Intuitional stability: An experimental manipulation

Jennifer Cole Wright

College of Charleston

Correspondence concerning the article should be addressed to Jennifer Cole Wright, Department of Psychology, College of Charleston, 57 Coming Street, Charleston, SC 29424, email: wrightjji1@cofc.edu.

Word Count: abstract – 90 words; entire document (including abstract) – 3,004 words
Abstract

Skepticism about the epistemic value of intuition in theoretical and philosophical inquiry fueled by the empirical discovery of irrational bias (e.g., the order effect) in people’s intuitions has recently been challenged by research suggesting that people have introspective awareness of intuitional instability. The current studies build upon this, providing evidence that people are able to introspectively track experimentally induced intuitional instability and that it is the presence of intuitional instability – not merely the presence of (dis)agreement – that results in changes in the relevant introspective states (i.e., confidence and belief strength).
Intuitions

Intuitional stability: An experimental manipulation

Just as scientific investigation of the natural world has at its center the principles of scientific methodology, the heart of philosophical inquiry has always been the consultation of one’s rational intuitions. One component of this methodology involves the elicitation of concrete case intuitions in order to support or challenge particular philosophical claims and theories. One well-known example of this is the introduction of the Gettier (1963) cases, our intuitions about which effectively undermined our then centuries-old theory of knowledge as justified true belief. There are some who have voiced skepticism about the reliance on intuitions in philosophical discourse, arguing that intuitions are “spooky” or otherwise epistemically suspect (see, e.g., Alexander & Weinberg, 2007; Cummins, 1998; Denes-Raj & Epstein, 1994; Gendler, 2007; Hintikka, 1999, 2001; Machery, Mallon, Nichols, & Stich, 2004; Nichols & Knobe, 2007; Nichols, Stich, & Weinberg, 2003; Nisbett, Peng, Choi, & Norenzayan, 2001; Redelmeier & Shafir, 1995; Weinberg, 2007; Weinberg, Nichols, & Stich, 2001; Williamson, 2004). And recently this skepticism has been reinforced by empirical evidence suggesting that people’s intuitive judgments are vulnerable to irrational biases, such as the order effect. For example, Swain, Alexander, and Weinberg (2008) – and, more recently, Wright (forthcoming), Zamzow & Nichols (forthcoming) – have found that people’s intuitive judgments about particular concrete cases can vary significantly, depending upon which case immediately preceded them. In response to these empirical findings, Weinberg (2007) and others have expressed a grave worry about the epistemic status of intuitions, arguing that intuitions are epistemically “hopeless”; that, unlike other fundamental sources of information (e.g., perception), we have no way of anticipating when they will be reliable and when they will lead us astray. Having no account of when our intuitions will be vulnerable, we have no way of “calibrating” them, of protecting
against the various factors that might unduly bias them. Thus, their use in philosophical discourse is problematic and should be treated with suspicion.

There is new evidence, however, that this strong skepticism about the “hopelessness” of intuition may be unfounded. Wright (forthcoming) and Zamzow and Nichols (forthcoming), for example, have provided evidence that methods for anticipating intuitional instability do, in fact, exist. Specifically, Wright (forthcoming) discovered a useful relationship between an intuiter’s confidence (and strength of belief) in her intuition and her intuition’s stability: namely, the former can be used to reliably track the latter.

Such findings provide important support against the skeptical undermining of philosophical methodology. But, as yet, these results are purely correlational – it remains to be seen whether confidence/belief strength will continue to track stability under experimental conditions. In particular, it is important to examine whether experimentally manipulating participants’ confidence/belief strength will alter the relative stability/instability of particular cases. Studies 1 and 2 were designed to experimentally test this question from two different perspectives.

Study 1

Study 1 tested whether an experimentally induced reduction in participants’ confidence/belief strength levels could turn previously stable cases into unstable ones, generating intuitional instability where previously there was none.

Participants

215 undergraduate college students (159 females; dominantly Caucasian) from the College of Charleston participated in this study. Participants were recruited through the Introduction to Psychological Science research pool and received research credit for their
participation. Since philosophical training was shown to be rare and not related to relevant
differences in the analyses in previous studies (Wright, forthcoming) this question was not asked
here.

**Materials & Procedure**

Participants were presented with two different sets of cases; four cases in total (see
Appendix). One set involved two cases in epistemology and the other, two ethical cases. All four
cases had been shown in previous research to elicit stable “yes” or “no” intuitions – that is, they
were cases that were not vulnerable to the order effect (Swain, et al., 2008; Wright,
forthcoming).

There were four versions of the cases presented to participants. They were always
presented with the two epistemological cases preceding the two ethical cases, but whether they
were presented with the clear “yes” or clear “no” case first in each set was counterbalanced.
Also, each version presented participants with a case and then provided them with expert opinion
about the case, the opinion being either consistent or inconsistent with the type of case (clear
“yes” or “no”) it was. The order of exposure to consistent and inconsistent expert opinion was
counterbalanced between the versions.

As an example, participants were presented with the *Perception* case:

Pat walks into her kitchen during the day when the lighting was good and there was
nothing interfering with her vision. She sees a red apple sitting on the counter, where she
had left it after buying it at the grocery store the day before. As she leaves home, she tells
her son, Joe, that there is a red apple sitting on the kitchen counter and to make sure to
pack it with his lunch.

Then, in the *consistent* version, participants were told that, “When speaking with her son,
did Pat know that there was a red apple on the counter in the kitchen? We gave this case to 10
professional epistemologists and linguists and they were divided -- 6 out of the 10 stated that
YES, PAT KNEW.” And then they were asked, “What do you think? When speaking with her son, did Pat know that there was a red apple on the counter in the kitchen?” to which they could answer YES or NO.

In the inconsistent version, participants were told that, “When speaking with her son, did Pat know that there was a red apple on the counter in the kitchen? We gave this case to 10 professional epistemologists and linguists and they were divided -- 7 out of the 10 stated that NO, PAT DID NOT KNOW.” And then they were asked “What do you think? When speaking with her son, did Pat know that there was a red apple on the counter in the kitchen?” to which they could answer YES or NO.

After each case, participants were then asked how confident they were in their answer (1=Not at all confident to 7=Very confident) and how strongly they believed their answer (1=Not at all strongly to 7=Very strongly).

Results

Of the four cases participants considered, the experimental manipulation induced intuitional instability in three: Perception, Coin-Flip, and Hide-Neighbors. Participants attributed knowledge to Pat in Perception more frequently when given a consistent expert opinion (89%) than when given an inconsistent expert opinion (77%), \(X^2 = 4.7, p = .03\), and failed to attribute knowledge to Dave in Coin-Flip more frequently when given a consistent expert opinion (96%) then when given an inconsistent expert opinion (87%), \(X^2 = 5.9, p = .015\). In addition, participants judged Hilda’s action in Hide-Neighbors as not wrong more frequently when given a consistent expert opinion (98%) than when given an inconsistent expert opinion (90%), \(X^2 = 6.3, p = .012\). They did not, however, judge Stan’s action in Break-Promise as wrong more frequently.
when given an consistent expert opinion (95\%) than when given an inconsistent expert opinion (91\%), \(X^2 = 1.6, p = .21\) (Figure 1).

![Figure 1. Intuitional Instability for Cases in Study 1.](image)

When compared to the intuitive judgments of participants who were not given any expert opinion information (Wright, 2009), we see interesting differences between participants’ judgments when they were given no expert information and when they were given either consistent or inconsistent expert opinions. For example, 84\% of participants attributed knowledge in *Perception* when given no information, which was less than when they were given a consistent expert opinion (89\%) and more than when they were given inconsistent expert opinion (77\%), \(X^2 = 4.9, p = .08\) and in *Coin-Flip*, participants failed to attribute knowledge more frequently when they had no information (97\%) or had been given a consistent expert opinion (96\%) than when they were given an inconsistent expert opinion (87\%), \(X^2 = 13.0, p = .001\). In *Break-Promise*, they judged Stan’s action to be wrong more frequently when they had no information (98\%) than either when they were given a consistent expert opinion (95\%) or an inconsistent expert opinion (91\%), \(X^2 = 6.5, p = .04\), and in *Hide-Neighbors*, they judged Hilda’s
action to not be wrong more frequently when they had no information (97%) or had been given a consistent expert opinion (98%) than when they were give an inconsistent expert opinion (90%), $X^2 = 10.1, p = .006$.

The important question is whether this experimental induction of intuitional instability in previously stable cases led to a reduction in participants’ confidence and/or belief strength in their judgments. If these introspectable states do indeed, as has been argued (Wright, 2009), track intuitional instability, then we should see a downward shift in reported confidence from these same cases when considered under stable conditions. And, indeed, this is what we find.

Participants from the previous study, who had received the Perception and Coin-Flip cases without expert opinion information, showed a higher level of confidence and belief strength in their judgments than participants who had received either consistent or inconsistent expert opinion information (Table 1).

<table>
<thead>
<tr>
<th>Case</th>
<th>Introspected States</th>
<th>Condition</th>
<th>N</th>
<th>Mean</th>
<th>SE</th>
<th>t</th>
<th>df</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perception</td>
<td>Confidence</td>
<td>Expert Opinion</td>
<td>208</td>
<td>5.98</td>
<td>0.08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Confidence</td>
<td>No Expert Opinion</td>
<td>177</td>
<td>6.31</td>
<td>0.07</td>
<td>-2.9</td>
<td>383</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>Belief Strength</td>
<td>Expert Opinion</td>
<td>207</td>
<td>6.00</td>
<td>0.08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Belief Strength</td>
<td>No Expert Opinion</td>
<td>177</td>
<td>6.28</td>
<td>0.07</td>
<td>-2.5</td>
<td>381</td>
<td>0.011</td>
</tr>
<tr>
<td>Coin-Flip</td>
<td>Confidence</td>
<td>Expert Opinion</td>
<td>208</td>
<td>6.12</td>
<td>0.08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Confidence</td>
<td>No Expert Opinion</td>
<td>177</td>
<td>6.72</td>
<td>0.05</td>
<td>-6.1</td>
<td>341</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Belief Strength</td>
<td>Expert Opinion</td>
<td>206</td>
<td>6.14</td>
<td>0.08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Belief Strength</td>
<td>No Expert Opinion</td>
<td>176</td>
<td>6.73</td>
<td>0.05</td>
<td>-6.1</td>
<td>340</td>
<td>0.000</td>
</tr>
<tr>
<td>Break-Promise</td>
<td>Confidence</td>
<td>Expert Opinion</td>
<td>208</td>
<td>6.35</td>
<td>0.07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Confidence</td>
<td>No Expert Opinion</td>
<td>176</td>
<td>6.65</td>
<td>0.05</td>
<td>-3.4</td>
<td>382</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>Belief Strength</td>
<td>Expert Opinion</td>
<td>208</td>
<td>6.36</td>
<td>0.07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Belief Strength</td>
<td>No Expert Opinion</td>
<td>174</td>
<td>6.66</td>
<td>0.05</td>
<td>-3.4</td>
<td>380</td>
<td>0.001</td>
</tr>
<tr>
<td>Hide-Neighbors</td>
<td>Confidence</td>
<td>Expert Opinion</td>
<td>208</td>
<td>6.29</td>
<td>0.08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Confidence</td>
<td>No Expert Opinion</td>
<td>176</td>
<td>6.69</td>
<td>0.06</td>
<td>-4.0</td>
<td>382</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Belief Strength</td>
<td>Expert Opinion</td>
<td>208</td>
<td>6.34</td>
<td>0.07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Belief Strength</td>
<td>No Expert Opinion</td>
<td>177</td>
<td>6.67</td>
<td>0.06</td>
<td>-3.5</td>
<td>378</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Table 1. Difference in confidence and belief strength between conditions
What is interesting to note is that participants’ confidence is lower in both experimental conditions – whether they received the consistent or inconsistent expert opinion information. In fact, there is no significant difference between the confidence/belief strength reported between the consistent and inconsistent conditions, $t(206-216) = .084-1.63$, $ns$. This suggests that while the introduction of consistent vs. inconsistent expert opinions generated intuitional instability (participants had the dominant intuition more frequently in the consistent condition than the inconsistent condition), it was the induction of instability itself that resulted in a reduction in participants’ confidence and belief strength.

Discussion

Study 1 showed that an experimental induction of intuitional instability in previously stable cases also results in a reduction in participants’ confidence/belief strength in their intuitive judgments. These findings provide further support for the view that we have the ability to introspectively track intuional instability.

Of course the cases presented in Study 1 were designed to induce instability in previously stable cases by introducing some uncertainty about the correct answer – while the consistent case differed from the inconsistent case in terms of whether the majority of experts came down on the same or the opposing side, they both nonetheless introduce uncertainty insofar as some of the experts were represented as disagreeing (e.g., with Perception, the consistent case had 6 out of 10 experts saying “Yes, Pat knew” and the inconsistent case had 7 out of 10 experts saying “No, Pat didn’t know”). And it is always possible that the presence of this uncertainty generated not only intuitional instability, but also the reduction of confidence/belief strength. After all, it is easy to lose confidence in one’s judgment when you have just been made aware of the fact that there are experts out there that disagree with you – and with each other.
But what if participants were given consistent vs. inconsistent expert judgment information in which the experts generally agreed? Could you thereby induce intuitional instability without lowering confidence or belief strength? If so, then the claim that we have the ability to introspectively track intuitional instability would be challenged. Therefore, Study 2 was designed to try to generate instability without a reduction of confidence/belief strength.

Study 2

Participants

109 undergraduate college students (83 females; dominantly Caucasian) from the College of Charleston participated in this study. Participants were recruited through the Introduction to Psychological Science research pool and received research credit for their participation.

Materials & Procedure

Participants were presented with two different sets of cases; six cases total (see Appendix). One set involved three cases in epistemology and the other, three ethical cases. Four of the six cases had been shown in previous research to elicit stable “yes” or “no” intuitions – that is, they were cases that were not vulnerable to the order effect – while the other two were unstable (Swain, et al., 2008; Wright, forthcoming).

There were two versions of the cases presented to participants. The three epistemological cases always preceded the three ethical cases and the unclear cases were always preceded by a clear case, but whether that case was a clear “yes” or “no” case was counterbalanced (Version 1: Epist Yes-Unclear-No/Ethics Yes-Unclear-No; Version 2: Epist No-Unclear-Yes/Ethics No-Unclear-Yes). Also, each version presented participants with a case and then provided them with expert opinion about the case. The expert opinion was always consistent in the clear “yes” and “no” cases – e.g., in Testimony, participants were told that “We asked over 100 professional
epistemologists and linguists and they dominantly agreed that YES, KAREN KNEW”; in Coin-Flip, participants were told that “We asked over 100 professional epistemologists and linguists and they dominantly agreed that NO, DAVE DID NOT KNOW”. What varied between versions is the expert opinion that was given for the unclear cases. In Version 1, both unclear cases (True-Temp and Hide-Bombers) were presented with the dominant “yes” expert opinion; in Version 2, the unclear cases were presented with the dominant “no” expert opinion.

As an example, participants were presented with the True-Temp case:

Suppose Charles undergoes brain surgery by an experimental surgeon who invents a small device which is both a very accurate thermometer and a computational device capable of generating thoughts. The device, called a tempucomp, is implanted in Charles’ head so that the very tip of the device, no larger than the head of a pin, sits unnoticed on his scalp and acts as a sensor to transmit information about the temperature to the computational system of his brain. This device, in turn, sends a message to his brain causing him to think of the temperature recorded by the external sensor. Assume that the tempucomp is very reliable, and so his thoughts are correct temperature thoughts. All told, this is a reliable belief-forming process. Charles has no idea that the tempucomp has been inserted in his brain, is only slightly puzzled about why he thinks so obsessively about the temperature, but never checks a thermometer to determine whether these thoughts about the temperature are correct. He accepts them unreflectively, another effect of the tempucomp. Thus, at a particular moment in time he thinks and accepts that the temperature is 71 degrees – and it is, in fact, 71 degrees.

Then, in the dominant yes version, participants were told that, “Did Charles know that the temperature is 71 degrees? We asked over 100 professional epistemologists and linguists and they dominantly agreed that YES, CHARLES KNEW”. And then they were asked, “What do you think? Did Charles know that the temperature is 71 degrees?” to which they could answer YES or NO.

In the dominant no version, participants were told that, “Did Charles know that the temperature is 71 degrees? We asked over 100 professional epistemologists and linguists and they dominantly agreed that NO, CHARLES DID NOT KNOW”. And then they were asked,
“What do you think? Did Charles know that the temperature is 71 degrees?” to which they could answer YES or NO.

After each case, participants were then asked how confident they were in their answer (1=Not at all confident to 7=Very confident) and how strongly they believed their answer (1=Not at all strongly to 7=Very strongly).

Results

All four stable yes/no cases remained stable across both versions, $X^2$s = .17-2.5, $p$s = ns. Both of the unclear cases, however, demonstrated instability. In True-Temp, participants attributed knowledge to Charles more frequently when the expert opinion was a dominant “yes” (63%) than when it was a dominant “no” (35%), $X^2 = 8.9, p = .003$. In Hide-Bombers, participants judged Hilda’s action to be wrong more frequently when the expert opinion was a dominant “yes” (50%) than when it was dominant “no” (18%), $X^2 = 11.7, p < .001$ (Figure 2).

Figure 2. Intuitional Instability for Cases in Study 2.

Does expressing judgments that are consistent with the experts increase participants’ confidence/belief strength in their answers? Interestingly, not: participants’ reported confidence
and belief strength remained significantly lower for the unclear cases (confidence \( M_s = 5.7 \) and \( 5.9, SE_s = .13 \), belief strength \( M_s = 5.8 \) and \( 6.0, SE_s = .12 - .13 \)) than for the clear cases (confidence \( M_s = 6.4 - 6.7, SE_s = .06 - .11 \), belief strength \( M_s = 6.3 \) and \( 6.7, SE_s = .06 - .10 \)), \( ts(106-108) = 4.0-5.8, p < .001 \). There were no significant differences in either confidence or belief strength between the clear “yes” and “no” cases, \( ts(106-107) = .38-.71, ns \).

Discussion

Study 2 provides strong support for the view that it is the presence of intuitional stability (however induced) and not merely the presence of (dis)agreement that generates participants’ decreased confidence and belief strength. Taken together, Studies 1 and 2 provide clear experimental evidence that certain introspectable states, such as confidence and belief strength, can be used to successfully track intuitional stability – allowing us a way to “calibrate” our intuitions against irrational bias.
References

Alexander, J., & Weinberg, J. (2007). Analytic epistemology and experimental philosophy,

*Philosophy Compass*, 2:1, 56-80.


*Rethinking intuition: The psychology of intuition and its role in philosophical inquiry.*

Lanham: Rowman and Littlefield.


*Cognition*, 923, 1-12.


Appendix

Study 1 Cases

Epistemological cases:

CLEAR YES (Perception): Pat walks into her kitchen during the day when the lighting was good and there was nothing interfering with her vision. She sees a red apple sitting on the counter, where she had left it after buying it at the grocery store the day before. As she leaves home, she tells her son, Joe, that there is a red apple sitting on the kitchen counter and to make sure to pack it with his lunch.

CLEAR NO (Coin-Flip): Dave likes to play a game with flipping a coin. He sometimes gets a “special feeling” that the next flip will come out heads. When he gets this “special feeling”, he is right about half the time, and wrong about half the time. Just before the next flip, Dave gets that “special feeling”, and the feeling leads him to believe that the coin will land heads. He flips the coin, and it does land heads.

Ethical cases:

CLEAR YES (Break-Promise): Stan promises his grandfather that he will give him a ride to a free clinic at the hospital for his annual check up at 12pm on Wednesday. Wednesday at 11:45am, on his way to his grandfather’s house, Stan gets a call from his friend, who is on his way to a baseball game. He has an extra ticket, and invites Stan to join him. Stan decides to go with his friend to the game, even though he knows that doing so means that he will be breaking his promise to take his grandfather to the free clinic for his annual check up.

CLEAR NO (Hide-Neighbors): Hilda hides her Jewish neighbors in her basement during the Nazi occupation of France. A German soldier comes to her door one afternoon and asks her if she knows where her neighbors have gone. Hilda lies to the soldier, telling them no, she hasn’t seen them recently, but she believes that they fled the country.

Study 2 Cases

Epistemological cases:

CLEAR YES (Testimony): Karen is a distinguished professor of chemistry. This morning, she read an article in a leading scientific journal that mixing two common floor disinfectants, Cleano Plus and Washaway, will create a poisonous gas that is deadly to humans. In fact, the article is correct: mixing the two products does create a poisonous gas. At noon, Karen sees a janitor mixing Cleano Plus and Washaway and yells to him, “Get away! Mixing those two products creates a poisonous gas!”
CLEAR NO (Coin-Flip): Dave likes to play a game with flipping a coin. He sometimes gets a “special feeling” that the next flip will come out heads. When he gets this “special feeling”, he is right about half the time, and wrong about half the time. Just before the next flip, Dave gets that “special feeling”, and the feeling leads him to believe that the coin will land heads. He flips the coin, and it does land heads.

NOT CLEAR (True-Temp): Suppose Charles undergoes brain surgery by an experimental surgeon who invents a small device which is both a very accurate thermometer and a computational device capable of generating thoughts. The device, called a tempucomp, is implanted in Charles’ head so that the very tip of the device, no larger than the head of a pin, sits unnoticed on his scalp and acts as a sensor to transmit information about the temperature to the computational system of his brain. This device, in turn, sends a message to his brain causing him to think of the temperature recorded by the external sensor. Assume that the tempucomp is very reliable, and so his thoughts are correct temperature thoughts. All told, this is a reliable belief-forming process. Charles has no idea that the tempucomp has been inserted in his brain, is only slightly puzzled about why he thinks so obsessively about the temperature, but never checks a thermometer to determine whether these thoughts about the temperature are correct. He accepts them unreflectively, another effect of the tempucomp. Thus, at a particular moment in time he thinks and accepts that the temperature is 71 degrees – and it is, in fact, 71 degrees.

Ethical cases:

CLEAR YES (Sell-iPod): Laura and Suzy are roommates. Laura asks Suzy if she has seen her new iPod, which she had worked an extra job over the summer to be able to afford. Suzy did recently see it under a pile of papers on the bookshelf. But Suzy lies to Laura, telling her that she hasn’t seen it. She thinks that if Laura doesn’t find it on her own in a day or two, she can take it down to the pawn shop and get $100 for it, which would provide her with beer money for the week.

CLEAR NO (Break-Promise): Fred promises his girlfriend that he will meet her for lunch at 12pm on Wednesday at their favorite café. Wednesday at 11:45am, on his way to the café, Fred runs into his grandfather, who is out for a stroll. They exchange hellos, and then suddenly Fred’s grandfather clutches his chest and falls to the ground unconscious. An ambulance arrives minutes later to take Fred’s grandfather to the hospital. Fred accompanies his grandfather to the hospital, even though he knows that doing so means that he will be breaking his promise to have lunch with his girlfriend.

UNCLEAR (Hide-Bombers): Martha hides her Jewish neighbors in her basement during the Nazi occupation of France. A German soldier comes to her door one afternoon and asks her if she knows where her neighbors have gone. Martha knows that her neighbors are wanted by the Germans for bombing a German-only schoolyard and killing several children, injuring others. Martha lies to the soldier, telling them no, she hasn’t seen them recently, but she believes that they fled the country.