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## DELIBERATION OR INTUITION?

### AN ANALYSIS OF COGNITIVE PROCESSES UNDERLYING DECISION MODES

#### Abstract

Recent studies suggest advantages of intuitive or automatic information processing compared to deliberation with regard to decision quality (e.g. Dijksterhuis et al., 2006; Wilson & Schooler, 1991). However, until now the question of the more effective decision mode cannot be answered conclusively (Plessner & Czenna, 2008). An analysis of cognitive processes underlying intuition and deliberation offers a promising approach to recommend a particular decision mode for well-defined situations in the future. Two studies investigated which cognitive processes form the basis of intuitive and deliberate decision making in simple and complex decision tasks. By means of classification of information integration strategies, no difference between intuition and deliberation can be found. The results point to an interaction of decision time and information integration algorithm in the intuitive decision mode. An eye tracking analysis revealed a more attribute-wise search pattern in deliberation compared to intuition concerning complex decision tasks.

#### ► Introduction

- Plessner & Czenna (2008): A review of studies suggests an inconsistent picture regarding the effectiveness of decision modes.
- Gigerenzer (2007): Intuition is based on simple heuristics.
- Glöckner & Betsch (2008): By the use of automatic processes, people are able to integrate complex information according to a weighted sum in a relatively short time frame.

#### ► Research Question

Which cognitive processes underlie intuition and deliberation in simple and complex decision tasks?

#### Study 1

#### ► Methods

Design:

2 **DECISION MODE** (intuition: fast, spontaneous decisions vs. deliberation: reflecting reasons) x 2 **COMPLEXITY** (3 cues vs. 12 cues)

Materials:

40 probabilistic inferences / city size paradigm

	L-Town	M-Town
Zoo	-	+
Don	+	-
Westdeutschland	+	-
Landeshauptstadt	+	-
Autokennzeichen 1 Buchstabe	-	+
Opernhaus	-	+
Fußball-Ersteigeklub	-	-
Messestadt	-	-
U-Bahn	-	-
Universität	+	+
Flughafen	-	-
DAX-Unternehmen	-	-

#### ► Results

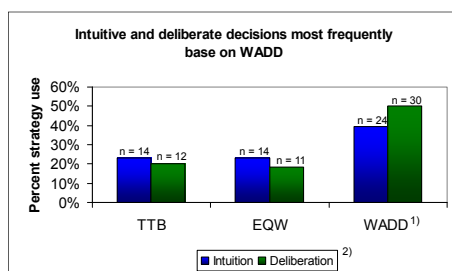
Manipulation Check:

Subjects in an intuitive decision mode decide significantly faster ( $F(1,119) = 415.6, p < .001$ ; intuition:  $M = 3.2$  and  $6.4$  sec., deliberation:  $M = 10.1$  and  $22.1$  sec.).

Information integration strategies:

The decision mode does not influence the frequency distribution of underlying information integration strategies (simple tasks: Fisher's Exact = 5.98, n.s.; complex tasks: Fisher's Exact = 1.73, n.s.).

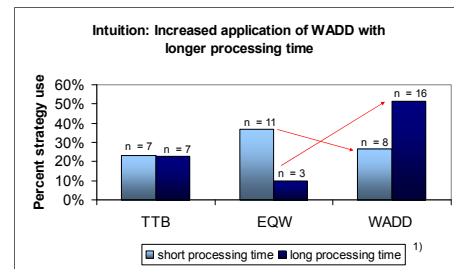
The Weighted Additive Strategy (WADD) is the most frequently applied decision strategy in both complexity levels.



- 1) TTB = Take the best Heuristic, EQW = Equal Weight Heuristic, WADD = Corrected Weighted Additive Strategy.
- 2) Decisions of 9 subjects in the condition intuition and 7 subjects in the condition deliberation could not be classified definitely.

Intuition: Interaction of decision time and information integration algorithm:

- **Simple tasks:** Strategies which integrate a high amount of information are more frequently applied with longer processing time (EQW and WADD; Fisher's Exact = 6.32,  $p < .05$ ).
- **Complex tasks:** An increased utilization of the information integration strategy WADD compared to EQW is found with longer processing time (Fisher's Exact = 7.17,  $p < .05$ ).



1) Short processing time:  $M = 4.06$  sec., long processing time:  $M = 8.38$  sec.

#### Study 2

#### ► Methods

Design:

2 **DECISION MODE** (intuition vs. deliberation) x 2 **COMPLEXITY** (3 cues vs. 12 cues)

Materials:

20 probabilistic inferences / city size paradigm

Procedure:

Recording of eye movements using the Eyegaze binocular system (LC Technologies)

#### ► Results

Fixations:

Deliberate decisions involve more fixations (main effect DECISION MODE:  $F(1,18) = 6.227, p < .05$ ), but decision mode does not influence fixation duration ( $t(18835) = -1.583, n.s.$ ).

Amount of inspected information:

In both conditions, subjects inspect a high amount of information. Deliberation and low complexity is associated with a higher percentage of information attended to (main effect COMPLEXITY:  $F(1,18) = 41.463, p < .000$ ; main effect DECISION MODE:  $F(1,18) = 7.162, p < .05$ ; intuition:  $M = 80.8\%$  and  $68.5\%$ , deliberation:  $M = 88.6\%$  and  $76.3\%$ ).

Information search pattern:

In simple decision tasks subjects show a weak tendency to perform attribute-wise information search. In complex decision tasks the attribute-wise search pattern becomes more pronounced, but subjects in the deliberate decision mode reveal an attribute-wise information search to a higher extend ( $F(1,18) = 4.559, p < .05$ ; SM-Index, Böckenholt & Hynan (1994): intuition:  $M = -.18$  and  $-1.38$ , deliberation:  $M = -.41$  and  $-2.88$ ).

#### Conclusion and Future Directions

In Study 1, no indication for the use of different information integration strategies depending on decision mode can be found. Furthermore, the data suggest that intuition cannot be equated with the use of simple heuristics. Subjects who spend more time for information search and –integration increasingly apply complex information integration strategies. Supporting this result, the eye tracking analysis in Study 2 implies that subjects in an intuitive decision mode attend to a high percentage of displayed information to reach their decisions. Moreover, the eye tracking analysis reveals differences in decision mode with regard to information search. Besides a more attribute-wise search pattern and a higher amount of inspected information, deliberation seems to be associated with increased steps backward to previously seen information. A current study investigates which cognitive processes form the basis of intuitive and deliberate decisions in real legal cases.