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Behavioral and Physiological Effects of Equine-assisted Early Intervention for Mother- Child Dyads with Insecure Attachment

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Animals, including horses may be valuable partners in many activities, pedagogy and therapy. Contact between humans and animals can facilitate an oxytocin secretion that, as a consequence, may alleviates stress-responses, increases social orientation and that supports attachment and caregiving. These mechanisms can be utilized in animal-assisted therapy, for example, to enhance trust between client and therapist and to help increase attachment security in clients with insecure attachment. In this study we compared the effects of an equine-assisted intervention with a conventional play-based intervention for mother-child dyads with insecure attachment, insecure caregiving and child dysregulation. Twenty mother-child dyads (with infants 12-24 months of age), with at least one part of the dyad showing an insecure attachment, were randomly assigned to eight weekly sessions of either equine-assisted or play-based intervention. Effects on mothers' caregiving behavior and physiology and on the relationship between clients and therapists were assessed via behavior coding, salivary cortisol, heart rate and heart rate variability measures. Mothers and their infants in the equine-assisted intervention had more body contact with each other ($p \leq 0.001$), a trend toward more vocal exchange ($p = 0.083$), and mothers showed a higher sympathetic activation, indicated by a higher heart rate ($p = 0.003$). In the play-based intervention, mothers showed greater parasympathetic activation than in the horse group, indicated by higher heart rate variability ($p = 0.004$) as well as enhanced rapport between mothers and the therapist ($p = 0.016$). We conclude that the main effect of the horse-assisted method was increasing positive arousal by the mother and child doing something exciting together, thus triggering attentiveness towards the child, indicated by higher rates of caregiving behavior, such as proximity and vocal contact. In contrast, the play-based intervention promoted a relaxed environment which allowed the therapists and mothers to engage more with each other. Hence, depending on intervention goals, a combination of equine-assisted and play-based interventions might be an optimal approach.

Keywords: equine-assisted intervention, early intervention, equine-assisted therapy, animal-assisted intervention, attachment, caregiving

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The primary caregiver functions as a secure base from which the child can explore the world (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1988; George & Solomon, 2008). Stress buffering in the mother-child dyad is mainly achieved by a fine-tuned mutual and complementary coordination between the attachment behavior of the infant and the caregiving behavior of the primary caregiver (Beetz, Kotrschal, Turner, Hediger, & Unväs-Moberg., 2011; Diamond, 2001). Reliable and sensitive primary caregivers are the main agents for the development of "secure attachment", i.e., a primary social representation (the "internal working model") on the side of the child characterized by trust in the emotional availability of the attachment figure in case of need (Ainsworth et al., 1978; Bowlby, 1953; Beetz et al., 2011; Bretherton & Munholland, 2008). Such relationship representations help to "anticipate, interpret, and guide interactions with partners" (Bretherton & Munholland, 2008) later in life as they allow the person to imagine interactions with others based on previous experiences (Bretherton & Munholland, 2008).

In the case of sub-optimal caregiving, the fine-tuning of interacting with the child will be affected, resulting in "insecure attachment", with its sub-classifications "insecure- avoidant"," insecure-ambivalent" or "disorganized" (George & Solomon, 2008; Main & Solomon, 1990).

The neuropeptide oxytocin was found to play a central mediating role in the primary caregiver-offspring relationship (Heinrichs, Dawns, & Domes, 2009). Oxytocin is released during labor, breastfeeding, physical contact in combination with positive emotions, sex, as well as during positive social contact (Diamond, 2001; Handlin et al., 2009; Heinrichs et al., 2009; Julius, Beetz, Kotrschal, Turner, & Unväs- Moberg, 2013; Stock & Uvnäs-Moberg, 1988; Turner, Altemus, Enos, Cooper, & McGuinnes, 1999; Unväs-Moberg, 1997a, 1997b; Unväs-Moberg, Bruzelius, Alster, & Lundeberg, 2008). Oxytocin is a calming agent, mediates trust and social interest and supports the parent-infant bond; in fact, oxytocin has a strong antagonistic effect on stress systems (reviewed in Beetz, Unväs-Moberg, Julius, & Kotrschal, 2012a).

Adolescents and adults with secure attachment are well able to cope with emotional and behavioral stress (Cooper, Shaver, & Collins, 1998; Diamond, 2001; Julius et al., 2013; Mickelson, Kessler, & Shaver, 1997) and are strengthened by the emotional social support they are able to accept from others. In contrast, individuals with insecure or disorganized attachment may exhibit dysregulated stress and calming systems (Diamond 2001; Julius et al., 2013). This could explain why individuals with insecure, and more so with disorganized attachment, may be even stressed in their company (Julius et al., 2013; Maunder, Lancee, Nolan, Hunter, & Tannenbaum, 2006). Later in life this is linked to difficulties in engaging in trusting and emotionally supporting partnerships.

Interactions throughout life can alter a person's internal working models (Bowlby, 1988; Zilcha-Mano et al., 2012). Hence, attachment-based interventions may indeed be able to affect attachment representations in a positive way, towards more security (Bowlby, 1988; Julius et al., 2013; Zilcha-Mano et al., 2012). Animal-assisted intervention may be particularly effective, because of the close physical contact between the client and the animal. This contact may activate the oxytocin system which then induces positive physiological and psychological effects, such as reduced fear and stress, increased trust and sociability (Beetz et al., 2012a; Julius et al., 2013). Also, the interactions between therapist and animal may suggest to the client that the therapist is a caring and attentive person, supporting a good rapport towards the therapist (Zilcha-Mano et al., 2011). Furthermore, Levinson (1969 cit. in Zilcha-Mano et al., 2011) claimed that

companion animals are natural objects of attachment and the internal attachment representations towards humans are usually not spontaneously transferred to animals (Beetz et al., 2011; Beetz, Julius, Turner, & Kotrschal, 2012b; Zilcha-Mano et al., 2011), which is particularly important for persons with an insecure attachment (Wedl, Beetz, Julius, & Kotrschal, 2015). A companion animal might "facilitate the formation of an attachment bond that can be relatively free of maladaptive projections" (Zilcha-Mano et al., 2011). This could consequently promote a secure relationship to the therapist himself. Finally, the presence of an animal could increase the motivation of clients in therapy (Wohlfarth, Mutschler, Beetz, Kreuser, & Korsten-Reck, 2013).

We presently studied the effects of an equine-assisted intervention (EAI) compared to a play-based intervention (PBI) in mother-child dyads with insecure attachment, suboptimal caregiving and stress coping as well as dysregulations on side of the child. None of the participating mother-child dyads had riding experience. We therefore expected that engaging in such a mutual and probably also challenging activity within a secure environment would support caregiving behavior like protection and mutual referencing and that the horse would specifically facilitate mutual attention towards each other. If so, attachment and caregiving behaviors like physical contact, vocal exchange, and positive reinforcement should increase over the period of the intervention. As a base for such changes in mother-child interactions, we expected a calming effect, in both, mother and child, due to the contact with the animal, potentially due to the activation of the oxytocin system (Beetz et al., 2012a, 2012b; Julius et al., 2013). Hence, cortisol levels and heart rates should be lower within the EAI-group than within the group receiving PBI.

Animal-assistance usually supports trust and stability in the relationship between clients and therapists (Julius et al., 2013). Contact with animals may therefore affect the client's perception of the therapist, leading to an enhanced rapport (Zilcha-Mano et al., 2011). We predicted that the vocal exchange between mothers and therapists would be more frequent in the horse-group as compared to the play-group.

Methods

The study was conducted at the children care centre "Bunter Kreis" in Augsburg, Germany. This care center is certified to keep horses on its premises and to offer horse assisted interventions.

Subjects

Twenty mother-child dyads voluntarily participated in this study. More than half of participating dyads were pointed towards our study by their social workers. The other participants found their way to our project via our newspaper adverts, where we aimed at recruiting mothers who felt challenged or had children with behavioral dysregulation, such as excessive crying, eating or sleeping problems. Dyads came from a risk-prone background with prevailing psychological disorders, a history of physical or sexual abuse, drug addiction, and teenage pregnancy. Two mothers participated with their foster children. In these two cases the children lived with their new family already for more than ten month. At the onset of our study mothers were 19 to 46 years of age (median: 27.5), children (12 girls, 8 boys) 11 to 24 months (median 16.55 months).

One week before the therapeutic intervention started, the attachment representations of children and mothers were assessed via the Strange Situation Procedure (Ainsworth et al., 1978) and the Adult Attachment Projective (George, West, & Pettem, 1999) and coded by a reliable coder of our research team (A.B.). Dyads were randomly assigned either to the equine-assisted intervention group or to a play-based intervention group as a control (10/10). Therefore, the PBI-group included

one mother with a secure attachment representation (but an insecurely attached child), three with dismissing, three with preoccupied and three with disorganized attachment representation. The EAI-group consisted of one mother with secure attachment (also with an insecurely attached child), four with dismissing, one with preoccupied and four with disorganized attachment representations. The PBI-group comprised of two children with secure attachment, three with insecure-avoidant and five with disorganized attachment representation. In the EAI-group five children showed secure attachment, one insecure-avoidant and four disorganized attachment patterns. All dyads attended one intervention session per week for the duration of eight weeks and participated in additional data collection sessions once before the start of the intervention and directly after the end of the intervention phase.

Therapists

Two therapists, one psychologist and one occupational therapist, both with extensive work experience in equine-assisted and play-based interventions conducted the interventions in our study. To avoid possible influences of the therapists' styles, each therapist was randomly assigned to 10 mother-child dyads and worked with five dyads in the equine-assisted intervention and five dyads in the play-based intervention.

Equine-assisted Intervention

Facilities. The equine-assisted intervention was conducted at a fenced area (20 x 20 meters) or in a riding pavilion (10 m diameter) at the premises of the care center. Prior to our study the equine-assisted intervention had been a long-established program at this hospital.

Horses and equipment. All of the three trained therapy horses that were involved in our study belonged to one of the therapists. On days off work they spent their time in an open stable where they were kept together with other horses in a herd. On days with scheduled therapy sessions, they were brought to the premises of the hospital, where they were kept in individual box stalls. For the sessions, the horses were equipped with a well-fitted halter, a leading rope, a thick saddle pad and a vaulting girth.

Procedure

Each session of the equine-assisted intervention had three main phases.

During a welcoming phase, mother and child were given the opportunity to approach the horse and pet or talk to it in front of the stable. Thereafter, the therapist, the horse and the mother with her child went to a fenced outdoor riding area. The horse was led by a trained horse-leader. The therapist accompanied mother and child on foot. In the intervention phase, the child, the mother or both sat on horseback. Throughout the sessions, mother, child and therapist engaged in different mutual tasks, such as singing, blowing soap bubbles, playing with balloons, rings, or other toys. The main goal was to induce positive interactions between mother and child. Furthermore, therapists mirrored and verbalized the child's feelings or needs, to make them more transparent for the mothers. This aimed at facilitating caregiving behavior in mothers. After the intervention phase, the horse was returned to the stable where mother and child could feed the horse with bread or carrots to say good-bye.

During the session two students were present. One student operated a digital video camera the other one collected the saliva samples. For videotaping the student accompanied mother, child and the horse at a short distance of about three meters. Only for saliva sampling the second student approached mother and child (for details, please see the section about saliva sampling). Otherwise, the students remained as passive as possible.

Play-based Intervention

Facilities. The play-based intervention was conducted in rooms of approx. 20 m² located in one of the care center buildings close to the riding area. The rooms were especially adapted for this kind of therapy and were furnished in friendly and natural shades. The walls were painted in light yellow and a green, and a fluffy carpet covered the floor. The room contained different toys (dolls, cars, toy blocks, instruments etc.), chairs and a table.

Procedure. After arrival, mother and child were able to freely choose a play activity of their own liking. The therapist was also involved in playing, but adjusted to the interests of mother and child. As in the horse intervention group, the focus was on a positive interaction between mother and child and the mirroring of the child's emotions and needs. During the session a student equipped with a digital video camera and a saliva-collection set was present in the room for data collection (see below). During videotaping the student remained inconspicuous in a corner of the room. Only for saliva sampling the student approached mother and child. If children approached the student, she tried to stay as non-involved as possible.

Parameters Investigated

Behavioral parameters. All therapeutic sessions were videotaped and later coded with the SOLOMON Coder (Péter, 2016) for the participant's behavior: the duration of physical activity, proximity between mother and child and between therapist and child, frequency of touch between mother and child and the duration of vocal exchange between the participants.

Physiological parameters. To obtain information about the effects of the therapy situations on the modulation of the hypothalamic-pituitary-adrenal (HPA) axis and the sympathetic-adrenal-medullary (SAM) axis, we measured salivary cortisol and heart rate.

Cortisol. Saliva samples (Vining & McGinley, 1987; Woodside, Winter, & Fisman, 1991) were collected via salivettes (Sarstedt, Etten-Leur, the Netherlands) at the beginning, after 20 minutes and after 40 minutes of the therapy session. As cortisol secretion follows a circadian rhythm (Mommersteeg, Keijsers, Heijnen Verbraak, & Doornen, 2006) mother-child dyads obtained their sessions at the same time of the day each week. Saliva samples were frozen at -20 degrees and later analyzed by enzyme immunoassay (EIA), following the procedure described in Beetz et al. (2012b). Cortisol data were integrated via calculating the area under the curve with respect to the increase (AUCi) for each session (Beetz et al., 2011; Pruessner, Kirschbaum, Meinlschmid, & Hellhammer, 2003). Unfortunately, no AUCi-values were calculated for children as too many samples were of poor quality (e.g. salivettes of the children did not contain enough saliva).

Mothers were instructed not to eat prior to the intervention and to avoid physical exercise. This should ensure that the first salivary measure of the day could serve as a baseline value.

Heart rate. To measure the impact of the therapeutic sessions on the SAM-axis heart rate (HR) data were collected from which heart rate variability (HRV) was calculated (Kučera, 2006). Therefore, both, mother and child carried a POLAR ® RS800CS heart rate monitor, including a chest belt and a POLAR ® watch as a data logger. This system logged 15-240 beats per minute (bpm). Before the chest belts were put on, the electrodes were carefully moistened with a wet sponge to improve skin contact. The obtained heart rate data were entered into the Polar ProTrainer software program and automatically error corrected via the program's algorithm. Datasets with more than 5% faulty or missing data were taken out of the sample. A high error rate was found in the heart rate data lines for the toddlers, as although using the smallest version of chest belts available,

they had to be additionally shortened to fit the participating toddlers in size. Therefore, the contact between electrodes and skin was not ideal. As a consequence, toddler heart rates were excluded from further analysis.

From the mothers' heart rate data, different indices for HRV were calculated, using the Polar ProTrainer program:
pNN50: Percentage of successive interbeat intervals that differ in more than 50 percent. The higher the scores, the higher is the parasympathetic activity and thus relaxation (Curic, Männer, Meißner, & Morawetz, 2007; Hottenrott, Hoos, & Esperer, 2006). RMSSD: This is a measure for rapid, high- frequent fluctuations of heart rate. Differences in successive interbeat intervals are calculated. The higher the scores the higher is the parasympathetic activity and thus relaxation (Curic et al., 2007; Hottenrott et al., 2006).

HR and HRV values were calculated for the entire therapy sessions and the phases between salivettes 1 and 2 (cortisol sampling) and between salivettes 2 and 3.

Ethical Statement

The study received approval from the "Deutsche Gesellschaft für Psychologie" (DGPs) ethics committee. This comprises risk assessments for human participants, animal wellbeing, the interventional setup, and the conducted study.

Data Analysis

Data were analyzed via PASW SPSS 18.00 by applying non-parametric tests: Mann-Whitney U-Test for group comparisons and Friedman-Tests for the calculation of changes over time.

Results

Caregiving Behavior – Body Contact

In all sessions mother and child had significantly more body contact in the equine-assisted intervention group (EAI) (Mann-Whitney U, $Z = -3.78$, $p \leq 0.001$; figure 1). But we found no significant changes regarding the duration of body contact between mother and child or the frequency of touching each other over the course of the eight sessions in both intervention groups (Friedman: body contact: EAI: $Chi^2 = 6.333$, $df = 7$, $p = 0.501$; play-based intervention (PBI): $Chi^2 = 5.5$, $df = 7$, $p = 0.599$; touching frequency: EAI: $Chi^2 = 6.415$ $df = 7$, $p = 0.497$; PBI: $Chi^2 = 7.584$ $df = 7$, $p = 0.371$).

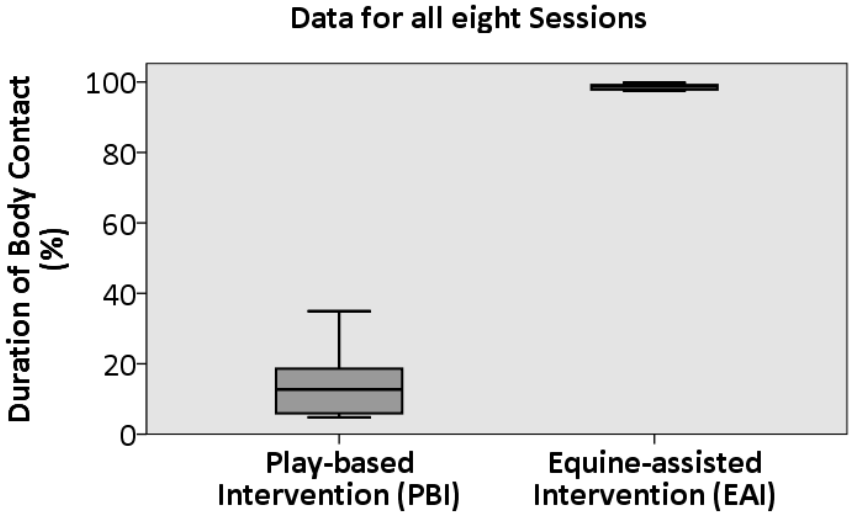

Figure 1. Duration of body contact between mothers and children (in percent) across all eight sessions of the interventions grouped by intervention type.

Caregiving Behavior – Vocal Exchange between Mother and Child

By tendency, more vocal exchange between mothers and children occurred in EAI as compared to PBI (Mann-Whitney U, Z = -1.436, p = 0.083). Particularly in sessions 3, 5, 6 and 7 mothers of the EAI-group spoke, by tendency, more to their children than mothers in PBI (sessions 3 and 6: Z = -1.814, p = 0.038; session 5: Z = -1.587, p = 0.062; session 7: Z = -1.587, p = 0.072).

HPA-Axis Modulation: Salivary Cortisol

We found no significant differences in salivary cortisol between the two groups at time point one, two or three, over all eight sessions. However, the AUCi values of mothers revealed a difference in session 4: values for AUCi of mothers were higher in the PBI (Mann-Whitney U, Z = -1.944, p = 0.027), indicating a greater increase of cortisol levels over the course of the therapy session.

SAM-Axis Modulation: Heart Rate Data

Mothers of the EAI-group showed a significantly higher heart rate than mothers of the PBI-group (Mann-Whitney U, Z = -2.685, p = 0.003; figure 2), but they also sat significantly less and walked more (Mann-Whitney-U, Z = -3.356, p ≤ 0.001). Heart rate variability (pNN50, RMSSD) of mothers was significantly higher in the PBI (Mann-Whitney U, pNN50: Z = -2.570, p = 0.004; RMSSD: Z = -2.797, p = 0.023; figure 3). These findings indicate overall a greater parasympathetic activity and less activation in the PBI-group.

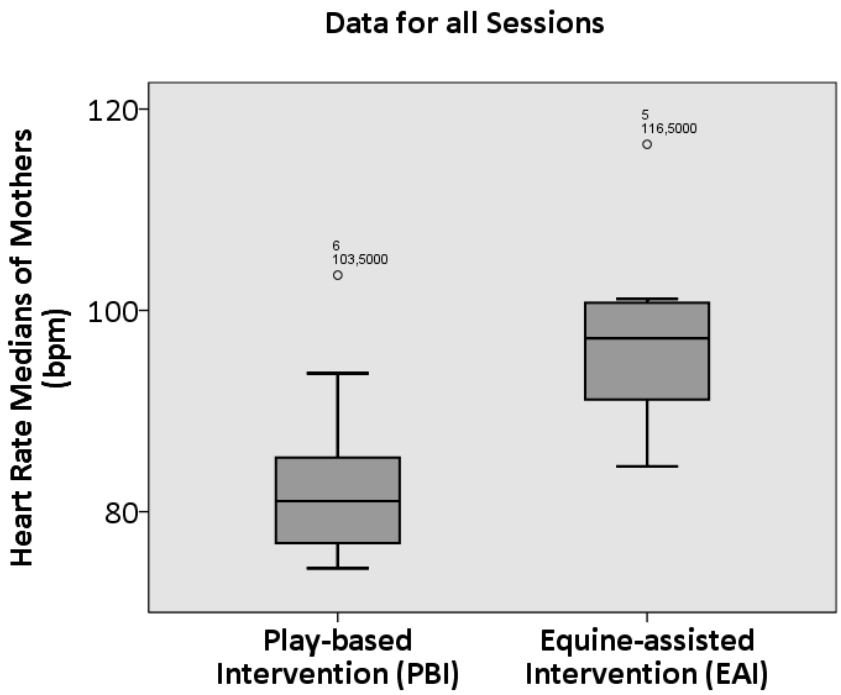

Figure 2. Median heart rate values of mothers (in beats per minute, bpm) for all sessions grouped by intervention type.

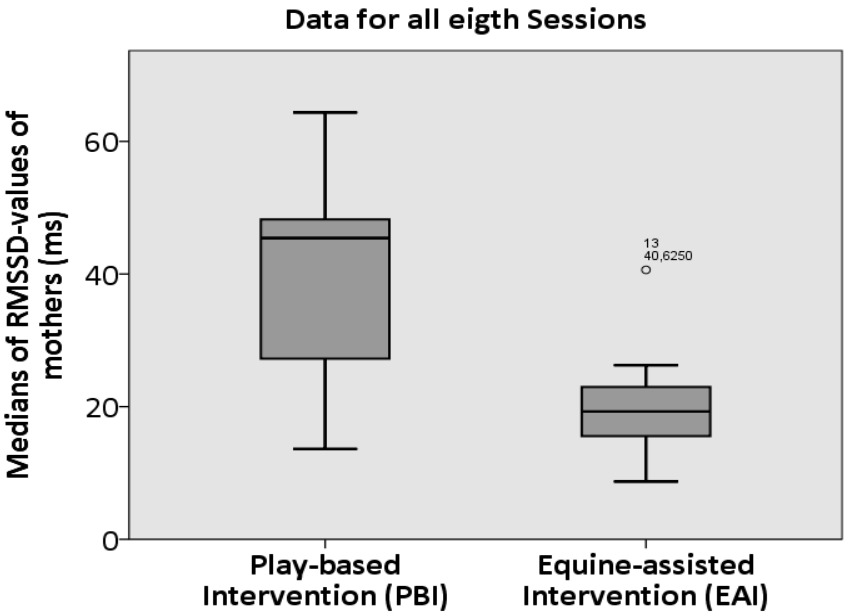

Figure 3. Boxplot showing medians of RMSSD-values (ms) of mothers across all eight intervention session grouped by intervention type.

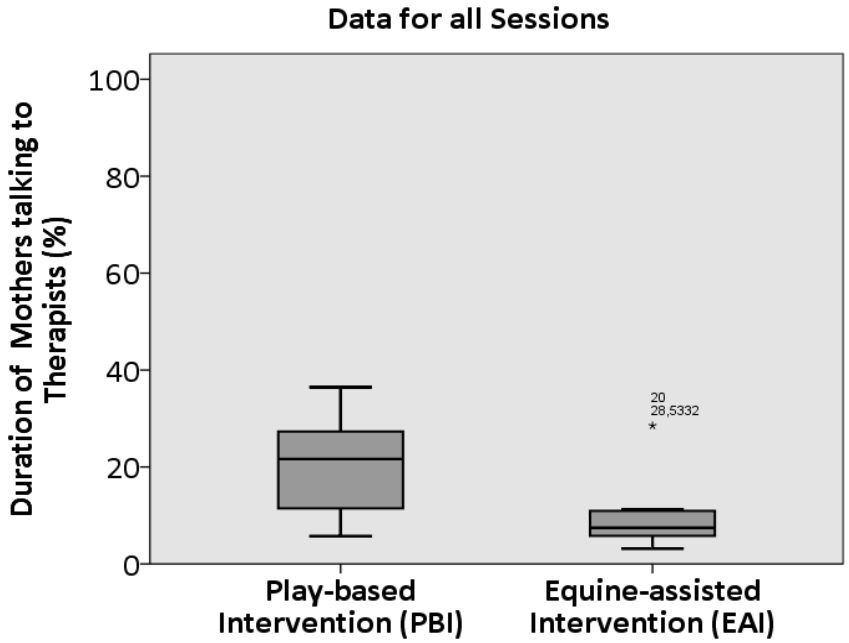

Figure 4. Boxplot showing the medians of the duration of mothers talking to therapists (in percent) across all interventional sessions arranged by intervention-group.

Interactions with the Therapist.

Across all eight sessions, therapists in the EAI-group held more body contact with the children as compared to the PBI-group (Mann-Whitney U, $Z = -3.326$, $p \leq 0.001$). Furthermore, our findings show that mothers in PBI talked significantly more to the therapist than mothers in EAI (Mann-Whitney U, $Z = -2.419$, $p \leq 0.007$; see figure 4).

Discussion

In this study we found significant differences in maternal behavior between an equine-assisted intervention (EAI), compared to a conventional play-based intervention (PBI). During the EAI, mothers found more possibilities to hold body contact, and (by tendency) to talk to their children. This pattern remained relatively constant across the eight sessions. Two factors may contribute to this pattern: first, many children were not yet able to walk on their own and were carried by their mothers or led by the hand when approaching the horse or when walking through the riding grounds. Furthermore, EAI as such provides more possibilities for mothers and children to spend time in body contact e.g. when sitting together on horseback, or when mothers safeguarde their children while riding. Being carried, physical contact, rhythm and furthermore being part of motherly activity establishes an atmosphere of togetherness (Klüwer 2008). Anisfeld, Casper, Nozyce, and Cunningham (2008) showed that carrying induces motherly responsiveness and promotes attachment security on a long-term range; this seems to be promoted to a larger extent in the equine-assisted setting. Additionally, we found a trend for more vocal exchange in the EAI-setting compared to PBI. Therefore, EAI seems to provide a setting which facilitates physical and vocal contact between mothers and their children, compared to PBI. A parallel study focused on the impact of the two different interventions on maternal caregiving and maternal attitude towards the child from a psychological perspective (Beetz et al. 2015). For this study mothers answered questionnaires such as the "Maternal Attitudes towards the Own Child Questionnaire" and the "Care-Index" and completed an "Adult Attachment Projective Test" before the onset after the interventions as well as after the last session. Children's attachment patterns were tested via the "Ainsworth Strange Situation Test" prior as well as after the intervention (for more details about these methods please see Beetz et al., 2015). This study found an increase in sensitive caregiving and a decrease in controlling caregiving of the participating mothers as well as an increase in cooperative behavior of the children and a reduction of child behavior that mothers perceived as difficult. Furthermore, participating mothers improved in reading, interpreting and responding sensitively to the attachment behavior of their infants. Overall, no group differences were found, showing that both interventions contributed towards these effects. The pre-post-comparison of the Strange Situation Test results for the participating children indicated a shift towards higher attachment security: three children from EAI and one child from PBI, who were showing disorganised attachment representations before the onset of the intervention were classified as insecure-avoidant or secure after the intervention (Beetz et al., 2015).

We initially hypothesized that the EAI would mediate calming effects in participants indicated by lower salivary cortisol levels due to oxytocin-mediated effects and decreased sympathetic activity (Julius et al., 2013). However, maternal cortisol levels did not differ between the two intervention groups, nor did they change within the groups over the course of the eight intervention sessions. One possible explanation for this pattern could be that we could not exclude that some mothers arrived at the intervention site by

bike or ate shortly before the start of the session. This could have impacted our baseline measurements of salivary cortisol. Furthermore, also aspects such as weather (heat, rain) or the amount of movement could have potentially increased the cortisol levels and thus, may have counterbalanced a possible activation of the oxytocin system via touch with the horse and between mother and child.

Furthermore, we found that the mothers' heart rates were higher and heart rate variability values lower during EAI as compared to the play interventions. As mentioned above, this could be explained by the greater physical activity of mother-child dyads in the EAI. They walked more and, also when sitting on horseback, muscular stimulation (balance, coordination, balance) was higher (Klüwer, 2005, 2008) than when sitting e.g. on the ground, as this was the case a lot of the time in the PBI. Kaminski, Pellino, and Wish (2002) found higher heart rates in a dog-assisted setting, where participants did not move much. The authors explain these findings with anticipatory arousal of subjects in expectation to spend time with the animals. This could also apply to our study as the participants were not horse-experienced prior to the trial and thus may have been more excited. Furthermore, inexperience with horse handling could also have facilitated a higher attentiveness and arousal of the mothers. Thus, in contrast to other studies (e.g. Allen, Blascovich, & Menes, 2002, Allen, Blascovich, Tomka, & Kelsey, 1991; Barker, Knisely, McCain, & Best, 2005; Beetz et al., 2011, 2012b) that found a significant stress-reducing effect in an animal-assisted setting, we found a stimulating effect of EAI.

Even though we did not find an alleviation in sympathetic activity, or increase in parasympathetic activity respectively in the EAI-group, the questionnaire assessment of Beetz et al. (2015) showed that 65% of all participating mothers would have preferred the EAI to the PBI. This may reflect the greater motivational effect of animal-assisted interventions, as discussed by Wohlfarth et al. (2013).

The fact that mothers in PBI spent more time talking to the therapists seemingly contradicts studies which documented that the presence of an animal increased trust and bonding to the therapist and thus enhanced rapport between client and therapist (Julius et al., 2013; Zilcha-Mano et al., 2011). However, in our study therapists and mothers spent more time talking to the children and safeguarding them during EAI, which may have left less time for conversation between mother and therapist. Thus, the presence of the horse did not enhance rapport between mother and therapist, at least not with regard to the amount of verbal communication. However, as our findings show, EAI does provide more room for the therapist to focus on and interact with the child and for the mother to communicate with her child. Thus the therapist can serve as a model for the mother how to interact sensitively with the child.

Bearing in mind, that this was the first comparison of equine-assisted early intervention for toddlers with a standard play-based intervention, we would like to address some limitations of the current study and showing directions for future research in this field. First of all, a greater sample size would be useful to enhance generalizability of our findings. Second, the intervention was provided for only eight weeks. Carrying out such a study over a longer period of time would help to assess if there are any long-term differences in the behavioral and physiological effects of EAI and PBI. Furthermore, a long-term study could help to reveal if potential calming effects of an animal-assisted approach were masked by novelty effects of being around horses in our study. Would participants become more familiar with being around horses, thereby improving the stress alleviating effect of such an intervention?

In line with the findings of Beetz et al. (2015), our results suggest, that both, EAI and PBI, have their benefits in supporting mother-child dyads with insecure attachment. We showed that the EAI does promote different behaviors, within the therapist-mother-child triad, like physical contact between mothers or therapists and children and by tendency vocal contact between mothers and their children. Thus an equine-assisted intervention provides a setting, which could help to increase more sensitive caregiving of the mothers.

Consequently, an intervention for insecurely attached mother-child dyads could be conceptualized as a combination of equine-assisted and play-based interventions. In such a case a starting period in PBI could help to establish trust and familiarity between clients and therapists which thereafter could constitute a foundation for activities in the EAI, which then offers more opportunities for physical contact and vocal exchange between mothers and infants.

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