Cooperation Detection and the Flexible Deontic Logic Theory of the WST

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The Wason Selection Task (WST) is the most studied and seminal task for investigating human testing of hypotheses, typically of the form of "if *p* then (always) *q*". Participants are requested to test a conditional in an empirical world of four cards, with the visible sides representing all logical categories: *p, non-p, q, non-q*. On one side of each card is a *p* or a *non-p*, on the other side a *q* or a *non-q*. Participants have to select the cards they would turn over to test the rule.

The traditional logical-falsificationist norm of hypothesis testing interpreted the conditional as material implication and only *p*- and *non-q*-card combinations were understood as correct selections. However, from the very beginning of the WST research the results have shown that people often selected confirmatory cases. It was then shown that content effects, particularly of deontic and social rules, can elicit facilitation effects – but also very different illogical selection patterns.

The Flexible Deontic Logic of the WST

Here a Flexible Deontic Logic Theory (FDL-Theory) of testing prescriptive rules in the WST should be briefly introduced. FDL-Theory tries to integrate research in this field and makes novel predictions. Here we can only outline the three main assumptions of this theory.

First, it is claimed that there is a normative difference between testing descriptive and prescriptive rules. The dichotomy of 'is' and 'ought' is the most fundamental distinctions of philosophy. Descriptive rules describe states of the world (i.e., facts) and can therefore be true or false. In contrast, prescriptive rules state what *should* be done or omitted; they often state what is right or wrong. Additionally to the fact that prescriptive rules cannot be directly falsified, descriptive and prescriptive rules also need to be tested in a different way. In my view, descriptive rules should be tested according to norms of Bayesian reasoning (cf. e. g. the approach of Oaksford and Chater), which explain the predominance of confirming selections in standard rarity conditions. In contrast, testers of prescriptive rules are typically concerned with "finding out those" or "selecting those" who either act in accordance or in discordance with that rule.

Secondly, based on Deontic Logic and ought tables, a systematization of different deontic conditionals is proposed, here only based on two-valued binary 2 × 2-ought tables. In the experiment the (tribal) conditional obligation rule "if someone is a bachelor, then he must abduct a virgin from a hostile tribe" and the conditional prohibition (not permission) rule "if someone is a bachelor, then he is forbidden from fleeing from a lost battle" have been tested. (Cf. Tables 1 and 2).

Thirdly, Deontic Logic is combined with the concept of a flexible focus (cf. Sperber & Girotto, 2002, 2003). The cheater detection algorithm postulated by Cosmides in 1989 is explained by a more general focus effect. Whereas perspective effects are concerned with cheater cases only, here – depending on the context – the goal of the task is either to check for cheaters or for cooperators (cf. Table 1 and 2).

Table 1 and 2: Cheater (dark circle) and cooperator focus (dotted circle) in a conditional obligation and prohibition.

Conditional Obligation	abducts virgin (q)	does not abduct virgin (¬q)
bachelor (p)	allowed	Forbidden
husband (non-p)	allowed	Allowed

Conditional Prohibition	flees (q)	does not flee (¬q)
bachelor (p)	forbidden	Allowed
husband (non-p)	allowed	Allowed

Experiment

The experiment had a 2 (obligation vs. prohibition rule, cf. above) × 2 (cheater vs. cooperator focus) between-subjects design (*N=80* students). In all conditions participants were asked to imagine being a member of a council of elders, whose task was to check whether members of a tribe either have violated or have followed the rules. The focus was introduced either by describing the council as having police functions or as decorating members with honor feathers.

Table 3: Resulting percentage of participants making each selection. (Predicted answers in darkened cells.)

	Obligation rule		Prohibition rule	
Card selected	Cheater	Coop.	Cheater	Coop.
P	75 %	100 %	100 %	80 %
¬P	30 %	10 %	10%	5%
Q	20 %	70 %	80 %	45 %
¬Q	70 %	15 %	20 %	55 %
N	20	20	20	20

The results confirmed both the effect of the two conditionals and the interaction with cheater versus cooperator detection. Moreover, it was shown that clear cut selection patterns can also be achieved in a context of cooperation detection. The results strongly favour FDL-Theory over the cheater detection approach of Cosmides and colleagues.

But also other theories of the WST, e. g. Mental Model Theory, Relevance Theory and Pragmatic Reasoning Schemata Theory, have not predicted such results. Further discussion and research will have to show whether these theories can be extended to account for these results.