 'Hans-as-reflection' in Pfungst's writing. With this metaphor the horse's passivity and insignificance of contribution are underscored.

Hans, however, was also a faithful mirror of all the errors of the questioner. (1911: 142)

These responses had nothing to do with the problem ... But in the horse's responses the degree of tension of the questioner's concentration was faithfully mirrored. (1911: 148)

The human factor is the source of truth and error, both the riddle of the Clever Hans phenomenon and its solution, while Hans is the 'faithful mirror'. Hans's appropriate and erroneous responses are on a par, being passive reflections of correct or incorrect solutions to problems comprehensible and expressible only by the questioner.

Moreover, it is not the questioner as an active participant or contributor who is the source of Hans's responses, but rather the questioner's inner state. Hans's major errors — for example, tapping 6 as an answer to the question 'how much is 2 times 6' — are explained in terms of the number lingering in the questioner's mind and unwittingly projected into his movements (1911: 143). Pfungst shows that the major cue for the horse's starting and stopping the tapping is his interlocutor's slight movement of the head; and this movement is pictured as originating in his state of inner tension. If the questioner's inner tension in the course of testing the horse is too slight, then the horse would tend to err over the correct response, as the questioner fails to release his head in a slight upward jerk at the right moment; while if his inner tension is too great, the horse would tend to err under the correct response, as the questioner releases his head in a slight upward jerk too soon. Pfungst writes that when Hans makes an error of one too few or one too many,

one might be led to believe that Hans had not made an error of calculation but merely of counting in the process of giving the result, which always had to be done by the cumbersome method of tapping. As a matter of fact, the trouble lay in the wrong degree of concentration on the part of the questioner: In errors of +1, tension was too slight, in those of –1, it was too great. (1911: 143)

Thus Pfungst not only shifts the emphasis away from Hans to the questioner, but also away from the questioner as actor to the questioner as isolated subject. At no point does Pfungst focus on the interactional dynamics between the two participants. Rather the picture elaborated is of the questioner as subject with inner consciousness and Hans as the compliant mirror of that state. In fact, Hans's *mirroring* is so exact that it can be used as an objective measure — dependable like a mechanical gauge — of the state of consciousness of his human interlocutor:

This difference in intensity of concentration... is attested, not only subjectively by Mr. Schilling's introspective statement, but may be measured objectively by means of the number of final taps which the horse gave with his left foot. (1911: 144)

Closely affiliated with his rhetoric of reversal is Pfungst's use of irony as a way of deprecating the naive account of a horse that has mastered human language, and replacing it with his own account of a horse that 'reacts to stimuli'. Pfungst's reversals become particularly ironic when explanations of Hans's incorrect responses were charitable and even laudatory. For example, previously, Hans's errors were often put down to character traits such as stubbornness and fickleness, or were explained as corollary to his sense of humor and wit:

Errors of another kind — the not infrequent offenses against the very elements of counting and the fundamental arithmetical processes — were regarded in part as intentional jokes and by an authority in pedagogy as a 'sign of independence and stubbornness which might also be called humour'. Hans emphatically asserted that $2+2$ was 3 or he would answer questions given in immediate succession as follows: 'How many eyes have you?' — 2. 'How many ears?' — 2. 'How many tails?' — 2. These errors, as a matter of fact, evince neither wit nor humor, but prove incontrovertibly that Hans had not even mastered the fundamentals. (1911: 146)

Coextensive with ironizing the humanized version of Hans, Pfungst manipulates the effective cues in such a way as to make the horse err in very simple problems. Making Hans look foolish in his responses was thus another method used by Pfungst to disprove that Hans had any true understanding of the questions posed to him. Once the non-linguistic signs that the questioner supplied to Hans were known to Pfungst, he was able to ask a question and at the same time cue the wrong response. So, he writes,

it is now readily conceivable how it was possible to make the horse respond to all sorts of foolish questions ... by means of controlled signs. One could thus

obtain consecutively the answers 'yes' and 'no' to the same question. Or one might ask: 'Hans, where is your head?', and Hans would bend to the earth. 'And where are your legs?' He would look at the skies. Etc. (1911: 77)

The technique employed here by Pfungst is a standard circus trick, which is more commonly used to 'anthropomorphize' rather than 'de-anthropomorphize' animals. It involves the questioner posing a (thoroughly human) question to an animal and simultaneously, and for the audience invisibly (when done with dexterity), cueing the animal to respond (Bouissac 1981). At the circus, the animal can be made to look as if it were participating in a linguistic dialogue; conversely, using the same technique, Pfungst demonstrates that Hans is completely ignorant. Of course, both the uncanny intelligence of the circus animal and the abysmal stupidity of Hans (who cannot even identify the position of his head and legs), while documented against the measure of knowledge of human language, are tacitly produced by means of a different (partly or largely extra-linguistic) semiotic system to which the animal has been taught to respond through training. In the case of the circus trainer, this system is explicitly taught to the animal and then used in performances simultaneously with an overlaying, yet semantically irrelevant, semiotic system (usually language). In the case of Hans, this system of operative signs was invisible to participants, until it was discovered by Pfungst; yet Pfungst does not conceptualize the signs as belonging to a different semiotic system operating between questioner and horse, but strips the signs of any meaning whatsoever, defining them as 'sensory stimuli' and 'motor responses'.

Pfungst's rhetorical use of reversal — 'what was looked for in the animal ... should have been looked for in the man' (1911: 151) — helps to stabilize his counterplot. It makes it appear as though the triumph of his own view depended simply upon the destruction of the idea of a horse that had mastered human language and basic mathematics. Thus Pfungst is bent upon consistently ironizing this view. At the same time that he shows it to be naive and groundless, he claims that everything attributed to the horse can now be seen to have its true source in the man. In this reversal, then, Pfungst does not attempt to restore appropriate credit to the parties involved, but rather denies that *any* credit at all belongs to the horse.

Pfungst's thesis is not simply to demonstrate Hans's reliance for his responses on the minute movements of his interlocutors. Beyond this demonstration, he advances a specific picture of what Hans's reliance signifies; that is, to the facts, he subtly addends a *particular interpretation*. Pfungst's interpretation of Hans's thorough dependence on cues as signi-

lying a lack or a disability is grafted so tightly onto his discovery of the horse following the experimenter's movements, that its character as interpretation is barely discernible. So, for instance, describing the course of Hans's training by von Osten, his owner, Pfungst casually notes the following:

Mr. von Osten saw the animal's intelligence steadily increase, without having the slightest notion that between his words and the responsive movements of the horse, there were interpolated his own unconscious movements — and that *thus* instead of the much desired intellectual feats on the part of the horse, *there was merely a motor reaction to a purely sensory stimulus*. (1911: 221, emphasis added)

In this formulation (which is a precis of his thesis), Pfungst illustrates the style in which he consistently addends a particular interpretation to the facts. He is claiming here that, despite von Osten's beliefs, the horse has not been responding to the actual content of the questions, but rather to the interpolated minute movement-cues of his trainer; from this Pfungst deduces that 'thus' — that is, *it follows* — Hans's response is 'merely a motor reaction to a purely sensory stimulus' (emphasis added). Pfungst's rhetoric ignores the fact that the burden of proof persists in showing the validity of the inference that if a response does not have the identical semantic signification it has for the questioner, it is *thus* a mere motor reaction.

To elaborate this point further, Pfungst is stating that since it is shown that Hans's answers are not equivalent to human answers — for instance, that Hans does not think that 2 plus 2 equals 4 — there is no signification (or significance) whatever to his answers, which are consequently 'motor reactions'. The inferential slippage here clearly rests on the tacit, tautological claim that a movement without human symbolic signification is mechanical. Pfungst's position, thus, melds an alloy of a scientific discovery of the horse's reliance on minute cues with a metaphorical picture of the horse's responses as 'mere motor reactions to purely sensory stimuli'. This alloy is so carefully — albeit not deliberately — crafted that Pfungst delivers the view of the horse-as-machine as though it were, or could be, a view that belongs to the realm of facts.

Pfungst places his discovery of the horse's responses to the questioner's minute cues within a non-signifying framework of 'sensory stimulus' — 'motor response'. He not only disproves that Hans knows German, arithmetic, the yearly calendar, and music, but he also actively abjures that Hans's participation is meaningful at all. As discussed, Pfungst delivers the mechanomorphic depiction of Hans's movements as the sole remedy for a misguided view of a humanized horse. In this section, I have attempted to show that Pfungst's mechanomorphic construction of

Hans is an effect of his uses of language, especially his forms of argumentation and rhetorical devices. In the following section, I focus more intensively on Pfungst's data: by reassessing his findings from an interactional perspective of the interface between human and horse, I show that Pfungst's mechanistic portrayal of a passive, controlled horse is not the sole alternative account to the pre-scientific explanations of Hans's feats which he debunked.

Respecifying the Clever Hans Effect through a conversation-analytic perspective

From stimuli and reactions back to questions and responses

As discussed, for Pfungst the connection between Hans and the experimenter is a controlling, uni-directional, causal connection. Thus, he writes that 'if Hans showed that he was about to cease tapping before it was desired, it was possible to *cause him* to continue by simply bending forward a trifle more. The greater angle at which the questioner's trunk was now inclined *caused* the horse to increase the rate of tapping' (1911: 64, emphasis added). Pfungst does not conceive of the connection between Hans and his questioner as a relation (or as a relationship, especially in the case of von Osten and Hans), but rather as one in which the horse's movements are 'caused', 'induced', 'brought about', 'guided', or 'controlled'. Because Hans's movements do not represent human ideas and are not the consequence of 'independent thinking', they are conceived as 'guided by stimuli' and thus foreclosed from being gestures at all.

In order to bring off this picture of a uni-directional determination of mechanical movements, Pfungst must systematically elide the interactional context of Hans and his questioners. The analysis cannot focus on the Clever Hans phenomenon as an actively and continuously sustained link between engaged participants. Instead, Pfungst's approach to the interactants is an approach to isolated subjects: the human subject is known to possess 'consciousness' and the capacity of 'conceptual thought'; the question under scrutiny is whether the horse *also* possesses 'consciousness' and the capacity of 'conceptual thought'.

On a sociological reconception of the entire phenomenon, the analysis is shifted away from isolated subjects to focus on a society of inter-subjectively connected actors. Here society is not conceived as a static, predefined framework into which actors enter. Rather as Strum and Latour (1987) put it (following Garfinkel [1967]), 'society' is understood

as 'performative society' which is achieved in practice by the contributions of all actors. Strum and Latour's understanding of 'performative society' is germane, here, in that they present this concept as encompassing both human and non-human associating and allying individuals who have 'something in common' (1987: 794). Thus, on their analysis, 'performative society' is applicable to human as well as to baboon societies. In affinity with a critical stance toward a reified conception of human society — as a preexisting system into which people enter — they write that 'baboons are not *entering into a stable structure* but rather negotiating what that structure will be, and monitoring and testing and pushing all other such negotiations' (1987: 788, emphasis in original). According to this view of performative society, which 'grants full activity to all social participants' (1987: 793), the relation between Hans and his questioners can be approached as an association in which the participants are actively producing and negotiating courses of action.

The difference between the society of Hans and his questioners and performative societies composed solely of humans (or solely of baboons, or horses) is that same-species actors create and negotiate, in essence and for the most part, the *same* course of action at *all* levels of engagement. The Clever Hans case, then, can be seen as a case in which, on the naive interpretation — apparently advocated passionately by von Osten, Hans's owner, and ratified by many others — the interaction was mistaken as one in which a fully shared (human) course of action was being constructed by the participants. The illusion of a completely congruous framework of understanding between Hans and humanity can be seen starkly in the belief that one item in the repertoire of knowledge possessed by Hans was the statement: 'The road and the bridge are held by the enemy'. Pfungst, of course, refutes the claim that Hans knew and remembered this statement, and once more exploits the occasion to knit together the rejection of a humanized horse with his own metaphysical thesis of an automated horse. He again presents as sole alternative accounts (i) that Hans's correct tapping indicates full comprehension of the sentence 'the road and the bridge are held by the enemy'; or (ii) that his movements are an 'induced system of automatic reactions'.

The sentence ... 'the road and the bridge are held by the enemy', which was given to the horse one day and correctly repeated by him the following day, was not an answer elicited from the horse by means of a question, *but rather* a system of automatic reactions which were induced by certain involuntary movements of the questioner as stimuli. (1911: 160–161, emphasis added)

On the interactional approach expounded in this section, Hans's participation *neither* expresses knowledge of human language, *nor* is reducible

to 'a system of automatic reactions'. Yet the apparently widespread belief that Hans understood and remembered propositional statements like 'the road and the bridge are held by the enemy', while bizarre in retrospect, is not completely unfounded from the perspective of performative society. The grounds for people's credulity will emerge more clearly after a closer look at the findings of Pfungst.

Hans's participation in the experiments is taken for granted in Pfungst's account. The sidestepping of the horse's participation is seen in the framing question — 'What is it that determines the horse's movements? Independent thinking or external signs?' — which not only involves assumptions visible on its surface (namely, that the two alternative solutions are mutually exclusive and exhaustive), but also passes over in silence the horse's participation in the entire operation; it effaces the significance of the intersubjective availability of Hans, as a mark of active engagement, attention, and interest. The investigation is built around assessing the allegation of Hans's 'independent thinking', which *has no other possible meaning* than that he can read and spell German, count, compute, correct musical dissonance, tell the day of the week, and so on. The question of whether the horse could actually do these through-and-through human activities, shifts the focus away from Hans's contributions, as such. Of course, his participation is relied upon to make Pfungst's investigation possible, yet its contexts are omitted from the text. Hans's incarnate forms of presence in the experimental and ordinary circumstances are almost entirely absent from Pfungst's monograph (cf. Wieder 1980; Lynch 1988).

Discarding the forms of Hans's presence, within the unique society of Clever Hans and his human interlocutors, is not simply an omission, but a crucial facet of Pfungst's argument. The omission of a society of interacting participants, with its forms of involvement, is ultimately a requirement if Pfungst's mechanomorphic depiction of Hans is to succeed. This is so because forms of involvement in interaction implicate subjects that respond to one another, express themselves, understand or misunderstand each other, show moods and needs, are differentially interested, bored, frustrated, joyful, capricious, (non)cooperative, etc., subjects that are involved so as to be, in phenomenological language, co-constituting their world.

It is possible, instead of pursuing the quest for conceptual thinking behind Hans's actions, to refocus attention on the surface forms of his performances as expressive of communicative — or, if you prefer, simply interactional — *competence*. It appears that Hans was remarkably competent in that way, but sight of that competence is lost with Pfungst's exclusive focus on the indisputable proof that Hans did not think out,

in human fashion, the problems presented him. In what follows, I juxtapose a conversation-analytic model of Hans's actions to Piungst's deterministic view, as a way of rediscovering the phenomena of *Clever Hans* within an interactional dimension.

The conversation-analytic perspective on interaction

Conversation analysis views interaction as a two-, or multi-, directional flow. Participants create courses of action together by organizing their contributions through the use of recurring patterns and procedures.⁵ These patterns and procedures are largely bilateral in form, and as a consequence the meaning of utterances and (their) actions in conversation emerge as determinate, only through the participants' mutual coordination of contributions. To clarify with an example, whether an issued 'command' is an invitation, a joke, a request, a warning, or a bona fide order is fully actualized through the response to it in the next turn. Thus, no feature of a conversational utterance, considered outside a sequential environment of a before and an after, can be relied upon to establish its meaning or force (Schegloff 1984).

A fundamental assumption and resource of understanding for conversationalists is that adjacently positioned utterances are to be heard as related to one another. It is precisely by virtue of actively fastening and sustaining the ties between their utterances that common courses of action and shared understandings are realized as accomplishments of all participants. The sequentially achieved character of actions in the course of conversation is evident in the necessity to access the environment of an utterance in order to discern what that utterance means or what it is doing. Participants (and analysts) rely upon the placement of an utterance, especially with respect to the preceding one, to gather the full scope of the meaning and action of that utterance (Sacks et al. 1974; Heritage 1984). In short, the sense and force of isolated utterance-actions is, essentially, indeterminate, and there can be no unilateral sovereignty over the meaning of contributions in conversation.

The tying between utterances in the course of conversation is not something that emerges, in retrospect, as the way things tend to turn out. Nor, in affinity with the view of society as performative, are these ties guaranteed somehow to 'just happen' upon entering conversation. Rather tying procedures are designed, anticipated, and received actively. Thus, conversation is the participants' *achievement* as it involves and demands their orientation to the intermittent, yet constant posing of the problem of linkage. On a turn-by-turn basis, at every (potential) trans-

ition-relevance position — that is, upon, or just before, the completion of the previous turn (Sacks et al. 1974: 703) — co-participants are presented with having to solve this problem of fit. Metaphorically then, conversation is like playing a loosely structured game of ball, probably the most fundamental requirement of this game is to keep the ball moving. Participants have to figure out how to throw it, to whom to throw it, and how to catch it. While the game is replete with familiar and recognizable ways to throw and catch, it is also part of the game to try to throw in new or unexpected ways, to return a throw with another throw rather than a catch, to find ways to hold on to the ball, to miss a catch, and so on. And like playing ball, conversation can be predictable, boring, surprising, exciting, polite, or rough — depending on the context, the players, their relations, and so forth.

Conversation analysts conceptualize the problem of linking utterances with two technical notions: sequential implicativeness and conditional relevance. The difference between these near-identical notions relates to the temporal reference point of linking turns. The notion of 'sequential implicativeness' addresses the problem of linkage from the point of view of the here-and-now of the participant looking toward the immediate future. The here is inspectable for the options it presents for the immediate future, usually the next turn. Thus, one ubiquitous way in which turn-transitioning is effected is that the current turn projects a relevant next activity, or range of activities, to be accomplished by the co-participant in the next turn (Schegloff and Sacks 1974 [1973]). The adjacency pair format in which two actions — for instance, a summons and a response — are tightly paired, such that when the first pair-part is produced the second is immediately implicated and expected, is then a special and limited case of sequential implicativeness, with the projected next action being highly specified (1974 [1973]).

The notion of 'conditional relevance' (Schegloff 1972) addresses the problem of linkage from the point of view of the here-and-now of the participant looking at the immediate past. The naturally operative constraint is to produce an utterance in accordance with the sequential implications of the previous one, or, if there is no tacit or explicit delimitation of action projected by the preceding turn, to design the next turn so as to be relevant conditionally upon the previous one (i.e., in some way follow from, address, refer to, play off, complement, or elaborate upon the utterance preceding it). An improvised form of retrospective adjacency-pairing can even be used to formulate an utterance, or as a method of acquiring a turn, in the open-ended circumstance where no requirement has been implicated by the previous turn. As Sacks puts it,

somebody who wants to make themselves a second speaker to some utterance can have as a maxim for him that if he wants to tie his utterance to that of a preceding speaker's ... he can use some second part which can be tied to some then-made 'first part' of a then-made first speaker's utterance. That is to say, somebody who wants to make themselves a second speaker, can make somebody a first speaker. (1992 [1965]: 151)

Obviously, the specific forms and details of conversational objects, and of their relations, are unique to human conversation and to its basic medium — human language. Yet certain of the more abstract and general features of conversation can be seen to be applicable to the interaction between Hans and his questioners. Thus, the interconnection of their gestures can be conceptualized and approached under the auspices of the general requirement of linkage, which characterizes conversation. And the same working assumption of conversationalists — that actions that are positioned in tandem are to be understood in mutual reference to one another — may be seen to inform the trajectory of certain events in the interaction between horse and experimenters.

Turn-taking between Hans and his questioner

The following passage is a synoptic statement given by Pfungst regarding his discovery of the movements of the questioners which cued Hans's responses:

I ... succeeded in discovering the essential and effective signs in the course of my observations of Mr. von Osten. These signs are minimal movements of the head on the part of the experimenter. As soon as the experimenter had given a problem to the horse, he, involuntarily, bent his head and trunk slightly forward and the horse would then put the right foot forward and begin to tap, without, however, returning it each time to its original position. As soon as the desired number of taps was given, the questioner would make a slight upward jerk of the head. Thereupon the horse would immediately swing his foot in a wide circle, bringing it back to its original position. (This movement which ... we shall designate 'the back step', was never included in the count.) Now after Hans had ceased tapping, the questioner would raise his head and trunk to their normal position. This second, far coarser movement was not the signal for the back-step, but always followed it. But whenever this second movement was omitted, Hans, who had already brought back his foot to the original position and had thereby put it out of commission, as it were, would give one more tap with his left foot. (1911: 47–48)

Pfungst does not regard this exchange as a form of interaction, but as a process of one-way determination. So, immediately following this descrip-

tion, he writes of the questioner 'guiding' the horse's tapping. Moreover, as proof of having discovered the operative cues, he states that

by voluntarily giving the necessary signs the horse might be *made to* respond at pleasure; so that anyone who possessed the knowledge of the proper signs could thereby gain *control over* the process of response on the part of the horse. (1911: 48, emphasis added)

The causal adequacy of the signs to produce the behavior is underscored in this way repeatedly by Pfungst; he often reiterates the theme of the questioner controlling or guiding the horse's tapping by a self-conscious use of the cueing movements. The repeated casting of the exchange in this way works to solidify the picture of a horse whose participation is devoid of spontaneity.

The exchange between horse and questioner described above can be laid out in a turn-taking format. The naive understanding of Hans's responses identified them as semantically equivalent to human responses to the same questions. So initially the exchange was conceived as follows:

- 1 Questioner: How much is 2 + 3?
- (Hans calculates 2 + 3 = 5)
- 2 Hans (tapping): 1, 2, 3, 4, 5

Pfungst reconstructs the exchange as follows:

- 1 Questioner: Slight bend of head and trunk
- 2 Hans: Begins tapping [1, 2, 3, 4 ...]
- (The questioner sustains the slight forward bend throughout Hans's tapping, until Hans arrives at the correct number)
- 3 Hans: Fifth tap [... 5]
- 4 Questioner: Slight upward head-jerk
- 5 Hans: Back-step (foot brought to original position)

The barely perceptible, upward head move of the experimenter is the cue in response to which Hans stops tapping and swings his right foot to home position. For Pfungst, the relation between the head-jerk and the back-step is causal; as he puts it, 'these movements of the questioner guided the horse in his tapping' (1911: 48). Because Pfungst's formulation of the relation between the questioner's move and Hans's back-step is causal, it is crucial that the upward jerk of the head distinctly *precede* Hans's backstep.

On a conversation-analytic model, the interaction between horse and questioner is two-directional, not one-directional. On this model, Hans's

tapping, and the return of his foot to home position, are not movements caused by the cues. Consilient with the view of 'performative society', for conversation analysis events cannot be rigidly predicted, because 'what happens' is negotiated and achieved in the course of interaction; that is, utterance-actions (or gestures) at particular sequential locations do not determine the co-participant's response, even when they strongly delimit what is expected in a next move. The elements of the interaction are not hierarchically subordinated as guiding and guided, causing and caused. Rather, these elements are regarded as both the component-units of the chain of interaction and the procedures used to mark just-previous actions or delimit just-upcoming actions. To give an example, a question posed in the course of conversation is simultaneously a semantically complete unit, as well as a procedure by which turn-change can be effected (see Sacks et al. 1974). However, exactly what action is accomplished by the question, and how (and whether) turn-change is effected, are matters negotiated through the response to it.

For Pfungst, since the slight movement of the questioner's head guides Hans's back-step, it *must* temporally precede the back-step. However, the two moves were so tightly connected that doubt was expressed by others present, whether the experimenter's jerk of the head preceded, or closely followed, the horse's back-step. The time differential between head-jerk and back-step was apparently extremely minute, yet crucial to Pfungst's causal argument. So, according to Pfungst, it became important that time measurements be taken' (1911: 50) to determine the temporal order of the questioner's and Hans's final moves. Pfungst used two observers with synchronized fifth-second stop-watches, one timing the horse's back-step, the other the questioner's head movement. Each stopped his watch the moment they perceived the respective moves. Once again, Pfungst's conceptualization of the guiding question of this particular experiment paves the way to verifying his thesis.

The difference in time between the two watches would show the time between the head-jerk of the questioner and the back-step of the horse, and if the back-step was indeed a reaction upon the head-jerk, then the watches would have to show a later time for the back-step than for the head-jerk. (1911: 51-52)⁶

So, if the watches indicated that the questioner's head-jerk temporally preceded the horse's swinging his foot back to resting position, then the conclusion can be nothing other than that 'the back-step was indeed a reaction upon the head-jerk'.

The problem then became identifying with accuracy when the experimenter's head-jerk and the horse's back-step occurred. There was general

consensus with respect to identifying the exact moment of the experimenter's slight head move. However, fixing a criterion for a precise timing of Hans's back-step was more problematic; it was decided that the horse's back-step would be recorded the moment the questioner recognized that it was about to occur. In Pfungst's words,

since the movement of the horse's foot does not occur as a jerk, but is of a greater extent than a jerk would be, it was agreed that the observer was to stop the watch as soon as he recognized the back-step as such, not when the foot was being raised from the ground, because it was not then evident whether the horse would bring it back to the original position or whether he was preparing to give another tap, nor when he had brought his foot completely back, *but at the moment which it was evident that the horse intended to make the back-step*. Experimentation had shown that an agreement as to this moment was possible. (1911: 51, emphasis added)

When the focus is on Hans alone, his back-step is seen as 'intended'; only within a theoretical reconstruction can his movement be respecified as pure reaction. When attention is turned to Hans, without recourse to a framework of stimulus-response within which to place his movements, the language of action — that is, of initiative, directionality, and design of movement originating from a present subject — is relied upon in order to describe how the instant is pinpointed that the movement *is about, or just beginning, to occur*. (This brings to mind J. L. Austin's quip: 'Ordinary language is *not* the last word ... Only remember, it is the *first* word' [1961: 133].)

To elaborate this point further, the moment of recognition that the horse is not going to continue tapping, but is about to return his foot to resting position, is articulated in terms of recognizing that the horse intends to make the back-step. At this point in the experiment, Hans's back-step cannot be constituted as a 'reaction', since the very purpose of the experiment is to determine whether or not the back-step is a reaction (by identifying if it follows the experimenter's head-jerk). Therefore the back-step must be identified by focusing on Hans alone, without extrinsic reference to the cause of his movement. When concentrating on Hans alone, the instant of his change of movement from tapping to the back-step is grasped as 'intended', that is, as initiated and directed action. (Overall, Pfungst was able to keep to a minimum such mental language with respect to Hans, simply by keeping Hans out of the spotlight.)

An objection that may be raised to overstressing Pfungst's mental criterion of recognition (namely, 'the moment in which it was evident that the horse intended to make the back-step') is that this is 'merely a way of speaking', and does not imply an understanding of the horse as

actually having 'intentions'. Yet this begs the question of why Pfungst is compelled to identify the specific moment in terms of what the horse intended. He states that 'experimentation had shown that an agreement as to this moment was possible', but he does not identify *how* it was possible. What the choice of wording betrays is that without the use of a mental vocabulary, certain witnessable actions are *not otherwise describable*. That is: while the pinpointing of the moment that Hans is about to begin (or has just begun) his back-step is not descriptively specifiable as a discrete *physical movement*, it is unproblematically available as a discrete *witnessable action*.

While there is no physical description for the horse's posture during the split second of time between two discrete gesture-forms (the tapping and the backstep), that moment in time, of the initiation of the transition from one to the next, can be *seen* and documented with a stop-watch. What is seen is that Hans is in the process of doing the next movement, and that he is present to that doing; what is witnessed is that the backstep does not 'just happen'. The way to put into words what can be seen is to describe it as 'the moment the horse intended the back-step'. Thus, it is not whether Pfungst is unwittingly conceding some elusive mental process at work which is germane here; rather, it is the implicit recognition of the horse's movement as *action*, rather than *reaction*.

Describing the horse as intending his back-step, and seeing the moment of that intention, are linked with witnessing his back-step as an action being initiated and performed, rather than as a reaction that is caused. (A reaction, almost by definition, cannot be intended.) The very implementation of the experiment's design betrays what the experiment sets out, and claims, to prove (namely, that the backstep is a reaction). What is interesting, then, about the expression of the 'moment intended' is not whether or not it signifies a commitment to 'intention' as an internal, self-conscious state. Rather what the linguistic articulation expresses is that the horse's movement is apprehended as an action performed by a subject.

The stop-watch measurements of the head-jerk and backstep were taken with von Osten (Hans's owner), Schillings, and Pfungst himself as questioners of Hans (vertical columns of the following two tables). None of the participants, with the exception of Pfungst who designed the experiment, knew why they were being observed. Measurements were taken by von Hornbostel, Pfungst, Schumann, and Stumpf (indicated on the horizontal columns). Table 1 indicates the number of tests carried out. Columns I and II indicate two series of tests done for each questioner (1911: 53). The results of the experiments are given in Table 2. The row R (for 'right') represents the cases where the back-step followed the head-

Table 1.

Experimenter Questioner	v. H		Pfungst		Schum.		Stumpf	
	I	II	I	II	I	II	I	II
V. Osten	9	15	34	17	—	—	8	27
Pfungst	6	13	—	—	—	—	9	—
Schillings	—	—	19	17	6	16	—	—

Table 2.

Experimenter Questioner	v. H		Pfungst		Schum.		Stumpf	
	I	II	I	II	I	II	I	II
V. Osten	R	44%	60%	62%	88%	—	—	48%
	W	56%	20%	12%	0%	—	100%	22%
	S	0%	20%	26%	12%	—	0%	30%
Pfungst	R	100%	92%	—	—	—	100%	—
	W	0%	0%	—	—	—	0%	—
	S	0%	8%	—	—	—	0%	—
Schill.	R	—	—	74%	100%	83%	100%	—
	W	—	—	5%	0%	17%	0%	—
	S	—	—	21%	0%	0%	0%	—

jerk (as expected); under W (for 'wrong') are the percentages of cases where, contrary to expectation, the stop-watches indicated that the back-step preceded the head-jerk (1911: 54). In his table, Pfungst did not record the cases 'which would complete the 100 percent, i.e., those in which the watches indicate simultaneity of the movements in question' (1911: 54). However, these percentages (S, for 'simultaneous') are included here, added to Pfungst's original table.

The results show variability along a number of parameters. As Pfungst points out, his own and Schillings's overall results are in agreement with each other and with the expectation that the head-jerk precedes the back-step. Since Pfungst was the only experimenter who knew what the experiment was designed to measure, he relies upon this agreement with Schillings to justify his claim that 'I succeeded, however, in eliminating the effect of this knowledge on my part' (1911: 52).

Pfungst proceeds to explain 'the few contradictory cases' between the first series (I) and the second series (II) in Schillings's case (note the discrepancy of results in Table 2). The discrepancy of results between Schillings's two series is put down to a lack of practice in the first series (while 'in the case of Mr. Pfungst', writes Pfungst, measurements 'had

been preceded by a number of practice tests' [1911: 55]). According to Pfungst, 'since ... Series II shows, in every case, a decided change which is similar for all observers (note, however, the disparity of Pfungst's case), there can be no doubt but that practice is here involved, and that Series II is to be regarded as the true standard' (1911: 55). While the discrepancy between Series I and II can be put down to practice of the particular test,⁷ Pfungst does not clarify why this should make Series II 'the true standard'. If the object is to show that the questioner's head move precedes the back-step (in order for the back-step to be a reaction), then it is entirely unclear (and somewhat counter-intuitive) why practice should be needed to arrive at the 'true standard'. Moreover, if practice were the underlying factor (of the trend to get 'better' results in Series II), then the clearest results should have been those of Hans's owner and trainer, von Osten, who had had the longest overall practice with Hans. Yet the results of von Osten are precisely the obverse of what would have been predicted on Pfungst's explanation of 'practice', and they are the most unrevealing relative to the expected results, i.e., that the back-step follows the head-jerk.

In discussing his own results, Pfungst suggests that for him Series I is the equivalent of Series II for the others, as he had done a number of practice tests beforehand. This, however, leaves the status of Pfungst's Series II, where he obtained less than 100 percent 'right' results, undecided. Presumably he did not consider the discrepancy between 100 percent and 92 percent 'right' results to be significant, especially since the 8 percent difference is of 'simultaneous' and not 'wrong' results.⁸ What is undecided, however, is whether the discrepancy between Pfungst's Series I and II can be put down to chance, or the same direction of a discrepancy would show up if the other questioners were subjected to a Series III. Accounting for the 8 percent discrepancy between Pfungst's two results is further exacerbated by the fact that the results of Series II are based on more than double the number of tests (13) of Series I (6). According to criteria of statistical significance, then, the results of Pfungst's Series II would have to be considered the more accurate as they are based on a greater number of tests. At any rate, the point is that the discrepancy may indicate a trend, namely, that as the number of tests are increased, and with more practice, an increasing number of 'simultaneous' results are obtained.

In contrast, then, to Pfungst's deductions this would suggest that with 'practice' the number of simultaneous results of head-jerk and back-step, rather than 'right' results of the head-jerk preceding the back-step, tend to increase. This would appear to be corroborated by von Osten's results (with up to 30 percent simultaneous results in one series), which are the

most difficult to account for on Pfungst's hypothesis. (As Pfungst puts it, 'the results of the measurements taken in the case of Mr. von Osten are far less satisfactory' [1911: 55]). It is unclear whether the discrepancy between von Osten and the results of Pfungst and Schillings is due to the overall greater number of tests performed with him as the horse's questioner (see Table 1), or is due to a qualitative difference of von Osten's style as the owner and trainer of Hans. Whatever the case, von Osten's results are the 'murkiest' and most perplexing from Pfungst's point of view. Here, there is both a tendency toward a large number of 'simultaneous' results in the time measurements of head-jerk and back-step and a notable number of 'wrong' results where, according to the stop-watch measurements, the back-step preceded the head-jerk.

Pfungst accounts for the overall unevenness of the results of his experiment with a patchwork of explanations. He argues that throughout the experiment, Series II is the 'true standard' with Series I as a practice series. He does not explain, however, why 'practice' should be needed at all to establish the true standard. If the relation of the head-jerk to the back-step is a deterministic one, it is unclear why practice should be needed to make this so. Pfungst also claims that there is 'a preponderance of "right" cases' (1911: 55). But again, if the horse's movement is a *reaction* upon the questioner's head move, then far more consistent results would be expected. Finally, the equivocality of von Osten's results is explained in that 'the decisive movements were far less easily observed' (1911: 55). Overall, and in accordance with Pfungst's expectations, the results do indicate that there is indeed a greater tendency for the back-step to follow the head-jerk. The question, however, is why the results are not as clear-cut as might reasonably be expected on the causal model of the questioner's head movement determining the horse's back-step.

That Hans is responding to the questioner's head-jerk, and possibly to other even more subtle signs adumbrating this move (especially in von Osten's case), is not a disputable matter. What can be questioned, however, is whether this finding of a connection between the head-jerk and the horse's back-step is best encompassed by a causal model. Indeed, the counterargument that can be made here is that the variability of the results suggests that an interactional model of fully bilateral participation could account for Pfungst's data more convincingly than a stimulus-reaction conception.

If the relation between head-jerk and back-step is conceived causally, then one might legitimately expect the results to be far more invariable, with the head move preceding the back-step in a clear-cut way. On the other hand, if the two movements are conceived under the auspices of 'performative society', on the model of paired actions which sequentially

implicate one another, then inconsistencies and variations in the results would be expected. If the horse's back-step is understood as a *participant's action*, then an ambit of variability would result from such factors as Hans's relationship with the particular experimenter, his relative anticipation of the questioner's different movements, his fluctuating attunement to those moves, and the modulations of mood, attention, and concentration during a particular experiment or day. That is to say, when the horse's movements are conceived as actions, then the sheer variety of parameters influencing their occurrence ensures that they cannot be predicted with mechanical regularity.

On a conversational model, the tying between the questioner's movement of the head and Hans's back-step can be apprehended as both 'context-free' and 'context-sensitive' (Sacks et al. 1974). The participants' linking of moves is context-free in the sense of their having become conventionally paired and attuned after a training process. The tying of the movements is context-sensitive in the sense of having to be locally reenacted by participants who cannot rely upon their movements to just happen automatically, but who must perform their actions at the appropriate moments. The interplay of context-independence and context-sensitivity in the pairing of head-jerk and back-step is precisely the kind of interplay that would generate the results of Table 2. While in most cases the expected sequence is successfully negotiated and enacted ('right' results), in other cases, for whatever local reasons, the expected sequence is muddled ('wrong' results). Thus, when actions are tied together within an interactive and mutually binding framework a 'munkiness' of results is to be expected, because nothing is happening automatically.

In conversation, tight transitions between turns, with neither gap nor overlap, are common. Moreover, 'together with transitions characterized by slight gap or slight overlap, they make up the vast majority of transitions' (Sacks et al. 1974: 701). According to a turn-taking conception, therefore, the simultaneous cases which Pfungst omits from his Table and barely discusses at all, far from being trivial results, precisely signify the tightness of fit between the questioner's head movement and Hans's back-step, conceived as turns. The cases of simultaneity attest to the fine attunement of the participants to one another, in that the sequential arrangement of their gestures tends toward the limit case of complete synchronicity. Thus, if the actors are understood as engaged in turn-taking, then the visual (i.e., almost instantaneous), rather than auditory, identification of transition-relevance positions accounts for the frequent synchronicity of their paired gestures.

Under the auspices of a unique performative society of Clever Hans and his questioners, the picture of Hans as reactive and controlled dis-

integrates. The trajectory of actions cannot be the unilateral, sovereign province of a single participant, but is rather shaped by the interlocking contributions of engaged participants. Courses of action cannot be systematically predicted, because what happens is negotiated on the spot, in a tying-actions game which, however replete with expected patterns, is always achieved (as Garfinkel puts it) 'another first time'.

Repair in the interactions of Hans and the questioner

As mentioned in the discussion of the conversation-analytic perspective, contributions in conversation are organized with the use of recurring, largely bilateral, procedures. 'Repair' is a technical term referring to one such set of methodical and recurrently encountered practices used by participants for correcting troubles, errors, or misunderstandings in conversation. In the course of conversation, repair can be self-initiated or other-initiated. Self-repair can occur in the same turn as the trouble source, in the transition space between turns, or in the third turn to the trouble source turn. Other-initiated repair can, through the use of different devices, either elicit self-repair from, or directly 'correct', the party whose talk contains the troublesome item. Finally, repair can be done explicitly, becoming, itself, the central interactional activity, or implicitly, being accomplished *en passant* in a course of action, and not becoming an overt conversational preoccupation (Jefferson 1972; Schegloff et al. 1977; Jefferson 1987).

One specific pattern that repair activity takes is that a speaker proposes an alternative to replace the item that is, in whatever way and for whatever reasons, targeted as wrong, imprecise, or inappropriate. This particular form often takes the sequential pattern of *XXY*, where the first speaker produces *X*, the next speaker (implicitly or explicitly) proposes an alternative *Y*, and the first person accepts the alternative *Y* by producing *Y* in the third turn (Jefferson 1987; examples are provided in Note 9).⁹ In one experimental setting, described in some detail by Pfungst, the interaction between questioner and Hans involves repair activity, exhibiting the pattern *XXY* observed in human conversation: in short, the interactional sequences between human and horse are demonstrably intelligible on the model of a three-turn repair series. Hans responds to a command (producing *X*), he is corrected by the experimenter (counter-proposing *Y*), and he aligns himself with the correction by offering an alternative, candidate response (attempting to produce *Y*). Here then is the example.

One of the things that Mr. von Osten claimed that Clever Hans knew was the names of all the colors. He demonstrated this before the spectators by laying out a number of differently colored cloths at some distance in front of Hans and asking him to go and bring back a specifically colored cloth. Hans would promptly do so, and he rarely failed to return with the correct cloth. By varying this experiment in certain ways, Pfungst was able to disprove the horse actually knew the German words for the colors. But once again, of course, he counter-suggested that Hans's responses were causally determined, stating that 'he was controlled by signs' (1911: 80).

To demonstrate that Hans was following cues rather than exhibiting knowledge of language, Pfungst showed that when the cloths were placed discreetly and widely apart in a row, Hans could easily pick out the one requested; the reason for this was that Hans could use the questioner's body and gaze orientation to pick out the cloth desired. But Hans did not perform as well when Pfungst rearranged the distribution of the cloths:

If ... the cloths were arranged, not in a row, but in several heaps, so that one might turn to a particular heap, but could not indicate a particular cloth, then Hans would regularly go to the proper heap, but would always bring forth the wrong cloth. After much persuasion Mr. von Osten consented to make a series of these tests himself. Hans's failures were deplorable. He would take up first one cloth, then another, then turn again to the first, etc.

Pfungst then proceeds to describe a course of action which, I argue, can be seen as interactionally organized under the auspices of repair work:

We would mention, however, that this apparent searching was not done spontaneously, but in response to Mr. von Osten's calls, such as 'See there!', 'The blue!', etc. Every time Mr. von Osten called, Hans would drop the cloth he was holding in his mouth, or he would turn away from the one he was about to grasp, and would then try another one ... As soon as the questioner noticed that Hans was about to take up the wrong cloth, all that was necessary to make him correct his error was to give some sort of exclamation, such as 'Wrong!', 'Look you!', 'Blue!', etc. Hans would pass on as long as the calling continued. If he was picking up, or about to pick up, a cloth when the exclamation was made, he would go on to the next; but if, at the time he was on his way to a certain cloth, he would change his direction in response to the call. If he stood before one of the pieces at the time, but had not lowered his head, he would pass on to the next. (1911: 83-84)

For Oskar Pfungst, Hans's floundering with the cloths are 'deplorable failures', which indeed they are, on the criterion of Hans's command of the German language. What are 'deplorable failures' for Pfungst, though,

from a conversation-analytic perspective — that is, according to very different evaluative criteria — are quite remarkable achievements. Hans is participating within a format of 'correcting activity' with the pattern of XYY:

A: (X)
B: (Y)
A: (Y)

On this template, the interaction between the questioner and Hans, after the questioner has asked Hans to bring forth a green cloth, may be laid out:

Hans: Blue
Questioner: Green!!
Hans: (Green?) White

Hans understands that the questioner's exclamation (Green!!) targets his action (Blue) as not-aligned with what the questioner intended him to do; he attempts to correct his previous action ((Green?) White) so as to meet the questioner's demand. Hans clearly does not know what 'green', 'white', or 'blue' mean. These words may be placed in brackets to indicate that Hans does not share the semantics of 'green cloth', 'white cloth', etc. So the sequence might be rewritten as follows:

Hans: [Blue]
Questioner: No, not the blue! Green!!
Hans: [(Green?) White]

Hans's response to the command to bring the green cloth cannot be corrected with the proposition 'That cloth is not green, it is blue'. Yet Hans apparently does understand that an exclamatory remark within a specific sequential environment is intended as a repair of his just beginning, just completed, or just about to be completed, action. That is, he takes the exclamation to be indicating that he is about to do, or in the process of doing, the wrong thing. Then, in accordance with the format of correction XYY, and *despite his profound ignorance of German*, Hans decides on X (the blue cloth he has just picked up) and attempts to align his action with his questioner's proposed alternate Y by producing candidates of Y.

Conversation-analysis have identified the general availability of the 'third-turn option' as a structural location for a first speaker to repair any misunderstanding or mishearing of their first utterance evident in the second speaker's turn. As Heritage puts it,

given the generic availability of this procedure, any second speaker may look to a third action to see whether this opportunity was taken and, if it was not, conclude that the analysis and treatment of the first action that was displayed in his or her second was adequate. Any third action, therefore, which implements some 'normal' onward ... trajectory for a sequence, tacitly confirms the displayed understandings in the sequence so far. (1984: 258)

In the interactional sequence between the horse and his questioner, the questioner makes use of the third-turn option and Hans orients to the repair work it attempts to accomplish. The full sequence can be laid out as follows:

- 1 Questioner: Hans, bring the green cloth!
- 2 Hans: [Blue cloth]
- 3 (1) Questioner: No! The green one!
- 4 (2) Hans: [White cloth]
- 5 (3)(1) Questioner: No! Look! Over there!
- 6 (2) Hans: [Green cloth]
- 7 (3) Questioner: (Makes no correction)
- 8 Hans: (Brings the cloth to the questioner)

Hans continues to offer candidate cloths as long as the third-turn, correcting option is used by the experimenter. The third-turn option indicates to him that his action, which follows the questioner's command, misaligns in some way with that command. When Hans finally chances upon the desired cloth, he also hears the *absence* of the third-turn repairing option: he then proceeds to implement the normal trajectory of the sequence of events, namely, he returns with the cloth which did not elicit corrective action.¹⁰

In one series of experiments testing Hans's knowledge of the words for colors, without the aid of vocal exclamations, Hans was successful in retrieving the correct cloth in 37 percent of the 103 trials. The total successful percentage jumped to 54 percent when vocal exclamations were allowed. Overall, Pfungst concludes that

without verbal admonition only one third of the tests brought correct responses, whereas one-half succeeded when those in which calls were used, are added. *Still this is a relatively poor showing.* (1911: 85, emphasis added)

It is noteworthy that Pfungst calls the vocal exclamation to which Hans responds an 'admonition', thus implicitly suggesting that its illocutionary force as corrective action is grasped by Hans. This point aside, however, it is clear that Pfungst proposes his last judgment of 'a relatively poor showing' on the criterion of Hans's alleged knowledge of the words for

colors. Quite correctly Pfungst points out that 'Hans did not know the names of the colors' (1911: 80).¹¹ Instead, Hans was able to respond to the command to retrieve a cloth by following the vector of the questioner's body orientation with respect to the correct cloth. Pfungst identifies the 'effective signal' as the turning of the questioner's head and trunk toward the desired cloth. Hans would then proceed toward the collection of cloths (whether in a row or in heaps) 'keeping his eye on his master'. However, once he arrived at the location of the cloths 'this method ceased to be effective, for then he could no longer see the experimenter' (1911: 81).

Pfungst thus shows that Hans relied upon the questioner's body orientation with respect to the laid-out cloths as a general directional pointer toward the desired cloth. Given the non-specificity of this pointer, which could only provide a general ambit of the cloth's locality, and given that Hans did not even have this indicator available once the questioner was outside his visual field, then it would seem that about one-third correct responses is not such a 'poor showing' after all. Moreover, 73 percent of his (total 63) erroneous responses were errors (designated as 'error I') of the type one-too-far to the right or to the left (of the desired cloth) (1911: 81-82). However, these 'errors' are only errors on the criterion of Hans's knowledge of the names of the colors. Therefore, the proposal that they are errors at all can be rejected, since the criterion of judging them as such is, in fact, inapplicable. On the other hand, on the criterion of Hans's estimating with relative accuracy the locality of the desired cloth, the responses which are one off to the right, or to the left, can be evaluated as relatively quite accurate. We may then, for the sake of argument, place them in the category of correct responses. On this redrawing of the data, and according to the *applicable* criterion of judgment — how well Hans reads the vector between the questioner's body/gaze and the cloth — the number of correct responses jumps up to about two-thirds; indeed it jumps to about 90 percent correct responses, for the cases where vocal 'admonitions' were allowed.

While Hans has no knowledge of the words for the colors, he exhibits a different kind of knowledge in his ability to grasp, within a specific set-up of objects and events, the direction of body/gaze as a first-pair part (calling for a response) and as deictic (pointing to a removed locality). Hans's understanding of his human coparticipant's body orientation, both as a gesture that expects another gesture paired to it, and as a pointer toward an object in a remote location, shows an ability to participate competently in an interactional game whose rules are quite abstract. The abstractness, however, does not turn on the postulation of 'conceptual thought' (which may or may not be involved). Rather the

abstractness inheres in the capacity to see silent space (the opening of the structural location for the next turn) and absent space (the deictic there) that the questioner's gestures enunciate.

Pfungst once again articulates Hans's participation in terms of the human control over the horse. He writes: 'Nor was it known to professional trainers that it was possible for the master to direct a horse to any point of the compass simply by means of the quiet posture of the body' (1911: 176). It is indeed remarkable that for Pfungst the discovery of the visual signals that Hans uses in performing these various tasks is equivalent to the discovery that Hans actually accomplishes nothing whatsoever (or nothing at all remarkable). He writes of Hans that 'he was rather like a machine that must be started and kept going by a certain amount of fuel (in the form of bread and carrots). The desire for food did not have to be operative in every case. The tapping might ensue mechanically as a matter of habit' (1911: 202). (Clever Hans cannot 'win' on Pfungst's turf: if he's not tapping for food, he's tapping from habit, and in any case mechanically.) Pfungst apparently came to regard Hans as a mindless puppet guided by the questioner's cues. His understanding of Hans is clearly colored by his view that he controls Hans. He writes that 'by exercising the utmost precision in facing the cloths, and by using in addition suitable oral signs, *I succeeded in getting Hans to bring, successfully, each one of the six cloths in a row, and without a single error*' (1911: 86, emphasis added). Thus Pfungst 'bends over backwards' in refraining from giving Hans any credit at all in retrieving the correct cloth without error.

Pfungst's reasoning is similar in his ultimate assessment of Hans's intelligence. Once he has shown that Hans's performances are not the mark of human symbolic thinking, none of Hans's actions can be seen as indicative of 'intelligence'. Thus in one experiment the word *aber* was written on one among five placards, and Hans was asked:

'What is the position, counting from left to right, of the placard which has the word "aber" inscribed upon it?'. Hans answered: 3. (It was indeed the middle placard). Then he was commanded: 'Go!'. Thereupon Hans went straight to the fourth placard ... The large number and the irregularities of the errors showed that there was *no manner of intelligence* involved in the pointing process. (1911: 79, emphasis added; cf. also 1911: 185)

Pfungst's evaluation of 'no manner of intelligence' is measured *solely* against a standard of how a human subject would respond in Hans's place. A human participant would understand the semantic connection between the original question 'where is the word written?' and the subsequent command to point to it. The fact that this semantic connection

does not exist for the horse is seen to warrant the judgment that 'there was no manner of intelligence involved'. So Hans's demonstrated grasp of the intentions of the questioner, first to tap, then to point out a placard, and his attempt to act in accordance with those intentions, by tying his next action appropriately to the questioner's preceding one, remain completely unacknowledged as actions that may well be said to exhibit intelligence in their own right.

Conclusion

On Pfungst's portrayal of Clever Hans, no conceptual space whatsoever emerges to see his acquired, participatory skills in these games, and his exhibited competence, as remarkable achievements. On an interactional approach, on the other hand, insofar as these games have procedures and regularities that have to be learned, and insofar as they require attentiveness and interest, then they exhibit their own internal and rational order, which the players have to both orient to and recreate. And insofar as orienting to and recreating this rational order is done with competence and reliability, and with some degree of alacrity and flair, then Hans may not only be seen as having contributed to an immanently rational order, but to have done so intelligently.

At this point it is possible to revisit the question of why so many people were so deceived by Hans's performances as to actually entertain the idea of a horse that could spell, compute, tell the time of the month, and identify how many ladies in the audience were wearing hats and how many corners there are in a circle. A very plausible answer to this question is that people were deceived because Hans played the games that von Osten taught him so well. That is to say, Hans's observers and questioners mistook Hans as possessing human reason, precisely because Hans could be trusted, consistently and reliably, to perform rationally — that is, appropriately, expectably, correctly, confidently, and so on. Trained by his owner to be a member of a particular performative society of games, Hans could be relied upon to recognize and use the procedures and objects of those games methodically and uniformly (see Garfinkel 1967: 10). On an interactional model, the judgment of Hans's actions as exhibiting intelligence and rationality was not, itself, mistaken. It was precisely the demonstrable character of those actions as intelligent and rational that was the basis for misidentifying *the dimension* of their intelligence and reason.

The point of this exercise has been to underscore that language and method of analysis are not neutral instruments in the representation of

animal life. And the line between action and behavior — even as it must have looked so vivid in the wake of an analysis that was 'the final verdict' — is again made dim with the novel analytic gestures and understandings that, gratefully, time brings.

Notes

1. In contemporary works of behavioral science the view of animals as passive and mindless is coming under scrutiny and critique. Especially since the emergence of cognitive ethology in the wake of Donald Griffin's work (see References), questions regarding animal consciousness and subjectivity have become increasingly more legitimate. Moreover, even within the behaviorist tradition (where themes of mentality have been actively shunned), scientists are finding evidence that stimuli are not passively received, but rather animals actively orient their attention to different features of the environment (see Rescorla 1980).
2. The strange character of this reasoning becomes more evident in a hypothetical human case: a person's behaviors can be manipulated, with the use of bribes and punishments, to become reliable and predictable (even down to the fine details); this outcome then is used as evidence that, *in general*, human behavior is determined.
3. One available analysis of the difference between these two forms of interaction is Habermas's argumentatively detailed distinction between strategic and communicative action (1981).
4. Lawrence Wieder refers to this tendency of behaviorism to exalt the experimental design over the subjects whose active participation makes it work, as 'methodogenesis' (1980). I am indebted to Wieder's thoughtful paper in this analysis of Pfungst's monograph.
5. For a discussion of the aims of conversation analysis, see Schegloff 1991; for an exposition of the fundamental conversation-analytic concepts of adjacency pairs, expansions, repair, and sequential markers as descriptive of a priori structures of social action, see Coulter 1983; for a comprehensive introduction to conversation analysis, see Heritage 1984.
6. In a long footnote Pfungst details the various experimental measures and controls he took to eliminate or minimize error (1911: 51–52).
7. Pfungst does not specify what problem or question the horse was presented with in these tests.
8. As mentioned, Pfungst did not include the figures for simultaneous results in his Table. Presumably he explained away simultaneously by figuring that the time differences between head-jerk and back-step were so small that marginal errors in the reaction times of the observers operating the stop-watches could explain the loss of recording that differential.
9. An example of the XYY form (from Jefferson 1987, transcript simplified):
 A: They're going to drive back Wednesday. (X)
 B: Tomorrow. (Y)
 A: Tomorrow. Right. (Y)
 The series can also have the pattern YXX, where the first person having produced X rejects the proposed alternative Y, preserving X in the face of the co-speaker's dissent:
 A: That was a gas leak. (X)
 B: That was an oil leak, buddy. (Y)
 A: It's a gas leak. (X)

10. Hans is also here exhibiting what conversation analysts have identified as a 'preference for agreement' (Pomerantz 1984), in that he attempts to align his actions with what is expected of him. With his actions Hans can be seen as demonstrating that he is participating in a game where affiliation and disaffiliation are not equivalently valued outcomes.
11. Pfungst then proceeds to make his characteristic inferential leap: 'It was plain that here also, as in all the other cases, he was controlled by signs made by the questioner ...' (1911: 80).

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