



Discussion

Why are we good at detecting cheaters? A reply to Fodor

C. Philip Beaman*

Department of Psychology, University of Reading, Earley Gate, Whiteknights, Reading, RG6 6AL, UK

Abstract

It is argued that the recent criticism by Fodor (Cognition 75 (2000) 29) of “cheater detection” in the Wason selection task is based upon a false presumption about what the task entails. Fodor compares two different ways of presenting the task, rather than two different task domains (social and non-social). Consequently, the conclusion that the selection task can tell us nothing about either the architecture or the history of cognition is invalid. Fodor’s explanation of the Wason selection task is examined experimentally and compared to predictions derived from social contract theory (Cognition 31 (1989) 187). It is concluded that, although Fodor’s variant of the Wason selection task improves performance, this improvement is independent of the task domain and is insufficient to account for the “cheater detection” effect. © 2002 Elsevier Science B.V. All rights reserved.

Keywords: Wason selection task; Deontic reasoning; Cognitive module

1. Introduction

A recent article by Fodor (2000) criticizes the “cheater detection” interpretation of the Wason selection task, arguing that a different inferential route rather than a different piece of neural “hardware” is sufficient to account for differences in performance on two separate versions of the task. The “cheater detection” interpretation was suggested by Cosmides (1989) who argued that there must be some dedicated mechanism for detecting those who default on social contracts, i.e. those who deliberately take benefits without paying costs or meeting requirements (Fiddick, Cosmides, & Tooby, 2000). Conversely, Fodor argues that the way in which the Wason selection task is expressed asserts two different propositions, depending upon which version of the task is administered.

Fodor’s argument runs thus: subjects who are required to verify rule (1) rarely remember to ask the non-coke drinkers whether they are under 18, whereas subjects who are told

* Tel.: +44-118-931-8523, ext. 7637; fax: +44-118-931-6715.

E-mail address: c.p.beaman@reading.ac.uk (C.P. Beaman).

that (2) is a regulation and are asked to check whether everyone is in compliance reliably remember to ask anyone not drinking coke how old (s)he is. Fodor's statements (1) and (2) are reproduced below and the finding is attributed to Wason (1966) (see Fodor, 2000, pp. 29–30).

- (1) If someone is under 18 (s)he is drinking coke.
- (2) Its required that if someone is under 18 (s)he drinks coke.

According to Fodor's analysis "if P then Q" asserts $P \rightarrow Q$ but "its required that if P then Q" requires Q rather than $P \rightarrow Q$ (where P and Q correspond, respectively, to "someone is under 18" and "(S)he drinks/is drinking coke"). Since (2) explicitly asserts Q it is not surprising that subjects look for counterexamples (not-Q) to check the validity of this rule. These counterexamples coincidentally happen to correspond to cheaters. If Fodor is correct, then there is no need for an evolved, or otherwise acquired, capacity to detect cheaters to explain performance in this task. As cheater detection is one of the strongest pieces of evidence put forward in support of evolutionary psychology the whole enterprise becomes that much less convincing (Fodor, 2000). However, while Fodor's logic may be exemplary, his knowledge of the Wason selection task appears to be suspect.

Wason's original rule was concerned with the positioning of letters and numbers on a set of cards. Wason's rule as it appears in the 1966 paper is: if a card has a vowel on one side then it has an even number on the other. Subjects were asked to indicate which cards needed to be turned over to ascertain whether the rule had been violated. Very few subjects gave not-Q responses. Subsequent studies have also used the if...then expression (Fodor's rule 1) but have placed the rule within a social context where not-Qs correspond to cheaters (for example "If a person is drinking beer, then the person must be over 19 years of age"; Griggs & Cox, 1982). In these studies, contrary to what Fodor says, subjects do produce not-Q responses (circa 75% compared to circa 25% in the cards version of the task; see Cosmides & Tooby, 1992). However, these comparisons are post-hoc and do not cover all possibilities. To formally test Fodor's position it is necessary to compare assertions of the form Fodor identifies as $P \rightarrow Q$ (rule 1) and *requires* ($P \rightarrow Q$) (rule 2) in the social domain, where "cheater detection" is assumed to apply, and the non-social domain, where it does not.

To summarize the two contrasting positions: the form of the words is important to Fodor as it decides which proposition the rule asserts. The actual content of the terms is unimportant as the rule remains fixed regardless of the referents of P and Q. Conversely, to social contract theory the form of the words is not as important as the content of the terms "P" and "Q". In social contract theory, it is the content of these terms that identifies them as social actors capable of cheating and so drives the cheater detection algorithm (Cosmides, 1989). It is reasonable, therefore, to suggest that the form of words favoured by Fodor and the more usual form of phrasing a rule in the Wason selection task literature be formally compared in both the non-social (cards) and social (drinking age) versions of the task.

The predictions are simple and are as follows. Fodor argues that *requires* ($P \rightarrow Q$) is about Q being required. If Fodor is correct, then subjects told "it is required that if P then Q" (rule 2) should reliably look for not-Q evidence in both social and non-social forms of the task. Subjects should NOT look for not-Q evidence in either form of the task when they are told "if P then Q", which asserts $P \rightarrow Q$ (rule 1).

Alternatively, if social contract theory is correct the wording of the rule is of little importance. A specialized “cheater detection” algorithm should be activated by the content of the task if the terms can be identified as social actors and so potential cheaters. If, for these reasons, content is important then one would expect more not-Q responses in both wordings (rule 1 and rule 2) of the drinking age task than in either wording of the card task.

2. Experiment

2.1. Method

2.1.1. Subjects

Sixty visitors to a University of Reading open day participated as part of a demonstration of psychological research.

2.1.2. Materials and design

Subjects were randomly assigned to one of two groups. Both groups completed two versions of the Wason selection task: an abstract “cards” version of the task, in which rule violations do not correspond to “cheating”, and a social “drinking age” version of the task, in which violating the rule can be clearly identified with “cheating”. In one group the wording of both selection tasks conformed to Fodor’s rule 1 (if P then Q). In the other group the wording of the tasks conformed to Fodor’s rule 2 (requires (if P then Q)). The exact wordings of all of the problems used are given in Appendix A.

Within each group half the subjects saw the standard abstract “cards” version of the selection task used by Wason (1966) first and then the social version of the task used by Griggs and Cox (1982). The other half saw the problems in reverse order.

2.1.3. Procedure

Subjects were told that the experiment was part of a study concerned with how people reason about rules and regulations. They were given the selection tasks in specially prepared booklets and asked to complete them by following the instructions given in the booklets and identifying only those cards they would need to turn over to complete the task (see Appendix A). Following the instructions there was a pictorial array of four cards, labelled with information corresponding to P, not-P, Q and not-Q responses for each task. All subjects saw the same cards in the same order.

2.2. Results

The percentage of not-Q responses recorded for each of the selection tasks is shown in Fig. 1. The frequency of not-Q responses in all conditions was analyzed using SAS and the CATMOD procedure to carry out a repeated measures chi-square (equivalent to a two-way ANOVA applied to categorical data; see Guthrie, 1981).¹ There was a significant effect of the wordings of the rule ($\chi^2 = 5.46$, d.f. = 1, $P < 0.02$), with rule 2 producing more not-Q

¹ Thanks to Philip Smith for help with this analysis.

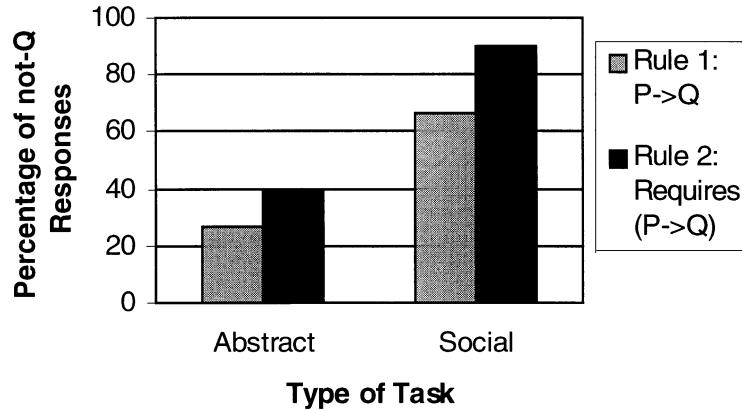


Fig. 1. The percentage of not-Q responses in the abstract “cards” version of the selection task – to which cheater detection does not apply – and the social “drinking age” version of the task – to which cheater detection does apply. Percentages are reported as a function of $P \rightarrow Q$ wordings (rule 1) or *requires* ($P \rightarrow Q$) wordings (rule 2).

responses than rule 1. There was also a reliable effect of the domain in which the problem was posed (abstract or social) ($\chi^2 = 32.11$, d.f. = 1, $P < 0.0001$); the social drinking age domain produced more not-Q responses than the abstract cards domain. However, there was no interaction between rule wording and domain ($\chi^2 = 0.4$, d.f. = 1, $P = 0.53$), indicating that the two factors were independent.

Fodor’s rule 2, *requires* ($P \rightarrow Q$), produced reliably more not-Q responses both for cheater detection and plain indicatives than did $P \rightarrow Q$ (rule 1). When the task corresponded to cheater detection (the drinking age task), however, there were reliably more not-Q responses for both rules than for either rule if the task (the cards task) did not correspond to cheater detection.

2.3. Discussion

The results of this experiment to some extent confirm Fodor’s logical analysis. The wording of the selection task such that it asserts *requires* ($P \rightarrow Q$) (rule 2) produces a greater proportion of not-Q responses than wording of the selection task such that it asserts $P \rightarrow Q$ (rule 1). That is to say, when a rule is expressed as a requirement or obligation, the number of not-Q responses increases. This is true for both abstract and social versions of the task. However, Fodor’s analysis is insufficient to account for the “cheater detection” effect, as “cheater detection” persists regardless of how the rule is expressed. Fewer not-Q responses are produced on an abstract version of the task where the assertion is the obligation, *requires* ($P \rightarrow Q$), than on a social version of the task even where, in the social version, the assertion is the rule $P \rightarrow Q$.

The conclusion drawn is that, although Fodor’s analysis has identified one factor influencing performance on the Wason selection task, his analysis is insufficient by itself to dismiss explanations of the task based on specialized social reasoning mechanisms. Social situations, in which cheating is a possibility, produce normatively logical responses when

logical reasoning corresponds to cheater detection. Cheater detection is aided by expressing the rule as *requires* ($P \rightarrow Q$) but it is not dependent upon expressing the rule in this way. Abstract situations (with no identifiable “cheaters”) produce fewer logical responses even when the rule is phrased as the requirement (*requires* ($P \rightarrow Q$)). These data strongly suggest that performance on social and non-social versions of the Wason selection task differs in ways not accounted for by a logical analysis that ignores the social background and context to the assertions.

Acknowledgements

Grateful thanks to Philip T. Smith for mathematical help and for organizing a useful discussion group.

Appendix A. Rule wordings

A.1. Drinking age selection task

A.1.1. Rule 1 wording

A certain pub in town serves only whisky or coke. The cards depicted below have information about four people sitting at a table in the pub. On one side of a card is a person’s age and on the other side of the card is what the person is drinking. Here is a rule: IF A PERSON IS UNDER 18 (S)HE DRINKS COKE IN THIS PUB. Select the card(s) you definitely need to turn over to determine whether or not people are violating the rule.

A.1.2. Rule 2 wording

A certain pub in town serves only whisky or coke. The cards depicted below have information about four people sitting at a table in the pub. On one side of a card is a person’s age and on the other side of the card is what the person is drinking. IT IS A LEGAL REQUIREMENT THAT IF A PERSON IS UNDER 18 (S)HE DRINKS COKE IN THIS PUB. Select the card(s) you definitely need to turn over to determine whether or not people are breaking the law.

A.2. Card selection task

A.2.1. Rule 1 wording

You wish to classify a set of cards according to certain criteria. The cards depicted below have information on both sides. On one side of a card is a letter and on the other side of the card is a number. Here is a rule about the cards: IF A CARD HAS A VOWEL ON ONE SIDE THEN IT HAS AN EVEN NUMBER ON THE OTHER SIDE. Select the cards you definitely need to turn over to determine whether or not the cards violate the rule.

A.2.2. Rule 2 wording

You wish to classify a set of cards according to certain criteria. The cards depicted

below have information on both sides. On one side of a card is a letter and on the other side of the card is a number. IT IS A REQUIREMENT OF YOURS THAT IF A CARD HAS A VOWEL ON ONE SIDE THEN IT HAS AN EVEN NUMBER ON THE OTHER SIDE. Select the cards you definitely need to turn over to determine whether or not the cards breach your criteria.

References

- Cosmides, L. (1989). The logic of social exchange: has natural selection shaped how humans reason? *Cognition*, *31*, 187–276.
- Cosmides, L., & Tooby, J. (1992). Cognitive adaptations for social exchange. In H. Barkow, L. Cosmides & J. Tooby (Eds.), *The adapted mind: evolutionary psychology and the generation of culture* (pp. 163–228). Oxford: Oxford University Press.
- Fiddick, L., Cosmides, L., & Tooby, J. (2000). No interpretation without representation: the role of domain-specific representations and inferences in the Wason selection task. *Cognition*, *77*, 1–79.
- Fodor, J. (2000). Why we are so good at catching cheaters. *Cognition*, *75*, 29–32.
- Griggs, R. A., & Cox, J. R. (1982). The elusive thematic-materials effect in Wason's selection task. *British Journal of Psychology*, *73*, 407–420.
- Guthrie, D. (1981). Analysis of dichotomous variables in repeated measures experiments. *Psychological Bulletin*, *90*, 189–195.
- Wason, P. C. (1966). Reasoning. In B. Foss (Ed.), *New horizons in psychology* (pp. 135–151). London: Penguin.