The influence of power and reason on young Maya children’s endorsement of testimony

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Abstract

Two important parenting strategies are to impose one’s power and to use reasoning. The effect of these strategies on children’s evaluation of testimony has received very little attention. Using the epistemic vigilance framework, we predict that when the reasoning cue is strong enough it should overcome the power cue. We test this prediction in a population for which anthropological data suggest that power is the prominent strategy while reasoning is rarely relied on in the interactions with children. In Experiment 1, 4- to 6-year-old children from a traditional Maya population are shown to endorse the testimony supported by a strong argument over that supported by a weak argument. In Experiment 2, the same participants are shown to follow the testimony of a dominant over that of a subordinate. The participants are then shown to endorse the testimony of a subordinate who provides a strong argument over that of a dominant who provides either a weak argument (Experiment 3) or no argument (Experiment 4). Thus, when the power and reasoning cues conflict, reasoning completely trumps power.

Research highlights

• Little is known about the effect of imposing one’s power vs. using reason on children’s endorsement of testimony.
• We predict that if the reasons are strong enough, then they should trump power.
• Four- to 6-year-old indigenous Maya children were found to take power and reason equally into account when evaluating testimony, when the cues were presented independently.
• When the two cues were pitted against each other, however, reason trumped power.

Introduction

Two of the main strategies parents use to influence their children are power and reason (Grusec & Goodnow, 1994; Hoffman, 1970). With power parents rely on their dominance to threaten or execute the withdrawal of privileges and corporal punishment. With reasoning parents provide their children with reasons why they should behave in the desired manner. The frequency with which these strategies are used is related to many child outcomes: immediate compliance (Gershoff, 2002), but also resistance to temptation (Grusec & Goodnow, 1994), pro-social behavior (Eisenberg, Miller, Lewis & Miller, 1990), and mental health (Gershoff, 2002). On the whole, parents’ use of reasoning has been found to be related to positive child outcomes (see, e.g. Hoffman, 1970). However, little is known about their impact in an essential domain: children’s evaluation of testimony. Are children more likely to endorse the testimony of someone who imposes their power or that of someone who relies on reasoning?

Power, which refers to the ability to control what others do and the distribution of resources, can result from two main factors: dominance and authority.
Dominance, which is shared with non-human primates and other social animals, largely relies on physical agonism (e.g. Lewis, 2002). For instance, two individuals compete for a scarce resource and the dominant monopolizes it through fighting, aggression or strength displays. Authority, by contrast, is a more human-specific construct in which the powerful position results from leadership, status, respect, or prestige (e.g. Fiske, 1992). With authority, power is less coercive, more institutionalized, and is less likely to rely on physical strength. Although dominance and authority are related, they do not always correlate, for instance when an elderly individual exerts a strong authority. Dominance plays a very important role in children’s lives (Boyce, 2004; Strayer & Strayer, 1976), and parents who use power can rely on dominance – their physical strength – to make children comply (Grusec & Goodnow, 1994).

Young children have been shown to identify dominance from several cues, and to make several inferences on the basis of dominance (Charafeddine, Mercier, Kaufmann, Clément, Berchtold et al., in press; Mascaro & Csibra, 2012); in particular, 3- to 5-year-olds tend to endorse the testimony of a dominant individual over that of a subordinate (Bernard, Castelain, Mercier, Kaufmann, Van der Henst et al., submitted). Preschoolers also tend to endorse the testimony of a physically stronger individual over that of a weaker one (Fusaro, Corriveau & Harris, 2011). Given that children this age infer dominance from physical strength (Charafeddine et al., in press), it is possible that they endorsed the testimony of the stronger individual because they thought he was more likely to be a dominant.

In the present experiments we have operationalized power in the following way: two characters are seen play fighting, and then competing over an object. In both cases, the same character accomplishes her goal (i.e. winning the fight, getting the object) at the expense of the other. These two situations are archetypal examples of dominance that preschoolers encounter in the kindergarten (Russon & Waite, 1991; Sluckin & Smith, 1977; Strayer & Strayer, 1976) and that have been used in several experiments (Charafeddine et al., in press; Mascaro & Csibra, 2012; Thomsen, Frankenhuis, Ingold-Smith & Carey, 2011).

To operationalize reasoning, we have relied on a contrast between a character who provides a circular argument and one who provides a strong, non-circular argument. Preschoolers have been shown to favor the testimony supported by the strong, non-circular argument (Mercier, Bernard & Clément, 2014; see also Corriveau & Kurkul, 2014).

In order to make predictions regarding which cue – power or reason – should provide stronger support for testimony, we rely on the framework of epistemic vigilance. Children’s ability to evaluate testimony can be understood as being part of a set of mechanisms dedicated to epistemic vigilance (Mascal & Sperber, 2009; Sperber, Clément, Heintz, Mascaro, Mercier et al., 2010). These mechanisms have evolved to enable the discrimination of beneficial and harmful communicated information, using cues such as trust in the speaker and plausibility of the information. In this framework, reasoning would have evolved to allow for a finer grained discrimination of messages. In particular, a main function of reasoning would be to allow senders to transmit messages that would not be accepted on trust. When a receiver doesn’t accept a message on trust, the sender can provide arguments. The receiver can evaluate these arguments and decide for herself if she should change her mind. Thus, strong enough arguments should be able to overcome a deficit of trust: a sender who is not trusted enough – for instance because she lacks power – but who provides strong arguments, should be believed (Mercier & Sperber, 2011). Evidence in adults suggests that strong arguments can take precedence over source-related cues such as confidence, competence, and honesty (Trouche, Sander & Mercier, 2014; Trouche, Shao & Mercier, submitted).

In order to test the prediction that strong enough arguments should take precedence over source-related cues such as power, one can try to determine whether children endorse the testimony of a subordinate providing a strong argument over that of a dominant providing a weak argument, or no argument. However, conducting such a test in the populations standardly recruited in developmental psychology raises some issues. Most participants in psychology experiments belong to cultures described as WEIRD – Western Educated Industrialized Rich Democratic (Henrich, Heine & Norenzayan, 2010). Cross-cultural research has demonstrated that the adults of WEIRD populations are outliers on a number of traits, some of which are relevant to the use of the power assertive and inductive reasoning strategies. Compared to many cultures, Western cultures tend to be individualist and relatively egalitarian, making the assertion of power more difficult (Singelis, Triandis, Bhawuk & Gelfand, 1995; Triandis & Gelfand, 1998). Western cultures have also been described as putting a unique emphasis on the use of reason in argumentation and debate (for review, see Mercier, 2011).

The specificity of WEIRD cultures is also reflected in parenting style (see, e.g. Little, Carver & Legare, submitted). Anthropological and linguistic evidence suggests that traditional societies tend to rely more on power assertion relative to reasoning than Western cultures.
(especially than the middle- and upper-middle-class children who usually take part in experiments, see, e.g. Tizard, Hughes, Carmichael & Pinkerton, 1983). In traditional societies, children are not supposed to question their parents’ decisions – they should be ‘seen and not heard’ (Maratsos, 2007, p. 124; see also Nicolaisen, 1988). As a result, they very rarely require explanations by asking ‘why-questions’ to adults (Gauvain, Munroe & Beebe, 2013). This evidence suggests that in traditional cultures, relative to Western cultures, power assertion plays a stronger role and reasons a weaker role. Children from a traditional culture would thus provide a more robust test of the hypothesis that strong enough arguments take precedence over a source-related cue such as power.

To test this hypothesis, children from traditional Maya populations were asked to decide which of two informants’ contradictory testimonies to endorse. In Experiment 1, one informant provided a strong (perceptual) argument and the other informant a weak (circular) argument. In Experiment 2, one informant was a dominant and the other a subordinate. In Experiment 3, one informant was a dominant who provided a weak argument and the other a subordinate who provided a strong argument. In Experiment 4, one informant was a dominant who provided no argument and the other a subordinate who provided a strong argument.

Population tested

The participants were 4-, 5- and 6-year-old children from indigenous Kaqchikel families living in three villages in the department of Sololá, Guatemala. These are rural villages in which the majority of the population is illiterate (INE, 2002). Kaqchikel societies are not egalitarian. Although the hierarchical order does not perfectly track standard dominance, since the elders occupy a high hierarchical position, there is still a strong link between physical dominance and hierarchical position, with men having a higher position than women who have a higher position than children (UNDP, 2014). As is true in other traditional societies, there is comparatively little talk between children and their caregivers (Bunzel, 1959; Maratsos, 2007). In the closely related K’iche’ communities, for which data are available, parents ask few questions to their children, relying primarily – over 50% of sentences – on imperatives when addressing them (Pye, 1986). This population thus fits well with the description provided earlier of a traditional population.

At the age of 4, children start pre-school, where they engage in educational activities for approximately four hours a day (PNUD, 2005). The experiments took place in the pre-schools of each village and were conducted in Kaqchikel, the children’s native language. The experimenters were two women from the community recruited and trained by one of the authors. For each experiment, each child was seen individually in a quiet room by a single experimenter for about 10 minutes. Pictures were presented on a binder while the experimenter told the stories and asked the questions. The translations from Spanish to Kaqchikel were carried out by one of the experimenters, the back-translation by the other experimenter, with discrepancies resolved through discussion. Most children took part in the four experiments, and they were rewarded with school materials, a bag, and a T-shirt after taking part in the experiment in which they last took part.

**Experiment 1**

**Method**

**Participants**

This experiment involved 99 children: 29 4-year-olds (16 girls, $M_{{age}} = 54.3$ months, $SD = 3.23$, range 50–60 months), 33 5-year-olds (14 girls, $M_{{age}} = 67.4$ months, $SD = 3.07$, range 61–72 months), and 37 6-year-olds (14 girls, $M_{{age}} = 78.5$ months, $SD = 3.07$, range 73–84 months).

**Materials and procedure**

The procedure was adapted from Mercier et al. (2014). In the first vignette, a young Playmobil girl, Maria, and her hen were presented to the children. The experimenter said: ‘In this game, you will try to help Maria find her hen’ (see Supplementary Materials for a complete example of the pictures and instructions). A second vignette – which was repeated four times with different backgrounds and boy characters – showed Maria facing two Playmobil boy characters, each one pointing in a different direction. The experimenter said: ‘For instance, one day, Maria is looking for her hen in front of a house. These two kids tell her something. Actually, these two kids disagree. This one says: “The hen went this way because I saw it go this way” [Perceptual Argument]. And this one says: “The hen went this way because it went this way” [Circular Argument]’ (Figure 1).

Finally, the experimenter asked the children, ‘According to you, where did Maria’s hen go?’ The characters’ location (left/right) and the order of information presentation were counterbalanced. Each child could obtain a maximum score of 4 points: 1 point for each story in which the direction supported by the perceptual argument was chosen.
Figure 1  Summary of the experiments. Experiment 1: Introduction of the girl and her hen that will get lost (common to all the experiments); the characters provide a perceptual and a circular argument, respectively. Experiment 2: The dominance relationship is established; the characters point in opposite directions without providing any argument. Experiment 3: The dominance relationship is established; the dominant provides a circular argument and the subordinate a perceptual argument. Experiment 4: The dominance relationship is established; the dominant provides no argument and the subordinate provides a perceptual argument.
Results and discussion

A Kruskal-Wallis one-way analysis of variance did not reveal any significant effect of age group, \( \chi^2 (2, N = 99) = 3.07, p = .216 \). One-sample Wilcoxon signed rank tests showed that the children were more likely than chance to select the testimony supported by the perceptual argument, both for the children as a whole (\( M_{\text{all}} = 3, Z = 6.21, p < .001, r = 0.50 \), see Figure 2), and within each age group (\( M_{\text{4yo}} = 3, Z = 4.13, p < .001, r = 0.66 \); \( M_{\text{5yo}} = 3, Z = 4.17, p < .001, r = 0.61 \); \( M_{\text{6yo}} = 3, Z = 2.71, p = .007, r = 0.32 \).

This suggests that the children from all age groups were able to discriminate between a strong, perceptual argument, and a weak, circular argument. They favored the testimony supported by the strong argument, replicating the results obtained by Mercier et al. (2014) with Swiss participants. One could argue, however, that the present results do not decisively answer the question of whether children are able to recognize the strength of the strong argument, or only the weakness of the circular argument. Children could think that the character providing the circular argument was in some way irrational, and thus favor the testimony of the other character without understanding that her argument was strong. Two sets of results weigh against this interpretation. Results from the study in Switzerland showed that 4- and 5-year-olds tended to endorse testimony supported by a circular argument over that supported by no argument (Mercier et al., 2014). This suggests that children of this age do not think that circular arguments are intrinsically irrational, only that they are weaker than other arguments. The results of the present Experiment 4 below also speak against this interpretation.

Experiment 2

Method

Participants

This experiment involved 97 children: 31 4-year-olds (18 girls, \( M_{\text{age}} = 54.3 \) months, \( SD = 3.48 \), range 48–60 months), 34 5-year-olds (15 girls, \( M_{\text{age}} = 67.3 \) months, \( SD = 3.20 \), range 61–71 months), and 32 6-year-olds (11 girls, \( M_{\text{age}} = 78.8 \) months, \( SD = 2.99 \), range 73–84 months). Ninety of these children had taken part in Experiment 1 a minimum of one month before.

Materials and procedure

The design was adapted from Bernard et al. (submitted). The experiment was composed of two phases: a dominance induction phase and a test phase.

Dominance induction phase. In the induction phase, the children were told two stories involving two boy characters, José and Luis. One story presented the two characters play fighting (seven vignettes, see Supplementary Materials); the other story showed them contesting a ball (seven vignettes, see Supplementary Materials). The same character won in both stories. The order of the stories, the dominant character and the position of the characters were counterbalanced.

Figure 2  Box plots representing the scores of children following the testimony of: (Experiment 1) the character giving the perceptual argument (\( M_{\text{all}} = 2.78, SD = .94 \)); (Experiment 2) the dominant character (\( M_{\text{all}} = 2.72, SD = .74 \)); (Experiment 3) the subordinate character giving the perceptual argument while the dominant gives a circular argument (\( M_{\text{all}} = 3.02, SD = .63 \)); (Experiment 4) the subordinate character giving the perceptual argument while the dominant gives no argument (\( M_{\text{all}} = 3.13, SD = .62 \)). The dark lines represent the median value. The boxes represent the middle half of the sample, between the lower and the upper quartiles. The whiskers represent the largest values except for the outliers. Circles are outliers and asterisks far outliers.
Test phase. In the test phase the children were presented with a testimony task in which Luis and José gave conflicting testimonies in four consecutive trials. This task is similar to that of Experiment 1 except that: (a) the protagonists gave no arguments, merely pointing in one direction and saying: ‘The hen went this way’ (Figure 1); (b) the four trials involved the same protagonists. Each child could obtain a maximum score of 4 points: 1 point for each story in which the direction supported by the dominant character was chosen.

Preference questions. After the fourth testimony trial, a picture displayed José and Luis against a neutral background and the experimenter asked the child: ‘Do you prefer José or Luis [order counterbalanced]?’ Then she asked: ‘Would you prefer to play with Luis or José [order counterbalanced]?’

Control questions. The experimenter asked the children: ‘Do you think that one of the two characters is the boss?’ If the answer was positive, the experimenter asked: ‘According to you, who is the boss?’ If the answer was negative, the experimenter asked: ‘If you had to choose between the two characters, which one would be the boss?’ To ascertain the children’s grasp of power, the experimenter also asked: ‘Who is the boss in the classroom?’

Results and discussion

A Kruskal-Wallis one-way analysis of variance did not reveal any significant effect of age group, $\chi^2 (2, N = 97) = 1.85, p = .397$. One-sample Wilcoxon signed rank tests showed that children were more likely than chance to select the testimony of the dominant character, both for the children as a whole ($Mdn_{all} = 3, Z = 6.65, p < .001, r = 0.47$, see Figure 2), and within each age group ($Mdn_{4yo} = 3, Z = 4.07, p < .001, r = 0.60$; $Mdn_{5yo} = 3, Z = 4.26, p < .001, r = 0.63$; $Mdn_{6yo} = 3, Z = 3.30, p = .001, r = 0.47$). These results show that the children from all age groups favored the testimony of a dominant over that of a subordinate, replicating the results obtained by Bernard et al. (submitted) with French children.

Comparisons to chance level (binomial test) for the group as a whole revealed a preference for the dominant character (59 preferences for the dominant, 38 preferences for the subordinate, $p = .042$) and a preference to play with the dominant character (59 preferences for the dominant, 38 preferences for the subordinate, $p = .042$). Mann-Whitney tests revealed that the testimony scores of the group of children who preferred (or had a preference for playing with) the dominant did not differ significantly from the scores of those who preferred (or had a preference for playing with) the subordinate ($Z = .817, p = .414$, and $Z = 1.09, p = .277$, respectively). In addition, one-sample Wilcoxon signed rank tests showed that all groups of children were more likely than chance to select the testimony of the dominant: children who expressed a preference for the subordinate ($Mdn = 3, Z = 3.95, p < .001, r = 0.51$); children who expressed a preference for the dominant ($Mdn = 3, Z = 5.37, p < .001, r = 0.59$); children who preferred to play with the subordinate ($Mdn = 3, Z = 4.34, p < .001, r = 0.58$); children who preferred to play with the dominant ($Mdn = 3, Z = 5.12, p < .001, r = 0.56$). Most children were able to correctly identify the dominant (73 out of 97, $p < .001$) and they all displayed a basic grasp of the concept of power (100% said that the boss in the classroom was their teacher).

The goal of Experiment 3 was to test whether strong arguments can trump the source (i.e. dominance) cue. For Experiment 3 to be meaningful, the dominance cue, considered independently, should not be weaker than the argument cue, considered independently. Otherwise we would simply be dealing with a weak source cue, and it would not be surprising if it were trumped by argument quality. To ensure that this was not the case, analyses were conducted with the children in Experiment 3 who also took part in Experiments 1 and 2 ($N = 81$). A paired-sample Wilcoxon signed-rank test revealed that for those children the score linked to the perceptual argument in Experiment 1 did not differ significantly from the score linked to the dominant character in Experiment 2 ($Z = .55, p = .583$). Thus, if argument strength trumps dominance in Experiment 3, it cannot be simply because the source cue used was intrinsically weaker than the argument cue.

**Experiment 3**

**Method**

Participants

This experiment involved 91 children: 28 4-year-olds (16 girls, $M_{age} = 53.9$ months, $SD = 3.40$, range 48–60 months), 31 5-year-olds (12 girls, $M_{age} = 67.5$ months, $SD = 2.88$, range 62–71 months), and 32 6-year-olds (12 girls, $M_{age} = 78.8$ months, $SD = 3.13$, range 73–84 months). Eighty-one of these children had taken part in Experiments 1 and 2 a minimum of one month before.

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Materials and procedure

The experiment was identical to Experiment 2 except that the arguments from Experiment 1 were introduced (and that the characters were different, as indicated by their new names). In each of the four testimony trials, the dominant used the circular argument and the subordinate the perceptual argument (Figure 1). Each child could obtain a maximum score of 4 points: 1 point for each story in which the direction supported by the perceptual argument (given by the subordinate) was chosen.

Results and discussion

A Kruskal-Wallis one-way analysis of variance did not reveal any significant effect of age group, \( \chi^2(2, N = 91) = 2.64, p = .267 \). One-sample Wilcoxon signed rank tests showed that children were more likely than chance to select the testimony of the subordinate giving the perceptual argument, both for the children as a whole (Mdn = 3, Z = 7.90, \( p < .001, r = 0.76 \), see Figure 2) and within each age group (Mdn4yo = 3, Z = 4.46, \( p < .001, r = 0.76 \); Mdn5yo = 3, Z = 4.77, \( p < .001, r = 0.76 \); Mdn6yo = 3, Z = 4.60, \( p = .001, r = 0.75 \)).

Comparisons to chance level (binomial test) revealed no preference between the characters (52 preferences for the dominant, 39 preferences for the subordinate, \( p = .208 \)), or preference to play with one of the characters (45 preferences for the dominant, 46 preferences for the subordinate, \( p = 1 \)). As in Experiment 2, Mann-Whitney tests revealed that the testimony scores of the children who preferred (or had a preference for playing with) the dominant and of those who preferred (or had a preference for playing with) the subordinate did not differ significantly (Z = .294, \( p = .769 \), and Z = –.654, \( p = .513 \), respectively). In addition, one-sample Wilcoxon signed rank tests showed that all groups of children were more likely than chance to select the testimony of the subordinate who gave a perceptual argument: children who expressed a preference for the subordinate (Mdn = 3, Z = 5.25, \( p < .001, r = 0.76 \)); children who expressed a preference for the dominant (Mdn = 3, Z = 5.92, \( p < .001, r = 0.75 \)); children who preferred to play with the subordinate (Mdn = 3, Z = 5.75, \( p < .001, r = 0.78 \)); children who preferred to play with the dominant (Mdn = 3, Z = 5.44, \( p < .001, r = 0.72 \)). Most children were able to correctly identify the dominant (74 out of 91, \( p < .001 \)) and they all displayed a basic grasp of the concept of power (100% said that the boss in the classroom was their teacher).

The interpretation of these results, however, faces the same issue as that faced in Experiment 1: instead of recognizing the strength of the strong argument, children could simply avoid the speaker who provides an argument that could be construed as being irrational and as violating conversational norms. Experiment 4 can rule out this interpretation, since it pits a subordinate who provides a strong argument against a dominant who provides no argument.

Experiment 4

Method

Participants

This experiment involved 60 children: 20 4-year-olds (12 girls, M\(_{age}\) = 53.9 months, SD = 3.59, range 48–60 months), 20 5-year-olds (9 girls, M\(_{age}\) = 66.3 months, SD = 3.28, range 61–72 months), and 20 6-year-olds (10 girls, M\(_{age}\) = 78.7 months, SD = 2.36, range 73–82 months). All of these children had taken part in two or three of the previous experiments, at least two weeks prior to taking part in Experiment 4.

Materials and procedure

The experiment was identical to Experiment 3 except that the circular argument was removed (and that the characters were different, as indicated by their new names). In each of the four testimony trials, the dominant did not provide any argument and the subordinate used the perceptual argument (Figure 1). Each child could obtain a maximum score of 4 points: 1 point for each story in which the direction supported by the perceptual argument (given by the subordinate) was chosen.

Results and discussion

A Kruskal-Wallis one-way analysis of variance did not reveal any significant effect of age group, \( \chi^2(2, N = 60) = .419, p = .811 \). One-sample Wilcoxon signed rank tests showed that children were more likely than chance to select the testimony of the subordinate giving the perceptual argument, both for the children as a whole (Mdn\(_{all}\) = 3, Z = 6.57, \( p < .001, r = 0.79 \), see Figure 2) and within each age group (Mdn4yo = 3, Z = 3.79, \( p < .001, r = 0.77 \); Mdn5yo = 3, Z = 3.74, \( p < .001, r = 0.77 \); Mdn6yo = 3, Z = 3.95, \( p = .001, r = 0.81 \)).

Comparisons to chance level (binomial test) revealed a preference for the subordinate character (12 preferences for the dominant, 48 preferences for the subordinate,
linguistic data suggest that dominance plays an important role, while argumentation, especially argumentation addressed to children, plays a more modest role. It is thus striking that, when very young children from these communities have to evaluate conflicting testimonies, strong arguments trump dominance. Argument evaluation thus plays the role predicted within the epistemic vigilance framework: that of overcoming source-based cues when good enough arguments are produced.

It should be noted that the contrast used in the current experiments between strong and weak arguments was particularly stark. The weak argument was perfectly circular, to the point that it could be considered anomalous (although circular replies to children’s questions might be fairly common, see Robinson & Rackstraw, 1967). By contrast, the strong argument was perfectly appropriate given the task in hand: having seen where the hen had gone provides a very strong support for knowing where the hen is (although even this argument could be defeated, for instance by someone who has seen the hen more recently, by someone who points out that it was in fact another hen, by someone who points out that the character is extremely short sighted, etc.). If the contrast between the arguments had been weaker, the reason cue should not have trumped the power cue so clearly – a result that would not run against the epistemic vigilance framework, which does not predict that one type of cue should systematically trump another.

Children might also have been expected to act differently if they had been in direct interaction with a dominant. In this case, the desire to ingratiate with the dominant, or even to avoid punishment, might have pushed the children to say they agreed with him. This might have been even more likely if the testimony had not borne on a factual matter, but on a matter of convention (such as object naming), or a practical matter (such as collective decision-making). Many more experiments will be necessary to better understand how reason and power cues interact in different contexts.

Data availability

All data are available at: https://sites.google.com/site/hugomercier/Data_Base_ReasonPower.xlsx?attredirects=0

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**Supporting Information**

Additional Supporting Information may be found in the online version of this article:

**Material.** Complete example of the pictures and instructions used in experiments 1, 2 and 3.