There is no Other Monkey in the Mirror for Spider Monkeys (*Ateles geoffroyi*)

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**Author Note**

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Abstract

Mirror self-recognition (MSR), usually considered a marker of self-awareness, occurs in several species and may reflect a capacity that has evolved in small incremental steps. In line with research on human development and building on previous research adopting a gradualist framework, we categorized the initial mirror responses of naïve spider monkeys (Ateles geoffroyi) according to four levels. We compared social, exploratory, contingent and self-exploratory responses to a mirror and faux mirror during three short trials. If spider monkeys respond as most monkey species, we predicted they would perform at level 0, mainly showing social behavior toward their mirror-image. However, because spider monkeys show enhancement of certain cognitive skills comparable to those of great ape species, we predicted that they would perform at level 1a (showing exploratory behavior) or 1b (showing contingent behavior). GLMMs revealed that monkeys looked behind and visually inspected the mirror significantly more in the mirror than the faux mirror condition. Although the monkeys engaged in contingent body movements at the mirror, this trend was not significant. Strikingly, they showed no social behaviors toward their mirror-image. We also measured self-scratching as an indicator of anxiety and found no differences in frequencies of self-scratching between conditions. Therefore, in contrast to most findings on other species, spider monkeys did not treat their image as another monkey during their initial exposure to the mirror. In fact, they reached at least level 1a within minutes of mirror exposure. These responses recommend spider monkeys as good candidates for further explorations into monkey self-recognition.

**Keywords:** spider monkeys, mirror self-recognition, self-awareness, gradualist framework
There is no Other Monkey in the Mirror for Spider Monkeys (*Ateles geoffroyi*)

Several studies have investigated whether species recognize themselves in the mirror (reviewed in Anderson & Gallup, 2015; de Veer & van den Bos, 1999). The interest in mirror self-recognition (MSR) largely stems from the fact that MSR is usually considered a marker of self-awareness (e.g., Gallup, 1982; Anderson & Gallup, 2011), which implies ownership of a self-concept and the ability to distinguish between the self and others, and may be highly adaptive in group-living species (Bekoff & Sherman, 2003; Cenami Spada et al., 1995). To date, clear evidence of MSR occurs in relatively few species, including great apes (e.g., Anderson, 1994; Anderson & Gallup, 1999; Gallup, 1970; Gallup et al., 2011), bottlenose dolphins (*Tursiops truncatus*: Reiss & Marino, 2001), Asian elephants (*Elephas maximus*: Plotnik et al., 2006), and Eurasian magpies (*Pica pica*: Prior et al., 2008), although often only in a limited number of individuals of those species. Other species, in contrast, show no evidence of MSR, failing to spontaneously recognize their image in a mirror (e.g., monkeys: see Anderson & Gallup, 2015 for a review; parrots: van Buuren et al., 2018).

When exposed to a mirror, monkeys typically persist in perceiving their mirror-image as an unfamiliar conspecific, even when given extended exposure and other facilitating cues such as paired exposure (Gallup et al., 1980). In an experiment with brown capuchin monkeys (*Sapajus apella*), de Waal et al., 2005) challenged the view that the monkeys were responding as they would to unfamiliar conspecifics. A similar response occurs in cichlid fish (*Astatotilapia burtoni*: Desjardins & Fernald, 2010).

A gradualist framework of the evolution of cognitive skills in small incremental steps has been proposed to explain the variety of behaviors displayed by different taxa during mirror exposure (e.g., de Waal, 2019; de Waal et al., 2005; de Waal & Ferrari, 2010; Murray, 2020). This gradualist framework can better explain behaviors toward a mirror, such as aggressive
responses in some bird and monkey species, to quick habituation in dogs and cats, to its
instrumental use by some monkeys and parrots, and to self-exploration in great apes (see de
Waal, 2019, for a review; Murray, 2020). This framework also explains why some species show
some evidence of MSR after intensive training (e.g., Chang et al., 2015).

In line with research on human development (e.g., Rochat, 2001, 2003), in non-human
species, naïve individuals’ responses to mirror exposure can be categorized according to
different levels. Here, we build on previous research (e.g., de Waal et al., 2005; Inoue-
Nakamura, 1997; Murray, 2020; Plotnik et al., 2006) to define the following four levels. Level 0
consists of individuals responding to their mirror image as they would to a conspecific, showing
aggressive and/or affiliative behavior. Level 1a consists of individuals exploring the mirror
without showing any aggressive and/or affiliative behavior. At level 1b, individuals start
connecting their image with their own body, performing unusual and repetitive behaviors in
front of the mirror, as if testing the contingencies between their body movements and those of
the image in the mirror. Finally, at level 2, individuals show self-exploration of body parts
which are not visible without a mirror. Individuals can also be tested for level 2 by marking
them with paint on the forehead and examining whether they touch the paint in their altered
image reflected in the mirror (e.g., Anderson & Gallup, 2011; Gallup, 1970).

We used the gradualist framework to evaluate spider monkeys’ (Ateles geoffroyi) initial
responses to their image in a mirror. Spider monkeys are an interesting species to test for levels
higher than 0 because they show enhancement of certain cognitive skills comparable to great
ape species (e.g., Amici et al., 2008, 2010; Amici et al., 2018; Deaner et al., 2006), including
human-like holistic face processing (Taubert, 2010). Here, we assessed the response level of
seven spider monkeys to a brief exposure to a mirror and a faux mirror, by comparing their
social, exploratory, contingent and self-exploratory behaviors between the two conditions. We
kept the mirror exposure brief (5 minutes for each trial, for a total of three trials) as we focused
on spider monkeys’ response level to the initial mirror exposure. If spider monkeys respond as most monkey species, we predicted they would perform at level 0 by mainly showing social behavior toward their image in the mirror. However, if their responses to mirror exposure are related to the enhancement of cognitive skills, we predicted that they would perform at levels 1a, 1b or 2 by showing exploratory, contingent and self-exploratory behaviors, respectively.

Method

Subjects and Study Site

We tested seven sexually mature spider monkeys (four females, three males) housed at the Centenario Zoo in Merida, Mexico. They were wild born but were raised as pets before being rescued and brought to the zoo. Spider monkeys were housed in well-established groups in enclosures with outdoor and indoor areas. All subjects were used to being temporarily isolated in the area of their enclosure where a familiar experimenter (FeA) individually tested them. They had all previously participated in experimental tasks, but none of them had previously been tested with a mirror, although we cannot exclude that they had been inadvertently exposed to mirrors while they were kept as pets. Subjects participated in the trials on a voluntary basis. Before and during testing, they were not deprived of food or water at any time. The experimental protocols provided spider monkeys with a form of enrichment and were approved by the Centenario Zoo and the University of Chester’s School of Psychology Ethics Committee.

Materials

A Clark’s 600 mm x 450 mm safety mirror was used; this had a stainless steel polished mirror quality surface on one side (used for the Mirror condition) and a non-reflecting brushed steel surface on the reverse side, in which it was not possible to see reflections of forms, shapes
or colors (used for the Faux mirror condition). Febreze odor neutralizing spray was applied between each trial to prevent olfactory cues.

Procedure

Subjects were tested alone in the familiar testing room. We used two rings to hang a mirror in the testing room, so that subjects could peer behind it, but not move it. Subjects received a small food reinforcement for entering the testing room and one at the end of the trial before being released into the home enclosure. We administered two different conditions each lasting 5 minutes. In the Mirror condition, the mirror was hanging in the testing room, with the reflecting stainless polished surface facing the subject. In the Faux mirror condition, the mirror was hung in the same position but with the non-reflecting brushed steel surface facing the subject. All individuals received 3 trials for the Mirror condition and 3 for the Faux mirror condition. The presentation of mirror type was counterbalanced, with some subjects starting with the Mirror and some with the Faux mirror condition.

Coding

All trials were video-recorded, and later coded from the videos by two observers (i.e., CMS and LM). Cohen’s weighted kappa tests were run to determine the level of agreement between coders. Sampling one subject across two conditions, perfect agreement was found for facial orientation ($k = 1.000; p < .0001$), and very high agreement was found for overall behavioral classification ($k = 0.811; p < .0001$). We coded affiliative and agonistic behaviors, indicative of level 0; exploratory behaviors, indicative of level 1a; contingent behaviors (defined as visual alternation from the body part to the mirror, including slowly waving the hand, moving slowly forward and backward, moving one leg slowly while standing on the other foot), indicative of level 1b; and self-exploratory behaviors, indicative of level 2 (Table 1). These behaviors were recorded when directed toward the mirror in the Mirror condition and toward the non-reflecting side of the mirror in the Faux mirror condition. In addition, we coded
self-scratching as a potential indicator of anxiety (see Maestripieri et al., 1992 and Schino et al., 1996 for evidence in other species; Table 1). All behaviors were coded as duration (i.e. total seconds spent in the behavior during the 5-minute trial), except for look behind and self-scratching, which were coded as frequency (i.e. total counts during the 5-minute trial).

(Insert Table 1 here)

**Statistical analyses**

Analyses were conducted using generalized linear mixed models (GLMMs: Baayen et al., 2008) with the lme4 package in R (version 3.5.0; Bates, 2010). In each GLMM the frequency or the time spent in one of the behavioral responses listed in Table 1 was the dependent variable (following a Gaussian distribution, with normally distributed and homogeneous residuals) and condition (Mirror or Faux mirror) was the predictor variable. In each model, we included the subject’s sex (i.e. male or female) and trial number (i.e. 1 to 3) as control fixed factors, and the subject’s identity as random factor. We compared full and null models using a likelihood ratio test (Chatfield et al., 2002). In case of a significant difference between full and null models, we conducted likelihood ratio tests to obtain the p values for each test predictor via single-term deletion (Barr et al., 2013). No convergence or stability issues were detected (except for some convergence issues in one model, see below).

**Results**

*Level 0 – Social behaviors.* Monkeys showed no social behaviors (i.e., agonistic behavior, affiliative behavior, fear) toward their image in the mirror, in any trial. No model was therefore run.
Level 1a – Exploration. Six of the seven monkeys looked behind the mirror with a mean latency of 49 seconds in trial 1 (videos 1-3 in SM). The comparison between the full and null model for looking behind the mirror was significant (GLMM: $\chi^2 = 6.30$, df = 1, $p = .012$); monkeys looked behind the mirror more often than the faux mirror (Table 2; Figure 1). The comparison between the full and null model for physical inspection of the mirror was not significant (GLMM: $\chi^2 = 0.58$, df = 1, $p = .445$; see Table 2), suggesting no differences in the physical inspection of either the mirror or the faux mirror between the two conditions. All seven monkeys engaged in visual inspection of the mirror, with a mean latency of 34 seconds in trial 1 (videos 1-4 in SM). For visual inspection of the mirror, the comparison between the full and null model was significant (GLMM: $\chi^2 = 4.21$, df = 1, $p = .04$); monkeys visually inspected the mirror more often than the faux mirror (Table 2; Figure 1). In all instances of look behind and visual inspection of the mirror, the monkeys did not do anything else than move around their enclosure prior to approaching the mirror.

(Insert Table 2 here)

(Insert Figure 1)

Level 1b – Contingent behaviors. Four of the seven monkeys showed contingent body movements in front of the mirror with a mean latency of 58 seconds in trial 1 (videos 1, 3 and 4 in SM). The comparison between the full and null model did not reach significance (GLMM: $\chi^2 = 3.33$, df = 1, $p = .068$) but the tendency was for the subject to have a higher probability of performing contingent body movements in the Mirror condition than in the Faux mirror condition (Table 2; Figure 1, video 2 in SM). Monkeys showed no contingent facial movements in any trial, so no model was run for this variable.
Level 2 – Self-exploration. Monkeys showed no self-exploration (i.e., body self-exploration and face self-exploration) in any trial. Therefore, no model was run.

Anxiety indicator – Self-scratching. The comparison between the full and null model was not significant (GLMM: $\chi^2 = 5.12$, df = 2, $p = .077$; Table 2), suggesting no differences in the probability of self-scratching between conditions.

Discussion

We exposed seven spider monkeys to a mirror and a faux mirror, for a total of 15 minutes per condition. Our results showed that spider monkeys performed no social behaviors when exposed to the mirror. Moreover, they looked behind and visually inspected the mirror more often than the faux mirror. Spider monkeys showed no difference in contingent behaviors and self-scratching between the two conditions and did not engage in any instance of self-exploration.

Firstly, spider monkeys showed no social behaviors when exposed to the mirror: they never engaged in agonistic or affiliative behavior, nor did they show fearful responses. Spider monkeys’ behavioral responses to unfamiliar conspecifics are usually antagonistic during introductions in captivity (Davis et al., 2009) and during intergroup encounters in the wild (Aureli et al., 2006). In contrast, when spider monkeys meet another member of their group, they engage in face greetings and embraces (Aureli & Schaffner, 2007; Schaffner & Aureli, 2005). None of our seven subjects engaged in any such behaviors during the three mirror trials. This finding suggests that spider monkeys did not treat their image as another monkey during the initial exposure to the mirror. Although looking behind the mirror has sometimes been considered as a social response (e.g. Povinelli et al., 1993), the lack of any more explicit social behavior toward the mirror image supports considering “look behind” as an exploratory
behavior. Our result on social behaviors contrasts with research on other species, which failed to immediately differentiate their mirror image from that of a conspecific, and often showed social behaviors even after several hours of mirror exposure. Social behaviors during initial mirror exposure occur in other New World monkey species (e.g., cotton-top tamarins, *Saguinus oedipus*, and squirrel monkeys, *Saimiri sciureus*: Inoue-Nakamura, 1997; brown capuchin monkeys, *Sapajus apella*: Anderson & Roeder, 1989; de Waal et al, 2005), by several species of macaques (e.g., rhesus macaques, *Macaca mulatta*: Inoue-Nakamura, 1997; Rajala et al., 2010; Suarez & Gallup, 1986; long-tailed macaques, *M. fascicularis*: Gallup, 1977; stump-tailed macaques, *M. arctoides*; Anderson, 1983; bonnet macaques, *Macaca radiata*: Inoue-Nakamura, 1997; but see Japanese macaques, *M. fuscata*: Inoue-Nakamura, 1997) and by gibbons (Hylobates, Symphalangus and Nomascus spp.; Inoue-Nakamura, 1997; Suddendorf & Collier-Baker, 2009; Ujhely et al, 2000). Remarkably, all four great apes exhibit some social behavior during initial mirror exposure (e.g., Inoue-Nakamura, 1997 for chimpanzees, *Pan troglodytes*, gorillas, *Gorilla gorilla*, and orangutans, *Pongo pygmaeus*; Walraven et al, 1995 for bonobos, *Pan paniscus*). Gallup (1970), for example, reported that chimpanzees repeatedly engaged in social behaviors towards their mirror image, with a substantial reduction only after around 20 hours of mirror exposure.

Very few studies to date have shown a lack of social responses during initial mirror exposure: bottlenose dolphins (Reiss & Marino, 2001), Asian elephants (Plotnik et al., 2006), and Western gorillas (Posada & Colell, 2007). Therefore, the performance of spider monkeys in our study is remarkable. Although our study only provides a preliminary understanding of spider monkeys’ reaction to mirrors, it is noteworthy given that spider monkeys already show cognitive skills comparable to those of great apes (e.g., Amici et al., 2008, 2010; Amici et al., 2018; Deaner et al., 2006).
Secondly, spider monkeys looked behind and visually inspected the mirror more often than they did the faux mirror. Our results suggest that spider monkeys reached level 1a in trial 1, after less than a minute of mirror exposure. Although four of the seven monkeys engaged in some contingent body movements while facing the mirror within a minute of mirror exposure, we found no significant difference between the mirror and the faux mirror conditions. This is something requiring further investigation, considering that contingent behaviors have been taken as evidence of level 1b (e.g., de Waal et al., 2005; Inoue-Nakamura, 1997; Plotnik et al., 2006). The spider monkeys showed no evidence of self-exploration (i.e. level 2), which is unsurprising given the reduced exposure to the mirror. Importantly, the different responses shown by spider monkeys in the mirror condition compared to the faux mirror condition cannot be explained by differences in individuals’ anxiety. Indeed, subjects did not differ in the self-scratching rate between conditions.

Our study provides a first assessment of spider monkeys’ response to mirrors, which revealed that spider monkeys reach at least level 1a after only minutes of mirror exposure. Future studies should investigate spider monkeys’ response to mirrors by focusing on the following aspects. Firstly, our findings of no occurrence of social behavior should be replicated with subjects that were not previous pets. Although in the Yucatan peninsula spider monkey pets are usually kept outdoors, where mirrors are typically absent, some experience with mirrors could have influenced our study subjects’ performance. Secondly, future studies should include observation of spider monkeys’ reactions to other monkeys to directly compare mirror responses with how monkeys typically interact with one another. Thirdly, subjects should be tested for a longer time, and with alternative stimuli such as video proxies of the mirror, to evaluate whether spider monkeys reach further levels of response to mirror exposure. Should spider monkeys perform like dolphins, elephants and great apes, there will be further support to
the view that spider monkeys show an enhancement of certain cognitive skills. Such discovery will also provide renewed impetus for a revised perspective on MSR.
References

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MIRROR RESPONSES IN SPIDER MONKEYS


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Table 1

Behavioral responses (adapted from Povinelli et al., 1993) according to Self-Recognition (SR) continuum framework (Murray, 2020)

<table>
<thead>
<tr>
<th>Level</th>
<th>Behavioral responses</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>L0 - No self-recognition</td>
<td>Agonistic behavior</td>
<td>Subject shows aggressive behaviors toward the mirror (e.g., threat faces, charging)</td>
</tr>
<tr>
<td>Social behaviors</td>
<td>Fear</td>
<td>Subject shows grimaces, escape behavior and/or squeals</td>
</tr>
<tr>
<td></td>
<td>Affiliative behavior</td>
<td>Subject shows affiliative behaviors toward the mirror (e.g., face greeting, tee-tee vocalizations, play invitations, sexual presentations)</td>
</tr>
<tr>
<td>L1a – Differentiated responses to mirror</td>
<td>Look behind</td>
<td>Subject lifts the mirror to inspect its back or peers over its edge to view its reverse side</td>
</tr>
<tr>
<td>Exploration</td>
<td>Mirror physical inspection</td>
<td>Subject touches the mirror with hands, feet, mouth, nose or tail</td>
</tr>
<tr>
<td></td>
<td>Mirror visual inspection</td>
<td>Subject explores the mirror by looking at it without touching it</td>
</tr>
<tr>
<td>L1b - Differentiated responses to video (or mirror) including contingency-checking</td>
<td>Contingent body movements</td>
<td>Subject makes purposeful or repetitious body movements, while facing the mirror (e.g., the subject’s face is oriented toward its body, then to the mirror and back; hands or arms are slowly waved in front of the mirror; side to side or backward/forward body movements in front of the mirror)</td>
</tr>
<tr>
<td></td>
<td>Contingent facial movements</td>
<td>Subject makes unusual face movements, while facing the mirror</td>
</tr>
<tr>
<td>L2 – Self-exploratory behavior</td>
<td>Body self-exploration</td>
<td>Subject uses fingers, hands or tail to examine parts of its body not normally visible, while facing the mirror</td>
</tr>
<tr>
<td></td>
<td>Face self-exploration</td>
<td>Subject uses fingers, hand or tail to examine its face or mouth, while facing the mirror</td>
</tr>
<tr>
<td>Anxiety indicator</td>
<td>Self-scratching</td>
<td>Subject repeatedly rubs its body with the fingers</td>
</tr>
</tbody>
</table>

Note. All behaviors were coded as duration (in seconds), except for look behind and self-scratching, which were coded as counts. For self-scratching, a new event was scored after a pause of 5 seconds.
Table 2

Results of GLMM models, including estimates, standard errors (SE), confidence intervals (CIs), likelihood ratio tests (LRT), degrees of freedom (df) and P values

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>SE</th>
<th>2.5% CI</th>
<th>97.5% CI</th>
<th>LRT</th>
<th>df</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Looking behind</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
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<td>1.10</td>
<td>0.81</td>
<td>-4.89</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Condition</strong></td>
<td>1.62</td>
<td>0.63</td>
<td>0.38</td>
<td>2.86</td>
<td>6.30</td>
<td>1</td>
<td>0.001</td>
</tr>
<tr>
<td>Trial number</td>
<td>-1.14</td>
<td>0.39</td>
<td>-1.90</td>
<td>-0.38</td>
<td>8.15</td>
<td>1</td>
<td>0.002</td>
</tr>
<tr>
<td>Sex</td>
<td>0.35</td>
<td>1.08</td>
<td>-1.71</td>
<td>2.40</td>
<td>0.14</td>
<td>1</td>
<td>0.704</td>
</tr>
<tr>
<td><strong>Physically inspecting</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>8.40</td>
<td>3.88</td>
<td>1.03</td>
<td>15.77</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Condition</strong></td>
<td>-1.90</td>
<td>2.59</td>
<td>-6.89</td>
<td>3.08</td>
<td>0.58</td>
<td>1</td>
<td>0.445</td>
</tr>
<tr>
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<td>1.58</td>
<td>-5.59</td>
<td>0.51</td>
<td>2.69</td>
<td>1</td>
<td>0.101</td>
</tr>
<tr>
<td>Sex</td>
<td>3.13</td>
<td>2.80</td>
<td>-1.91</td>
<td>8.16</td>
<td>1.50</td>
<td>1</td>
<td>0.220</td>
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<tr>
<td><strong>Visually inspecting</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>16.07</td>
<td>10.52</td>
<td>-3.42</td>
<td>35.55</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Condition</strong></td>
<td>11.38</td>
<td>5.54</td>
<td>0.53</td>
<td>22.23</td>
<td>4.21</td>
<td>1</td>
<td>0.040</td>
</tr>
<tr>
<td>Trial number</td>
<td>-7.61</td>
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<td>4.96</td>
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<td>0.026</td>
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<tr>
<td>Sex</td>
<td>10.57</td>
<td>11.51</td>
<td>-11.44</td>
<td>32.58</td>
<td>1.09</td>
<td>1</td>
<td>0.296</td>
</tr>
<tr>
<td><strong>Contingent body movements</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
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<td>1.79</td>
<td>0.58</td>
<td>7.40</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td><strong>Condition</strong></td>
<td>2.14</td>
<td>1.21</td>
<td>-0.16</td>
<td>4.45</td>
<td>3.33</td>
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<td>7.86</td>
<td>1</td>
<td>0.005</td>
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<tr>
<td>Sex</td>
<td>1.69</td>
<td>1.22</td>
<td>-0.64</td>
<td>4.03</td>
<td>2.07</td>
<td>1</td>
<td>0.150</td>
</tr>
<tr>
<td><strong>Self-scratching</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Intercept</td>
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<td>0.94</td>
<td>0.53</td>
<td>4.04</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td><strong>Condition</strong></td>
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<td>0.58</td>
<td>-0.94</td>
<td>1.32</td>
<td>0.12</td>
<td>1</td>
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<tr>
<td>Trial number</td>
<td>-0.86</td>
<td>0.35</td>
<td>-1.55</td>
<td>-0.16</td>
<td>5.73</td>
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<td>0.017</td>
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<tr>
<td>Sex</td>
<td>0.56</td>
<td>0.83</td>
<td>-1.04</td>
<td>2.15</td>
<td>0.60</td>
<td>1</td>
<td>0.440</td>
</tr>
</tbody>
</table>

*Note.* Significant effects of test predictors are in bold.
Figure 1

Estimated marginal means (+ SE) of the probability of looking behind the mirror/faux mirror, visually inspecting the mirror/faux mirror and performing contingent body movements in the Mirror condition and in the Faux mirror condition.
Supplementary Materials

Video 1

Spider monkey engaged in Visual inspection, Contingent body movement, Look behind and Self-scratching in front of the mirror

Video 2

Spider monkey engaged in Visual inspection, Look behind and Physical inspection of the mirror

Video 3

Spider monkey engaged in Visual inspection, Look behind, Contingent body movement and Physical inspection of the mirror

Video 4

Spider monkey engaged in Visual inspection and Contingent body movement in front of the mirror