

**Experimental Studies of Intuitions about Consciousness:
Methodological and Statistical Details**

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This paper provides additional methodological and statistical information about the experiments reported in our paper ‘Intuitions about Consciousness: Experimental Studies’ (*Phenomenology and Cognitive Science*, forthcoming). The information contained here is not necessary for an understanding of the key philosophical and psychological claims of that other paper, but it may prove helpful for some readers.

Study 1

This first study was conducted by Alina Simone. A series of phrases were entered into Google and the number of hits for each phrase was recorded. Some phrases ascribed states that require phenomenal consciousness; others ascribed states that did not require phenomenal consciousness. The results were as follows:

States that do not require phenomenal consciousness:

‘Microsoft intends’	25,700
‘Microsoft decides’	11,400
‘Microsoft tries’	52,600
‘Microsoft wants’	135,000
‘Microsoft believes’	31,100
‘Microsoft hopes’	56,600
‘Microsoft loves’	4,100
‘Microsoft hates’	970

States that require phenomenal consciousness:

‘Microsoft feels depressed’	0
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'Microsoft experiences joy'	0
'Microsoft feels happy'	0
'Microsoft feels pain'	2
'Microsoft feels angry'	0
'Microsoft feels scared'	0

States that did not require phenomenal consciousness received significantly more hits than those that did, $t(12) = 2.2, p < .05$.

Study 2

Subjects were 34 students in philosophy classes at University of North Carolina — Chapel Hill. Each subject was given a list of sentences and asked to rate these sentences on a scale from 1 ('sounds weird') to 7 ('sounds natural'). Some of the sentences ascribed phenomenal states to a corporation; others ascribed non-phenomenal states to a corporation.

The sentences ascribing phenomenal states to a corporation were:

- Acme Corp. is now experiencing great joy.
- Acme Corp. is getting depressed.
- Acme Corp. is feeling excruciating pain.
- Acme Corp. is experiencing a sudden urge to pursue internet advertising.
- Acme Corp. is now vividly imagining a purple square.

The sentences ascribing non-phenomenal states were:

- Acme Corp. believes that its profit margin will soon increase.
- Acme Corp. intends to release a new product this January.

- Acme Corp. wants to change its corporate image.
- Acme Corp. knows that it can never compete with GenCorp in the pharmaceuticals market.
- Acme Corp. has just decided to adopt a new marketing plan.

The order of questions was counterbalanced, but there were no order effects.

The ratings given for each item were as follows:

Phenomenal states:

- 2.7: Vividly imagining
- 2.5: Getting depressed
- 2.1: Feeling excruciating pain
- 3.7: Experiencing great joy
- 4.7: Experiencing a sudden urge

Non-phenomenal states:

- 5.2: Knowing
- 6.1: Believing
- 6.3: Intending
- 6.6: Wanting
- 6.6: Deciding

As the table shows, even the most acceptable phenomenal state was still deemed less acceptable than the least acceptable non-phenomenal state. To test this effect for statistical significance, we assigned each subject a ‘phenomenal score’ (by taking the sum of his or her ratings for the phenomenal states) and a ‘non-phenomenal score’ (by taking the sum of his or her ratings for the non-phenomenal states). As expected, the non-phenomenal score was significantly higher than the phenomenal score, $t(33) = 21.7, p < .001$.

The one surprise was that people’s ratings for ‘urge’ were so high. In fact, ratings for all of the non-phenomenal states were significantly above the midpoint (all $ps < .01$) and all of the phenomenal states except ‘urge’ were significantly below the midpoint (all $ps < .001$), but the rating for ‘urge’ was actually significantly above the midpoint, $t(33) = 2.2, p = .04$.

Study 3

Subjects were 28 students in a philosophy class at University of North Carolina — Chapel Hill. All subjects were given a two-page questionnaire.

One page of the questionnaire began with the following vignette:

Once there was a powerful sorceress. She came upon an ordinary chair and cast a spell on it that endowed it with a mind. The chair was still just made of wood, but because of the magic spell, it could now think complex thoughts and form elaborate plans. It would make detailed requests to the people around it, and if they didn’t do everything just as it wanted, it would start complaining. People used to call it the Enchanted Chair.

After reading this vignette, subjects were asked four questions:

- Can the Enchanted Chair *show compassion for starving people*?
- Can the Enchanted Chair *solve extremely complex math problems*?
- Can the Enchanted Chair *feel happy or sad*?
- Can the Enchanted Chair *walk around a room by itself*?

Then, on the other page, subjects were given the introductory paragraph: ‘Imagine that Acme Corp. is a giant multi-national corporation. We want to ask some questions about

what such a corporation would and would not be capable of doing.’ They were then asked four questions:

- Can Acme Corp. *show compassion for starving people*?
- Can Acme Corp. *solve extremely complex math problems*?
- Can Acme Corp. *feel happy or sad*?
- Can Acme Corp. *walk around a room by itself*?

The order of pages was counterbalanced, as was the order of questions within each page, but there were no order effects.

All questions were answered on a scale from 1 (‘probably no’) to 7 (‘probably yes’), with the midpoint marked ‘in between.’ The mean ratings were as follows:

	Enchanted Chair	Acme Corp.
Show compassion	5.0	4.1
Solve math problems	5.8	4.8
Feel happy or sad	5.6	1.8
Walk around	1.7	1.2

The key question was whether people would be more willing to ascribe feelings of happiness or sadness to the chair than they were to the corporation. Indeed, this contrast is significant, $t(27) = 7.7, p < .001$. Moreover, the rating for the corporation was significantly below the midpoint, $t(27) = -7.6, p < .001$, while the rating for the chair was significantly above the midpoint, $t(27) = 4.7, p < .001$.

Study 4

Subjects were 31 students in a philosophy class at University of North Carolina-Chapel Hill. All subjects received a questionnaire that was exactly like the one used in Study 3, except for the inclusion of two additional items.

Subjects were randomly assigned either to the ‘feeling condition’ or to the ‘no-feeling condition.’ For subjects in the feeling condition, the two additional items were:

- Acme Corp. is feeling upset.

- Acme Corp. is feeling regret.

For subjects in the no-feeling condition, the two additional items were:

- Acme Corp. is upset about the court's recent ruling.
- Acme Corp regrets its recent decision.

In all cases, one of the additional items appeared first on the questionnaire, while the other appeared fourth. Within this constraint, the order of the additional items was counterbalanced.

The mean responses were as follows:

	Feeling	No- Feeling
Upset	1.9	5.3
Regret	2.8	6.1

We subjected the results to a 2 (condition) X 2 (order) X 2 (mental state type) mixed-model ANOVA. There were no order effects. There was a significant main effect of mental state type (upset vs. regret), such that people were more willing to ascribe upsetness than regret, $F(1, 27) = 16.9, p < .001$. There were no significant interaction effects.

Most importantly, there was a main effect of condition, such that people were less willing to ascribe mental states in the feeling condition than they were in the no-feeling condition, $F(1, 27) = 63.9, p < .001$.

Study 5

Subjects were 38 students taking undergraduate philosophy classes at University of North Carolina-Chapel Hill. Each subject was randomly assigned either to the 'chair condition' or to the 'corporation condition.'

Subjects in the chair condition received the following vignette:

Once there was a powerful sorcerer. He took a perfectly ordinary chair and cast a spell on it that endowed it with a mind. From then on, it was called the Enchanted Chair.

The sorcerer had been hoping that the Enchanted Chair would do his bidding, but instead it quickly developed goals of its own. It had its own unique interests and was always pursuing some unusual project that no one would have expected. It would strive to accomplish these projects in every way it could.

In the end, the sorcerer decided to dismantle the chair. But he also made sure that each of the individual parts of the chair were kept intact and used to make good pieces of furniture after the chair was destroyed.

After receiving this vignette, subjects were asked: ‘Was it *wrong* of the sorcerer to dismantle the chair?’ Answers were recorded on a scale from 1 (‘not wrong at all’) to 7 (‘very wrong’).

Subjects were then asked to indicate whether they agreed or disagreed with the following three sentences:

- The sorcerer behaved *considerately*.
- The sorcerer behaved *callously*.
- The sorcerer behaved *selfishly*.

Answers were recorded on a scale from 1 (‘disagree’) to 7 (‘agree’).

Subjects in the corporation condition were given a slightly different vignette:

Once there was a powerful businessman. He took out a big loan and created a new corporation. From then on, the corporation was called *EnChair*.

The businessman had been hoping that EnChair would do his bidding, but instead it quickly developed goals of its own. It had its own unique interests and was always pursuing some unusual project that no one would have expected. It would strive to accomplish these projects in every way it could.

In the end, the businessman decided to dismantle the corporation. But he also made sure that each of the individual employees got very good jobs after the corporation was disbanded.

After receiving this vignette, subjects were asked: ‘Was it *wrong* of the businessman to dismantle the corporation?’ Answers were recorded on a scale from 1 (‘not wrong at all’) to 7 (‘very wrong’).

Subjects were then asked to indicate whether they agreed or disagreed with the following three sentences:

- The businessman behaved *considerately*.
- The businessman behaved *callously*.
- The businessman behaved *selfishly*.

Answers were recorded on a scale from 1 (‘disagree’) to 7 (‘agree’).

The mean responses were as follows:

	Sorcerer	Businessman
Wrong	4.2	2.39
Considerate	2.55	4.72
Callous	5	2.83
Selfish	5.7	4.22

All of the contrasts were statistically significant. Hence, the sorcerer’s action was regarded as more wrong, $t(36) = 3.0, p = .005$, and he was regarded as less considerate, $t(36) = 4.4, p < .001$, more callous, $t(36) = 4.2, p < .001$, and more selfish, $t(36) = 2.7, p = .01$.