

Changes in oxytocin reactivity and reduction of psychopathology



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„An exciting neuropeptide“

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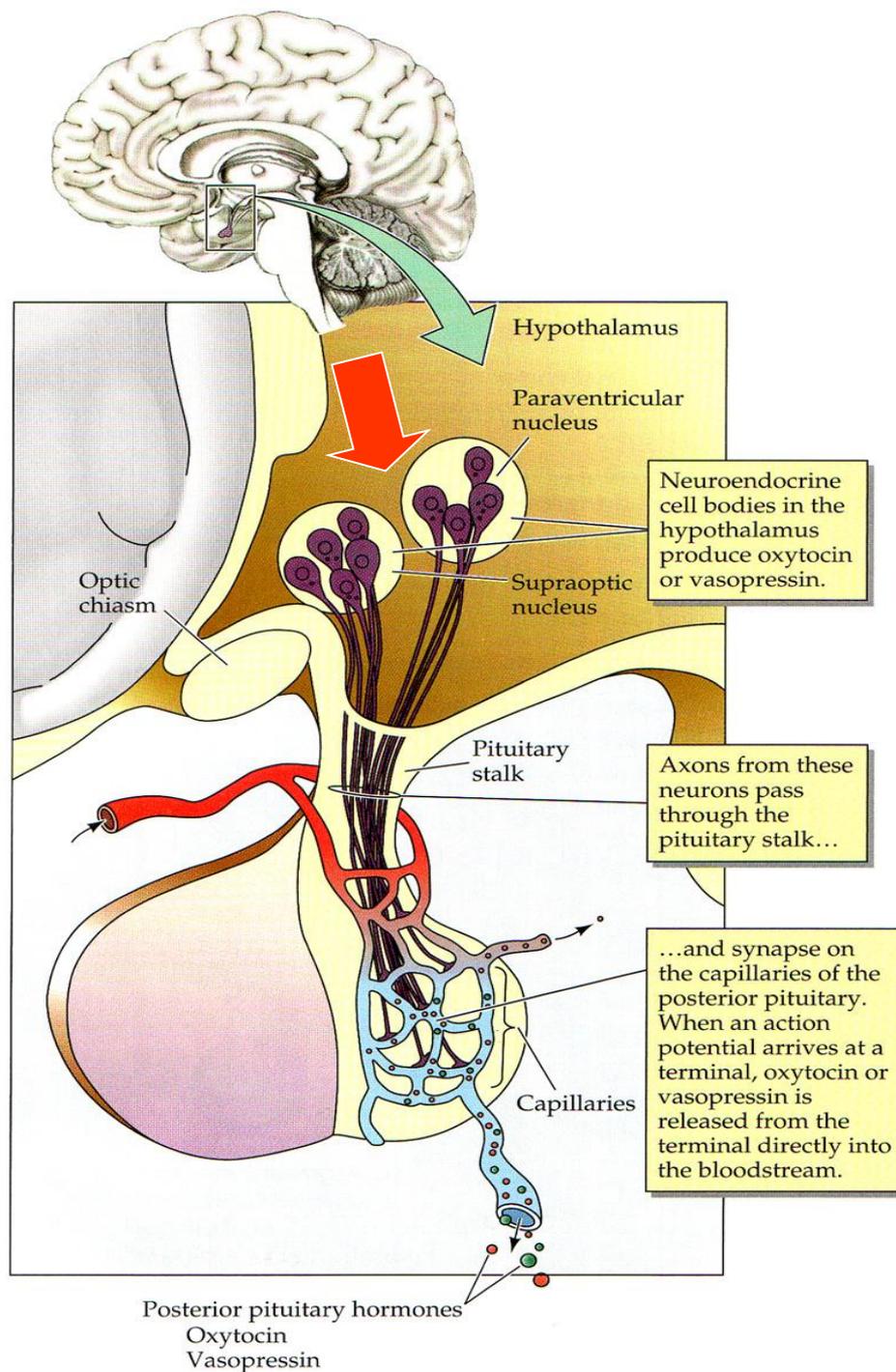
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1. Oxytocin: „An exciting neuropeptide“

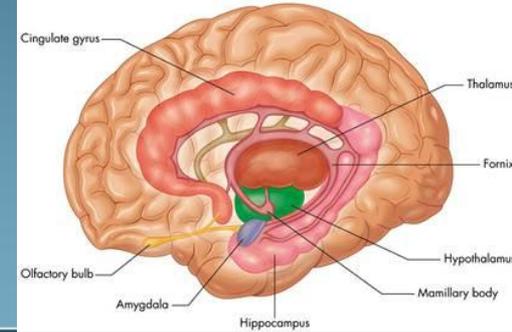
- very old from an evolutionary perspective and can be found almost unchanged in all kinds of mammals
- consists of nine amino acids differing only in two of them from vasopressin
- neuropeptide in blood and brain
- generated in the hypothalamus (two main nuclei)

Growing evidence for relevance in psychological processes...



Anmerkung: Die Abbildung wurde aus dem Buch „Biological Psychology“ entnommen. (Rosenzweig & Breedlove, 2002) (3. Auflage) (S.132)

Neurobiological background and physiology



- Projections from paraventricular oxytocinergic neurons in different areas of the brain like bulbus olfactorius, frontal cortex, amygdala etc. (Bujjis et al., 1985)
- Some brain systems are especially equipped with oxytocin receptors like the amygdala (Ferguson et al., 2000; Kirsch et al., 2005) and the limbic system (Insel & Young, 2000)
- Increase or reduction is governed by the brain, estrogen and many other NT, as well as sensory stimulation during suckling, warmth of the body, touch or sexual stimulation (Lund et al., 2002; Kendrick et al., 1986; Sansone et al., 2002; Stock & Uvnäs-Moberg, 1988)

Overall functions of oxytocin

- Uterine contraction during birth and milk ejection
stress protective effects...



- Decrease of heart rate and reduction of blood pressure and stress hormones (Amico et al., 2004; Heinrichs et al., 2003; Neumann, 2002)



Psychological effects of oxytocin in attachment processes (animal studies)

- Induction of motherly behavior in sheep (Kendrick et al., 1982) and rats (grooming, nestbuilding, suckling) after injections of oxytocin (Pedersten et al., 1982)
- in social situations applications of low doses induces fear reducing effects (more body contact) and attachment behavior (Uvnäs-Moberg, 1994)
- Low doses increase social recognition in rats (Ferguson et al., 2000; Ferguson et al., 2001) and raise memory abilities for social interactions experienced as positive
- Oxytocin-knockout mice are characterised as „socially amnestic“ (Ferguson et al., 2001)



Psychological effects of oxytocin in attachment processes (human studies)

- Effects on the distribution of warmth in the body of the mother (Eriksson et al., 1996)
- strong negative correlations of aggression with values of oxytocin and high positive ones with calmness and interest in social interaction (Uvnäs-Moberg, 1990; 1993)
- reduction of anxiety in stressful situations (Heinrichs et al., 2002)
- augmentation of trust in social situations (Kosfeld & Heinrichs et al., 2005)
- experiences of social deprivation in russian orphans during the first month of life result in lower oxytocin reactions (Wismer-Fries & Pollak et al., 2005)
- Attachment disorders and psychopathological development in general are associated with insufficient levels of oxytocin



2. FFET- a bonding-questionnaire

Fragebogen für emotionale Tiefenebenen (FFET)

Vielen Dank für Deine Teilnahme bei der Evaluierung dieses Fragebogens.

Versuche den Bogen bitte möglichst zeitnahe nach dem Bonding auszufüllen und nimm Dir bitte etwas Zeit bei der Beantwortung der nachfolgenden Fragen. Setze bitte ein Kreuz unter die Aussage, die am ehesten auf Dich zutrifft und Deine Erlebnisse am treffendsten beschreibt. Bearbeite bitte **alle** Fragen und setze pro Antwort auch nur ein Kreuz. Lies Dir jede Aussage bitte sorgfältig durch und folge beim Ankreuzen spontan Deinen ersten Impulsen!

Beispiel:

„Wenn ich meine Wut zeige, kann sie mir und anderen schaden.“					
	trifft voll zu	trifft zu	trifft etwas zu	trifft gar nicht zu	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

(Mit den einzelnen Kästchen hast Du die Möglichkeit Deine Aussage zu gewichten)

Ich bin : weiblich Mein Bondingpartner weiblich
 männlich heute war : männlich

Heute ist meine..... Bondingsitzung
(bitte eintragen die wievielte Bondingsitzung heute war)

Patientencode:
(bitte nicht ausfüllen)



**Secondary and
instrumental emotions**

Level I: Intellectual reflection

Emotions are perceived and verbalized, but not emotionally expressed. There is no congruence between the verbal expression of emotion and behavioral expression.



Level II: Minimal emotional expression

Emotions are experienced and expressed. However, there continues to be a holding in or holding back from fully embodied emotional expression.



Level III: Full emotional expression (gut level)

Primary emotions are fully expressed, and the entire body is involved. The individual is completely involved in the expression of his feelings and is focused on expressing both the intensity and the nature of the emotion.



Level IV: Identity level

The emotion is no longer directed against someone else but rather as an expression of one's own emotional power, self-assurance and identity. One feels entitled to express one's emotions and needs. One is able to accept one's emotions and still feel lovable.

**Primary adaptive emotions:
Focus of Bonding Psychotherapy**

Figure 3: Levels of emotional expression and types of emotion



Fragebogen für emotionale Tiefenebenen

- measures subjective experiences in a bonding session
- assessment through 45 items (likert scale with four characteristics)
- procedure of self-evaluation (will take 20-30 minutes)
- What kind of emotional qualities have been experienced?
- Did the person express the feelings?
- How strong was the intensity of feelings?



classification of client to one of the levels



3. Methods

- time of data collection: June 21 th - October 16 th, 2007
- data collection in clinic Bad Herrenalb with a **sample** of 40 test subjects (27 female, 13 male ; Ø 43,38 years; range : 18-65)
- assessments at the first and seventh bonding session, data available for both sessions from 26 patients, 16 female, 10 male)
- heterogeneous distribution of ICD 10 diagnoses
- blood sampling (10ml), each time before and after bonding, (serum and plasma)
- centrifugation (3500g for six minutes) , stored on dry ice, kept frozen in a fridge (-70 ° C) until posting)



Short delineation of the procedure

Thursday

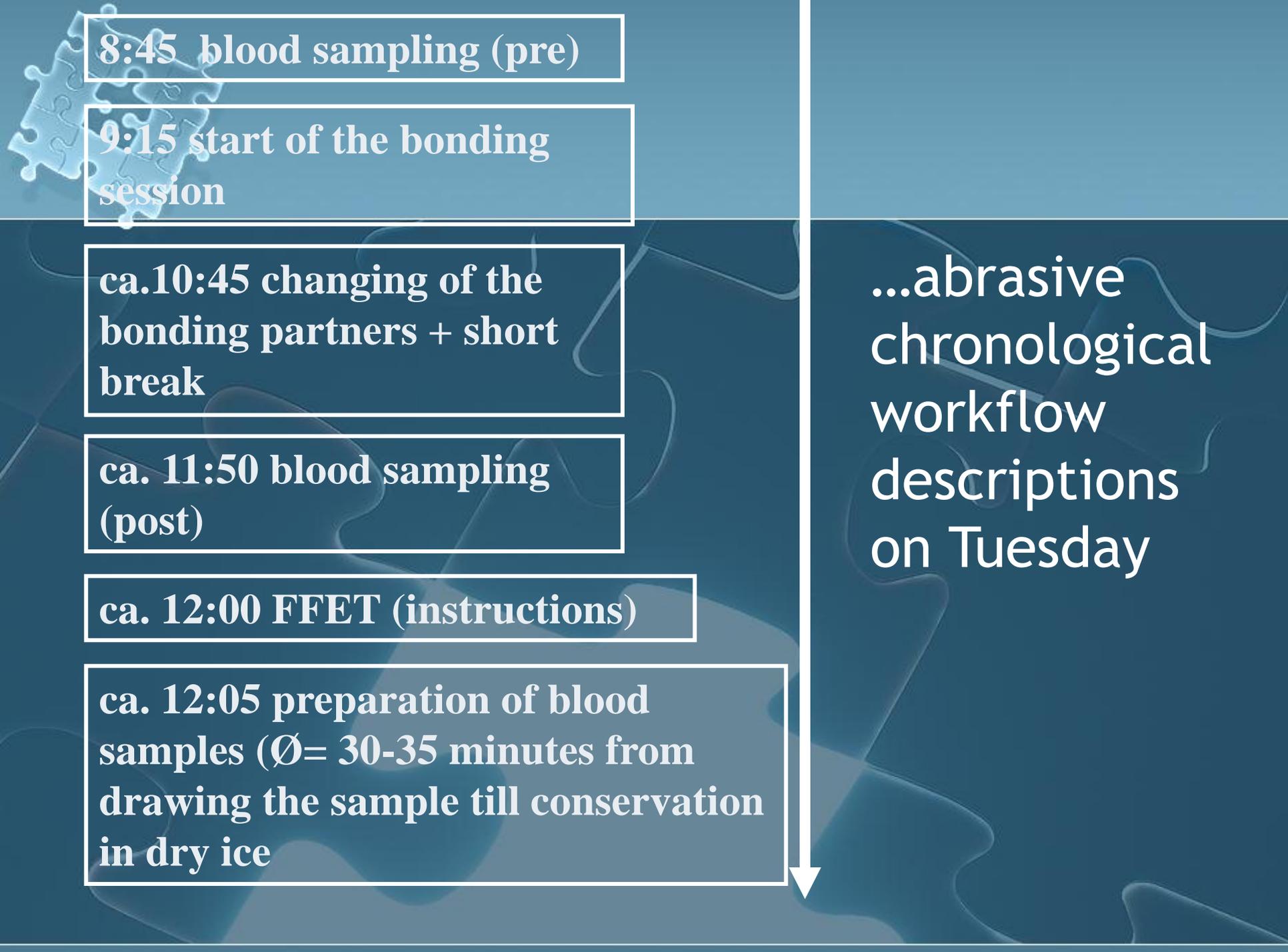
- public recruiting in the plenary meeting following a detailed information meeting (one hour) plus RSQ (test diagnostics)

Friday

- blood sampling for assessment of baseline values

Tuesday

- blood sampling before and after bonding session in order to determine pre-, post and difference values of oxytocin levels



8:45 blood sampling (pre)

9:15 start of the bonding session

ca.10:45 changing of the bonding partners + short break

ca. 11:50 blood sampling (post)

ca. 12:00 FFET (instructions)

ca. 12:05 preparation of blood samples (\emptyset = 30-35 minutes from drawing the sample till conservation in dry ice)

**...abrasive
chronological
workflow
descriptions
on Tuesday**



Assessment Procedures and Questionnaires

- measurement of attachment behavior → RSQ
- measurement of bonding-experiences → FFET
- measurement of mental states → SCL-90 R
- Health questionnaire (diseases and physical disorders)
- Personal documentation (demographic data, ICD 10, addiction, daily consumption of cigarettes, medication)
- Consent form (including contact details)
- Assessment of the neurochemical correlates (ELISA) oxytocin, vasopressin; RIA ,high test sensitivity of 0,05-0,1pg/ml)



Variables for controlling biases

- 1. age
- 2. sex
- 3. contraception
- 4. first day of the last menstruation before the 1. appointment of examination
- 5. first day of the last menstruation before the 2. appointment of examination
- 6. smoking and smoking behavior
- 7. addiction
- 8. number and kind of ICD 10 Diagnose
- 9. antidepressants
- 10. anxiolytics
- 11. medication affecting the serotonin system
- 12. information of the health questionnaire
- 13. consumption of alcohol before admission(wine)
- 14. consumption of alcohol before admission (beer)
- 15. consumption of alcohol before admission (hard liquor)
- 17. number of bonding sessions



Legend of the applied neurochemical und psychological measures

- baseline value oxytocin (no bonding; 1 sample)
- pre-value oxytocin (before bonding session and for the first and second appointment)
- post- value oxytocin (after bonding session and for the first and second appointment)
- Release of oxytocin Diff.1 (Post-Pre)
- Release of oxytocin Diff.2 (Post-Pre)
- Difference of the difference for oxytocin (Diff.2-Diff.1)
- Scales of the SCL-90 R
 - a. Pre-Value of all nine scl-scales
 - b. Diff-Value of all nine scl-scales (Post-Pre)



Scales of the SCL-90 R (Derogatis, 1995)

"How much did you suffer in the last seven days under...?"

Four different levels:

not at all (0)

a little (1)

rather (2)

strongly (3)

very strongly (4)



Scales of the SCL-90 R (Derogatis, 1995)

1. Somatization
2. Obsessive Compulsive thoughts and behaviour
3. Interpersonal sensitivity (insecurity)
4. Depression
5. Anxiety
6. Phobic Anxiety
7. Hostility (aggression)
8. Paranoid Ideation
9. Psychoticism
10. GSI (Global Severity Index)



4. **Short** summary of the main results (thesis)

Attachment and oxytocin

- Insecure attachment seems to be associated with low levels of oxytocin

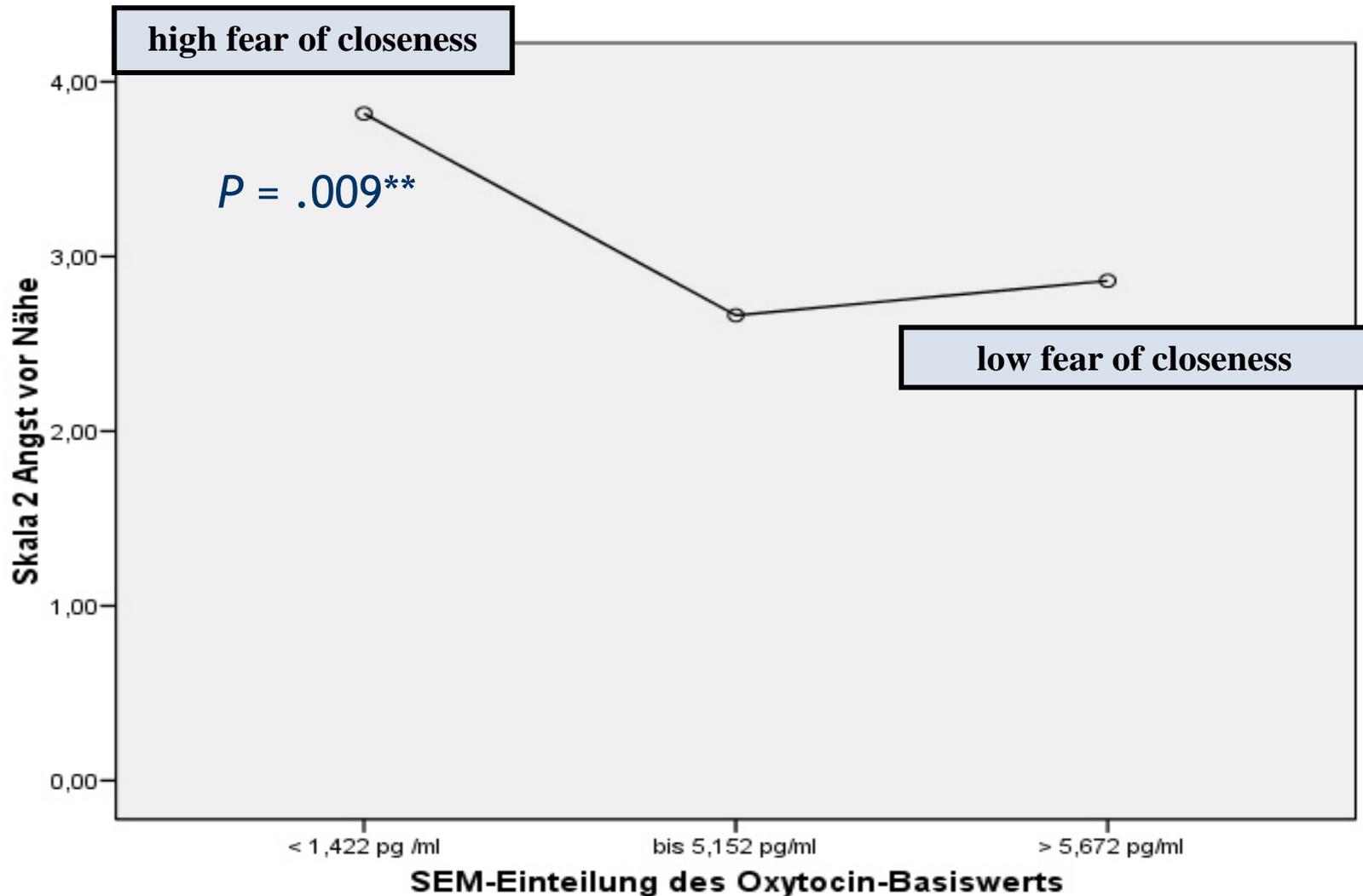
Bonding and FFET

- Bonding leads to deeper emotional depth level, the lower levels decrease and the higher levels rise

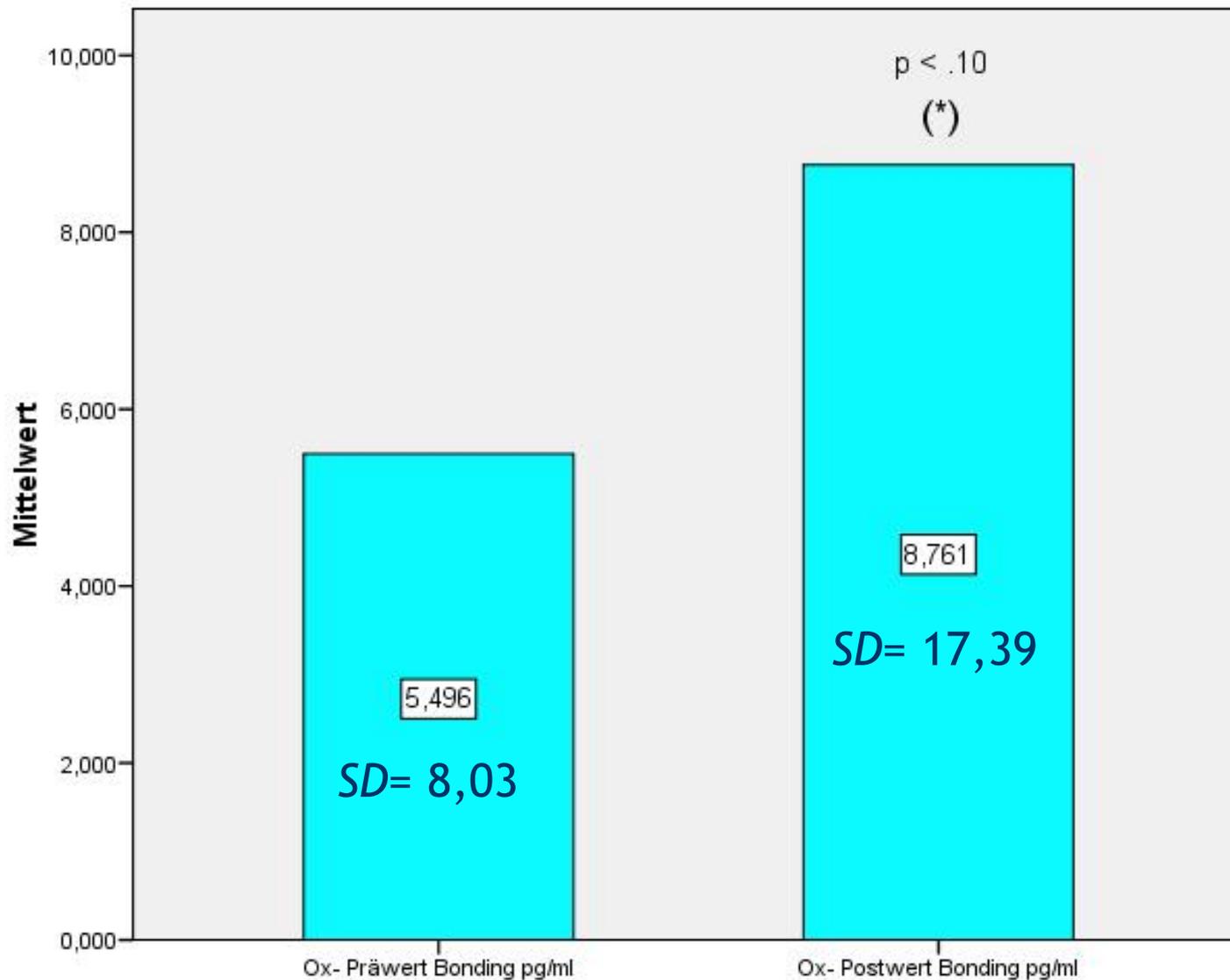
Bonding and oxytocin

- Bonding seems to lead to an increase of oxytocin release after the 7th, but not after the first bonding session
- Bonding seems to influence the absolute responsiveness of the oxytocin system

Means on the subscale „fear of closeness“ of the attachment scale according to the three groups of oxytocin baseline values in n = 23 females

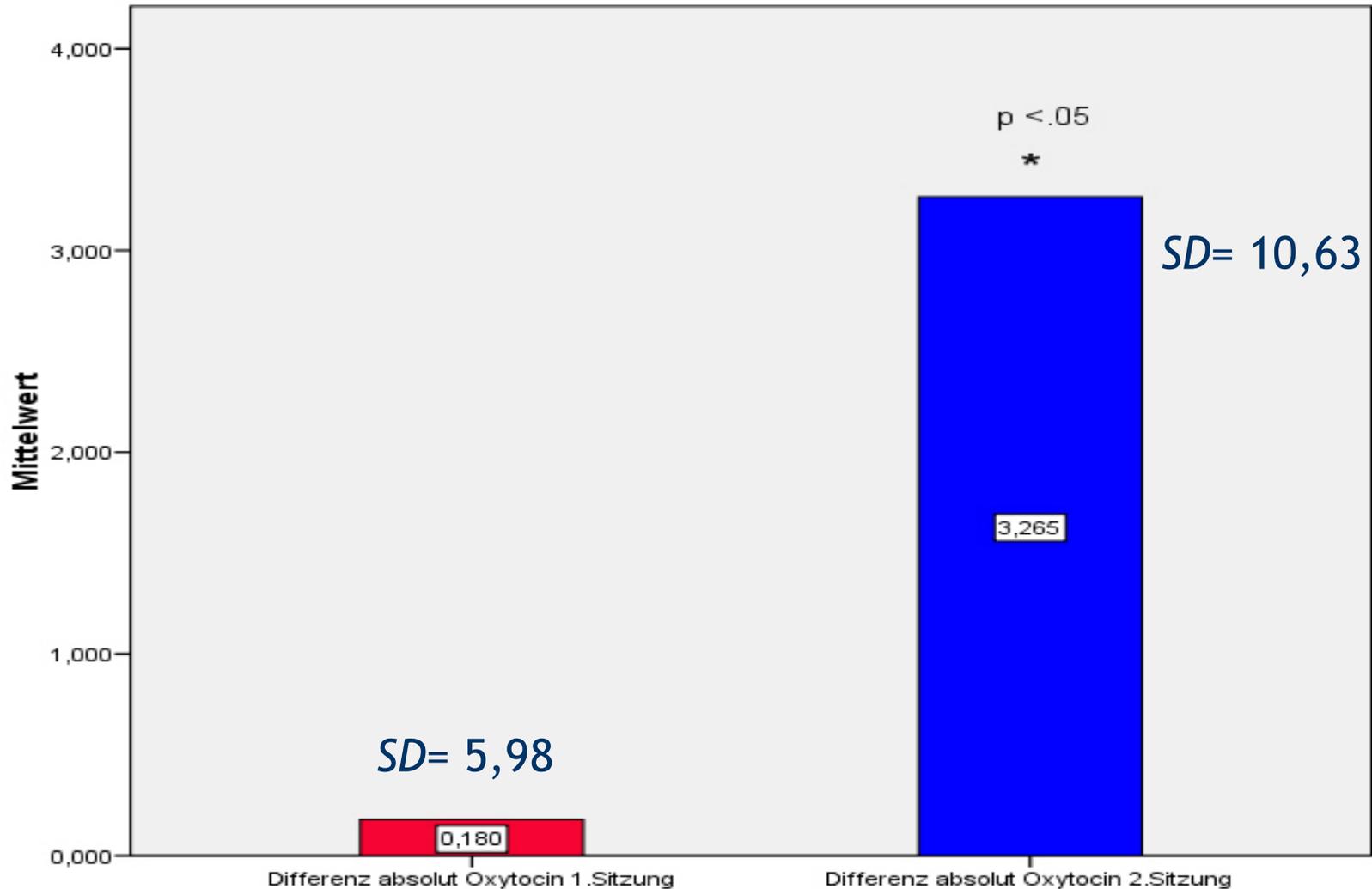


Reactions of oxytocin at the second appointment





Means of difference scores between pre- and post session oxytocin values (raw scores) at the first and second session (n = 26)





Questions of interest

- Are psychopathological symptoms at admission associated with responsiveness of oxytocin during the first and the second appointment?
- Are improvements in emotional states during therapy predictable from oxytocin reactions after a few bonding sessions?
- Are improvements in the subjective emotional states as measured by the SCL-90 R associated with changes in oxytocin reactivity?



5. Hypotheses and results of the current study

Hypotheses 1

- Subjective emotional states (pre-values SCL) are associated with responsiveness of oxytocin in the *first* and in the *second* appointment
- *The stronger the symptom, the stronger the release of oxytocin during bonding!*



Correlation between the reaction of oxytocin and the pre-values of the scl-scales (n=38)

		Correlations			
		Differenz absolut Oxytocin 2.Sitzung	Differenz in % Oxytocin 2.Sitzung	RANK of OX_DIF_2	Somatization
Differenz absolut Oxytocin 1.Sitzung	Pearson Correlation	,659**	,476*	,545**	,330*
	Sig. (2-tailed)	,000	,014	,004	,043
	N	26	26	26	38
Differenz in % Oxytocin 1.Sitzung	Pearson Correlation	,225	,335	,231	,389*
	Sig. (2-tailed)	,269	,094	,256	,016
	N	26	26	26	38
RANK of OX_DIF_1	Pearson Correlation	,527**	,532**	,456*	,428**
	Sig. (2-tailed)	,006	,005	,019	,007
	N	26	26	26	38

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).



Correlation between the reaction of oxytocin and the pre-values of the scl-scales (n=38)

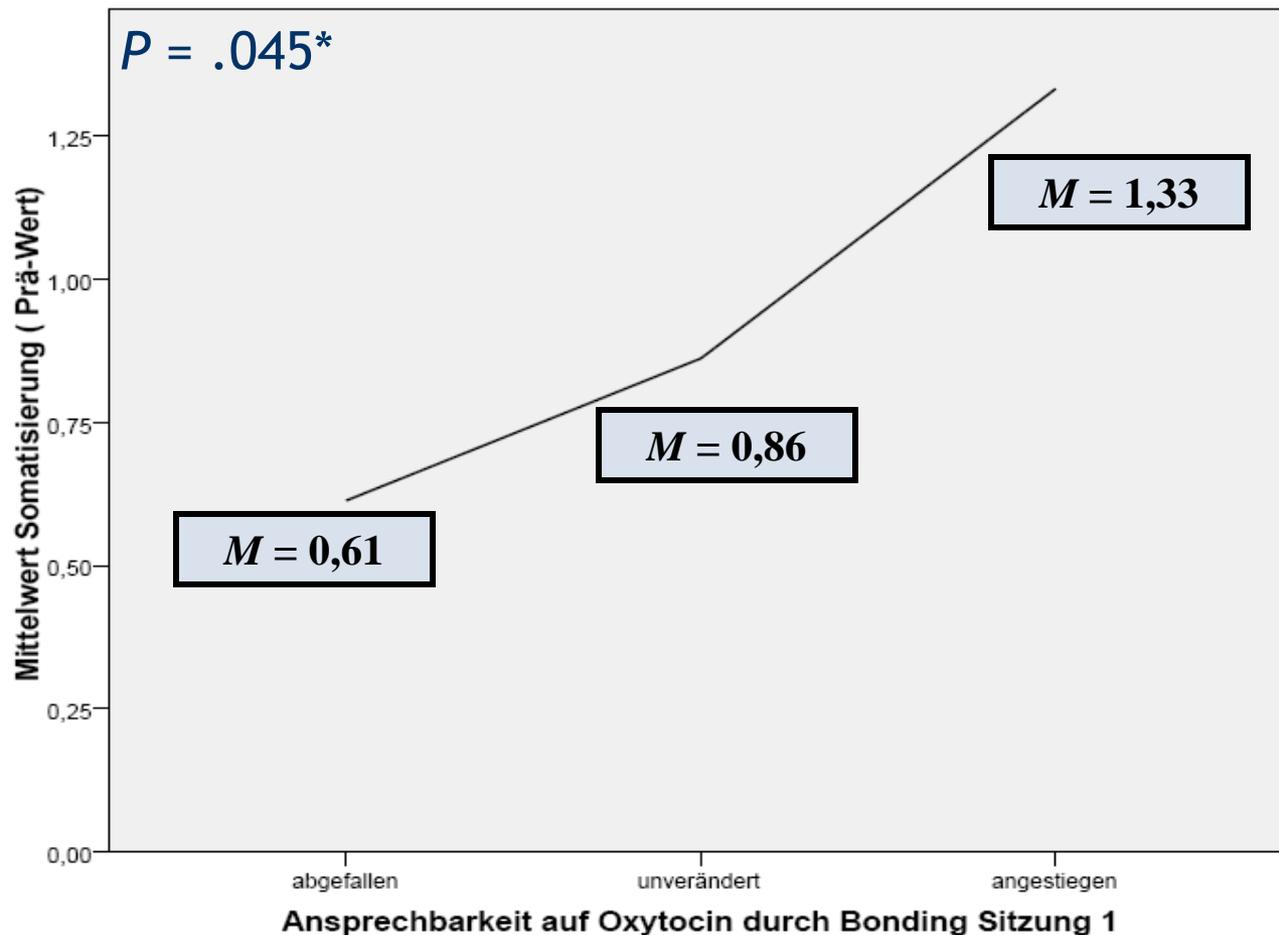
Correlations

		Differenz absolut Oxytocin 2.Sitzung	Differenz in % Oxytocin 2.Sitzung	RANK of OX_DIF_2	Anxiety
Differenz absolut Oxytocin 1.Sitzung	Pearson Correlation	,659**	,476*	,545**	,157
	Sig. (2-tailed)	,000	,014	,004	,348
	N	26	26	26	38
Differenz in % Oxytocin 1.Sitzung	Pearson Correlation	,225	,335	,231	,357*
	Sig. (2-tailed)	,269	,094	,256	,028
	N	26	26	26	38
RANK of OX_DIF_1	Pearson Correlation	,527**	,532**	,456*	,329*
	Sig. (2-tailed)	,006	,005	,019	,044
	N	26	26	26	38

** . Correlation is significant at the 0.01 level (2-tailed).

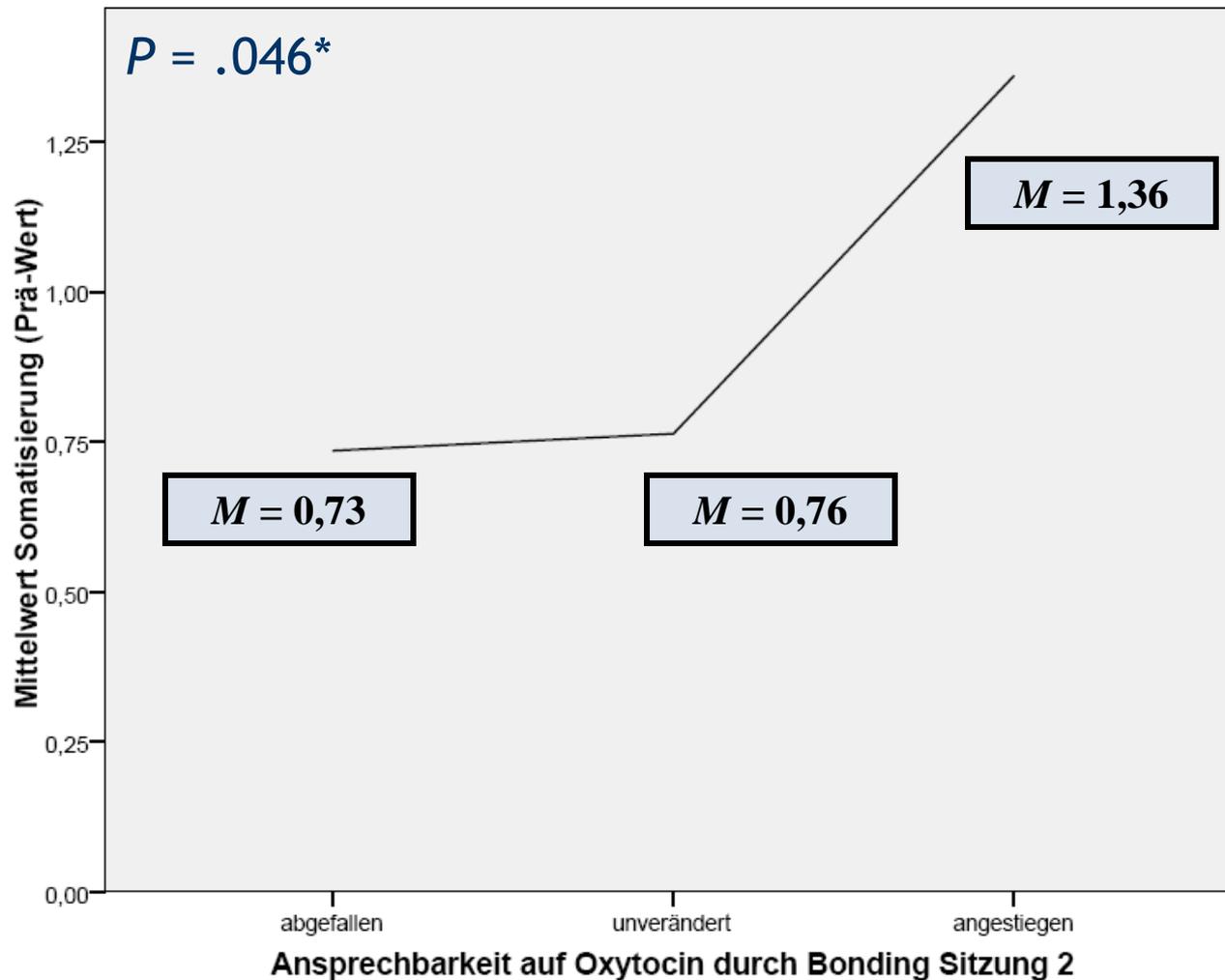
* . Correlation is significant at the 0.05 level (2-tailed).

Results of ANOVA and means of the pre-value on the scale "somatization" according to the three reactivity groups of oxytocin (first session) (n=38)



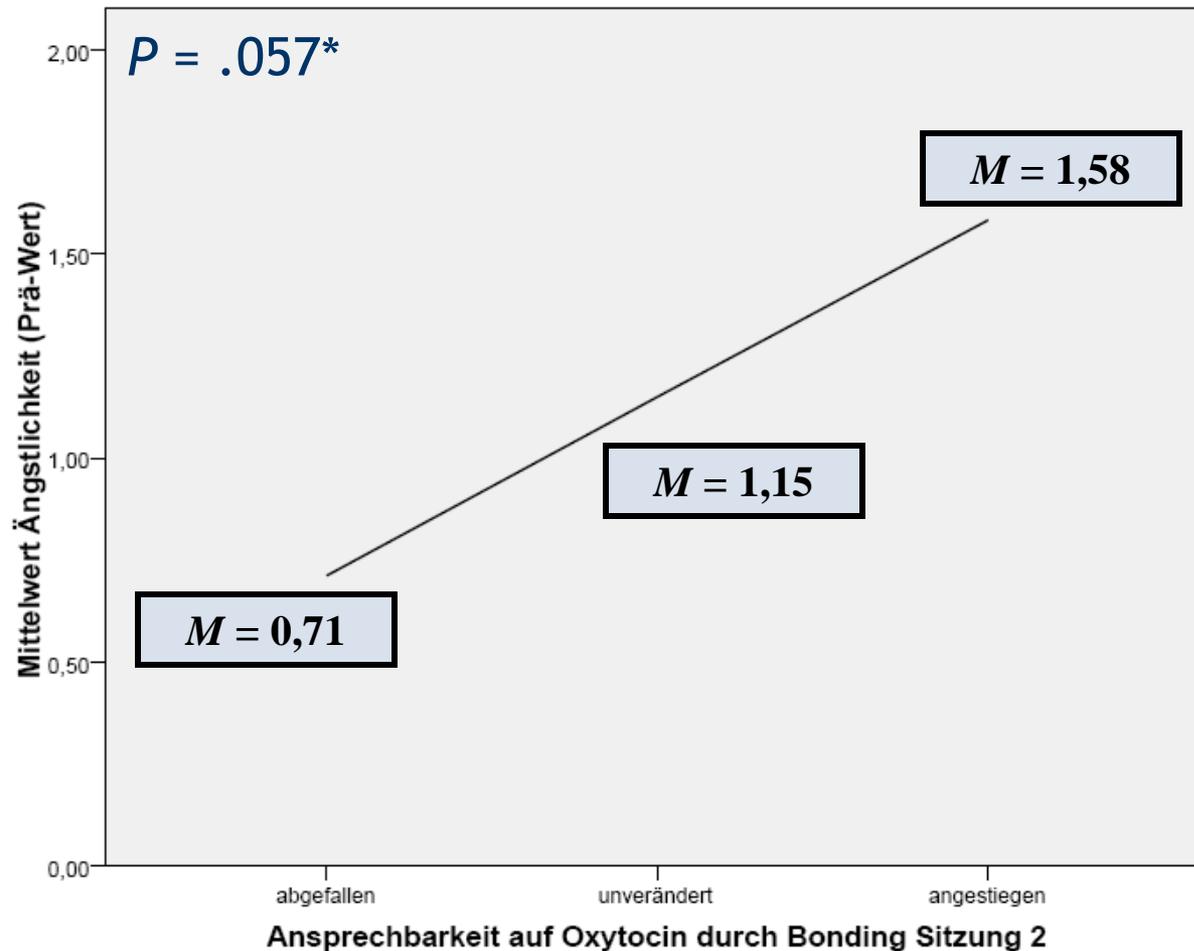


Results of ANOVA and means of the pre-value on the scale "somatization" according to the three reactivity groups of oxytocin (second session) (n=24)

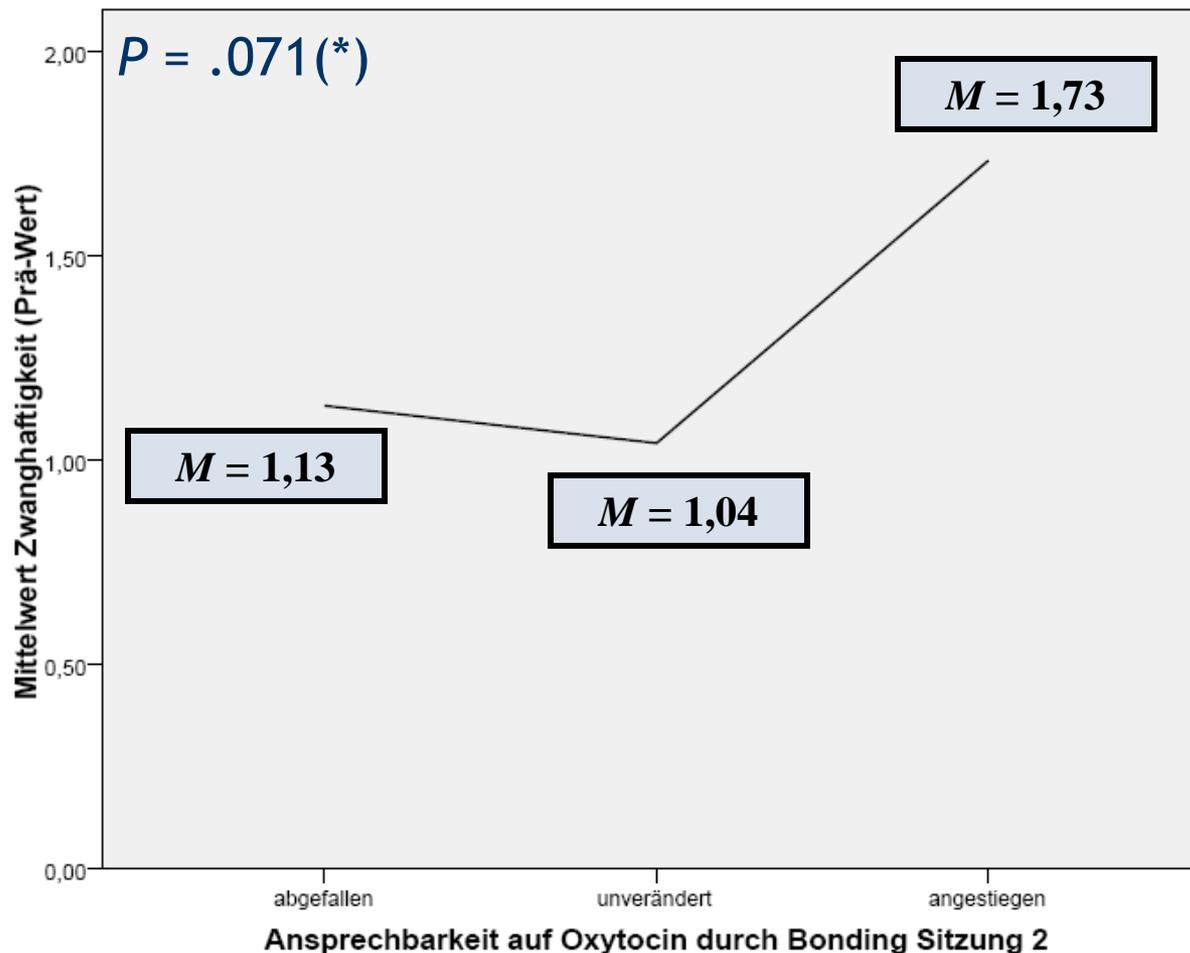




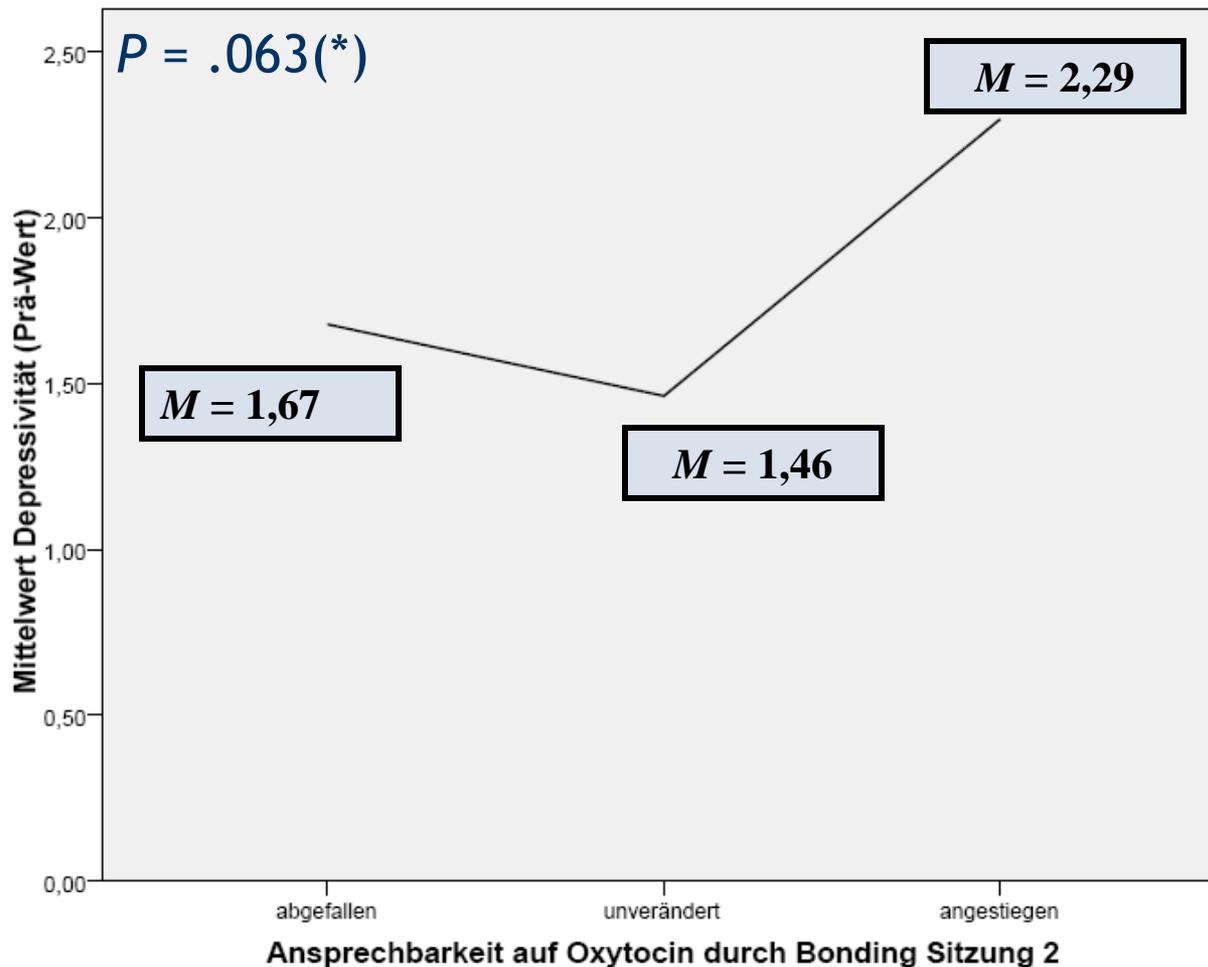
Results of ANOVA and means of the pre-value on the scale "anxiety" according to the three reactivity groups of oxytocin (second session) (n=24)



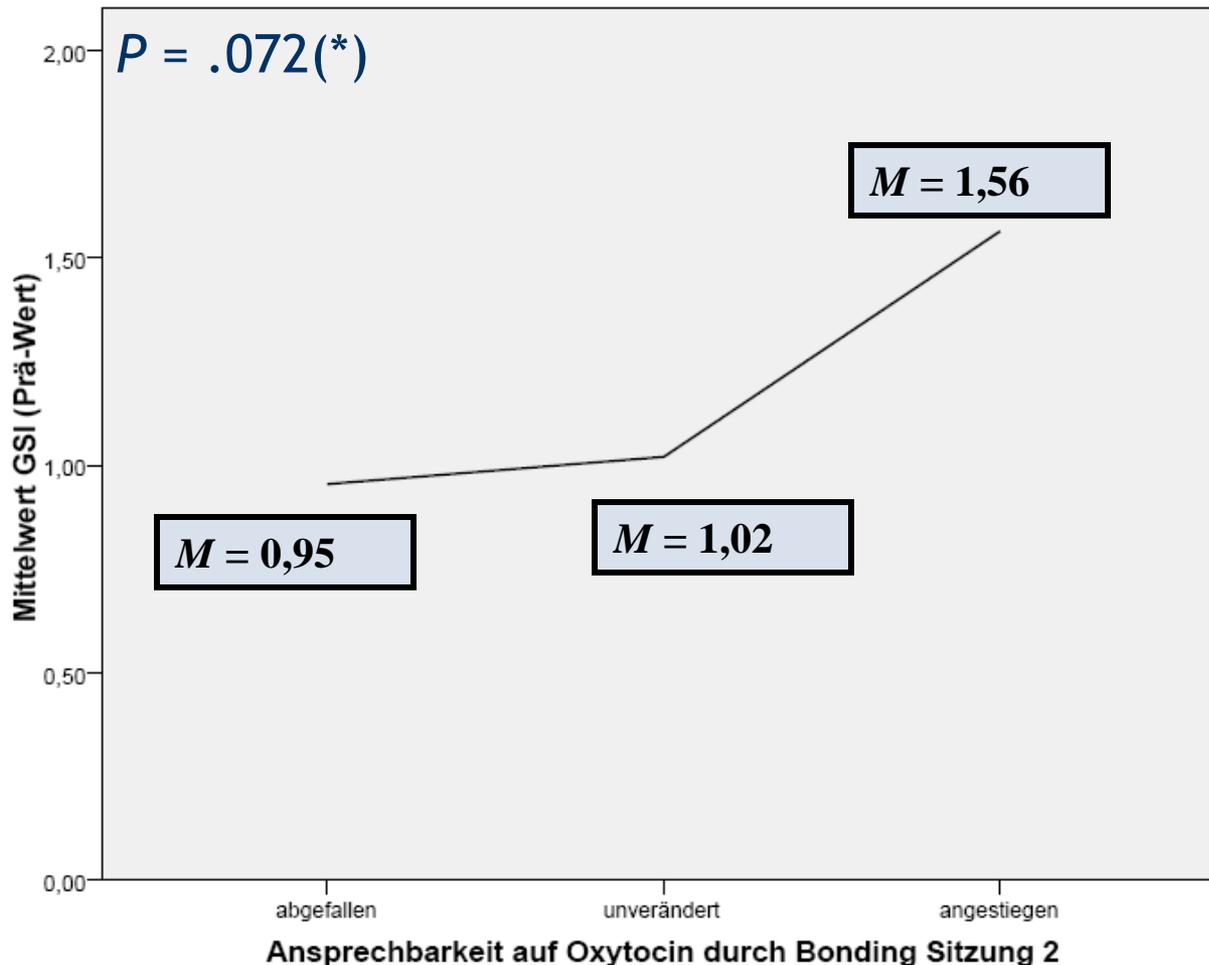
Results of ANOVA and means of the pre-value on the scale "obsessive comp." according to the three reactivity groups of oxytocin (second session) (n=24)



Results of ANOVA and means of the pre-value on the scale "depression" according to the three reactivity groups of oxytocin (second session) (n=24)



Results of ANOVA and means of the pre-value on the scale "GSI" according to the three reactivity groups of oxytocin (second session) (n=24)



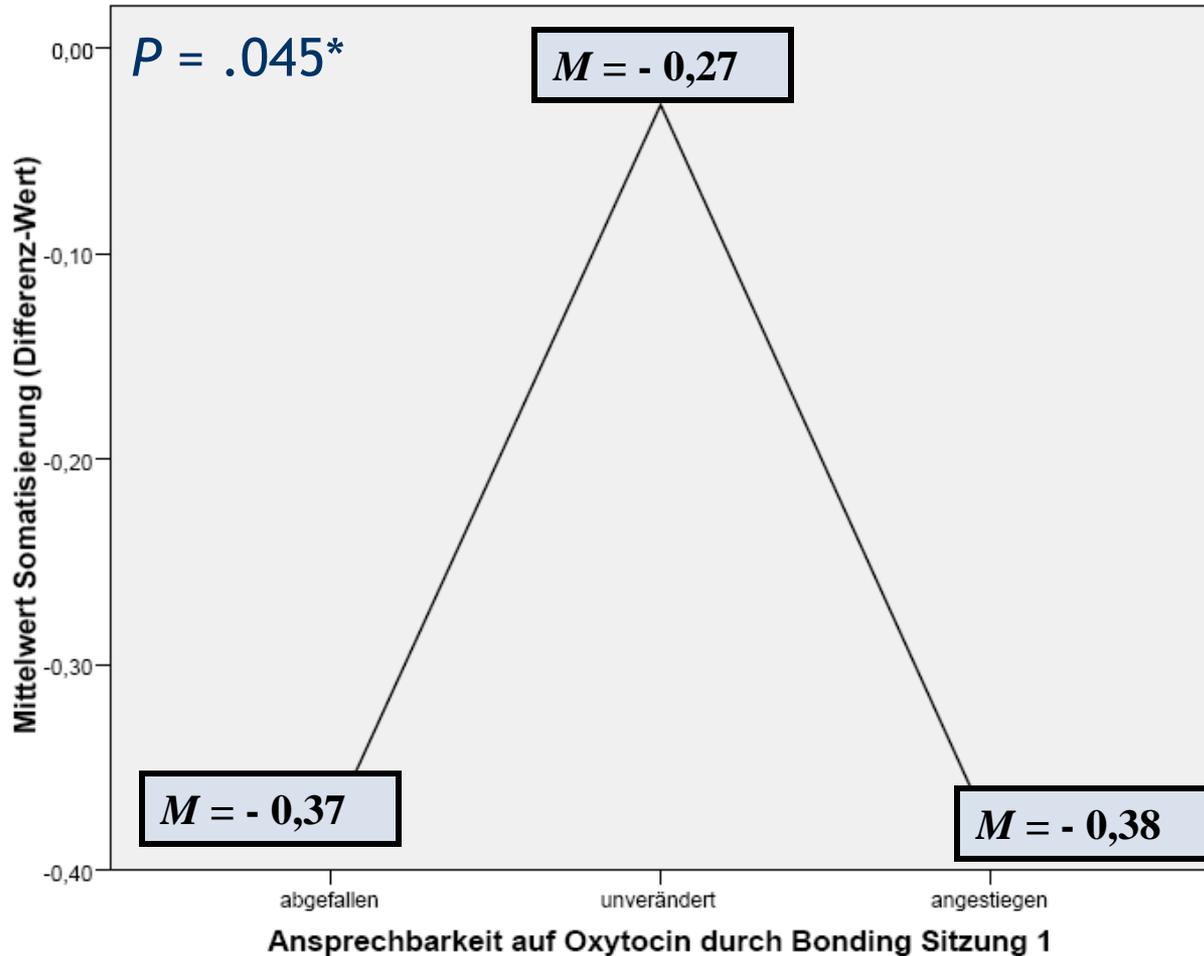


5. Hypotheses and results of the current study

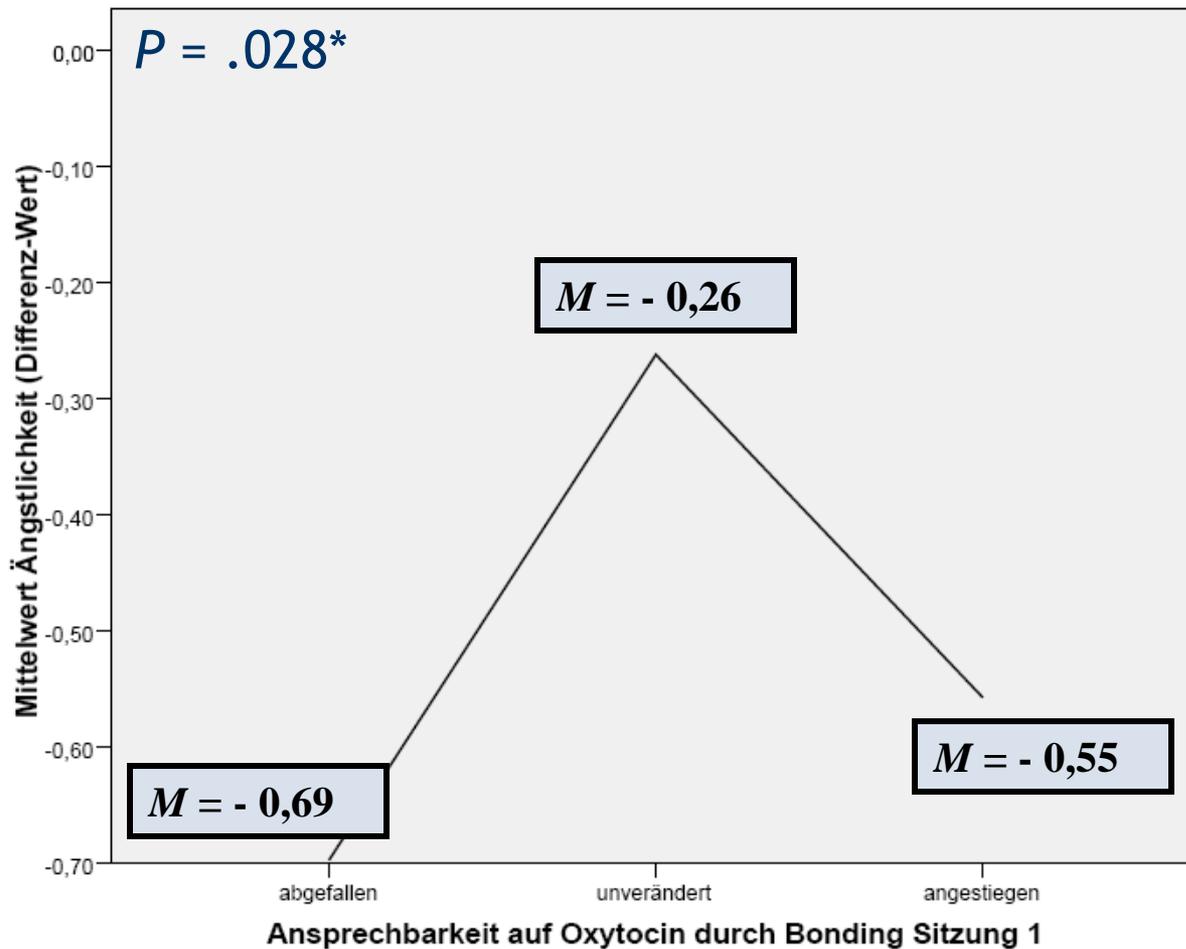
Hypotheses 2

- **Improvements** in the subjective emotional states (differences in SCL-90 R) are associated with the responsiveness of oxytocin during the *first* and the *second* appointment

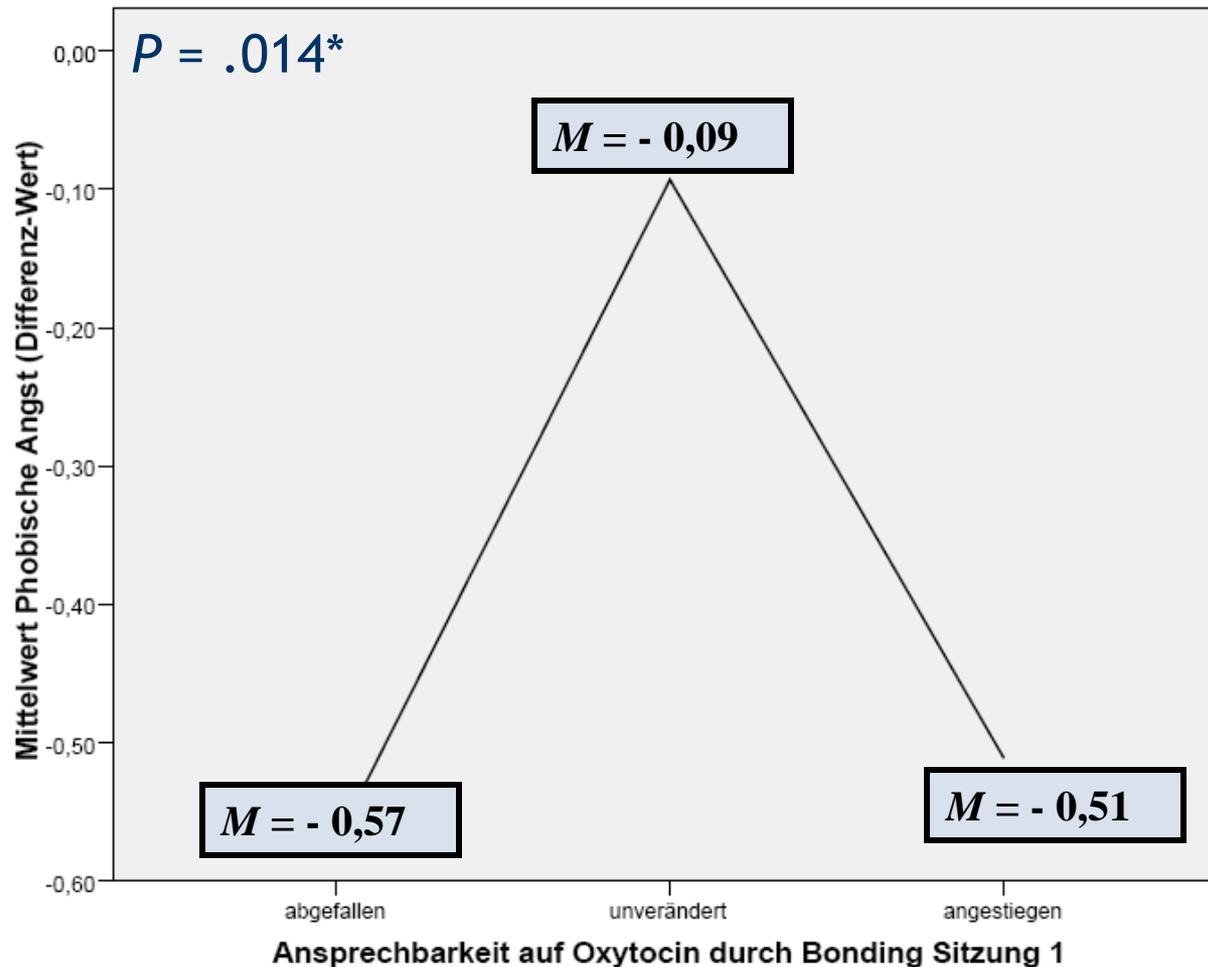
Results of ANOVA and means of the dif.-value on the scale "somatization" according to the three reactivity groups of oxytocin (first session) (n=38)



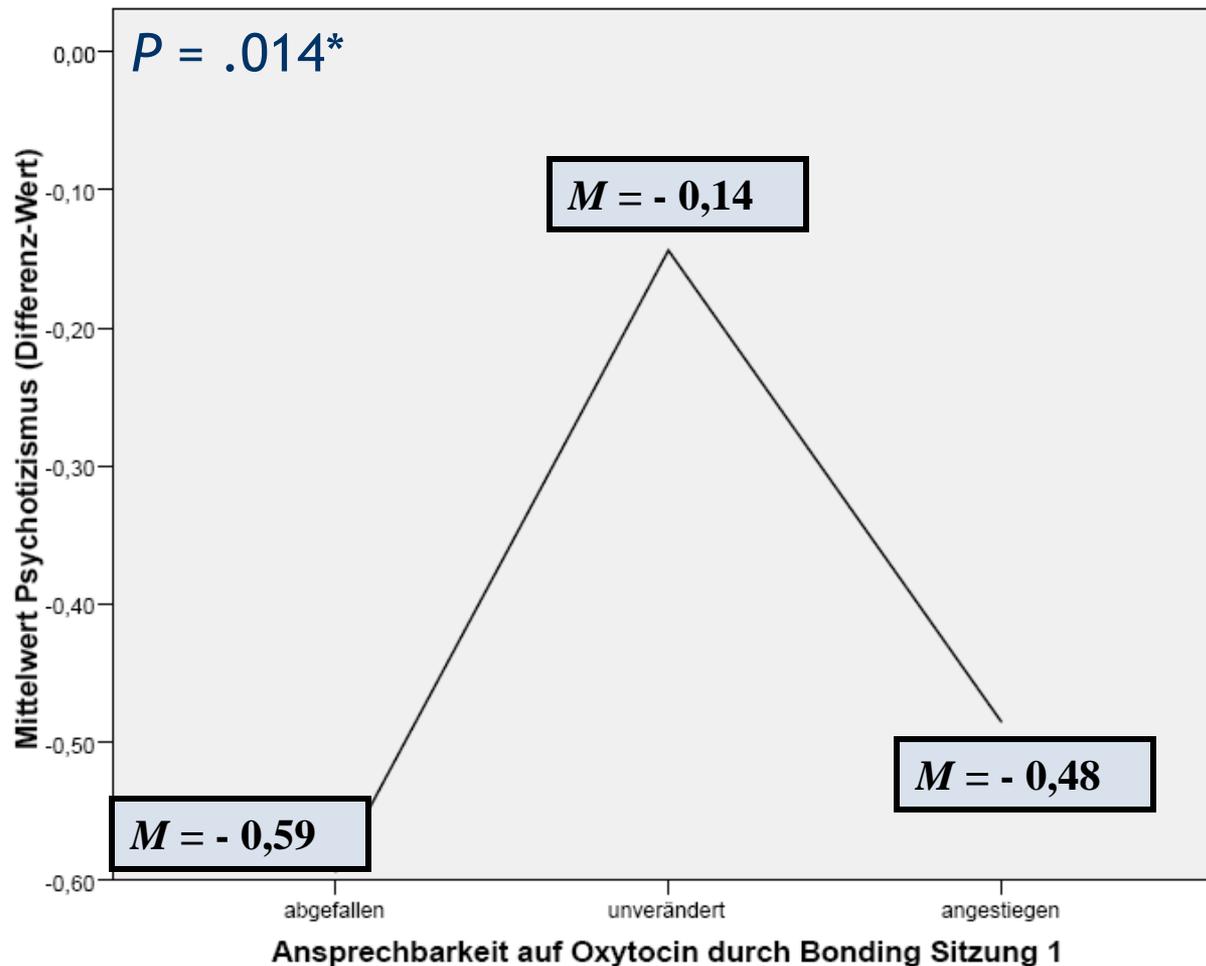
Results of ANOVA and means of the dif.-value on the scale "anxiety" according to the three reactivity groups of oxytocin (first session) (n=38)



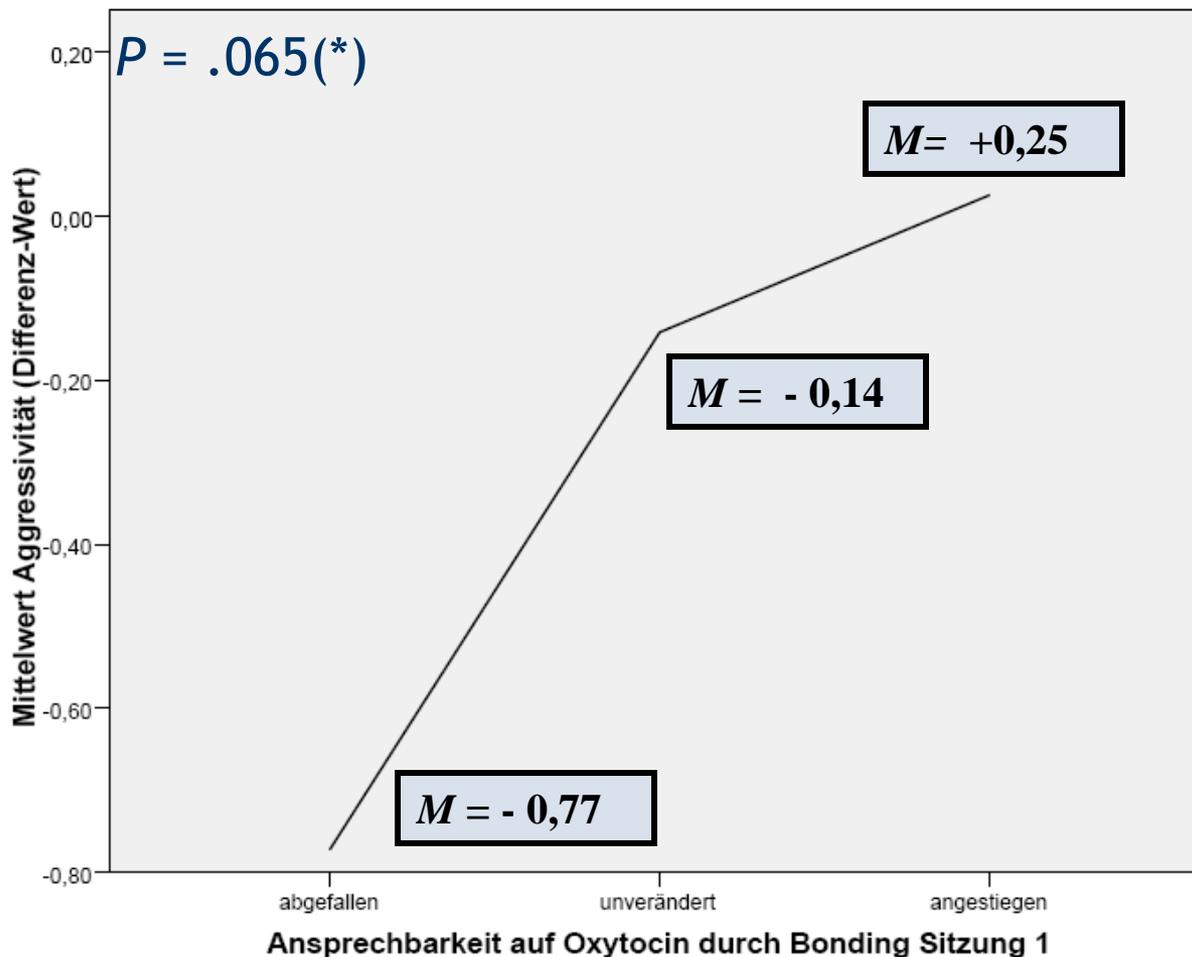
Results of ANOVA and means of the dif.-value on the scale " phobic anxiety" according to the three reactivity groups of oxytocin (first session) (n=38)



Results of ANOVA and means of the dif.-value on the scale "psychoticism" according to the three reactivity groups of oxytocin (first session) (n=38)

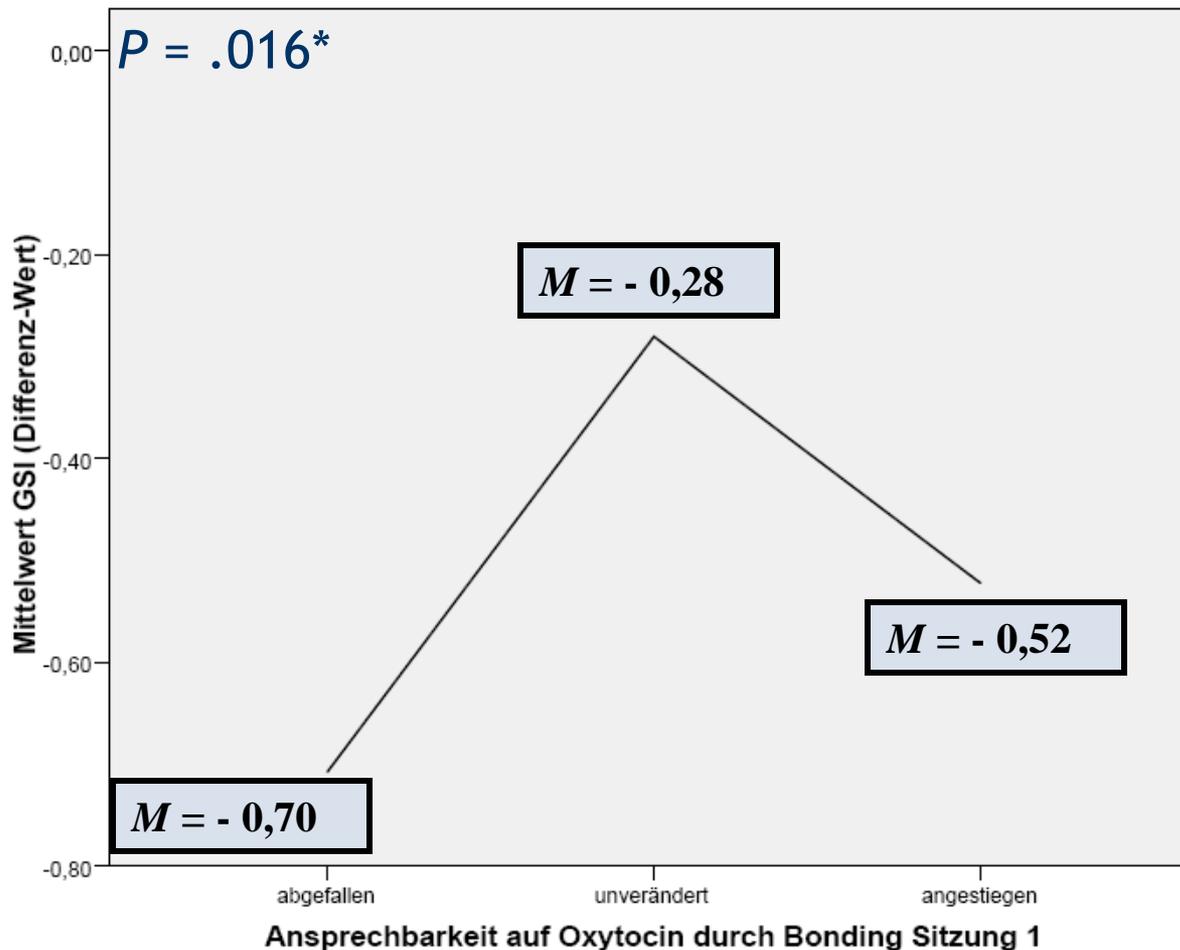


Results of ANOVA and means of the dif.-value on the scale "hostility" according to the three reactivity groups of oxytocin (first session) (n=38)



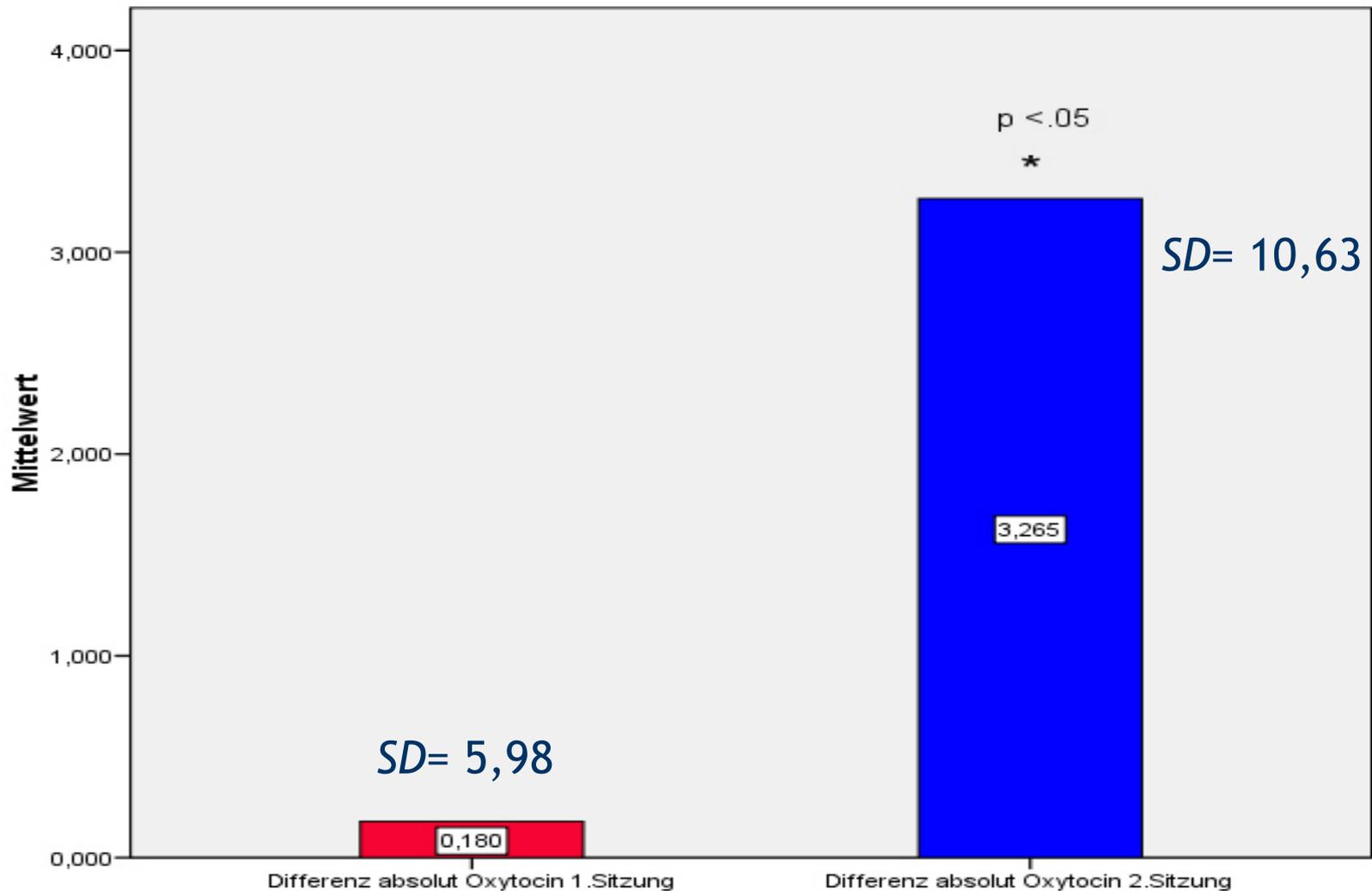


Results of ANOVA and means of the dif.-value on the scale "GSI" according to the three reactivity groups of oxytocin (first session) (n=38)





Mean values of the absolute oxytocin differences between the first and second session in comparison (n = 26)





5. Hypotheses and results of the present study

Hypotheses 4

- Improvements in subjective emotional states (differences in SCL-90 R) are associated with a change of oxytocin reactivity (diff.2 - diff.1)



...unfortunately they are not...



6. Criticism

- no control group
- influences of other therapeutic interventions, especially concerning the second session (6-8 weeks apart from the first session), cannot be separated from bonding during an inpatient treatment
- males and females different confounders
- other possibly confounding variables yet unidentified?
- no information, how stable changes of oxytocin reactions are over time beyond the hospital treatment



7. Implications for future research

Replication of the study results under consideration of the following improvements

- a) Inclusion of *control group(s)* and a more sophisticated design
- b) Selection of a more *homogeneous sample* (age, sex, diagnoses)
- c) Application of more differentiated measurements for the attachment styles (AAI?) or at least two different questionnaires given **before** and **after** clinical treatment
- d)
 - Is the higher oxytocin level at the end of therapy stable over time?
 - Are other forms of psychotherapy able to achieve similar or even better results concerning neuroendocrinology?
 - What relations with bonding can be observed with the neuropeptide vasopressin?



Thank you for your attention !





Questions ???

Please ask ! 😊

Contact:

Academy for Psychotherapy Hessen

Ludwigstr. 76

35392 Gießen

(Germany)

alexander.mueller@psycho.med.uni-giessen.de

Results of ANOVA and mean of the three reactivity groups of oxytocin (second session) in dependence on the dif. value "paranoid ideation" (n =24)

