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Measuring the stream of consciousness – Vallacher and Nowak's Mouse Paradigm

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Focus of this presentation

- Mouse Paradigm (MP) – enables to track the momentary changes in evaluation of a target → measures **judgement dynamics or attitude dynamics**

- The problem: stability *versus* variability of attitudes

- Some examples of studies using MP

Static approach to attitudes

- Traditional theories in psychology: ABC model (Ostrom, Greenwald, Brock, 1968, Petty and Cacioppo, 1981)

- Basic statements:

  - Internal congruence of attitudes - affective, behavioral, cognitive elements

  - Attitude representable as a single point on a scale

 - Stable in the absence of external stimuli

  - File drawer analogy

A **-**ffective
B **-**ehavioral
C **-**ognitive

R → The target
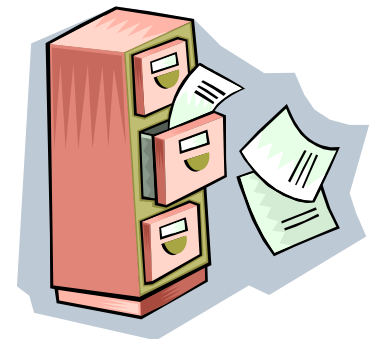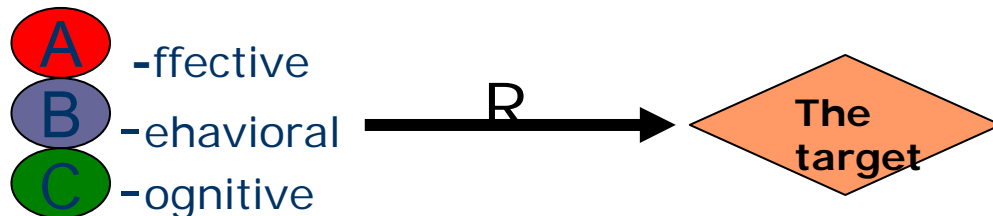
Shortcomings of the static approach

- Questionable predictive force

- Static attitudes are not adaptive – due to the changing environment

- Temporal variation is dismissed as random noise (information input that could not be controlled in a study)

Different point of view – the dynamic approach to attitudes

- William James (1890) – the stream of consciousness

  - Contents of the mind (*i.e.* attitudes) continuously change

- Tesser (1978) – attitude polarization

  - increasing cognitive consistency in the absence of external stimuli

- Anderson (1981) – information integration theory

  - information from a number of sources is integrated into an overall judgment

| Valuation Function | Integration Function | Response Function |
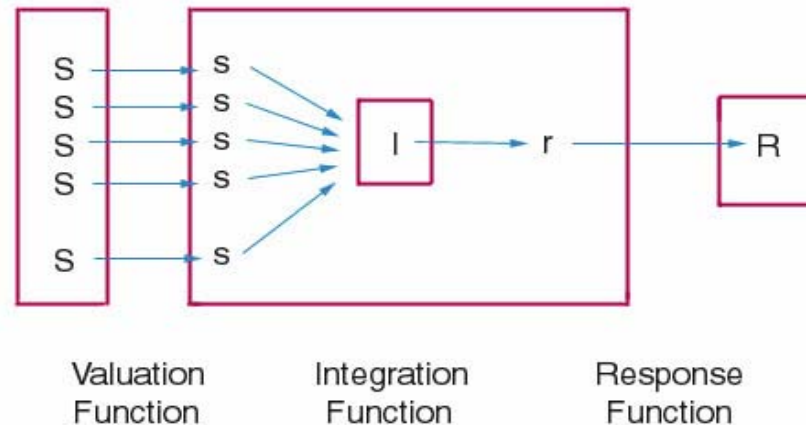
**Dynamics of social judgement – e.g. Vallacher, Nowak & Kaufman (1994)**
Dynamics and organization of the Self – e.g Vallacher, Nowak, Froelich & Rockloff, (2002) Nowak, Vallacher, Tesser, Borkowski 2000

- The stream of consciousness may be regarded as a self-organizing dynamical system

- Attitudes may change in time not only due to changes in the environment but also due to **intrinsic dynamics of thought** (interactions within elements of the cognitive system)

- Evaluation may be regarded as an **order parameter** for the system. Singular thoughts are diverse but they all can be scaled with respect to the common parameter of evaluation

- The elements are not static in valence but influence each other locally in order to achieve a common evaluation

Press for integration as means of maintaining thought consistency

- [7] We actively engage in maintaining the cognitive consistency: denial, discounting, selective recall, confirmatory bias, defensive attribution, and dissonance reduction etc. It *„enables people to act consistently in spite of their intrinsic capacity for seemingly unlimited cognition”* (Nowak, Vallacher, Tesser, Borkowski)

- → The dynamics of information processing indicate the extent to which the information is integrated in the cognitive system

- Coherence vs. conflict within elements of judgment system (univalent and mixed valence representations)

  - Looking for equillibria: point attractors and attitude oscilation

- Global evaluation, e.g. global self-esteem, is an emergent feature of the system of elements that operate under the press for integration mode
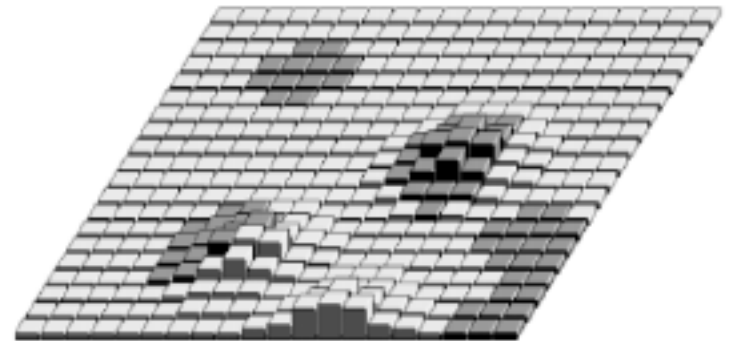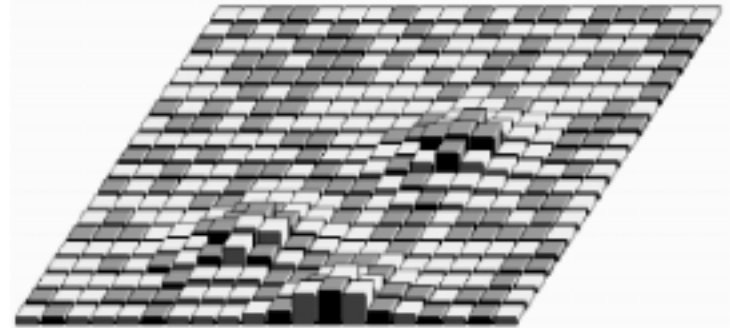
How to measure the intrinsic dynamics?

- We don't have access to the minds of other people

- Changes in thought happen relatively fast

- Asking people directly about the content of their minds changes the content itself

The Mouse Paradigm.

How does it work?

The rationale behind the Mouse Paradigm method

- Evaluation can be considered as an approach–avoidance behavior (Hovland, Janis & Kelly, 1953)

- Momentary state of one's feelings towards an object corresponds to the perceived distance from this object

- The more positive the evaluation, the shorter the distance

Instructions

- „Sometimes the feelings we have about a target are relatively stable [...] Sometimes, though, our feelings show changes over time, whether from week to week, day to day, or even within a given day. In this exercise, you will be asked to indicate your moment-to-moment feelings about the target."

Mouse paradigm – a screenshot

The target
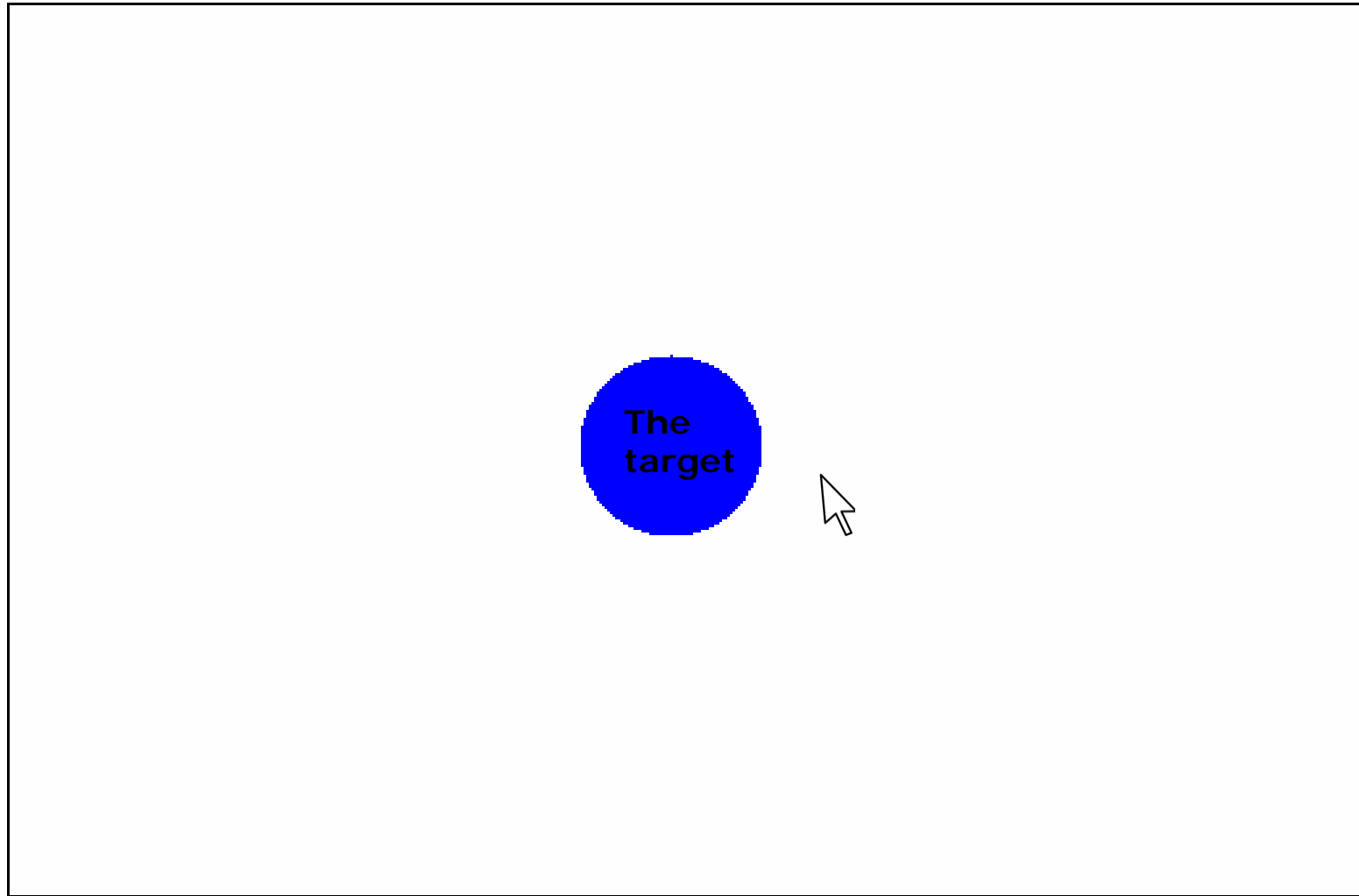
- A computer mouse as a tool to measure the momentary evaluation of an object

- Circle in the center of the screen represents the object. Position of the mouse cursor represents the feelings of a subject

- „Silent" and „loud" version of the MP

Mouse paradigm - the measures

- Every 0.1 second the program records the position of the cursor

- Analysis of the coordinates changing in time allows for the following parameters to be counted:

  - Distance from the screen center

  - Dynamic measures: variance of the distance, velocity and acceleration of the cursor

  - Time when the cursor remains idle

    - Within „close" region

    - Within „far" region

Exemplary data output
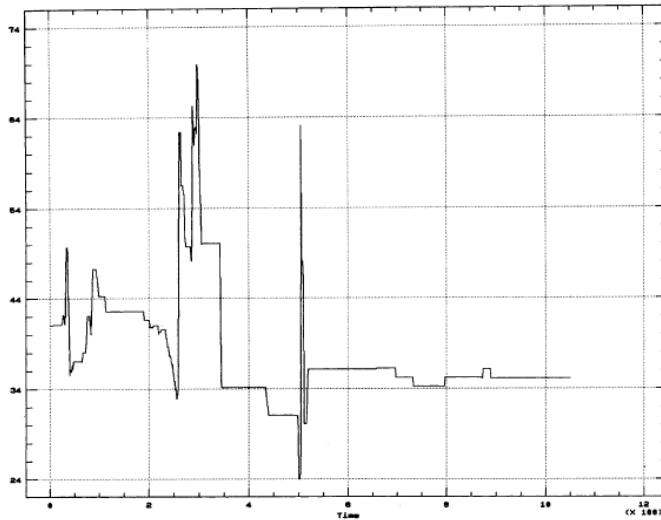
Figure 1. Distance from target by time for subject judging positive target (Experiment 1).

Momentary Self-Evaluation by Self-Esteem and Time
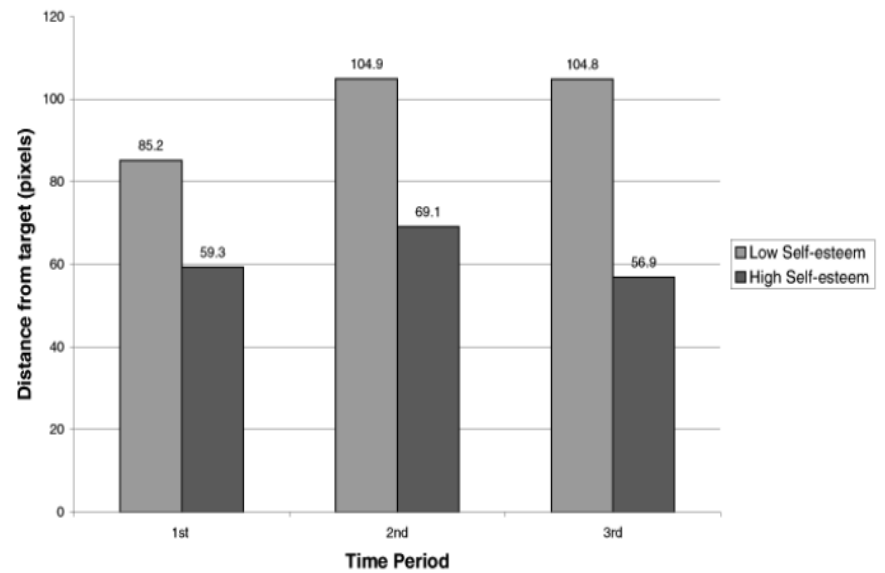
Research so far

- Social judgment (Vallacher, Nowak & Kaufman; Vallacher & Nowak, 1994, 1997)

- Dynamics of the Self (Vallacher & Nowak, 2000; Vallacher, Nowak, Froelich & Rockloff, 2002; Krejtz, 2003)

- Evaluation of in-group/out-group members (Lubna Haddad, 2000)

- Psychology of sport (Parzelski, 2008)

- Company brand mark recognition (Styla, 2006)

- Validation (in preparation) – correlations with implicit (IAT) and explicit (Rosenberg) measures of self-esteem, high reliability (Lisiecka, Styła, Ziembowicz)

Example of a study: Vallacher, Nowak, Froelich & Rockloff, (PSPR, 2002)

- Participants: 69 undergraduates

- Measures: level of self-esteem (Rosenberg scale), self-esteem stability (Rosenberg scale), self-concept certainty, loud version of MP

- 3 conditions: positive, negative and no priming

- Results:

  - priming effect visible only in the 1st time period

  - the effect of global self-esteem on both distance and resttime in 'close' and 'far' region became more pronounced in the 2nd and 3rd time period
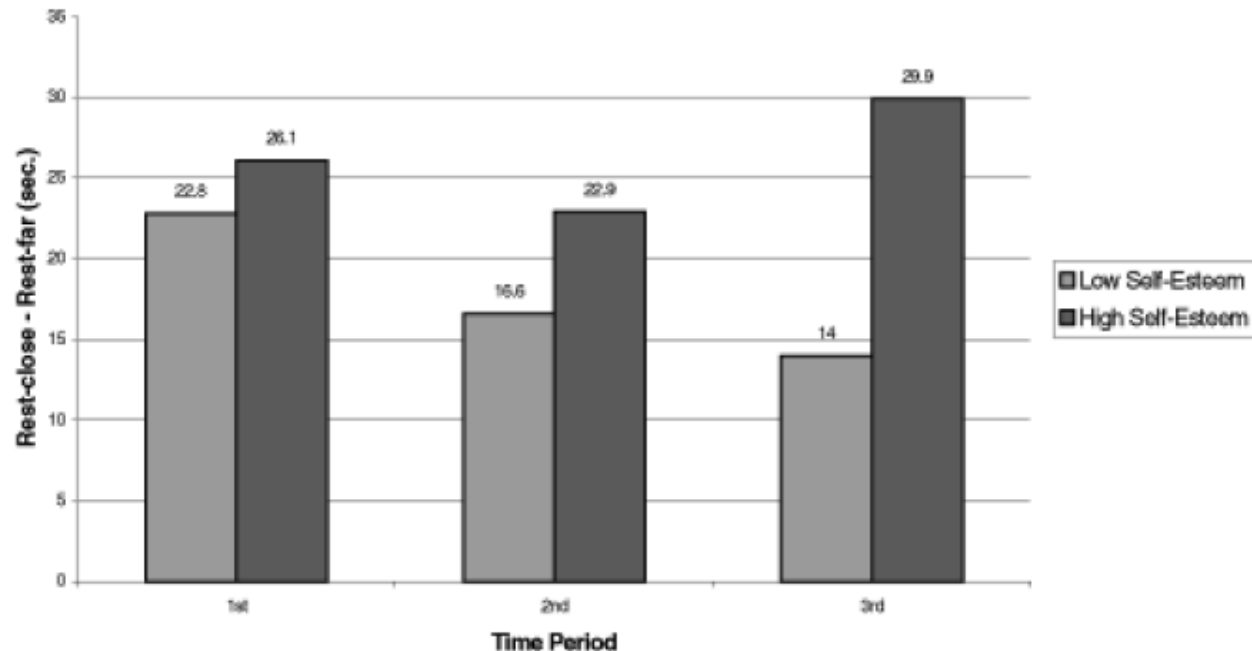
Silent version of MP - validation

- Question: Can silent version of MP be used as a reliable diagnostic tool for explicit and implicit self-esteem? (important for diagnosticians and psychotherapists)

- Measures:

  - self-esteem and s.s. stability (Rosenberg scale); measure of implicit s.-s.: IAT (Implicit Association Test; (Greenwald, McGhee, Schwartz, 1998), last week's positive / negative events.

  - Two administrations of MP

- Participants:

  - 94/84 psychology students (first and second year)

Results

- Silent MP gave reliable results (correlations between: 0.6 – 0.7) but it depended on occurrence of positive vs. negative life events

- MP gave more universal results than other measures of self-esteem: mean distance in MP correlated with explicit measures of self-esteem, rest time – with implicit measures of self-esteem; even when they did not correlate with one another

- Variance of the distance from the center of the screen became smaller with the course of time

- Movement in the silent version was more random

- It is better to teach subjects to use silent MP (more reliable results in the second session)

Variance of the distance in 3 time periods
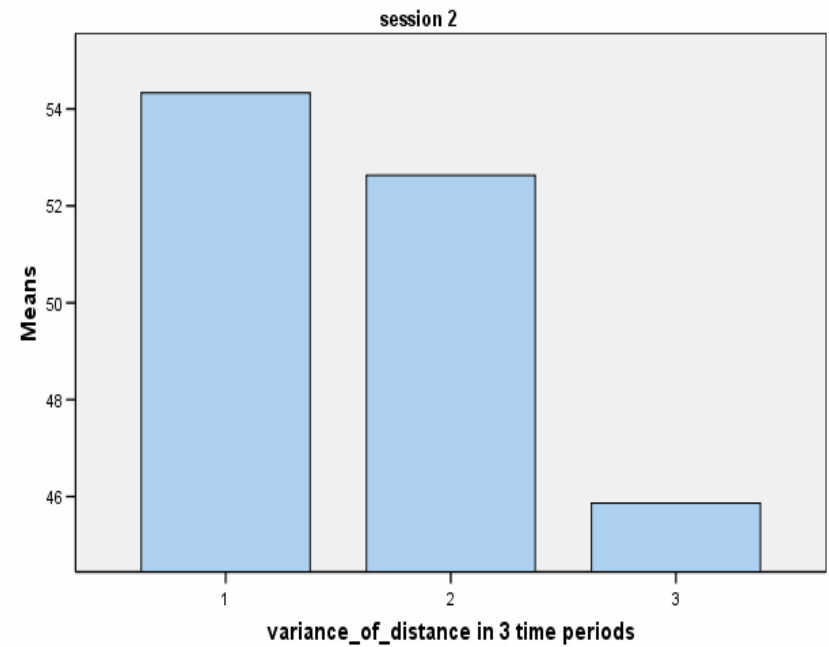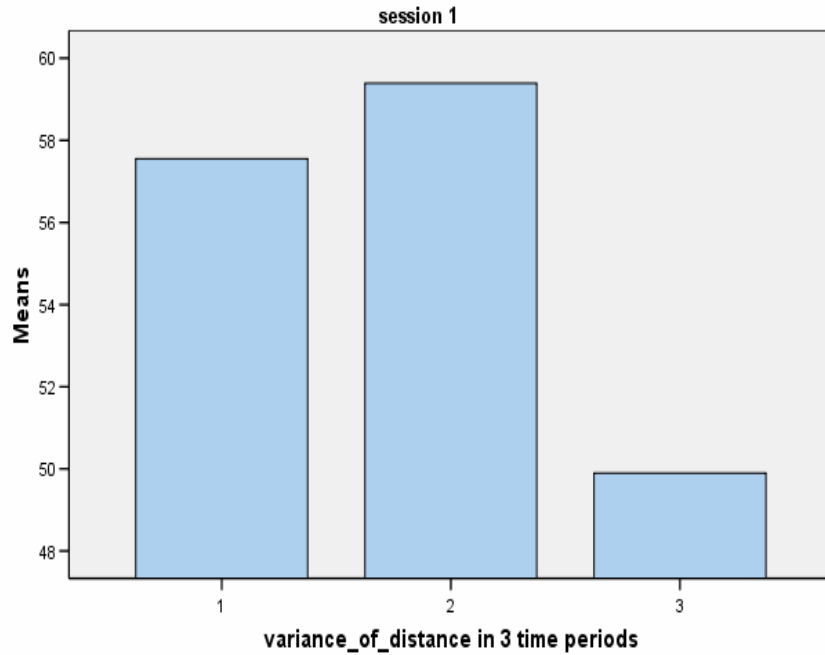
session			Level of selfesteem (Rosenberg)	Stability of selfesteem (Rosenberg)	IATeffect
session 1	Mean distance	Pearson's correlation	-,436(**)	-,336(**)	-,167
MOUSE MEASURES		p	,000	,001	,108
	Whole resttime	Pearson's correlation	-,001	,152	,262(*)
		p	,994	,144	,011
	Resttime close	Pearson's correlation	,110	,157	,211(*)
		p	,291	,132	,041
	Resstime far	Pearson's correlation	-,131	-,007	,058
		p	,210	,948	,581
EXPLICIT MEASURES	Level of selfesteem (Rosenberg)	Pearson's correlation	1	,511(**)	,132
		p		,000	,206
	Stability of selfesteem (Rosenberg)	Pearson's correlation	,511(**)	1	,062
		p	,000		,556
session 2	Mean distance	Pearson's correlation	-,657(**)	-,463(**)	-,207
MOUSE MEASURES		p	,000	,000	,059
	Whole resttime	Pearson's correlation	,033	,092	,221(*)
		p	,767	,408	,043
	Resttime close	Pearson's correlation	,263(*)	,209	,136
		p	,016	,057	,216
	Resstime far	Pearson's correlation	-,283(**)	-,135	,132
		p	,009	,222	,230
EXPLICIT MEASURES	Level of selfesteem (Rosenberg)	Pearson's correlation	1	,595(**)	,033
		p		,000	,764
	Stability of selfesteem (Rosenberg)	Pearson's correlation	,595(**)	1	-,072
		p	,000		,516

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Thank you!