

Clever Hands: Uncontrolled Intelligence in Facilitated Communication

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Five studies examined how people who are answering questions on behalf of another person may use their own knowledge to answer correctly while attributing authorship of their answers to the other. Experiments 1 and 2 found that participants instructed to answer yes/no questions randomly were unable to do so. They were more often correct on easy than hard questions, and extended opportunity and incentive did not reduce this effect. Experiments 3–5 found similar correctness for participants who were asked to answer yes/no questions by sensing either the ostensible keyboard finger movements or unvoiced inclinations of another person who had been admonished not to answer, and who was in fact a confederate and was not even given the questions. In this paradigm, the answers were often attributed to the other.

Under certain conditions, people lose the sense of authorship for their own actions and attribute them to agents outside themselves. This was the case in 1904 when trainer Wilhelm von Osten exhibited Clever Hans, a horse who appeared to answer questions correctly by tapping a hoof. Extended investigation revealed, however, that Hans was only clever enough to respond to an unconscious movement produced by the trainer—a tendency to lean forward when a question was asked, and then to straighten up when Hans had completed the right number of taps to answer the

question. The trainer was convinced of the horse's intelligence, however, and vehemently denied the influence of his own—even after the nature of his influence had been explained to him (Pfungst, 1965).

Projecting intelligence to another agent may not be the penchant of horse trainers alone, and instead may underlie a range of social phenomena. This possibility has been illustrated through the remarkable history of *facilitated communication* (FC), a popular but discredited technique in which communication-impaired clients are helped at keyboards by facilitators who brace the clients' hands while they type. Although facilitators usually claim not to contribute to the messages, their influence has been shown in many studies. Like von Osten, FC facilitators influence their clients' responses while attributing these same responses to the clients. Our research explores this authorship confusion by focusing on (a) how facilitators' intelligence exerts uncontrolled effects on their movements, and (b) how facilitators' belief in the ability of the client to communicate leads them to attribute these intelligent movements to the client.

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Facilitated Communication

FC was devised as a therapeutic technique by teacher Rosemary Crossley in the hopes of communicating with people with autism, cerebral palsy, and other disorders that hamper communication. The idea was for a trained facilitator to sit with the impaired person and hold his or her hand at a keyboard. This was intended to support the pointing or typing finger and guide the retraction of the arm, but not to guide the communicator's responses, and facilitators were cautioned not to influence the communicator's responses

themselves. With such facilitation, it was often found that individuals who had never said a word in their lives were seemingly able to communicate by typing meaningful sentences and even lengthy reports (Biklen & Cardinal, 1997; Crossley, 1992; Crossley & McDonald, 1980).

The bright hope for FC was soon dimmed by research showing that many facilitated responses originate with the facilitators themselves (Felce, 1994; Jacobson, Mulick, & Schwartz, 1995). One telling study delivered separate questions through headphones to facilitators and clients, and the resulting answers were found to match the questions given to the facilitators, not the clients (Wheeler, Jacobson, Paglieri, & Schwartz, 1993). It turned out that FC could not uncover facts unknown to the facilitator (Cabay, 1994; Siegel, 1995; Simpson & Myles, 1995). When clients were given messages or shown objects with their facilitators absent, they were not able to describe these items in subsequent FC (Crewes et al., 1995; Hirshoren & Gregory, 1995; Klewe, 1993; Montee, Miltenberger, & Wittrock, 1995; Regal, Rooney, & Wandas, 1994; Szempruch & Jacobson, 1993). Although some proponents of FC attest to its effectiveness even in the face of such evidence (e.g., Biklen & Cardinal, 1997), the overwhelming weight of research indicates that FC consists largely of communication from the facilitator (Twachtman-Cullen, 1998).

Beyond the distress that this finding yields for the families of the clients, a fundamental scientific question remains: Why would a person serving as a facilitator fail to recognize his or her own active contribution? It seems odd that someone can perform a complex, lengthy, and highly intelligent action and yet mistake it for the action of someone else. The strong impression that the client is the communication source, however, is reported by hundreds of people who have served as facilitators, and it seems unlikely that such a large population would be lying. How does such projection of one's own intelligent responses to another person occur?

The explanations offered in the literature note the resemblance of FC to the family of phenomena known as motor automatisms (Ansfield & Wegner, 1996; Burgess et al., 1998; Dillon, 1993; Hall, 1993; Sheehan, 1994; Spitz, 1997). Automatizations are actions that are not experienced as consciously willed. Automatizations that occur through coaction, such as cooperative automatic writing, table turning and tilting, or Ouija-board spelling, for example, often do not feel willful to the performers, and they seem to occur without conscious guidance—so much so that they are sometimes attributed to spirits or other agents rather than to the self. In FC, the actions produced without a feeling of conscious will are then attributed to the client.

Like the processes that create automatizations (see Wegner, 2002), the processes underlying FC break into two steps: *action production* and *action projection*. Action production occurs as the facilitator produces intelligent actions—pressing keys on behalf of the client that are selected in a way that uses facilitator knowledge. This step would be unremarkable except that the facilitator then remains less than fully informed that these intelligent actions are self-produced. This is evident because in the second phase of the process—action projection—the possibility that these actions are one's own is supplanted by the belief that the actions emanated from the client. The processes of action production and action projection thus each invite analysis.

Action Production

It is difficult to grasp at first how actions could be produced without accompanying knowledge that the actions are one's own. Past theorizing about automatizations has attempted to handle this problem by suggesting that automatizations occur in unusual ways that depart from normal voluntary action—such as through dissociation (Hilgard, 1986), ideomotor processes (Burgess et al., 1998; Carpenter, 1888), or ironic processes (Ansfield & Wegner, 1996; Wegner, 1994). These special action production systems presumably bypass conscious will, yielding actions that occur without this feeling.

Dissociation, for example, involves control processes that operate outside consciousness. However, such dissociation is usually assumed to occur in only a small proportion of the population (e.g., Carlson & Putnam, 1993; Kihlstrom, 1985), and so is not a likely candidate for explaining the widespread susceptibility to FC effects found in randomly selected participants (Burgess et al., 1998). Ideomotor effects, in turn, are actions that occur by virtue of thinking about action rather than by virtue of intention. Although there is evidence that people who experience facilitation are more susceptible to ideomotor effects (Burgess et al., 1998), ideomotor phenomena tend to be small (Knuf, Aschersleben, & Prinz, 2001), seldom accounting for lengthy or multistaged actions. Ironic effect explanations, in turn, focus on automatic behaviors and thoughts that occur in opposition to intentional mental control. These, too, are relatively restricted in scope and brief in duration (Wegner, Ansfield, & Pilloff, 1998). It is not clear, then, how the production of long and complicated communications by many of the people who attempt facilitation could be due to any of these rather limited processes.

Perhaps automatizations are not caused by a special action production system. It may be instead that the same processes that yield normal voluntary action are recruited to produce the actions that occur in automatizations (Wegner, 2002). In automatizations, however, the processes that usually accompany action production and simultaneously operate to ascertain authorship (so to indicate that the action is authored by the self) are subverted or misled such that the source of the action becomes unclear. This approach, then, depends on the idea that people are not perfectly informed of their authorship by the processes by which their voluntary action is produced. Rather, the determination of authorship is an add-on, a judgment reached through the perception of self and situation rather than through some privileged understanding that arises from the conscious causation of the action (cf. Bem, 1972; Nisbett & Wilson, 1977).

This reasoning suggests that people may perform intelligent actions without being consciously aware of doing so willingly. And indeed, evidence has accumulated for just such actions (for reviews see Bargh, 1997; Dijksterhuis & Bargh, 2001; Wegner & Bargh, 1998). People can be led by unconscious or indirect primes to be friendly (Wilson & Capitman, 1982), helpful (Anderson, 1983; Macrae & Johnston, 1998), aggressive (Carver, Ganellen, Froming, & Chambers, 1983), slow, or rude (Bargh, Chen, & Burrows, 1996), and even smart (Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001; Dijksterhuis & van Knippenberg, 1998). Some such studies suggest that these effects do not depend on participants' awareness of the prime or on their ability to report the occurrence of the action (Dijksterhuis & Bargh, 2001).

Things that people do can be informed by what they know, then, even without their conscious realization that what they know is being applied to their action. Facilitators in FC may be influenced by just such *uncontrolled intelligence*, the production of intelligent actions that occurs without conscious intention, or even in opposition to such intention. The typical facilitator doubtless has at hand information about the client's activities and circumstances, after all, and is also likely to have expectations for what the client wants, or what might arouse the client's interest or emotions. Such knowledge could prime the facilitator to influence the actions that the facilitator and client make together at the keyboard, percolating subtly into the choices of letters and words even while the facilitator may be attempting to counteract such influences. The facilitator is thus intrinsically primed by his or her own prior knowledge. The facilitator's knowledge can inform his or her judgments even when he or she is attempting to respond in a way that does not depend on this knowledge. A first goal of the present research, then, was to see if prior knowledge can influence action against a person's intention in this way.

The typical instructions to the facilitator in FC emphasize the importance of sensitivity to the communicator and of not influencing the communication. On being asked to remain fully open to any sign of influence from the communicator, the facilitator is being asked not to contribute meaningful responses. Our strategy for studying the process of intelligent action production was to test the influence of an indirect form of this instruction. Rather than asking people not to contribute meaningful responses, we simply asked them to respond randomly. Experiments 1 and 2 were designed to see if knowledge informs action when participants are not consciously trying to express knowledge, and instead are trying to answer questions randomly.

Action Projection

How do facilitators come to believe that they are not authors and that the client is the source? Normally, we can identify actions as our own, in part, because the physical separation of self and other allows us to get visual information about who did what. There is insufficient separation of self and other in the FC setting, however, to provide this information. Another clue to authorship is the proprioceptive feedback we get from our muscles, skin, and joints that we do not receive from these parts of other people. Facilitators ought to be able to tell what they were contributing, perhaps, by feeling the movement of their own fingers. However, such proprioceptive feedback is often remarkably weak, so faint that it is easily overridden by visual or verbal feedback (Fournier & Jeanerod, 1998; Pavani, Spence, & Driver, 2000). A third clue to authorship is what we are thinking. Authorship inferences may often be based on the fact that we have thoughts that seem to cause what we do, and so we can identify actions that have occurred as our own to the extent that we knew we were going to do them and felt that we consciously willed their occurrence (Wegner, 2002, in press; Wegner & Wheatley, 1999).

Action projection may happen in FC because facilitators do not perceive their own thoughts as exclusive causes of the communicative actions. The simple fact that one's hand movements coincide with the movements of another possible agent of the action is enough to yield a reduced sense of conscious will for the action and an accompanying inference that the client is the author. Once

communicative actions have been produced, in other words, the matter of who did them is determined by the facilitator's beliefs about who could have done them. To the degree that the client is believed to be a plausible agent of the action, the self's authorship will be underestimated—the action will be projected to the other—even in the presence of conscious thoughts that are consistent with the actions and occur appropriately prior to them (Wegner, 2002).

Experiments 3–5 were designed to test this account of action projection. Participants were asked in these studies to facilitate communication by answering questions for another person—ostensibly another participant who had been instructed not to respond. In Experiments 3 and 4, the novice facilitators were invited to “read the unconscious muscle movements” of the person's fingers at a keyboard during questioning. In Experiment 5, the novice facilitators were asked merely to empathize with a person to discern the person's answers. However, in all cases the person playing the “communicator” was a confederate who heard no questions and so produced no relevant movements. The accuracy of answers that facilitators gave on behalf of communicators served as a measure of action production. The degree to which facilitators attributed the answers to this inert communicator served as a measure of action projection.

Overview

These studies were designed to break down the process of FC by looking at the action production and action projection components. Unlike prior research that has looked at actual FC interactions or close analogs, these studies abstracted the elements of the FC situation for examination. The usual practice of FC was abridged such that participants were asked to answer yes/no questions rather than to type answers in full. Experiments 1 and 2 explored the action production component by investigating the production of intelligent actions outside a communication setting—when participants working by themselves were asked to give random answers to questions. The instruction to answer randomly was used because, like the instruction not to influence the communicator that is given in FC, it implies that the facilitator should not apply his or her own knowledge in answering. Experiments 3–5 then focused on both action production and action projection in a setting one step closer to the FC situation. For these latter experiments, participants attempted to discern the answers to questions made by another person who in reality could not make informed responses.

Experiment 1: Intelligence in Random Answers

Freud (1901/1965) maintained that no action is truly random: “One cannot make a number occur to one at one's own free choice any more than a name” (p. 240). Participants in this study were nonetheless challenged with exactly this task—to make freely chosen, random answers to questions. It was expected that when participants were asked to give random answers to easy yes-or-no questions, their knowledge of the correct answers would influence their responses, leading them to answer more items correctly than would be expected by chance. In contrast with Freud's assumption that disturbing unconscious thoughts would influence the direction of intentionally random responses, however, we assumed merely that the participant's knowledge would have such influence. Just as people presented with “2 plus 2 equals ___” may not be able to

resist thinking of “4,” they may be compelled to answer easy questions correctly when they are given the choice and required to respond. This inclination might be related to the more general tendency people have to express beliefs automatically and take more time and processing to express what they disbelieve (Gilbert, 1991; Wegner, Coulton, & Wenzlaff, 1985).

This study did not pursue the problem of whether people can make response sequences that resemble random sequences in details such as run-length or nonredundancy (e.g., Baddeley, Emslie, Kolodny, & Duncan, 1998; Nickerson, 2002). The focus was on participants’ response correctness when correctness was not mentioned and randomness of the response was explicitly instructed. We expected that participants could not help but be correct more often than chance.

Method

Undergraduates at Harvard University (50 women and 19 men) participated for monetary compensation. Data from 5 participants were not used because their responses in the experiment were incomplete, so the final sample was 64 (47 women and 17 men). Gender differences were not found in this or the other experiments, so these analyses are not reported.

Each participant was individually seated at a computer, at which a pair of keys was labeled *yes* and *no*. A spreadsheet was open to record responses, but the monitor was off so participants could not track their responses visually. A cassette player was placed near the computer monitor. The participants were told that the audiotape contained questions to which they were to respond using the two indicated keys on the keyboard. They were asked to press *Enter* after each response. A total of 28 questions was asked, 20 easy (e.g., “Does a triangle have 3 sides?”; “Does a lemon taste sweet?”) and 8 hard (e.g., “Did Alfred Hitchcock eat meat?”; “Does an Italian deck of cards contain Jacks?”). The correct answer was *yes* for half the questions in each set and *no* for the other half. There was a 4-s interval between questions. Before the tape began, the participant was given the following instructions:

Please answer each question as randomly as you possibly can. Try not to generate a predictable pattern of yes/no or yes/yes/yes, but try to generate a random sequence. After each question make the most free and random choice you possibly can.

Participants were then left alone to respond to the questions. Afterward, participants were asked to estimate the percentage of questions they answered correctly and they were then paid, debriefed, and dismissed.

Results and Discussion

The mean proportion of correct answers for the easy questions was .82. This value was significantly greater than the mean proportion for hard questions ($M = .54$, $t(63) = 7.51$, $p < .001$, $\eta^2 = .47$). Therefore, participants were apparently influenced by their knowledge of the answers to respond far more accurately for easy questions than for hard ones. The distribution of correct response proportions to easy questions was skewed, with 92% of participants answering a mean proportion of .50 or more of the items correctly. Overall, the proportion correct was not significantly different on those questions for which the correct answer was *yes* than on those for which the correct answer was *no*.

The postexperimental estimates participants made of the proportion they had answered correctly averaged .70. This estimate was for questions overall, so included both the easy and hard questions. This estimate was higher than the expected value of .50

correctness that would follow from random responding ($z = 8.00$, $p < .001$, $SD = 0.20$), so participants understood that correct answers influenced their responses away from chance.¹ However, the awareness of the influence of correctness was not perfect. The mean estimate of .70 correct was lower than the actual proportion correct for easy questions ($M = .82$), $t(63) = 6.45$, $p < .001$, $\eta^2 = .40$, and also lower than the actual proportion correct for all questions ($M = .74$), $t(63) = 2.46$, $p < .02$, $\eta^2 = .09$. So, participants were not fully aware of how strongly their responses were influenced by the correct answers. Even so, the correlation between estimated and actual correct was .76 for total correct and .77 for number correct on the easy items ($p < .001$ in each case). At the individual difference level, then, estimates of correctness were fairly well calibrated with actual correctness.

These results show that people were influenced by knowledge of the answers to easy yes-or-no questions even when they were responding to the instruction to answer the questions randomly. The participants were substantially but not completely aware of this influence, in that their estimates of number correct were above chance but short of their actual correctness.

One possible reason for this influence was that participants in this setting were simply poor at following instructions, failing to obey the explicit experimental demand to answer randomly. As a check on this, we asked 16 additional participants in a class to perform the random answer task, but only after a more detailed description of randomness (e.g., try to “flip a coin in your head each time”) and a 5-min group discussion on making random, freely chosen answers. Their mean proportion correct for the easy questions was still .64. This value, although reduced from that observed in the main experiment, was still significantly greater than their mean of .48 for the hard questions, and this comparison had an effect size similar to that observed in the main experiment, $t(15) = 3.65$, $p < .002$, $\eta^2 = .47$.

Another explanation for the correctness of random answers is that the sample under study here included people who are unusually motivated to be correct. Perhaps these select college students could not achieve random answers because they were motivated to achieve accuracy to an extreme that might not characterize participants from the general population. To check on this, we gathered a sample of respondents who were waiting for trains in Boston’s South Station and presented them with the random answering task. Recruited individually for pay, each participant heard the instructions and the question series over headphones, and answered into a dictaphone. Mean proportion correct for easy questions in this sample was .90, which was significantly greater than their mean proportion for hard questions of .49, $t(16) = 9.68$, $p < .001$, $\eta^2 = .85$. Participants estimated their overall correctness as .68, which was marginally lower than their actual correctness across easy and hard questions ($M = .78$), $t(16) = 1.95$, $p < .07$. In this study, the estimates were not well calibrated with actual correctness, $r(16) = .31$, $p = .22$. There are interesting hypotheses that might be raised

¹ Participants were not told that yes and no answers were to occur with equal probability in random answers, or that yes and no answers were distributed equally among correct and incorrect response alternatives. The .50 proportion noted here follows from the potential inference participants might have made based on knowing there were two response alternatives—correct and incorrect.

to account for the apparent inflation and underestimation of the effect in this sample and setting, but the key point here is simply that the influence of knowledge in the random answer paradigm is not unique to college students.

Experiment 2: Uncontrolled Intelligence

Can people overcome the influence of their knowledge when they are trying to answer questions randomly? And if so, does this ability stem from resource-dependent cognitive processes? These are difficult questions to pose empirically because the answer in both cases might be null. It is hard to establish that a psychological process is uncontrollable and independent of mental resources because these characteristics imply the absence of any significant ability to control the process. The best we can do to test the controllability of correctness in random answering is to see whether conditions that often exert influence over other controllable processes also exert such influence in this case. This study examined whether the proportion of correct responses given in the random answering task would be influenced by (a) monetary incentives to be random and (b) pressure to answer questions quickly.

If correct answers are produced by a controlled process, incentives to answer randomly should decrease correct responses. People are sometimes able to influence their own cognitive processes, and there is evidence that biases can be reduced in some domains when people are given financial incentives to do so (e.g., Camerer & Hogarth, 1999). One standard financial incentive in studies of control over cognitive biases is the offer of a prize for performance, so we offered people a prize of \$50 for making responses that were “most random.” Response to such an incentive would be one indication that the process was under the control of the respondent.

Another test of the controllability of intelligence in the random answer task is the role of time pressure on performance. Controlled cognitive processes are often identified by the detrimental effect that time pressure has on their operation (Bargh & Thein, 1985; Wegner & Bargh, 1998), and asking people to answer questions in under 2 s each is a standard manipulation of such pressure. If correctness is reduced in the random answer task when participants are given ample response time, as compared with when their responses are speeded, it could be inferred that the cognitive processes promoting correctness are controlled rather than automatic.

Method

Students from Harvard University participated for pay. Because of a programming error, data from 8 participants were lost, and the final sample consisted of 60 (39 women and 21 men). The procedure of Experiment 1 was adapted for computer presentation of questions and response-time measurement (using *DirectRT*; Jarvis, 2000). Participants saw each question on the screen along with words *yes* and *no*, and heard the question aloud. The instructions to answer randomly were given as in Experiment 1, this time both verbally by the experimenter and on the computer screen. Response time was measured from the offset of the audio file delivering each question.

Participants responded to 56 questions. The first 28 (20 easy and 8 hard) were delivered as in Experiment 1, without any mention of response time. Time pressure was then increased for the second 28 questions (again 20

easy, 8 hard), which were presented after an instruction screen informing participants that they now needed to respond within 2 s after hearing each question. The order of conditions was not counterbalanced on the assumption that participants who had initially responded under time pressure would have difficulty relaxing for a nonpressured item set. The correct answer for half the questions was *yes* and half was *no*.

For the manipulation of financial incentive (cf. Camerer & Hogarth, 1999), one group ($n = 27$) was told beforehand that those most successful in answering randomly would be eligible to win \$50. The remaining participants ($n = 33$) were not alerted to such an incentive. At the conclusion of the experiment, participants were debriefed and paid, and were entered into a drawing regardless of their performance. One lucky participant was awarded the prize.

Results and Discussion

The proportion of correct answers was examined in a 2 (incentive vs. no incentive) \times 2 (easy vs. hard questions) \times 2 (time pressure vs. no pressure) analysis of variance (ANOVA) with repeated measures on the latter two variables. A significant main effect was found for question type, $F(1, 58) = 13.24, p < .001, \eta^2 = .19$, with a higher mean proportion answered correctly for easy questions ($M = .65$) than for hard questions ($M = .54$). As in the prior study, then, participants were influenced by their knowledge of the correct answers to the easy questions even when instructed to provide random answers to all questions. An examination of the distribution of correctness for the easy items showed again that the majority of participants (75%) answered a mean proportion of .50 or more correctly on the easy items. The proportion of correct answers was somewhat lower in this study than in the last, perhaps because of the computer presentation.

There were no significant main or interactive effects for incentive; the overall mean proportion correct for incentive participants ($M = .60$) was much like that for no-incentive participants ($M = .59$). Similarly, there were no significant main or interactive effects for time pressure; the overall mean proportion correct for time pressure trials ($M = .58$) was not significantly different from that for no-pressure trials ($M = .61$). These findings suggest that correct responding was not controllable in this setting. Although this conclusion cannot be drawn directly from such null findings, there are associated findings suggesting at least that these influences on controllability were effectively manipulated.

The effectiveness of the incentive manipulation can be inferred from its influence on participants' postexperimental estimates of their correctness. A 2 (incentive vs. no incentive) \times 2 (estimated vs. actual total correct) ANOVA revealed that, as in the prior study, participants underestimated the correctness of their answers, $F(1, 57) = 14.95, p < .001, \eta^2 = .21$, estimating .55 correct while answering correctly a mean proportion of .62 (for easy and hard questions combined). This underestimate was only significant, however, under high-incentive conditions. There was a significant interaction of incentive with estimated versus actual total correct, $F(1, 57) = 4.99, p < .03, \eta^2 = .08$, and simple main effects analysis indicated it was only in the incentive condition that the estimated proportion correct ($M = .52$) was less than the actual total correct ($M = .64$), $F(1, 57) = 16.63, p < .01$. Without the incentive, the estimate ($M = .57$) was not significantly below the actual correct ($M = .60$). This pattern suggests that the incentive led participants to estimate that they had successfully overcome the tendency to answer correctly in their pursuit of random an-

swering. The incentive manipulation was apparently effective enough to have motivated this distorted perception that correctness had been avoided.

There was also evidence for the effectiveness of the time pressure manipulation. Time pressure had the effect of speeding up responses. The analysis of response times showed a significant main effect for time pressure, $F(1, 58) = 39.63, p < .001, \eta^2 = .41$, with faster responses under time pressure ($M = 2,051$ ms) than without time pressure ($M = 3,253$ ms). Easy questions were also answered more quickly ($M = 2,127$ ms) than hard questions ($M = 3,178$ ms), $F(1, 58) = 46.90, p < .001, \eta^2 = .45$, as would be expected if response time here was an indication of cognitive resource usage. A significant interaction of time pressure and question type was also found, $F(1, 58) = 14.46, p < .001, \eta^2 = .20$, showing that participants were particularly inclined to take their time on hard questions without time pressure ($M = 4,043$ ms) as compared with the other conditions (combined $M = 2,188$ ms)—apparently pondering over the hard questions even while under the instruction to answer randomly. No significant effect was found for incentive on response times, so incentive did not itself introduce a sense of time pressure.

The relation between response time and answer correctness was examined by computing the mean proportion of correct responses at each of seven 500-ms response-time intervals. As shown in Figure 1, responses made in very short times (under 1,000 ms) were near random, whereas those that took longer (1,000 ms or above) were more correct. Because not every participant contributed to every response-time interval, these data could not be treated in an overall ANOVA. Individual t tests showed the proportion correct was significantly lower in the combined first two intervals than in each other interval ($p < .05$ in each case). This suggests that participants answering quickly overcame the knowledge of the correct answer. Perhaps they answered before even fully processing the question and having the answer come to mind.

It seems that two antecedents of controllability were successfully varied in this experiment, but that this variation had little effect on the correctness of random answers. Participants given a financial incentive to increase the randomness of their answers estimated that they were successful in doing this, but in fact did not

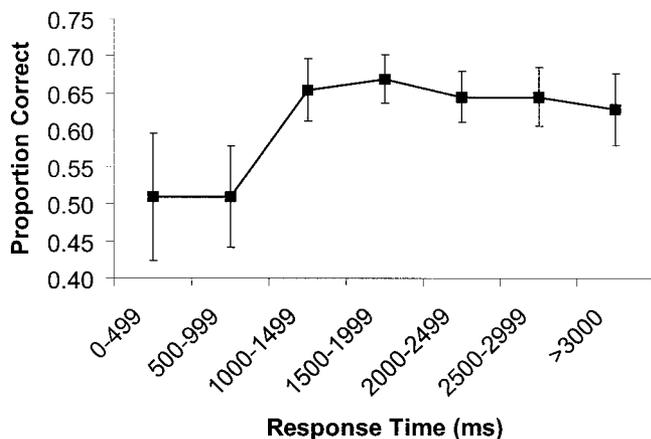


Figure 1. Mean proportion of items answered correctly at each of seven response time intervals. Error bars are standard errors.

do so. And participants whose responses were significantly speeded by time pressure were still no more likely to give correct responses than those who were not speeded. Indeed, the response-time analysis indicated to the contrary that questions answered slowly were more likely to be answered correctly. This result suggests at first glance that increments in control rather than automaticity were linked with answer correctness. However, the correctness occurring with longer response times may have happened when people took enough time thinking about the question to have the correct answer come to mind. Although the controllability of intelligent responding cannot be ruled out on the basis of null effects, this observation along with the absence of such significant effects here does suggest that further inquiry on the uncontrolled nature of correct answers is warranted.

Experiment 3: Action Projection

This study explored whether question answers—such as those produced in the prior studies—might be misattributed to another person. The paradigm was modeled on the standard FC situation, but was distinct from it in ways calculated to allow the detection of action projection. Participants cast in the role of facilitators were told about FC (cf. Burgess et al., 1998), and then were asked to use the technique in an experiment to see if they could “read the muscle movements” of a normal participant. For this purpose, the “facilitator” placed two fingers on *yes* and *no* keys, and a confederate serving as “communicator” rested the complementary fingers of the opposite hand atop the facilitator’s fingers.

Then, in the presence of the facilitator, the communicator was admonished not to respond to any questions. It was explained that both communicator and facilitator would hear *yes/no* questions on headphones, and that the facilitator was to try to read the communicator’s unconscious finger muscle movements and press the key for each question that the communicator would have pressed. Because muscle reading is possible (e.g., Beard, 1877; Baldwin, 1902), no questions were in fact transmitted to the communicator’s headphones. Thus, each facilitator was trying to discern answers ostensibly conveyed through unconscious muscle movements from someone who was, in reality, entirely unaware of what was being asked.

The 50 questions the facilitator heard included 20 easy questions. We anticipated that participants here, like those in the random answer paradigm, would tend to answer correctly without instructions to do so, and even while explicitly instructed instead to try to detect the communicator’s answers by sensing his or her movements. The measure of action production in this setting, then, was the proportion of correct answers given for the easy questions. This experiment moved beyond the random answer paradigm to allow the measurement of action projection. The second measure was participants’ subjective sense of how much influence the communicator had on the answers that were generated. Given that the communicator heard no questions and was moving randomly if at all, any value greater than zero would indicate the presence of action projection.

Method

Participants. Undergraduates (11 women and 8 men) enrolled in psychology courses at the University of Virginia were awarded class credit for participation.

Procedure. Participants were each run with a confederate whom they were told was also a participant. When both arrived, the experimenter read an introduction to lead participants to believe that FC is effective:

Facilitated communication, or “FC,” is a popular technique invented for the purposes of communicating with people with various developmental disabilities, such as autism and mental retardation. The method that we will be using is a variation of FC. The idea behind FC is that these individuals are capable of communicating at a higher level than thought previously, but lack the language and motor skills with which to speak, write or type. Facilitated communication usually consists of a facilitator who supports the client’s arm or hand while the client presses letters or symbols on a keyboard or picture board. We are interested in finding out if FC can work with different groups of people, including people who do not have any disabilities. So, in this study, we are going to test people’s ability to accurately read each other’s fine muscle movements, much as in the case of what I just explained to you about FC.

The experimenter said that the facilitator and communicator roles would be decided randomly, and gave assignments on paper slips out of a cup. Both slips said “facilitator,” but the confederate claimed that his or her slip said “communicator.” The pair was seated at a computer where a word processor was open for data collection and a pair of keys were marked *yes* and *no*. A two-channel audiotape of a male voice was recorded such that 50 questions could be heard on the participant’s headphones through one channel, while only question numbers and “Answer please” prompts could be heard on the confederate’s headphones through the other channel.

The experimenter said that the facilitator and communicator would listen to *yes/no* questions delivered through headphones to eliminate distracting noises. The tape player was in view, so as to maintain the deception that both the facilitator and communicator would hear the same tape—although the channels were actually split to the different headphone sets. The experimenter then said the following to the facilitator:

Please place the index and middle finger of your right hand on the *yes* and *no* keys, like this. Listen to the questions, but make no attempt to answer them yourself. You are trying to sense the communicator’s

answers by paying attention to muscle movements in her (his) fingers. Whenever you detect her (his) answers, press the key you sense that she (he) wants to press. Sometimes these muscle movements are very subtle and may be difficult to feel. In fact, many people report that they can’t feel any muscle movements at all. Nevertheless, I encourage you to make your best guess for each question as to what you feel your partner wants to answer. Please provide an answer to each question, even if you think you’re not feeling anything, because you may be tapping into something of which you are not aware.

The experimenter said to the communicator: “Please place the index and middle finger of your left hand gently on top of the facilitator’s middle and index fingers, like this.” The experimenter demonstrated (see Figure 2), and then said the following:

As you listen to the questions, clearly form the answer to each one in your mind, but make no attempt to press the keys physically. It is the facilitator’s job to sense which key you want to press. After you put on the headphones, I will give you 3 practice questions so that you can learn how to do the task. Once these questions are done, please take off your headphones and wait for instruction.

The practice questions were easy factual questions (“Is the capital of the United States Washington, DC?”). After these, the experimenter explained that there would be a total of 50 test questions, some factual and some concerning the communicator’s life. The experimenter noted that afterwards, the communicator would be asked the questions again alone. The experimenter said that those answers would later be compared with the answers the facilitator helped provide to see how accurate the facilitator was in reading the communicator’s muscle movements. The experimenter then started the audiotape and left the room.

The 50 questions were of three types: 20 easy factual questions (e.g., “Are there 15 months in a year?”); 5 harder factual questions (e.g., “Is the capital of Delaware Wilmington?”); and 25 personal questions (e.g., “Are you a vegetarian?”). The correct answer for half of the easy questions was *yes* and for half it was *no*.

When the tape was done, the experimenter separated the participant and confederate and gave the participant a questionnaire. One item assessed



Figure 2. Hand placement, with facilitator (participant) below and communicator (confederate) above.

perceived communicator influence: "Who did you feel was influencing the answers that were given to the questions?" Participants made a check along a line anchored with the labels *100% You (0% Other Person)* and *100% Other Person (0% You)*, and with *50% You (50% Other Person)* in the center. Check placement in 1% units from 0 to 100 was the index of perceived communicator influence, with higher values indicating more communicator influence. For the next questions, 9-point scales were used: "Do you believe that facilitated communication works?" (rated from 1 = *does not work at all* to 9 = *works very well*); "Did you feel you were able to feel the other person's muscle movements?" (rated from 1 = *never* to 9 = *always*); "Did you assume the communicator knew the answers to the easy questions?" (rated from 1 = *did not know them* to 9 = *knew them*).

In debriefing, participants were asked if they had heard of FC before, and if they had, what they had heard about the technique. Prior knowledge did not influence the findings. In addition, participants were probed for suspicion of the confederate, and none was encountered.

Results and Discussion

The mean proportion of the 20 easy questions that participants answered correctly ($M = .87$) was greater than the mean proportion of hard questions ($M = .60$), $F(1, 18) = 14.15, p < .001, \eta^2 = .44$, and also greater than chance responding ($M = .50, z = 11.69, SD = 0.14, p < .001$). The participants also felt that the communicator had exerted a considerable percentage of influence on the answers that were provided ($M = 35.79$), far more than the actual level (which was zero because the communicator heard no questions; $z = 7.15, SD = 21.82, p < .001$). No respondent chose zero, as the range was from 5 to 70. Overall, 6 participants rated the communicator's influence as greater than their own (above 50%), and 13 rated it as less.

Correlation analysis showed that perceived communicator influence was not related to the proportion of easy questions the participants answered correctly, $r(19) = -.16, p = .51$. This result suggests that separate processes may be at work in action projection—one that leads facilitators to offer correct answers to the questions asked of the communicator, and another that promotes the sense that these answers are attributable to the communicator. The two components of the FC process, action production and action projection, operated independently.

This observation was corroborated by the pattern of other correlations. Perceived communicator influence was correlated with participants' belief that FC works, $r(19) = .80, p < .001$, and also with their report that they could feel the communicator's muscle movements, $r(19) = .74, p < .01$. The proportion of easy questions answered correctly, however, was not significantly related to either of these reports. Instead, proportion of easy questions answered correctly was correlated only with the participants' assumption that the communicator knew the answers to the easy questions, $r(19) = .61, p < .01$. No other correlations were significant.

These findings suggest that the action production and action projection processes are separable, and are influenced by different factors. Action production functions here much as it does in the random answering paradigm—with one exception. Participants in this setting were answering questions on behalf of another person, and so were placed in the position of trying to answer not only as the other might, but in a way that makes sense to the other. Answering incorrectly might seem like an affront in this setting, an insult to the intelligence of the ostensible communicator. This idea is supported by the finding that participants answered more easy

items correctly when they agreed that the communicator would know the answers to the questions.

The projection of the action to the other, in turn, seems to be more a function of belief that the other is a plausible agent of the action. Belief in FC predicted projection, and reports of feeling the other's muscles move was also related to projection. The belief item was only answered after the experiment, and belief was not manipulated, so it cannot be concluded from these data that prior belief in the plausibility of the others' contribution to the action caused the action projection that was observed.

Experiment 4: Action Projection and Belief

The purpose of this study was to test the influence of manipulated belief in FC on the level of action projection. In the FC literature, it is often suggested that facilitators who are trained in the technique and have faith in its effectiveness are the most inclined to achieve apparent communication effects (e.g., Jacobson et al., 1995; Spitz, 1997; Twachtman-Cullen, 1998). And, in Experiment 3, postexperimental belief that FC works was correlated with perceived communicator influence. Therefore, a belief manipulation was devised for this study to assess the causal influence of belief.

A second variable was included to see whether the action production effects observed in Experiment 3 might have arisen from facilitator self-presentation to the communicator. As noted earlier, a facilitator in this setting might find it odd to attribute wrong answers on easy questions to the communicator in the communicator's presence. One source of the accuracy of facilitators' answers to the easy questions might be the facilitators' concern that the communicator would be insulted to have a facilitator answer questions incorrectly on his or her behalf.

In this study, this motivation was manipulated. Whereas some participants did the task as in the prior study, others were told that the communicator's tape presented the questions subliminally. It was suggested to participants that communicators might have an urge to answer without knowing why and still produce unconscious finger muscle movement, and that the facilitator might be able to sense this, but that with subliminal input the communicator would not be in a position to judge whether the facilitator had answered the question correctly. This subliminal presentation condition was expected to discourage participants from answering questions correctly merely because they were concerned that the communicator would be aware of the answers they were providing. Although such self-presentation could also function in an actual FC setting, it would be useful to see whether action production occurs even in its absence.

Method

Participants and design. A 2×2 between-participants design was used, varying manipulated belief in FC (belief vs. disbelief) and question format (normal vs. ostensibly subliminal presentation to the communicator). University of Virginia undergraduates (47 women and 19 men) participated as in the prior experiment, and were randomly assigned to conditions.

Procedure. The procedure was that of Experiment 3, with two exceptions. First, for the belief manipulation, participants viewed one of two introductory videotapes. The tapes were created by editing a PBS *Frontline* program entitled *Prisoners of Silence* (Palfreman, 1993). The "belief" tape

(16 min in duration) was edited to suggest that FC was a widely accepted innovation. The “disbelief” tape (19 min) was edited to provide a thorough debunking of FC and included descriptions of studies that disproved its validity. After participants saw a tape, they were told that research was to do further testing of FC using a variation of the usual technique. It was explained that the study was on whether reading muscle movements can work with people who do not have disabilities. For participants viewing the disbelief tape, this instruction left open the possibility that FC might work in the experiment. The experimenter said,

As you have seen on the tape, FC does not work with people with profound developmental disabilities. We suspect, however, that it may work on people that do not have disabilities. Therefore, we are doing testing on the technique with college students.

For participants in the normal presentation condition, the procedure was as in the prior study. For those in the subliminal presentation condition, the procedure departed from this, beginning when the roles of facilitator and communicator were chosen. The experimenter said,

we are interested in finding out if people can help another person answer questions even if those questions are administered subliminally. Now, I imagine you are both at least somewhat familiar with what subliminal messages are, but I’ll explain briefly: Subliminal messages are stimuli that are presented below conscious awareness. In this experiment, the communicator will be listening to a tape on which questions are presented subliminally; they are recorded below the human auditory threshold. And the facilitator will attempt to answer those questions by sensing the communicator’s muscle movements.

After the role assignment, the instructions continued: “Now, the interesting part of this experiment is that the communicator is going to receive the questions subliminally in her (his) headphones.” The communicator was told the following:

Your tape will sound as if it has no questions on it; on a conscious level, you will hear the announcer say “Question 1,” then you’ll hear a pause, and then you’ll hear “Answer, please,” and so on. In reality, there will be subliminally recorded questions on your tape. As you listen to the tape, clearly form an answer, yes or no, to that question in your mind, but make no attempt to press the keys physically. It is the facilitator’s job to sense which key you want to press. Even though you may not think you have heard a question, always form an answer in your head.

The subliminal and normal tapes heard by the confederate were, of course, identical to each other and without content as in the prior study.

When testing was over, participants responded to the perceived communicator influence question, and questions were presented with 9-point scales (1 = *disagree* and 9 = *agree*) to check the manipulations, to assess perceptions of answer control during facilitation, and to see if facilitators thought they could feel the communicator’s movements.

Results and Discussion

Manipulation effectiveness. Agreement with the item “Facilitated communication works” was a check on the effectiveness of the belief manipulation. A 2 (belief vs. disbelief) \times 2 (normal vs. subliminal) ANOVA showed that participants in the belief condition were more likely to endorse this statement ($M = 4.25$) than participants in the disbelief condition ($M = 2.03$), $F(1, 62) = 25.58$, $p < .001$, $\eta^2 = .29$. There were no other significant effects for this item, so belief in FC was influenced only by the videotape manipulation.

The item “I assumed the communicator knew the answers to the easy questions” checked the manipulation of normal versus subliminal question format. People in the subliminal condition were less likely to endorse this statement ($M = 5.73$) than people in the normal condition ($M = 7.59$), $F(1, 62) = 8.12$, $p < .01$, $\eta^2 = .12$, and other effects were not significant. Thus, the facilitators in the subliminal condition were indeed less likely to think that the communicator was aware of the answers to the questions.

Proportion correct. A $2 \times 2 \times 2$ ANOVA on the proportion of correct answers revealed only a significant main effect of easy versus hard question, $F(1, 62) = 87.22$, $p < .001$, $\eta^2 = .58$. Participants were far more likely to answer easy questions correctly ($M = .82$) than hard questions correctly ($M = .51$). Easy questions were also answered more correctly than would be expected by chance ($M = .50$, $z = 16.11$, $SD = 0.17$, $p < .001$). There were no other main or interactive effects in this analysis. Thus, the action production process was not influenced by participants’ belief in the effectiveness of FC overall, and it was also unchanged when participants were led to believe that the communicator was not even conscious of the questions. Apparently, the production of correct answers in this paradigm, like the production of correct answers in the random answering paradigm, is relatively impervious to contextual factors.

Perceived communicator influence. Participants across conditions felt that the communicator had influenced the answers that were provided ($M = 32.30$) more than the actual level of zero ($z = 13.47$, $SD = 20.53$, $p < .001$). The range of responses was 0–86, with only 2 participants reporting zero communicator influence. Overall, 13 of 79 participants reported that the communicator had greater influence than they did (over 50%). Participants attributed a greater percentage of influence to the communicator if they were led to believe that FC works ($M = 41.44$), however, than if they were led to believe it does not work ($M = 24.16$), $F(1, 62) = 12.26$, $p < .001$, $\eta^2 = .17$. This finding indicates that action projection is influenced by beliefs about the likely agency of the communicator. This result also is pertinent to the question, however, of whether FC is entirely eradicable under the proper conditions of skepticism. As it turned out, a persuasive appeal against the effectiveness of FC did significantly reduce perceived communicator influence, but this debunking did not eliminate perceptions of communicator influence entirely. Estimated percent of communicator influence in the disbelief condition ($M = 24.16$) was still significantly above zero ($z = 9.06$, $SD = 16.95$, $p < .001$). Admittedly, a report of zero influence is a stringent criterion to apply when this is the endpoint of a rating scale. However, zero influence by the communicator was indeed the prearranged normative standard in this situation, and it is informative that participants were not able to discern this standard.

The manipulation of normal versus subliminal question format had no effect on perceived communicator influence, nor was the interaction significant. Apparently, action projection did not depend on participants’ belief that the communicator was conscious of the questions and answers. The tendency to attribute answers to the communicator was present even when participants believed the communicator was not conscious of the questions.

Perceptions of the communication. Responses to other rating items showed perceptions were strongly influenced by belief in FC. Participants led to believe in FC, as compared with those given the debunking video, were more inclined to agree that “I was able

to feel the other person's muscle movements" ($M = 4.29$ vs. 3.02), $F(1, 62) = 7.63$, $p < .01$, $\eta^2 = .11$, that "I was able to read the communicator's muscle movements fairly well" ($M = 3.22$ vs. 2.31), $F(1, 62) = 4.81$, $p < .05$, $\eta^2 = .07$, that "I usually felt the other person's finger move just before I responded" ($M = 4.65$ vs. 3.33), $F(1, 62) = 8.27$, $p < .01$, $\eta^2 = .12$, and that "I felt a pulse coming from the other person's finger just before I responded" ($M = 4.82$ vs. 3.56), $F(1, 62) = 6.19$, $p < .05$, $\eta^2 = .09$. The participants led to believe in FC were less likely than those given the debunking tape to agree that "The other person's fingers remained perfectly still throughout the experiment" ($M = 3.88$ vs. 5.91), $F(1, 62) = 10.29$, $p < .01$, $\eta^2 = .14$, and that "I felt I was controlling the answers that were given to the questions" ($M = 5.73$ vs. 7.14), $F(1, 62) = 8.83$, $p < .01$, $\eta^2 = .12$. The manipulation of belief prompted distorted perceptions of the communication, all consistent with the idea that the communicator was indeed conveying information to the participant. Because the communicator was in fact inert in this setting, these perceptions were inaccurate.

Correlations. The correlation between proportion of easy items answered correctly and perceived communicator influence was $-.01$. As in Experiment 3, these indexes of action production and action projection were independent. Although both action production and projection are required for the occurrence of FC, the processes appear to be separable steps. Consistent with this, these variables had different patterns of correlation with other variables.

Only one of the questionnaire ratings was predictive of action production. As in Experiment 3, proportion of easy items answered correctly was correlated with agreeing that "I assumed the communicator knew the answers to the easy questions," $r(66) = .27$, $p < .05$. Proportion correct was not related to other perceptions of the communication. Action projection, in contrast, was correlated with a variety of items tapping the perception that the communication was successful. Perceived communicator influence was related to agreement that "Facilitated communication works," $r(66) = .54$, $p < .001$, "I was able to feel the other person's muscle movements," $r(66) = .59$, $p < .001$, "I was able to read the communicator's muscle movements fairly well," $r(66) = .66$, $p < .001$, "I usually felt the other person's finger move just before I responded," $r(66) = .59$, $p < .001$, and "I felt a pulse coming from the other person's finger just before I responded," $r(66) = .43$, $p < .001$. Perceived communicator influence was negatively related to agreement that "The other person's fingers remained perfectly still throughout the experiment," $r(66) = -.46$, $p < .001$, and "I felt I was controlling the answers that were given to the questions," $r(66) = -.76$, $p < .001$.

Summary. Manipulated belief in FC increased the participants' sense that the communicator influenced the answers, and it also increased endorsement of items indicating belief in FC, but it did not affect the proportion of easy items correctly answered by the facilitator. The absence of significant effects on proportion correct or on perceived communicator influence for the manipulation of normal versus subliminal question format indicates that self-presentation to the communicator did not predominate in producing action production or projection. Facilitators who thought that the communicator heard the questions subliminally behaved as did those who thought the communicator was hearing the questions. Overall, action production and projection were again present.

Participants answered the easy questions more correctly than they did the hard questions, and also answered the easy questions more correctly than they might have by chance, while attributing these answers to a substantial degree to a communicator who in reality had never heard the questions.

Experiment 5: Action Projection and Touch

In attempting to read the muscle movements of the communicator, participants judged that they were indeed receiving information from the communicator's movements. Indeed, it is possible to imagine that touch between participant and communicator might play a role in the action projection process. The participant might make subtle movements toward correct answers, for instance, which could displace the communicator's fingers, and so create "evidence" that the communicator was indeed moving toward the correct response. This experiment explored whether production and projection processes depend on the physical contact of participant and communicator. Levels of correct responding and action projection were examined among facilitators asked merely to empathize with a communicator sitting nearby.

Method

University of Virginia undergraduates (45 women and 25 men) were randomly assigned to a muscle reading condition as in Experiment 3 ($n = 31$), or to a no-touch condition ($n = 39$). The instructions for the no-touch condition included an introduction to FC that emphasized people's "ability to empathize with one another." For the no-touch condition, the experimenter asked the communicator to sit facing away from the computer screen, thus not seeing the participant's answers. The communicator was asked to "form the answer to each question clearly in your mind," but the communicator did not touch the keyboard or the participant. The experimenter instructed the participant to

listen to the questions, but make no attempt to answer them yourself. You are trying to sense the communicator's answers by empathizing with him or her. That is, imagine what it would be like to be him/her answering the questions. Whenever you detect his or her answers, press the key you sense that he or she wants to press. So, I encourage you to make your best guess for each question as to what you feel your partner wants to answer. You should provide an answer to each question, even if you think you're not sensing anything, because you may be tapping into something of which you are not aware.

Results and Discussion

A 2×2 ANOVA tested the effects of condition (muscle reading vs. no touching) on correct responses to hard versus easy questions. The only significant effect was for question type, $F(1, 68) = 211.66$, $p < .001$, $\eta^2 = .76$, with the proportion correct for easy questions ($M = .93$) greater than that for hard questions ($M = .55$). Participants not touching the communicator answered the easy items at a level greater than chance ($M = .94$, $z = 32.14$, $SD = 0.09$, $p < .001$), and not different from that of participants touching the communicator's fingers ($M = .92$). However, the influence attributed to the communicator was marginally higher in the muscle reading condition ($M = 43.30$) than in the no-touching condition ($M = 32.03$), $t(68) = 1.91$, $SD = 23.29$, $p < .06$. Although participants in the no-touch condition continued to attribute influence to the communicator at a level greater than zero

($z = 7.90$, $p < .001$), their feeling that the communicator was contributing tended to be undermined when the manual contact was discontinued. As in the prior studies, the correlation between correct answering of easy questions and perceived communicator influence was negligible, $r(70) = -.16$, *ns*.

The results suggest three conclusions. First, it appears that even when facilitators do not touch the communicator and base their actions merely on empathy with the communicator, they continue to produce answers that are largely correct. It seems that the processes yielding correct answers are not dependent on physical contact between facilitator and communicator. The second conclusion suggested by these results is that the further step of action projection—thinking that the correct answers are indeed produced by the communicator—may be more dependent on physical contact. Without touch, the degree of influence attributed to the communicator dropped to some degree. Physical contact between facilitator and communicator may obscure the facilitator's appreciation of self as the source of the action and make it more reasonable to project this action to the communicator. Finally, these results reinforce the findings of Experiment 4 to indicate that self-presentation to the communicator is not influential in producing correct responses. Participants in the no-touching condition answered the items without the communicator observing their answers at all, eliminating concern about such observation as a possible motive for correct answering.

General Discussion

These experiments introduced two paradigms that contain elements of the standard FC situation—one examining response production and another examining communication. In the “random answering” paradigm of Experiments 1 and 2, participants were instructed to answer yes/no questions randomly, giving “the most free and random choice you possibly can” after each one. Such random answers were more correct for easy than for hard questions, suggesting that answering was influenced by knowledge of the correct answer. This effect may underlie the processes of action production in FC whereby facilitators produce communications for clients even while not trying to do so.

In the “muscle reading” paradigm of Experiments 3 and 4, then, participants were asked to answer yes/no questions by sensing the keyboard finger movements of another person who had been admonished not to answer, and who was in fact a confederate and was not even given the questions. The answers that participants offered were more correct for easy than for hard questions, again showing the influence of participants' knowledge. In this paradigm, the answers were often attributed to the other. A persuasive message that increased belief in the effectiveness of FC was found to enhance such action projection in Experiment 4, suggesting that the plausibility of the client's authorship of the action amplifies the facilitator's perception that the actions produced by the self have been generated by the other. And in Experiment 5, participants attempting to answer empathically for the client without benefit of physical contact also exhibited tendencies to offer correct answers and attribute them to the client.

The Production of Intelligent Actions

In these experiments, participants showed a marked tendency to answer yes/no questions correctly when they knew the answer.

This happened when participants were asked to answer randomly (Experiments 1 and 2), even with instructions on randomness (Experiment 1 follow-up) and financial incentive to be random (Experiment 2), and regardless of whether they were prompted to answer quickly or allowed to take their time (Experiment 2). Correct answers in response to the instruction to answer randomly also were found in a community sample (Experiment 1 follow-up). Correctness was observed when participants were asked to answer by sensing the (random) muscle movements of another person (Experiments 3 and 4), and occurred at similarly inflated levels when participants were led to believe that this person could not communicate with them (Experiment 4), when they were instructed that this person was not conscious of the questions that were being posed (Experiment 4), and when they did not touch the person and were only asked to empathize (Experiment 5).

The only significant influence observed for such correctness was the correlation (in Experiments 3 and 4) between proportion correct and participants' reports that the communicator was likely to know the answers to the easy questions. This result led us to examine self-presentation to the communicator explicitly in Experiment 4. In that study, leading facilitators to believe that communicators were not conscious of the questions reduced reports that the communicator was likely to know the answers, but did not have a significant impact on percent correct. Percent correct was also not affected in Experiment 5 when participants were asked to respond (without touching) for a communicator who was not aware of their responses. Concern about answering questions incorrectly in front of the communicator thus was not a strong influence on production of correct answers in the muscle reading studies.

Taken together, these findings suggest two possible conclusions about action production. One possibility is that participants in these studies were remarkably unaware of the influence of correctness on their answers and were unable to control this effect even when given a variety of inducements and favorable circumstances. The other possible conclusion is that these experiments did a remarkably poor job of providing such inducements and circumstances. The present results do not help to arbitrate which sort of remarkableness is present here. As noted earlier, null effects always produce this quandary of interpretation, and this feature of the present results must be understood in this light. The tendency to answer correctly under the instruction to answer randomly or for someone else (who provides only random information) was robust in these studies and so appears uncontrolled and uncontrollable. The empirical observation of the effective control of correctness in these circumstances awaits further inquiry.

Further research is also warranted on how these effects occurred. Although several demonstrations exist of behavior production processes that are informed and influenced without the person's conscious participation (e.g., Dijksterhuis & Bargh, 2001), the study of this influence is only beginning. What seems to be clear at this point is that actions can be performed even while people have only a limited appreciation of their origins. The participants in the present studies may have been quite aware that they were trying to be random, for instance, or that they were trying to sense the other's muscle movements—and perhaps also that they were trying not to be correct or trying in other cases even to be correct. However, this array of conscious understandings of what was being done was not sufficiently coherent and insistent to

shape the overall set of responses to eliminate the influence of knowledge of correct answers.

It seems that people produced correct answers without cognitively controlling this aspect of their behavior. Whatever it was that participants thought they were doing, they did not seem to understand what it was that we, the researchers, thought they were doing: answering the questions correctly (cf. Vallacher & Wegner, 1985). This description applies to other cases when people are primed to act without knowledge that the prime is influencing their action. When people walk slowly after thinking about the elderly (Bargh et al., 1996), or perform well on trivia items after thinking about professors (Dijksterhuis & van Knippenberg, 1998), it is not merely the fact of their primed behavior that is interesting. The noteworthy feature of these performances is the person's lack of knowledge that it *is* a performance that has an origin in the person's recent experience. The present research brings into relief the role of this lack of insight in the production of uncontrolled intelligent action. In particular, it shows that behavior can be primed intrinsically—by preexisting personal knowledge—when that behavior is intended to occur independent of such influence.

These studies of action production do not illuminate the more fine-grained processes that may occur in FC. In producing letters, words, and sentences, the facilitator must do far more than provide *yes* or *no* answers, and the details of such productions are essential to understanding FC in full. Simple *yes/no* decisions provide an initial window into these complexities, however, because the discourses attributed to clients are built up from a series of such decisions. For example, facilitators report that sometimes they guess what the client would say and try to “get them started” by typing the first letters of words. Facilitators also report that they sometimes “finish” a word or phrase once they understand the gist of what the client is trying to say. In fact, in a richly detailed examination of facilitation cases, Twachtman-Cullen (1998) discovered that facilitation involves a startling amount of overt helping. Although the final product of FC often *looks* amazingly elaborate, it is nonetheless constructed through a series of facilitator decisions, many of which may be mirrored in attempts to answer questions randomly.

The Projection of Actions to the Other

The projection of action to the other was examined in Experiments 3–5. It was found that the facilitators' belief that FC works had a strong and consistent influence on action projection effects in both studies. In Experiments 3 and 4, belief was significantly correlated with perceived communicator influence. And manipulated belief in Experiment 4 enhanced perceived communicator influence (but had no effect on proportion of items answered correctly). These findings suggest that an essential facet of action projection is the interpretive set that the facilitator brings to the situation. Quite simply, if the facilitator thinks facilitation will work, he or she appears more likely to ascribe the action to the other person.

The level of perceived communicator influence may have been magnified in the muscle reading experiments by our explicit attempt to heighten belief in FC. FC was described (Experiments 3 and 5), or shown in a video (Experiment 4), to be entirely possible. To some degree, this manipulation must be understood as a form of experimental demand—an expectation conveyed by the exper-

imenters that FC was legitimate and could occur in this setting. The trappings of these studies were strongly conducive to belief in FC, and so created a matrix of expectations that resembles the hopes that accompany the actual practice of FC in clinical settings (Jacobson et al., 1995). Still, it is noteworthy that substantial action projection remained even in the presence of an explicit experimental demand *not* to believe in FC. Perceived communicator influence was reduced in Experiment 4 as a result of debunking, but not to zero. The testing of the efficacy of FC in the laboratory may produce a context of plausibility that cannot be overcome even with a vigorous program of debunking (Ross, Lepper, & Hubbard, 1975; Wegner et al., 1985).

Belief in the possibility of FC brought with it a set of associated perceptions. People who were led to believe, or who happened to be believers, tended then to perceive that they could read the communicator's muscle movements. They even reported feeling a pulse coming from the communicator's fingers when this could not have happened, whereas those who did not believe reported not perceiving movement. Belief in FC provided a context for interpretation of the actions that were produced, allowing the participants to view the answers as emanating from the communicator and not from themselves. The attribution of answers to the communicator was reduced somewhat in Experiment 5 by eliminating the participant's ability to touch the communicator, but a noteworthy level of action projection remained merely because the communicator was identified as a plausible source of the answers.

In all likelihood, participants had many thoughts cross their minds during the questioning—about the answers, about how they should respond, and about what they were or were not feeling in the fingers of the communicator. Even though some of these thoughts may have been consistent with the correct answers, and may have occurred in mind prior to the answering—so to suggest that participants were the authors—these thoughts were not exclusive candidates for causing the action of answering (see Wegner, 2002; Wegner & Wheatley, 1998). The communicator was another plausible cause. These experiments found that the creation of action projection was not difficult—a matter of forcing FC beliefs on people, or of selecting some highly gullible sample of “true believers” to serve as facilitators. Rather, the simple assumption that the communicator *could* contribute was sufficient to undermine the participant's own thoughts as causal candidates and instead encourage attribution of the actions to the communicator. Action projection depends on the seemingly innocent belief that the other could be a source of one's own action.

Production and Projection

How do action production and projection work together in FC? As we have noted, past accounts of FC and other automatisms have conflated these processes, leading to the idea that a single, special action production process (involving dissociation, ideomotor action, ironic processes, or the like) must be responsible for actions that are open to projection. This approach is founded on the unwarranted intuition that when people act, they consciously will what they are doing, and the conscious thought of what was willed must necessarily inform them of their own authorship of the action. This assumption about the nature of conscious agency suggests that FC and other automatisms require a special mechanism, one that both produces the anomalous action and leaves its authorship

indeterminate. The present findings weigh against this one-process account, indicating instead that production and projection are fully separable.

The results of Experiments 3–5 suggest that the production of correct responses is independent of the projection of these responses to the other. Measures of action production and action projection were uncorrelated in these studies. Action projection responded to the belief manipulation in Experiment 4 whereas action production did not. Patterns of correlations were found to differ between these variables, with action projection linked to a general tendency to perceive FC as working, but action production linked only to the tendency to think that the communicator might know answers to the easy questions.

The separation of the production and projection processes in this paradigm may have been fostered by the way in which the “muscle reading” situation departed from standard FC. Facilitators in FC outside the lab are regularly confronted with the results of their work. They see the words appearing on the screen, and this feedback is likely to further their belief in FC and prompt escalating projection. Participants in the muscle reading paradigm were not made aware of the “success” of their action productions in this way. The actions that we counted as evidence of the FC phenomenon were correct responses to the easy questions. However, the measure of action projection referred globally to all responses to the questions. Thus, participants’ projection of answers here was not predicated on the correctness of the answers. Participants received no feedback about their correctness, yet projected some responsibility for the answers.

The degree of action projection observed in the present research might have been even larger with the provision of such a feedback process. If action production and projection are linked in FC, they may be connected by virtue of a self-perception process. In the lab, the projection of the action to the other does not seem to be essential for the production of the intelligent actions, nor does the production of the intelligent actions seem essential for the occurrence of projection. Facilitators’ fundamental lack of insight into the action production process thus merely provides a context within which the projection of the actions to the communicator can make sense.

Authorship Confusion in Everyday Life

The cases of FC and Clever Hans illustrate authorship confusion because they feature the projection of intelligent action to agents that are unlikely to be capable of such action. Our experiments render authorship confusion even more starkly, as they show projection of action to others under conditions when the other is entirely inert. In everyday social settings, the processes at work here might continue to apply, however, whenever a person believes that some other agent could conceivably be the source of an action the person has performed. Wegner (2002) has suggested that such circumstances arise when people frame their own contribution to a coaction as *inaction*, *stimulation*, *reaction*, or *collaboration*.

The belief that one is inactive is inherent both in FC and in von Osten’s interaction with Clever Hans. People think they are doing nothing, and this impression may create a set to interpret their own thoughts as accompaniments rather than causes of the action. People believe they are inactive, too, when they attribute (their

own) motion to a stationary spot of light in the autokinetic effect (Sherif, 1935). An expectation of inaction is also present when, for instance, one plays a game with a child and hopes to have the child win. Dozens of attempts not to play well and have the child succeed still result, somehow all too often, in all the right moves and an unwanted defeat for the child.

Approaching one’s action as stimulating a response from the other person may be a second path toward action projection. This is certainly what happens in FC when the facilitator tries to help the communicator “get started.” Another example arises when a parent helps a young child get dressed, and comes away thinking the child put on the mittens successfully and will be able to do it again. Next time, though, the parent is struck with the child’s apparent lapse in memory. It seemed as though the child was perfectly capable of doing this independently, but now cannot do it. Perhaps in the process of stimulating the child’s action, the parent was projecting the action in the initial session and ended up attributing to the child what the parent had actually accomplished. Similar examples occur in teacher–student interactions, and in close relationships when one partner influences the other to do something and yet assumes the other not only wanted to perform the action, but actually thought of it as well (cf. Weiner, 1991).

Actions perceived as reacting to the other person are also likely to be projected to the other person. Interactions can be parsed into segments in many ways, some of which suggest that own action caused the other’s action (e.g., I avoided her and she complained), and others of which suggest that the other’s action caused one’s own action (e.g., she complained and I avoided her). Swann, Pelham, and Roberts (1987) found that people set to perceive their own actions as reactions often remembered the interaction in ways that featured the other’s causal agency. Facilitators in FC who help to “finish” the words that a communicator has “started,” for example, might then be inclined to attribute the words to the communicator.

Authorship confusion may also arise when people interpret their behaviors as collaborating with the other. People working in groups regularly experience a “we-feeling” for what the group does, such that authorship for any individual’s action is lost in the melding of individuals into the group. Individuals motivated to maintain a communal orientation may fail to record or recognize individual authorship (Clark, 1984), and so become susceptible to the projection of their own actions to other group members. Ironically, then, people in groups might influence the group relentlessly, all the while perceiving the impetus for group action as coming from other members. Political leaders may behave quite autocratically, for instance, while sincerely perceiving that they are slaves to the “will of the people.”

These studies were directed toward understanding an unusual social situation—the oddly framed interaction that occurs in FC. It is possible, however, for other more typical social interactions to engage similar forces when their participants understand them in ways that promote action production and projection. With further research, we may learn just how often and with what effect uncontrolled intelligence leads people in daily life to play puppeteers. In the right circumstances, each of us might lead others to know what we know and do what we want—even while we fail to realize that we are pulling the strings.

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