

**THE WASON SELECTION TASK:
REASONING, DECISION MAKING OR BOTH ?***
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INTRODUCTION

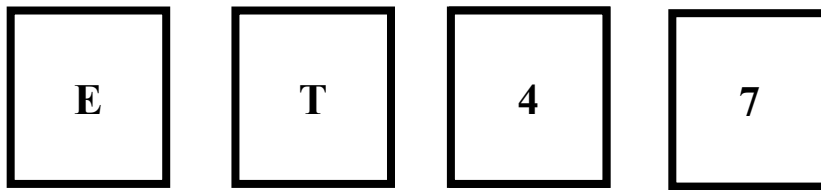
One of the experimental tasks most frequently used to study how subjects reason, is the **Wason selection task** (Wason, 1966, 1968). **The main objective of this work** is present the current state of the experimental research on this task, focusing on the empirical studies which have highlighted the plasticity of reasoning towards **semantic and pragmatic factors**. The task involves presenting the subjects with four cards which have a number (odd or even) written on one side and a letter (vowel or consonant) on the other side. Immediately afterwards, a conditional rule is presented:

“If a card has a vowel on one side then it has an even number on the other side”

Subjects were shown four cards which had on their exposed sides: a vowel, a consonant, an even number and an odd number. They had to select which cards to turn over in order to decide whether the rule is true or false.

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For example:



Less than 10% of subjects answered correctly :“E” and “7”. Furthermore, they systematically committed different mistakes: they either selected the card “E” (*verification bias*: Wason, 1968) or they selected “E” and “4” cards (*matching bias*: Evans, 1972, 1998). **Why intelligent adult s fail to solve it?**. In order to answer this question, other versions were designed (see table 1).

DIFFERENT VERSIONS OF THE TASK OR DIFFERENT SELECTION TASKS?

The early investigations focused the difficulty of the task on the abstract nature of the rule presented. First empirical studies manipulated the **rule content**, ratifying the existence of a **thematic facilitation effect** (Wason & Johnson-Laird, 1972; Johnson-Laird, Legrenzi & Legrenzi, 1972). See Evans, Newstead & Byrne 1993, chapter 4, for a review on the history of the thematic facilitation effect; see also Martín, Valiña, Seoane & Leirós, 2008; Evans, 2017; Valiña & Martín, 2016).

Manktelow and Evans (1979) using specific content with an arbitrary relationship, did not register any improvement in performance with respect to the original abstract version. Later empirical research reflected the influence of **scenario** and **experimental instructions** on the selection.

Directly related to these factors the importance of the **deontic** character of the statement as opposed to the **indicative** character of the original version was considered (see for example Martín, Valiña & Evans, 1999)

Experimental approximations of the problem begin to arise which study the influence of **empirical knowledge** and the subjects' experience with the selection of the cards. Within this context, new lines of research have been designed which have endeavoured to respond to questions such as:

(1) “Why does facilitation occur largely when deontic as opposed to indicative versions are presented, and what is the origin of this?”

Some authors suggest that this “deontic advantage” is based on the innate knowledge of what is allowed, obligatory or prohibited (Cummins, 1996a, b; 2013; Harris & Nuñez, 1996). (See Veleiro, Peralbo & García-Madruga, 1998, for a reply of this affirmation). For other authors, the objectives of the subjects who reason (Manktelow & Over, 1991) and the perspective from which they do so are key factors in the selection of cards (Gigerenzer & Hug, 1992; Politzer & Nguyen-Xuan, 1992). From these empirical studies, another question has been posed:

(2) “Do the pragmatic aspects which are activated upon the presentation of deontic statements also occur with indicative statements?” Within this framework, the influence of **context** has been studied as a key factor in reasoning, in indicative versions of the task (Almor & Sloman, 1996, 2000; Astington & Dack, 2013; Dack & Astington 2011; Girotto, Kimmelmeyer, Sperber & van der Henst, 2001; Staller, Sloman & Ben-Zeev, 2000). Likewise, the **necessity/sufficiency** of the relationship expressed in the rule is another modulating variable in the

performance of the task (Ahn y Graham, 1999; Ayal y Klar, 2004; Hilton, Kimmelmeyer y Bonnefon, 2005).

(3) Another question for debate is: **“When subjects faced with the task, do they decide which cards to select before thinking about them (Ball, Lucas, Miles & Gale, 2003; Evans, 1996; Evans & Ball, 2010; Lucas & Ball, 2005), or do they think before selecting? (Handley, Newstead & Neilens, 2009)”**. In connection with this issue, some debate has arisen regarding the most suitable research method for studying reasoning on the task (Evans, 1998; Lucas & Ball, 2005 Roberts, 1998 a, b; Roberts & Newton, 2001).

Table 1. Empirical Research on the Wason Selection Task, in chronological order

<i>Authors</i>	<i>Rule-Example</i>	<i>Result-Explanation</i>
Wason & Shapiro (1971)	<i>“Every time I go to Manchester I travel by car”</i>	Facilitation of thematic content
Johnson-Laird, Legrenzi & Legrenzi (1972)	<i>“If a letter is sealed, then it has a 50 lira stanp on it”</i>	Facilitation of thematic content
Manktelow & Evans (1979)	<i>“If I eat a haddck, then I drink gin”</i>	No thematic facilitation in arbitrary relationship
Griggs & Cox (1982)	<i>“If a person is drinking beer, then the person must over 19 years of age”</i>	Facilitation by content-experience relationship

(Continued)

Table 1. (Continued)

<i>Authors</i>	<i>Rule-Example</i>	<i>Result-Explanation</i>
Manktelow & Over (1991)	<i>“If you tidy up your room, then you may go out to play”</i>	Selection of cards wich breaks the rule.: Child: “p & not-q”; Mother: “not-p & q”
Valiña, Seoane, Ferraces & Martín (1995)	<i>“If a person is sitting in the front seat of a car, then that person must be over 12 years of age”</i>	Better performance in thematic version. Facilitation of violation instructions. Individual differences
Valiña, Seoane, Ferraces & Martín (1998)	<i>“If a person is riding a motorbyke then he must wear a helmet”</i>	Interactive effect instructions and content. Superior logical indexes in deontic versions
Stanovich & West (1998)	<i>“If Baltimore is on one side of the ticket then plane is on the other side of the ticket”</i>	Better performance in deontic version. Individual differences
Martín, Valiña & Evans (1999)	<i>“If a card has a bricklayer written on one side, then it must have/has hard hat written on the other side”</i>	Effect of scenario in deontic problems. Better performance in permission or obligation rules
Valiña, Seoane, Ferraces & Martín (2000)	<i>“If a person is more than 18 years old, then he has the right to vote”</i>	Facilitation of violation Instructions. Better performance in the thematic-obligation task. Individual differences

(Continued)

Table 1. (Continued)

<i>Authors</i>	<i>Rule-Example</i>	<i>Result-Explanation</i>
Almor & Sloman (2000)	<i>“If an employee gets a day off during the week, then that employee must have worked on the weekend”</i>	Looks for a rule-history coherence
Giroto, Kimmelman, Sperber & van der Henst (2001)	<i>“If a person travels to any East African country, then that person must be immunized against cholera”</i>	The context expressed in the text modulates the relevance to make inferences
Handley, Feeney & Harper (2002)	<i>“If a customer lives in Tavistock then they pay the reduce tariff”</i> <i>“If a customer lives ... Plymouth/Totnes then they pay the reduced tariff”</i>	Selection of card influenced by the presence of a second rule
Ayal & Klar (2014)	<i>“If you buy my miracle medicine for \$ 12.50, you will be cured in less than ten days”</i> <i>“If you give me \$ 60, then I will have the furniture delivered and assembled in your home”</i>	Different cheating ploys modulate the selection. Key: necessity/sufficiency of the cost-benefit relationship
Thompson, Plowright, Attance & Caza (2015)	<i>“If it is the first day of the month, then there must be pancakes for lunch”.</i> <i>“If the child takes a cookie then the child must have earned a gold star sticker”</i>	Interaction type of `problem (“cheater or non-cheater”) and parental connection with the child (existent or non-existent)

CONCLUSIONS

Different variables have been proposed which can interact and explain reasoning on this problem. An important part of empirical research on the task would seem to underline the plasticity of reasoning towards factors relating to content, context and empirical knowledge. In addition, research into the task has been the basis for more general theoretical debate, such as human rationality, or the study of individual differences (Stanovich, West & Toplak, 2016; Valiña, Seoane, Ferraces & Martín, 1995, 2000; Seoane, Valiña, Rodríguez, Ferraces & Martín, 2007), and has contributed to the configuration of a new paradigm in the Psychology of Reasoning (Over, 2009; Over & Elqayam, 2016).

References

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