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MASTER THESIS

Mother-infant interaction patterns within the course of an early parenting training

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Abstract

Background: The transition to parenthood is an existential change and can lead to positive as well as negative long-term consequences. Early attachment between parent and child is one of the most important conditions for the entire later life. Numerous factors can influence early parent-child attachment. Parent education programs can support and empower parents to respond sensitively and individually to their child in order to promote the development of a secure attachment. Monitoring the effectiveness of these programs is of high importance in order to make interventions as targeted and sustainable as possible.

Objectives: This study aims to examine the mother-child interaction changes throughout the parent education program "Sicherer Hafen".

Methods: This Panel study with repeated measurement analysed 51 videos of mothers aged 21 to 40 years and their children aged 2 to 16 months (N=17). Using the method *Coding Interactive Behaviour*, mother-infant interaction was evaluated at three time points by three independent coders. An interrater- reliability assessment and repeated measurement ANOVA with post-hoc test was performed.

Results: The assessment shows a significant positive improvement of the mother-child interaction patters in the categories *Parent intrusiveness*, *Child social involvement* and *Dyadic reciprocity*. For the categories *Parental sensitivity* and *Child withdraw*al did no significant results were found, but a positive trend based on the mean scores can be observed.

Conclusion: This study shows the positive course of the mother- child interaction patterns within the parenting training "Sicherer Hafen". Nevertheless, no causal associations to the parenting training, or other influencing factors can be drawn. Further studies, including the mother's attachment experiences, the child's temperament, the relationship to the partner, and the contents of the counselling, are recommended. Further establishment of such prevention courses is essential to protect children, to support their right to health and to prevent maltreatment and violence.

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List of Abbreviations

BMFSJ	Bundesministerium für Familie, Senioren, Frauen und Jugend - Federal Ministry for Family Affairs, Senior Citizens, Women and Youth
BELLA	Befragung zum seelischen Wohlbefinden und Verhalten - Mental well-being and behaviour survey
CI	Confidence Intervall
CIB	Coding interactive behaviour
EPB	Developmental psychological counseling - Entwicklungspsychologische Beratung
df	Degree of freedom
GABI	Group attachment – based intervention
ICD-10	Interantional Classification of Diseases
IRR	Inter-rater reliability
ICC	Intra- Class- Correlation
KiGGS	Kinder- und Jugendgesundheitssurvey - Child and adolescent health survey
M	Mean
n	Sample size
SD	Standard deviation
rmANOVA	repeated measurement analysis of variance
SPSS	Superior Performing Software System
STEP	Systematic Training for Effective Parenting
UKE	Universitätsklinikum Hamburg-Eppendorf
WHO	World Health Organisation (Weltgesundheitsorganisation)

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1 Introduction

The constitution of the World Health Organisation (WHO) states that everyone has the right to the highest attainable standard of health (WHO, 2020, p. 1). Even before birth, the health of an infant is influenced by numerous determinants. Positive as well as negative influences promote or hinder the healthy development of a child. The transition to parenthood also represents an incisive life event and has a lasting impact on the parents as well as the child. The mutual interactional behaviour between mother and child creates a relationship and an attachment that can influence the health throughout the entire life time (Egle & Hardt, 2014, p. 108).

Children, growing up in disadvantaged families, are significantly more often mentally and physically ill (Egle & Hardt, 2014, p. 111). Misunderstandings or small interferences, which often start in early childhood and are not recognised and coped with by the parents, lead to further stressors (Ziegenhain & Derksen, 2006, p. 63). Stress and other burdens lead to impairments in the mother-child interaction. This effect of impaired mother-child interactions is a dysfunctional mother-child relationship and is described as an impaired attachment (Grossmann & Grossmann, 2020). For parents it can be difficult to ask for help in this matter. It can also be difficult to realise and understand that raising and caring for one's own child or children is challenging or cannot be done without additional help and support. The decision to claim help from a family counselling centre is also not easily made. Feelings of guilt, social pressure and the feeling of being bad parents accompany many parents and hinder them from asking for help (Ziegenhain & Derksen, 2006, p. 140).

In order to strengthen disadvantaged families and enable them to access their right to health, early prevention measures are offered by the government or from private investors. Furthermore, parent education programmes offer knowledge about developmentally beneficial interaction behaviour, which promotes the attachment relationship between the child and its parent. Such programs also help to prevent maltreatment and violence, as children have the right to live free from

violence (Bundesgesetzblatt, 2000, p. 1479). According to the BMFSJ (Bundesministerium für Familie, Senioren, Frauen und Jugend - Federal Ministry for Family Affairs, Senior Citizens, Women and Youth) the evidence on the effectiveness of such prevention programs is poor (BMFSFJ, 2021, p. 31).

Approximately 58.500 children under the age of 3 live in Hamburg, (Behörde für Arbeit, Familie Soziales und Integration, 2017, p. 11), almost 20% of whom are affected by poverty and thus grow up in a disadvantaged family situation(ebd., p. 42). The Hamburg parenting training "Sicherer Hafen" offers an analysis of the parent-child interaction in addition to providing knowledge about child development. Video analysis and developmental psychological counselling (Entwicklungspsychologische Beratung - EPB) are used for targeted prevention and the promotion of maternal skills. The scientific evaluation of this parent education programme is the responsibility of the Universitätsklinikum Hamburg Eppendorf (UKE). One part of the evaluation, the assessment of the mother-child interaction in a home play situation using the method Coding Interactive Behaviour (CIB) (Feldman, 1998), is described in this scientific thesis.

The research question - ***Does the mother-child interaction change throughout the parent education program "Sicherer Hafen"?*** - aims to examine the course of interactional behaviour between the mother and her child. A positive development of the mother-child interaction is suspected, due to the reliable methods (EPB and CIB) used in the programme and the evaluation. In order to address the research topic and to answer the research question, the theoretical background is described comprehensively at the beginning of the thesis. This includes the transition to parenthood, the fundamentals of attachment theory, the influences on attachment as well as the consequences of a poor quality of the mother-child interaction. Furthermore, the relevance of the scientific observation of a play situation between mother and child is described, as well as the basis of video analysis and EPB. This is followed by a presentation of the research question, the hypotheses and the methodological framework of this study. The results section follows and describes the participating sample and the results. In the seventh chapter, the calculated results are critically considered and discussed

on the basis of the theoretical background. Finally, recommendations for action are given as well as recommendations for further research in this field.

2 Theoretical Background

Chapter 2 presents the theoretical background regarding the relevant topics to this Master thesis. First, the transition to parenthood is described. Furthermore, the definitions of interaction and attachment are given, as well as their origins and development. Next, the influences on interactional behaviour, as well as the relevance of the mother-child interactions are explained. The play situation between mother and child is then discussed in scientific terms. Finally, the video analysis for assessing mother-child interaction is presented, as well as the description of the principles of parent education programmes. Since the focus in this thesis is on mother-child interaction, from chapter 2.2 onwards only the mother and the child will be referred to.

2.1 Transition to Parenthood

In 1999, Reichle and Werneck defined the transition from a couple's relationship to parenthood with “the successful completion of birth” (quoted after Ziegenhain & Derksen, 2006, p. 133). Nowadays, this definition is only partially correct, as parenthood and family life are subject to constant change. Parenthood can be differentiated into biological and social parenthood. The biological mother is the one who gave birth to the child. The biological father is the one who conceived the child. Social parenthood, usually with legal recognition, is assumed by adults who are reliable long-term caregivers for a child in everyday life and who assume everyday responsibilities regarding the child’s raising and socialization. Social parents are, for example, adoptive parents, foster parents or stepparents (Vaskovics, 2020, p. 270 f.).

The transition to parenthood is often described as an existential change. Intense feelings, hopes, and fears accompany this change (Scholtes, 2016, p. 37). Finding the new identity as a mother or father and integrating it for oneself as well as in a relationship depends, among other things, on the personal inner working models. These working models are based on the individual attachment experiences from the parents' own childhood. They change and expand in pregnancy and during the time after the child is born (Favez et al., 2006, p. 219).

Gloger-Tippelt (1988) developed a model for the transition to parenthood that is divided into eight phases. These phases proceed during the period of pregnancy until the child's twelfth month of life.

Pre-birth

I.	Uncertainty phase (Verunsicherungsphase)	By the 12th week of pregnancy, unsettling thoughts arise, the current life situation is reflected upon, and professional and financial aspects are discussed. The first changes in the partnership are noticed. First physical symptoms such as fatigue, nausea or vomiting (Gloger-Tippelt, 1988, p. 75 f.).
II.	Phase of adaptation (Anpassungsphase)	Up to the 20th week of pregnancy, the pregnancy is usually seen positively, and the mother can feel the child (Gloger-Tippelt, 1988, p. 75 f.).
III.	Concretisation phase (Konkretisierungsphase)	Up to the 32nd week of pregnancy with the first fetal movements, the child's growths and the expectations of parenthood. (Gloger-Tippelt, 1988, p. 75 f.).
IV.	Adaptation and preparation phase (Adaptions- und Vorbereitungsphase)	From the 32nd week of pregnancy, physical discomfort and anxiety about childbirth and parenthood increase (Gloger-Tippelt, 1988, p. 88 f.).
V.	Birth phase (Geburtsphase)	The presence and support of the partner are of great importance. They can ensure a positive birth experience and form part of the basis for a successful parent-child relationship (Gloger-

Tippelt, 1988, p. 92 f.).

Post-birth

VI.	Phase of exhaustion and overwhelm (Erschöpfung und Überwältigung)	From birth to 2 months, settling into the new role and taking on responsibilities and obligations. The daily routine is adapted to the infant (Gloger-Tippelt, 1988, p. 96 f.).
VII.	Challenge and transition phase in the adaptation (Herausforderung und Umstellung in der Anpassung)	2nd to 6th month after birth, crisis phase with traditional division of roles. First conscious reactions of the child (Gloger-Tippelt, 1988, p. 101).
VIII.	Adjustment phase to parenthood (Gewöhnungsphase an die Elternschaft)	First routines and habituation to the new situation are established. The couple relationship becomes increasingly stable (Gloger-Tippelt, 1988, p. 108 f.).

The time specifications of the model are to be understood as rough guidelines. The most vulnerable phases are at the beginning of pregnancy, shortly before birth, and between the second and sixth month of life (Gloger-Tippelt, 1988, p. 214 f.). Adoptive parents, stepmothers - and fathers can be assigned to the phases from post-birth.

The theoretical model of Fthenakis et al. (2002) starts after birth, which additionally shows all typical changes within the partnership as well as the inhibiting and promoting factors for the quality of the couples' relationship. Promoting and inhibiting factors can be the individual expectations and competencies, joint

solution and decision-making competencies, as well as the handling of conflict situations (Fthenakis et al., 2002, p. 447).

Thus, transition to parenthood and the experience afterward are individually characterized and can be positive and negative. Parents described the positive development that can be observed as harmony in partnership, happiness, and fulfilment (Fthenakis et al., 2002, p. 60). They benefit from the child and learn new things. The joy of the child's development, social recognition and mutual respect as partners are positively emphasized (Scholtes, 2016, p. 38). In addition, a fair distribution of tasks among the partners and mutual support, the slow overcoming of traditional role models as well as a good support structure are emphasized (Institut für Demoskopie, 2020, p. 68).

On a contrasting note, the transition can be experienced as a crisis, a break, or a negative change. Worry, uncertainty, financial burden, and renunciation may be the result. Putting one's interests aside, the worry of not having enough time and that something could happen to the child burdens parents (Institut für Demoskopie, 2020, p. 8). Furthermore, parents are accompanied by insecurity regarding educational issues, the career situation (Institut für Demoskopie, 2020, p. 68), and the high societal demands on the current parenting ideals (BMFSFJ, 2021, p. 23). Loss of control, unpredictable situations, and an unstable self-image can also trigger stress (Scholtes, 2016, p. 38). The intense change in the couple's relationship can also be very burdensome (Favez et al., 2006, p. 213). Even couples who have previously lived a balanced relationship with an equal distribution of, for example, household duties often find themselves in a traditional distribution of roles after the child was born. If the changes are seen as unfavourable, satisfaction in the partnership and as parents can be severely impaired (Scholtes, 2016, p. 39). The change of interests and value orientations, the change of self-perception up to depressions as well as physical symptoms can be consequences. Additionally, the relationships with oneself, one's partner, parents, and friends are reshaped, and individuals either become closer or more detached (Scholtes, 2016, p. 37).

In addition to individual experiences, resources and competencies, social status is a significant factor in parenthood's positive or negative trajectories. Negative perceptions and negative consequences are reported more frequently in families with socially low status and from migrant families (BMFSFJ, 2021; Institut für Demoskopie, 2020, p. 25). Furthermore, the negative consequences are more significant for single parents (Institut für Demoskopie, 2020, p. 72).

In summary, the transition to parenthood can have diverse and far-reaching effects on all areas of parents' lives. Significant indicators for the course of changes are the quality of the partnership, the social status, and the individual attachment experiences (Favez et al., 2006, p. 219; Fthenakis et al., 2002, p. 90; Institut für Demoskopie, 2020, p. 25). The transition to parenthood is a particularly vulnerable stage of life; therefore, parents are especially open and need support during this time (Ziegenhain & Derksen, 2006, p. 134).

2.2 Mother-Child Interaction

About 45 years ago, the mother-child relationship moved into the focus of scientific research. One of the reasons for this assumption was the striking "dependence" of children on their caregivers. Psychiatrist and psychoanalyst John Bowlby (1907-1990) considers the supposed negative dependency of children as a positive need with a strong desire for attention and support in almost every interaction between children and their caregivers - the need for attachment (Bowlby, 1958, p. 371; Bowlby & Stern, 2006, p. 222). Attachment arises from a relationship. A relationship arises from recurring social interactions between two people (Abels, 2020, p. 5).

Social interactions take place in multiple contexts and are promoted or inhibited by, among other things, personal values and norms, as well as the individual resources of the interaction partners. Interaction also consists of an individual's face-to-face perception and continues by individuals observing each other and unconsciously putting themselves in the role of the other participant. By interpreting the opponents behaviour, conclusions can be drawn for the following

action or reaction of the interpreter (Asisi, 2015, p. 20). From multiple interactions, an inner image with resulting behaviour patterns is consolidated resulting in a relationship. These behavioural patterns evoke expectations of the other person and, in turn, influence the interactions of both participants. Based on the relationship the attachment develops, which in turn influences interactions and expectations. The first attachment experiences take place in the early phase of child development and are thus unconscious (Wadepohl et al., 2016, p. 11).

The pursuit of interaction and therefore attachment, an evolutionary human predisposition, is defined by Bowlby as an attachment behaviour system and is independent along with the food and sex drives (Bowlby, 1958, p. 351). The child's pursuit of attachment through cooperative behaviour is one of the three essential elements of Bowlby's attachment theory. The mother's nurturing behaviour through permanent care toward the child represents the second basic element (Bowlby, 1975, p. 222 ff.). The exploration behaviour system of the child is described as the third one (Bowlby & Stern, 2006, p. 229 ff.). Bowlby considers the infantile attachment behaviour system as establishing close emotional proximity to a supposedly competent person, and wanting to keep that proximity constantly. The competence of this person consists in satisfying any kind of, and especially emotional needs. This connection provides trust, security, ensures the survival, and mental health of the child (Bowlby, 1975, p. 190 f.; Rosmalen et al., 2015, p. 5).

Stressful situations activate the child's attachment behaviour system. Internal stresses such as hunger or fatigue, or external influences such as strangers or environments are examples for stressful situations. The attachment relationship is established in the interplay of infant attachment behaviour and maternal nurturing behaviour. Mothers perceive their infant's signals and needs through the nurturing behaviour system, and respond promptly and appropriately. They regulate the child's affects and thus provide a secure basis, thus the foundation for the development of attachment (Bowlby & Stern, 2006, p. 199). If a child is emotionally balanced and secure in its attachment behaviour, the natural exploration behaviour system is active. Starting from the mother as the secure base, the child

engages with its material and social environment, as long as it is not in a stressful situation. This exploration can directly promote the child's autonomy behaviour, and thus the child's psychological stability and self-confidence. The mother can encourage and support the exploration behaviour (Bowlby & Stern, 2006, p. 231).

The presence of attachment is evident in attachment behaviour. The child's attachment behaviour, i.e. the need for protection and security, involves observable instinctual behaviours such as crying, laughing, calling, clinging to, or following the person to whom the child is attached (Bowlby, 1958, p. 361; Bowlby & Stern, 2006, p. 204). Children develop lasting attachment with only a few people, but attachment behaviours may be directed toward multiple people (Bowlby, 2008, p. 22).

2.2.1 Patterns of Attachment

To assess the quality of early mother-infant attachment, (Ainsworth, 1985, p. 775) developed a classification system of attachment behaviour during her studies in the early eighties. The different adaptation strategies of children to the behaviour of their mother are divided into four different attachment patterns.

I. Insecure-avoidant Attachment (A)

Children with insecure-avoidant attachment often experience rejection, hostile behaviour, or over- or under-stimulating behaviour from their mothers. These children try to cope without affection and help from their mothers, in order to become psychologically independent. These children actively avoid closeness and contact.

II. Secure Attachment (B)

Children with a secure attachment know that their mothers will reliably stand by them in situations that trigger fear or stress. The children's exploration behaviour is encouraged and sensitively accompanied. The mothers protect their children, are affectionate, and offer comfort. The children in this attachment pattern seek closeness and contact.

III. Insecure-ambivalent Attachment (C)

In children with an insecure-ambivalent attachment, the support is uncertain in fear or stressful situations. The mothers of these children react ambivalently - on the one hand sensitively and appropriately, on the other in a rejecting or hostile manner. The children do not know if and when they can reliably access the mother again. This uncertainty leads to separation anxiety. The exploration desire is only slightly prominent. On the one hand, the children seek closeness and contact, on the other hand, they react with angry rejection, resist parental contact or reject offers to play (Ainsworth, 1985, p. 775 ff.).

IV. Disorganized Attachment (D)

In this attachment pattern, no organized, no distinct behaviour can be observed. These children were usually abused by one or both parents, severely neglected, or had to cope with mental disorders, such as manic depressiveness of the mothers (Crittenden, 1985, p. 89). The secure source of attachment becomes a source of anxiety and insecurity. Children in this attachment pattern disconnect from the attachment figure, freeze, or appear psychologically absent (Hédervári-Heller, 2012, p. 62).

The classification to the respective attachment pattern is based on the "Strange Situation" experiment (Ainsworth, 1985, p. 774). In the first year of the child's life the respective attachment pattern develops, it is recognizable between the seventh and twelfth month of life. The child develops specific inner images of the mother and itself. These emerge through communication and interaction with the mother and her individual behaviour. The attachment patterns are formed and manifested by combining the inner images, that become dominant cognitive structures, and the daily maternal interactions (Bowlby, 2008, p. 105).

The review from Glogler-Tippelt (2000) provides a summary of German studies on the classification of attachment patterns using the "Strange Situation" experiment. Secure attachment (type B) is the most common with 44.9% (n=593). 27.7% of the

children are insecure-avoidant (type A), 6.9% insecure-ambivalent (type C), and 19.9% disorganised (type D) (Gloger-Tippelt et al., 2000, p. 92).

2.2.2 Development of Early Attachment

In general, an infant shows interest in social interaction from the date of birth. Preferentially the infant turns to the human face and the voice of the mother. The first mother-infant interactions and maternal attachment behaviour are represented by the mother's instinctive behaviour immediately after birth, when she holds, touches and breastfeeds the infant (Bowlby, 2008, p. 7). During the first weeks of the infant's life, the mother adjusts to her child. Predominantly the child acts, the mother usually reacts intuitively, resulting in an ongoing dialogue. Pre-linguistic communication is an essential factor in building a relationship. Eye contact, babbling, uncontrolled movements of arms and legs, whining, as well as crying and screaming are obvious infantile ways of communication – they signal the need for attachment (Bowlby, 2008, p. 7; Ziegenhain & Derksen, 2006, p. 20). Besides the previous described obvious ways of communication, pre-linguistic communication also includes subjective feelings and experiences, affects, moods, needs, motivations, interests, and intentions, in addition to concrete interaction. Through this type of communication, the infant is able to discover and evoke behaviours of its counterpart, as well as to influence and trigger them. Above all, the mother's facial expressions and gestures arouse the infant's interest, especially if they are adapted to the infant (M. Papoušek, 2014, p. 70 f.). Through mutual interaction, the instinctive behavioural patterns on both sides are individually formed and further developed (Ainsworth, 1979, p. 936), and the child experiences his or her own emotions and intentions (M. Papoušek, 2014, p. 71).

The development of attachment during the first year of life is categorized into four phases:

I. <u>Orientation and signals without differentiation of the person</u>

From birth until the second or third month of life, the infant does not differentiate between familiar or unfamiliar people. Individual needs, for

instance, are signalled by crying or smiling. The infant can be held and soothed by any person. It can follow people with its eyes and can grasp and make sounds. The purpose of these behaviours is to extend the time spent with the contact person.

II. Orientation and signals directed at one or more different persons

In the third month, the infant begins to direct his behaviour predominantly toward specific persons. Although the infant can still easily be taken in the arms and comforted by other people, it can already perceive differences between familiar and unfamiliar people. The infant tries to maintain the bond with the primary caregiver through his behaviour.

III. Maintaining closeness to a differentiated person by movement and signals

From the sixth month until the third year of life, the child shows clear attachment behaviour and prefers a primary caregiver. It follows the caregiver and seeks his or her closeness through the active attachment behaviour system. Other people are chosen as secondary attachment persons. Strangers are treated with caution.

IV. Formation of a goal-corrected partnership

The fourth phase is characterized by the consideration of the plans and goals of the attachment person (Bowlby, 1975, p. 247 ff.).

Sensitive mothers are able to respond quickly to their child's rhythms and needs in order to take advantage of their child's cooperative behaviour and therefore promote attachment (Hédervári-Heller, 2012, p. 60). The foundation for a secure attachment is formed by protection, comfort, unconditional love, support in the exploration of the environment, and understanding the behaviour and reciprocal interactions of the child. The prompt and appropriate satisfaction of the child's needs for attachment, ease the child's further development of its many competencies (Schnabel, 2012, p. 951).

2.2.3 Determinants Influencing Interactional Behaviour

The description of the different attachment patterns (chapter 2.2.2) underlines that attachment is influenceable. In addition to the evolutionary intuitive behaviour, there are numerous intrinsic and extrinsic factors that influence the emergence and development of attachment. Henceforth the mother's and the child's intuitive behaviour in the mutual interaction is described. They represent the positive influence on attachment. Subsequently, obstacles to attachment are pointed out. Feldman's (2012) model (Figure 1) illustrates the numerous and diverse determinants which influence the mother-child dyad. The described determinants influence each other as well as the individuals themselves.

Evolutionarily, expectant parents are well prepared to empathically empathize with their infant's needs. To a certain extent, parental attachment behaviour is a given pattern. For example, parents know how to comfort their baby when it cries, to feed it when it is hungry and to protect it in dangerous situations. This pattern of behaviour must be further developed through experience. Parental attachment behaviour towards the child is formed and developed through interaction with one's child, observation of other families and experiences with one's parents (Bowlby, 2008, p. 5).

Parental sensitivity plays a significant role in attachment emergence and development. It is the primary determinant of attachment security. Sensitivity involves the parents' ability to perceive the child's signals, interpret them correctly and respond appropriately, promptly and lovingly. Sensitive behaviour is considered successful when the mother acts from the child's point of view. If the signals are constantly and reliably recognised and lovingly responded to, the child experiences self-efficacy and optimal conditions are created for the development of a secure attachment (Grossmann & Grossmann, 2020, p. 239; Kalinauskiene et al., 2009, p. 316 f.). A study by Feldman & Eidelmann (2009) of middle-class mothers and their child, indicates that maternal sensitivity increases rapidly in the first 6 months of the child's life. The second 6 months show slower changes (Feldman & Eidelman, 2009, p. 198).

Through striking and simplified basic patterns in facial expressions, speech, touch and gestures, maternal communication is adapted to the maturity level of early childhood perception, learning abilities and integration of experience. (H. Papoušek & Papoušek, 2002, p. 145). Optimally, the interaction between mother and child provides a basis for the development of a secure attachment, healthy child development and the possibility to integrate learned knowledge. To do so, the child needs simple, slow, high-contrast stimulation with frequent repetition and should be awake, calm, and receptive. Furthermore, the child needs recovery breaks and individual regulatory support from the mother. Face-to-face interactions, close physical contact with affectionate touch, praise, acknowledgement and a loving way of holding the baby promote attachment (Ainsworth, 1979, p. 934). According to Bell & Ainsworth (1972), the most effective maternal behaviours to reassure a child and signal safety to him or her are holding the child in the arms, feeding, and touching (Grossmann & Grossmann, 2020, p. 212 cited after Bell & Ainsworth, 1972). Parental responsiveness - the ability to respond - and the tendency to imitate, helps the infant to test and practise its maturing motor, mimic, vocal, social-communicative and language-related learning skills in a self-effective way (H. Papoušek & Papoušek, 2002, p. 190).

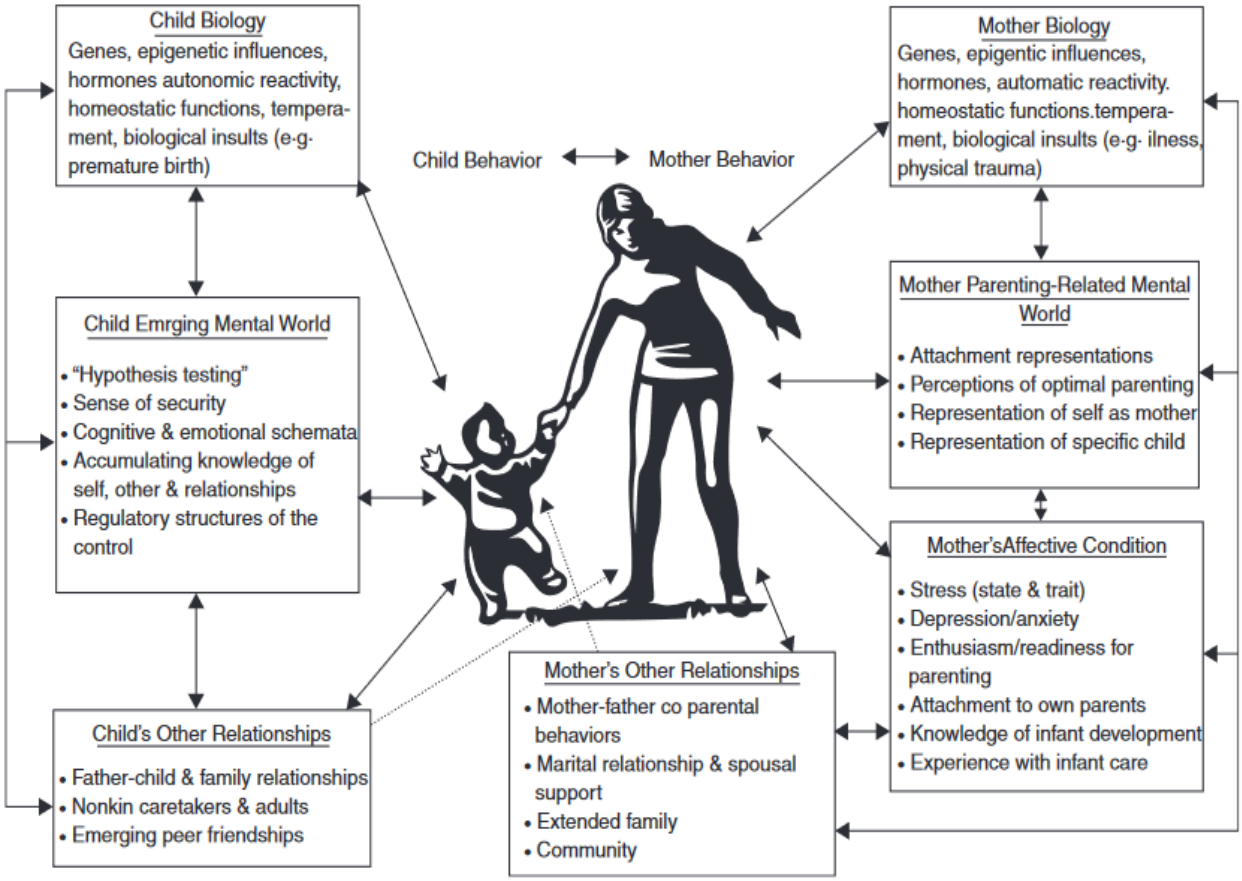

Figure 2 Mutual influences between mother and child (cited after Feldmann, 2012, p. 537)

Optimally, the mutual communication between mother and child is characterised by positive reciprocity. The adapted maternal behaviour leads to eye contact and joint attention. Affective signals and needs are answered and mirrored by the mother, and result in infant self-efficacy. The child's reactions, such as eye contact, smiling and cooing, have a rewarding effect on the mother and strengthen her intuitive competence. This in turn promotes the supportive presence of the mother, and the willingness to perceive the child's affective emotions, stresses or fears, to understand them from the baby's point of view, and to mitigate them with the intuitive maternal behavioural system and transform them into positive ones (Grossmann & Grossmann, 2020, p. 219; M. Papoušek, 2014, p. 72).

The behaviours described above provide the optimal basis for the development of secure attachment. However, the demands on motherhood are high (chapter 2.1).

Various factors can individually influence the mutual attachment behaviour. The fast pace and dynamics of child development, as well as the constant changes in the intensity of attachment behaviour, require continuous maternal adaptation processes (Bowlby, 2008, p. 228 f.) These high demands pose challenging situations. In addition, factors such as the socio-economic status of the family, stress, experiences with violence or drugs (Akbas, 2017, p. 264), the quality of the partnership relationship (Scholtes, 2016, p. 39), attachment experiences with one's parents (Bowlby, 1975; Bowlby & Stern, 2006, p. 326), the actual birth experience, the separation period after birth, and maternal care before and after birth (Peterson & Mehl, 1978, p. 1171 f.), are influencing determinants. Unfulfilled role expectations and distorted perceptions of child raising can also become burdening influences (Bowlby & Stern, 2006, p. 326). Also, changes in family constellations, science, digitalisation, social expectations, generational behaviour, the educational structure, and childcare availability are requirements that constantly change and that can be attributed to today's time (Institut für Demoskopie, 2020, p. 1).

The degree of sensitivity in adults also varies. A high degree of sensitivity requires emotional security for the child. A high degree of sensitivity requires emotional security for the child. If the mother is continuously overburdened and stressed by high demands, this ongoing frustration, overwhelm and disappointment can lead to limited sensitivity towards the child. The consequences are a reduced perception of the child's needs and signals and thus, in the long term, an impairment of the development of attachment and the child's self-regulatory abilities (Scholtes, 2016, p. 41). Maternal depressiveness and anxiety has also been shown to lead to reduced quality of interaction (Mertesacker et al., 2004, p. 54). Also a maternal bonding disorder, in which the primary emotional relationship to the child is disturbed, is also a hindrance (Papousek & von Hofacker, 2015, p. 2).

Childhood influences also play a major role in mother-child interaction. For instance, maternal withdrawal behaviour and irritation can be triggered by temperamental children with strong negative affectivity and poor ability to regulate themselves. A high social status and social support can have a positive effect in

this regard; for mothers with social burdens, the child's strong temperament can trigger overwhelming and additional burdens (Tester-Jones et al., 2015, p. 7). Illnesses or disabilities of the child can also affect the quality of mother-child interactions (Bowlby & Stern, 2006, p. 331).

The various and individually shaped influences on mother-child interactions are either consciously perceived and controlled, and guided by the mother, or the influence is subconscious and leads to problems. Parent education programs begin at an early stage as a preventive measure and identify potential risk factors for the mother, and offer conflict resolution strategies, as well as support.

2.2.4 Relevance of the Early Mother-Child Interaction

The foundation for early childhood development and adaptation, as well as for behavioural regulation, is formed by the primary relationships between the infant and its parents (Papousek & von Hofacker, 2015, p. 1). The numerous factors influencing mother-child interaction (Chapter 2.2.3) and attachment security likewise shape attachment patterns (Chapter 2.2.1), but also influence the child's individual course of life. Depending on the child's individual resources and resilience, maternal behaviours, and the resulting inner models of self and mother, shape the child's personality traits throughout life (Bowlby, 2008, p. 100; Fröhlich-Gildhoff & Rönnau-Böse, 2015, p. 48).

The mothers of children with a secure attachment communicate spontaneously with each other, they are aware of their child's psychological state and need for attention. They appear attentive, sensitive, helpful and encouraging. Thus the child gains self-confidence, self-esteem, and learns to regulate itself (Fröhlich-Gildhoff & Rönnau-Böse, 2015, p. 46). Attachment security is considered a protective factor (Fröhlich-Gildhoff & Rönnau-Böse, 2015, p. 47) and positively influences cognitive, linguistic, and social-emotional development. Furthermore, secure attachment has a positive effect on the child's health, school success and quality of life. Adults who have experienced an early secure attachment are mostly able to build a satisfying relationship with their own children (Neumann, 2002, p. 244 f.).

Mothers with insecure or disorganised attached children only sporadically acknowledge the child's needs and react delayed or inappropriately. They are less attentive and sensitive, intervene in senseless ways, and disregard the child's feelings and activities. They restrain the child and also fail to provide help or encouragement (Grossmann & Grossmann, 2020, p. 218 f.). Infants who do not receive a prompt response to their needs from their mothers, who are often left to cry for a longer period of time, also cry more in later stages of their development. Consequently mothers often react more reluctantly and even more delayed, whereupon the child cries even more often and learns fewer ways of communicating than a child whose needs have been answered promptly. A negative circle develops (Grossmann & Grossmann, 2020, p. 220 ff., cited after Bell & Ainsworth, 1974). These behaviours trigger stress reactions in the child.

Such stress experiences in early childhood have an impact on physical and mental health in adulthood and can reduce life expectancy. The consequences are diverse and long-lasting. Burdensome stressors such as insecure or disorganised attachment patterns and attachment disorders promote cognitive and emotional impairments. These manifest themselves, for instance, in limited stress coping strategies, social problems and lowered self-esteem (Egle & Hardt, 2014, p. 106 ff.). Severe mental disorders such as narcissistic personality disorders can also be the consequence (Bowlby, 2008, p. 101).

If the mother-child interaction is impaired and negatively influenced over a long period of time, the child does not build up a sustainable attachment relationship with the mother. Children with severe trauma or frequent changes of caregivers develop a pathological form of attachment organisation. An attachment disorder may develop. These attachment disorders can be observed from the 8th month of life and manifest until the 5th year of life. According to the ICD-10 (Interantional Classification of Diseases), two types of attachment disorders are distinguished:

1) Reactive attachment disorder in childhood
    - ✦ Extremely fearful and alert behaviour, as well as ambiguous reactions in different situations
    - ✦ Emotionally conspicuous, reduced responsiveness, withdrawal behaviour, aggressive behaviour towards self or others
    - ✦ Ambivalent reactions towards attachment mother
    - ✦ with a sensitive attachment person, also social reciprocity and responsiveness in interaction
    - ✦ Contact with peers severely limited
      Main causes: severe emotional or physical neglect, abuse or severe maltreatment

2) Childhood attachment disorder with disinhibition
    - ✦ Distanceless interactions with unfamiliar people
    - ✦ Absence of exclusive attachment relationships during the first years of life
    - ✦ Clinging behaviour, as well as the search for attention
    - ✦ Attachment needs are shown towards attachment persons as well as strangers without distinction
    - ✦ Aggressive behaviour towards themselves or others
    - ✦ Severely limited exchange with peers
    - ✦ Main causes: extreme emotional or physical neglect, as well as frequent change of the attachment person (DIMDI, 2016)

Regarding the prevalence of attachment disorders in Germany, there are no current studies available. A study conducted in the United Kingdom on 1600 children between the ages of five and eight showed a prevalence of attachment disorders 1.4%. Neglect and abuse could be proven for almost all children (Pritchett et al., 2013, p. 3).

The consequences of attachment disorders and parental violence towards the child can be psychological disorders, such as personality disorders, misperceptions, or developmental delays. The violence experienced is often continued by the children in adulthood, in their own raised family (Bowlby, 2008, p. 72; Neukel et al., 2019, p. 236). Other consequences of insecure and disorganised attachments, as well as attachment disorders, are increased risk behaviour, such as early smoking, frequently changing sexual partners, drug use, and suicide attempts, which can be understood as a compensation attempt for the early absence of emotional care. Further, social problems develop (Grossmann & Grossmann, 2020, p. 273), and physical as well as mental illnesses, which in turn increase individual mortality. A combination and accumulation of the described risk factors also increases mortality (Egle & Hardt, 2014, p. 108 ff.). Identified risk groups are particularly single mothers, migrants and unemployed mothers (Egle & Hardt, 2014, p. 111; Hagen & Kurth, 2007, p. 28; Schenk et al., 2007, p. 592). Thus, Lange et al. (2007) proved in the KiGGS study (Kinder- und Jugendgesundheitssurvey- Child and Adolescent Health Survey), that children and adolescents from socially disadvantaged families are more frequently affected by developmental disorders and behavioural problems (Lange et al., 2007, p. 583). Research from the BELLA study (Befragung zum seelischen Wohlbefinden und Verhalten - Mental well-being and behaviour survey) also shows that children with behavioural problems are more likely to be raised in families with an unhappy parental relationship, in families with a high potential for conflict, or in families in which the parents perceived their own childhood as inharmonious (Ravens-Sieberer et al., 2007, p. 814 f.).

Psychotherapy can be used to treat the consequences of a disrupted mother-child interaction (Windaus, 2014, p. 504). Changes in the individual attachment patterns and the personal development can also be achieved through changes in lifestyle and life circumstances. Promotional factors such as a good alternative family environment, social support in youth, or above-average intelligence can have a compensatory effect on stressful experiences in early childhood (Bowlby, 2008, p. 111; Egle & Hardt, 2014, p. 105). Thus, early negative attachment experiences do not necessarily have to have negative consequences.

2.2.5 Play and Scientific Observation

Childhood play is one of the biologically anchored basic needs of the child, it contributes to healthy development, and is a significant factor in mother-child interaction. Only a child, who feels comfortable, plays. Every child needs play to develop and form its individual personality (Runcan et al., 2012, p. 765). For mothers, the aim of play is to have fun and pleasure with the child. The child's motivation originates in curiosity, the need for self-efficacy, the urge to explore, and the need to succeed (Papousek, 2010, p. 30). During play, mother and child pay attention to each other. Alternating phases of engagement and periods of interruption for rest are contents of the play. The positive resulting aspects are the emerging dialogue, the shared experience of happy moments, getting to know each other, and the strengthening of the mother-child relationship (Runcan et al., 2012, p. 796). For instance, high involvement of the mother in the game is associated with high quality of interaction (Runcan et al., 2012, p. 798). Through play, the child learns not only motor skills, but also linguistic and perceptual skills, as well as cooperation, sharing, and communicating intentions and goals, and new ways of behaving. The realisation that the child's actions trigger reactions in the mother and make these reactions predictable, promotes the child's self-efficacy (M. Papoušek, 2014, p. 72).

Mutual interaction begins with eye contact. Individually, mother and child contribute to this primarily through the initiation, maintenance, modulation, termination or avoidance of eye contact. The infant focuses on an object and the mother follows the infant's gaze, which transmits information about the infant's next actions. Thus, the mother can respond appropriately to the child's behaviour and increases positive reciprocity (Collis & Schaffer, 1975, p. 319 f.). In general, the positive or negative atmosphere, dynamics and adaptation regulation can be observed in the play situation. Individual child behaviours such as positive affect, affection to the mother, alert, fatigue, verbal output, withdrawal, avoidance or creative-symbolic play provide information about the quality of the interactions (Papousek & von Hofacker, 2015, p. 3 f.). Also maternal behaviours such as praising, support, affectionate touch, imitating, forcing, overriding, negative affect, hostility, anxiety, rejection or even violence give the researchers an insight into the

interaction quality and allows for a prediction regarding the attachment pattern (Grossmann & Grossmann, 2020, p. 213 f., 218 ff.).

The focus in play is on joint attention. For this reason, play situations are very well qualified for the scientific observation of mother-child interactions. The study from Feldman & Klein (2003) (Feldman & Klein, 2003)shows the application of the scientific coding method CIB in a play situation to investigate the self-regulation competencies of the child to the mother and other caregivers. Included factors in the evaluation were for example the child's positive effect, maternal limit setting, creative-symbolic play, and joint attention (Feldman & Klein, 2003, p. 683 f.). Another study from Feldman et al. (1997) used the play situation as the observation setting for the investigation of the relations between change in mother-infant interaction and change in parental and infant traits. For instance, assessed factors were forcing, overriding, acknowledging, imitating, and elaborating (Feldman et al., 1997, p. 154 f.).

2.3 Video Analysis for the Assessment of Mother-Child Interaction

Mother-child interactions can only be observed in the brief moment in which they occur. Thus, the scientific use of video technology means the entrance into the concrete scene of the interaction between mother and child. For decades, the use of video technology in research has played an important role in infant and toddler research (Thiel-Bonney, 2014, p. 416). By slowing down and repeating the interactional processes between the mother and the child, the video makes it possible to accurately assess and reflect the interactions. The individuals can be observed separately from each other, and together. In addition, the dynamics between the participants and to their environment become apparent.

The advantages of video-based counselling for the assessment of mother-child interaction are numerous. The analysis includes the mother, thus promoting an understanding of her own child with its needs, perspectives and developmental possibilities. In addition, self-assessment is encouraged. The mother can also be convinced of the positive as well as negative reciprocal influence during the

interactions, counselling in this regard can take place individually and promptly. Both parties' strengths are focused on and purposefully promoted. The promotion of strengths is accompanied by the mother's positive self-affirmation (Kalinauskiene et al., 2009, p. 619 f.; Papousek, 2000, p. 617 f.). Furthermore, the pre-linguistic communication between mother and child is recorded in its individuality. For mothers, who are unaware of their psychosocial burdens and thus unaware of potential risk factors for their child, video-based counselling provides an individual insight into interaction behaviour with the child. As a result, the need for support can be identified. The risk factors and problems can be explored in depth through discussions and covered promptly according to need (Ziegenhain & Derksen, 2006, p. 140).

Another advantage is the sustainability of the visual impressions. The images seen are remembered for a long time and appeal to the procedural memory, which represents relational experience. Relationship experiences are not encoded linguistically in the brain, so the images of the video recordings can be used to link to the experiences (Ziegenhain & Derksen, 2006, p. 146). Thus, the formation of new interaction patterns is possible.

Changes in the interaction between mother and child can also be reliably documented through video analysis. Concerns about the use of the video footage are clarified in advance by carefully explaining the purpose and use of the video recording (Thiel-Bonney, 2014, p. 419 f.). Video analysis is a commonly used method in research of family behaviour. The method is used as therapy, as well as in intervention programmes, such as parent education programmes (Feldman et al., 2003, p. 683).

2.4 Parent Education Programs

As early as 1979, Ainsworth commented that interventions to improve the quality of mother-child interaction are an effective way to address deep-seated problems in parents, thus supporting the development of a secure attachment pattern (Ainsworth, 1979, p. 934). The basic aim of parent education is to prevent

psychological and physical violence as well as neglect. Children have the right to a non-violent childhood. Physical punishment, mental injury and other humiliating behaviour are prohibited by law (Bundesgesetzblatt, 2000, p. 1479). Numerous parent education programmes are offered to protect children and support parents.

The prevention of stresses and strains that hinder child development must start early and in many ways in the family. Parent education includes information, exchange of experiences, discovering one's own strengths and resources, and practical help. (BMFSFJ, 2021, p. 30; Hartung, 2012, p. 973). Parent education programs are one of the most frequently used strategies to improve the enhancement in parent-child relationships and strengthen families. Therefore to prevent mental health impairments and strengthen psychosocial health resources (Butchart et al., 2006, p. 17; World Health Organization, 2019).

Several types of parent education programs exist to address the diverse needs of various types of families – for example parents and their child or children, single mothers, pregnant woman or parenting teens. The main content of the programs are usually general parenting information to gain additional knowledge or skills, and parental support and information for specific issues, such as alcohol dependency, substance abuse, specific diseases, low literacy or learning disabilities of the children or the parents. The parent education programs not only vary in the curriculum content and target population, but also in lengths, setting, and the measurement of the outcome (Colosi & Dunifon, 2004, p. 2 f.). Parent education interventions can be offered in different kind of settings, as group-based training, clinically based therapy, or individually oriented - for example as home visits, or as a combination (Mikton & Butchart, 2009, p. 353 f.).

With regard to participation in such programmes, barriers emerge. Pressure of expectations and social desirability make it increasingly difficult for mothers to go to counselling centres. Feelings of guilt about not being able to cope with everyday life and the child, needing help and unfulfilled wishes and expectations regarding family life, hinder the participation (Ziegenhain & Derksen, 2006, p. 140). Families with low incomes, few educational resources and ill or disabled family members,

are also less likely to be reached by services (BMFSFJ, 2021, p. 25; Hartung, 2012, p. 975). To counteract the prevention dilemma, services must be low-threshold and demand-oriented. Therefore, these services should be free of charge and offer a welcoming environment such as family centres (BMFSFJ, 2021, p. 31). Also the connection to the health system and child and youth welfare services enables to reach out to families in burdening life situations (BMFSFJ, 2021, p. 31).

Insecurity and the desire to do everything perfectly can be reasons for participating the programs. Parents also request support because of exhaustion caused by unexpected adaptation problems in the child's behaviour or unclear diagnoses or disabilities of the child (Ziegenhain & Derksen, 2006, p. 144).

The promotion of parenting and relationship skills has proven to be a starting point for successful prevention, especially in early childhood. Interventions that focused on the improvement of the interactional behaviour were also found to be the most effective in improving child attachment security. A randomized controlled trial from Kalinauskiene (2009) using video feedback, and focusing on interaction and attachment, shows that maternal sensitive responsiveness enhances during intervention (Kalinauskiene et al., 2009, p. 613). Also, Pillhofer et al. (2015) (Pillhofer et al., 2015, p. 163) conducted a short-term intervention with video feedback, and demonstrated significant improvement in maternal sensitivity in high-risk mothers. The study by Ziegenhain et al. (2004) is based on EPB and video feedback in high-risk mothers and also resulted in improvement in maternal sensitivity. A randomized controlled trial from Steele (2019) assigned mothers who were regarded at risk of maltreating their children, to either the parenting training STEP (Systematic Training for Effective Parenting) or the group attachment – based intervention (GABI). They used the CIB assessing the mother-child relationship. In comparison the results showed an improvement in the GABI-group of the maternal supportive presence and dyadic reciprocity, as well as declines in maternal hostility and dyadic constrictions (Steele et al., 2019, p. 209 ff.). Concluding, a group based intervention program for children from birth until three

years of age, plus the home visits with video feedback, seem very suitable for the improvement of mother-child interaction and identifying risk factors.

Another benefit is the social community in parenting classes, friendships can be developed which in turn provide possible support for the future (Köhler, 2014, p. 517). The BMFSJ (2021) emphasises the usefulness of early prevention programmes during pregnancy and the first three years of a child's life. The parent education program "Sicherer Hafen" includes the themes described above and is the basis of this scientific thesis (Kapitel 4.1).

2.5 Developmental Psychological Counselling

The theoretical basis of EPB is based on notions of development associated with the transactional model of development. The transactional model describes the complex interactions between the child, his or her parents, and their life contexts. According to this, child development is understood as the result of a continuous and dynamic interaction between the child and his or her environment. Through interactions of people involved, children are actively and purposefully influenced. Interaction is always influenced by previous experiences and also influences future interactions. It is the starting point for further developments and possible limitations (Sameroff & Mackenzie, 2003, p. 614). EPB aims to promote the early parent-child relationship and to prevent future developmental and behavioural problems. This is accomplished through early relationship promotion, especially when there are only discrete warning signs in the interaction between the infant and his or her parents. Furthermore, the counselling supports parents in dealing more sensitively with their child. This is achieved by learning to perceive the child's signals and to react appropriately and promptly to them. The importance of continuous care and attention to the child is conveyed to the parents. (Ziegenhain & Derksen, 2006, p. 133).

The starting point in EPB is a video recording in a home or institutional environment that allows for close observation of every day and age-typical parent-child interactions. Typically, in infancy, diapering, play, or feeding situations are filmed to evaluate interactional behaviour. The child's behaviours are closely, but

non-judgmentally, observed and understood based on the EPB. First, parents learn about their child's individual abilities and strengths, as well as the intense reciprocity between them and their child (Ziegenhain & Derksen, 2006, p. 148). In the concept of EPB, deficits or pathologies are not assumed, but rather the strengths and abilities of the children and parents are recognized, described, understood and used for the promotion of the relationship. The child's perspective is emphasized in all phases of the counselling process.

The milestones in early childhood development are striking. They lead to a significant change in the quality of the child's behaviour. These milestones of the child's development are used in the process of EPB. Preventively, future changes are discussed, and/ or when the expected change in the child's behaviour occurs, another scheduled consultation takes place. Recurring consultations give parents confidence and success and reduce or even avoid possible escalation of situations (Ziegenhain & Derksen, 2006, p. 17 ff.). The success criterion of EPB is considered to be a trusting and sustainable relationship between the counsellor and the parents. The focus of counselling is neither the child nor the parents but the relationship from the child's perspective. Parents must be perceived as cooperation partners in order to strengthen and support them in their role. Certain attitudes and basic convictions of the counsellors are a prerequisite for a trusting relationship: parents love their children and want the best for them; difficult living conditions and a lack of resources to develop their own coping strategies lead to excessive demands; parents do not want to be seen as in need of help and have a right to respectful treatment in every situation; unbureaucratic, reproach-free and emphatic support strengthens parents in their role. (Ziegenhain & Derksen, 2006, p. 141).

In principle, it is assumed that those seeking help have the necessary resources to solve problems but need support to find access to them to develop solutions. The goal of this systemic solution-oriented counselling is the joint development of access to these resources. Families with multiple psychosocial stresses, in particular, make use of this form of counselling. The systemic, transactional approach refers to the various systems from the child's environment that affect the

child and thus do not exclusively consider the parent-child dyad (Ziegenhain & Derksen, 2006, p. 140).
Furthermore, the EPB is characterized by interdisciplinary. Cooperation with paediatricians, social welfare or other areas is necessary. Suppose the counselling of the video recordings does not improve the sensitivity and the parent-child interaction. In that case, as can be the case in highly stressed families, other support measures will be agreed upon and called in.

As already described (chapter 2.1), parents are particularly in need and open for support when entering parenthood. Thus, EPB is particularly suitable in infancy and toddlerhood. Due to the low-threshold and preventive counselling, the EPB can be flexibly integrated into existing health care services.

3 Research Question and Hypotheses

The immense importance of mother-child interaction has been comprehensively described in the previous chapters. Similarly, the need for prevention programmes in pregnancy and early parenthood is presented. The effectiveness and benefit of a prevention programme must be proven in order to continue and to adjust the content. Hence, for the part of the evaluation of interactional behaviour between the mother and the child regarding the parent education program "Sicherer Hafen", the following research question arises:

Research question	Does the mother-child interaction change throughout the parent education program "Sicherer Hafen"?

Hypotheses:

H0	The mother-child interaction does not change throughout the parent education program "Sicherer Hafen".
H1	The mother-child interaction does change throughout the parent education program "Sicherer Hafen".

Based on the data collected in the prevention programme, the research question is answered on the basis of the working hypotheses. Once the H0 or H1 hypothesis has been verified, the results are descriptively presented and described in chapter 5. Following this, in relation to the theoretical background (chapter 2), the results are discussed in chapter 6.

4 Methods

This qualitative evaluation study is a longitudinal study with a Panel design. This study design provides longitudinal data at the individual level. The main characteristic of this design is the repeated measurement of the same items or variables in the same sample. Another characteristic and also advantage is that the independent variable is chronologically earlier than the dependent variable (Pforr & Schröder, 2015, p. 1).

The following chapter describes the methodological process of the evaluation study in detail. First, the basic study, in which the present study is integrated, is explained. Moreover the applied method including the used criteria is described. Furthermore, the statistical procedure is presented.

4.1 Basic Study "Sicherer Hafen"

The parenting course "Sicherer Hafen" is a project of the operationally active BerndtSteinKinder- Stiftung in Hamburg. The concept for this parenting course was developed in cooperation between the BerndtSteinKinder- Stiftung and the Babyambulanz *Von Anfang an*. The research group "Lebensqualitätsforschung" from the Department of Medical Psychology of the UKE is scientifically evaluating the project. The evaluation study started in January 2017 and was funded for 38 months.

The study evaluates the effectiveness of the modularised prevention offer for disadvantaged families in Hamburg and generates possible optimization approaches based on the pilot study. It is to be examined whether the modularised offer contributes to an increase in parental competence, an improvement in the quality of life of children and parents, and a positive parent-child interaction that is conducive to the development of children (Witt & Quitmann, 2020, p. 3).

The parent education program accompanies young parents for 20 months, the earliest starting from 30 weeks of pregnancy, during the transition to parenthood and to increase parent-child attachment by improving parental sensitivity.

The program includes four group meetings and eleven individual consultations. The group meetings take place in four different parenting schools in Hamburg (Barmbek, Bergedorf, Kirchdorf-Süd and Wilhelmsburg). The focus of the parenting course is on personal attachment behaviour, role models, perception of family, and partnership expectations. The aim is to impart knowledge about babies' needs, organizing everyday life and dealing with each other as well as coping with stress. During the four group meetings parents can get to know other parents, exchange information, arrange private meetings and receive information about how others experience their new life situation as mother, father and family. The group meetings occur once prenatally and subsequently postnatal after 3-8 weeks, 6-8 months, and 12-18 months. The topics of the group meetings are based on the developmental phases of the children and deal with (I) growing into the new roles, (II) arriving in the world, (III) locomotion and bonding, and (IV) discovering the inner self and autonomy (Witt & Quitmann, 2020, p. 3 ff.).

The individual consultations usually take place in the home environment of the family. They are conducted once prenatally and postnatally shortly after birth, twice between 3-8 weeks, twice between 3-4 months, three times between 6-8 months and twice between 12-28 months. They are implemented by consultants who are trained in the Ulm concept of EPB (chapter 2.5), which is the basis of the home visits. The EPB is a video-supported, low-threshold counsel concept that aims to build a successful parent-child relationship and a secure emotional bond with the child. Furthermore the aim is to prevent behavioural and developmental disorders in later childhood and adolescence. Accompanying the individual consultations small video sequences are used. The parents are filmed in daily situations. The videos help the parents learn and better respond to the babies' signals under the consultant’s guidance. This enables them to recognize their child's abilities and strengths, interpret their behaviour and offer help. In total, four videos of each family are recorded, which are discussed and evaluated together with the parents according to the EPB concept.

The study design is longitudinal and uses a mixed-method approach. The quantitative part includes the evaluation of the group meetings at four different

points in time. Furthermore, four questionnaires were completed during the course of the program, to evaluate the parents and their child's quality of life, the experience and the possible burdens of parenthood, the relevance of the contents of the group meetings, the satisfaction with the offer and, from the participants' point of view, desirable changes or optimizations of these group offers. Additionally, participants received in total six paper pencil questionnaires to evaluate the individual consultations (Witt & Quitmann, 2020, p. 4). Besides the quantitative data collection the parent-child interaction is qualitatively evaluated by the four videos taken from the consultant´s. In this study the mother-child interaction was evaluated using the video analysis method CIB (Feldman, 1998), which is described in the following chapter.

4.2 Coding Interactive Behaviour

The CIB is a global rating scheme which has versions for newborns, infants, toddlers, pre-schoolers and adolescents. The infant and toddler version can be applied to children from 2 months to 36 months. This rating scheme consists of 45 items and four scales. The parental scale includes 22 items, the child scale consists of 16 items, the dyadic scale has two items and finally the overall scale includes two items (Table 1) (Feldman, 1998, p. 3 ff.). The items address the individual style, the authenticity and flow of the session, and the mother and the child's interactive involvement. Each item is coded on a 5-point-Likert scale, where generally one implies a minimal level of the specific behaviour and five the maximal level. However, 14 items imply the opposite and were recoded when necessary before the final statistical analysis was conducted. The tool is well-validated and has good psychometric properties (Feldman, 1998, p. 5).

Table 1: Scales and items of the coding scheme CIB (Feldman, 1998, pp. 7–32)

Scales	Items
Parent Codes	Forcing, overriding, acknowledging, imitating, elaborating, parent gaze/ joint attention, positive affect, parent depressed mood, parent negative affect/ anger, hostility, vocal appropriateness/ clarity, parent anxiety, appropriate range of affect, consistency of style, resourcefulness, on-task persistence[a], appropriate structure/ limit-setting[a], praising[a], criticizing[a], affectionate touch, enthusiasm, parent supportive presence
Child Codes	Child gaze, positive affect, negative emotionality/ fussy, withdrawal, emotional lability[a], child affection to parent[a], alert, fatigue, child vocalization/ verbal output, child initiation, child compliance to parent[a], child reliance on parent for help[a], on-task persistence[a], child avoidance of parent[a], competent use of environment[a], creative-symbolic play[a]
Dyadic codes	Dyadic reciprocity, adaptation-regulation, fluency, constriction[a], tension[a]
Lead-Lag Interaction	Child-led interaction, parent led-interaction

[a] Items cannot be coded for children <8 months (Feldman, 1998, pp. 7–32)

After Feldmann (1998) eight categories can be extracted from the coding scheme:

a. Parental sensitivity,
b. Parental intrusiveness,
c. Parental limit setting,
d. Child social involvement,
e. Child withdrawal,
f. Child compliance,
g. Dyadic reciprocity and
h. Dyadic negative states.

The following table 2 shows all categories and the associated items.

Table 2: CIB categories and items (Feldman, 1998)

Category	Item
Parental sensitivity	Acknowledging, imitating, elaborating, parent gaze/ joint attention, positive affect, vocal appropriateness/ clarity, appropriate range of affect, resourcefulness, praising, affectionate touch, parent supportive presence
Parent intrusiveness	Forcing, overriding, parent negative affect/ anger, hostility, parent anxiety, enthusiasm
Parental limit setting	Consistency of style, on task persistence, appropriate structure/ limit setting
Child social involvement	Child gaze, positive affect, child affection to parent, alert, fatigue, child vocalization/ verbal output, child initiation, competent use of environment, creative-symbolic play
Child withdrawal	Negative emotionality/ fussy, withdrawal, emotional lability, child avoidance of parent
Child compliance	Child compliance to parent, child reliance on parent for help, child on-task persistence
Dyadic reciprocity	Dyadic reciprocity, adaptation-regulation, fluency
Dyadic negative states	Constriction, tension

A sequence of two minutes from each video was chosen to rate the mother- child interaction. The sequence was randomly chosen from the middle of the video to avoid bias. Three independent coders rated every video sequence independently using the CIB manual after Ruth Feldman from 1998.

4.3 Including Criteria

Concerning the chosen method CIB, the following inclusion criteria for this evaluation were defined:

- ✓ the mother has filled out the questionnaire T0
- ✓ the mother and her child were videotaped by at least three different time points
- ✓ the child is older than eight weeks
- ✓ the videos are longer than three minutes
- ✓ the videotaped situation is a playing situation (no feeding, no diaper or clothes changing)
- ✓ the videotaped persons are the mother and her child (no father, no siblings)
- ✓ the video quality is good (lightning and sound conditions, faces and viewing direction are recognizable)

The consideration of the inclusion criteria led to 25 drop outs. In total 17 participants were included in the evaluation.

4.4 Inter - Rater Reliability Analysis

After rating every video, one coder prepared an overview of all cases in Microsoft excel. Then the data was transferred to SPSS (Superior Performing Software System) to conduct the statistical analysis. As multiple independent coder rated the mothers and their children's videos, inter-rater reliability (IRR) assessment was conducted to quantify the coders degree of agreement (Hallgren, 2012, p. 2). In this study, three coders applied the method CIB as described in chapter 4.2. The average intra-class correlation (ICC) statistic was used for assessing IRR, as multiple coders rated all videos. Also, averages were used for hypothesis testing. Every coder rated every video and all items independently. Therefore the requirements of a fully crossed design for the IRR are met. Thereby systematic bias between the coder can be assessed and controlled, improving overall IRR estimates (Hallgren, 2012, p. 3) .

For the analysis a two-way and mixed-effects model with the absolute agreement was specified as each coder rated every subject, the coder were not selected randomly, and the final results were only applied to the target group and not a larger population. The IRR calculation was performed with the statistical program SPSS Version 27. After the IRR assessment all cases of disagreement between the coders were identified and then resolved by discussing the behaviour until agreement was reached. The syntax can be found in appendix I.

4.5 Repeated Measurements ANOVA

In total, six of the eight categories (see chapter 4.2) were used for the final statistical analysis. Category (c.) and (f.) were excluded due to many logical missing's at time point one, which arose from items that could not be rated for children under eight months. Before the categories were build, the rating scale of the item "fatigue" was recoded. After the categories were defined and build, category means were computed for all three time points. In total, 18 variables were generated (Table 3).

Table 3: Category variables with variable names

Category	Variable Name
Category a.	
Parental sensitivity, time point one	PC_SEN_T1
Parental sensitivity, time point two	PC_SEN_T2
Parental sensitivity, time point three	PC_SEN_T3
Category b.	
Parent intrusiveness, time point one	PC_INT_T1
Parent intrusiveness, time point two	PC_INT_T2
Parent intrusiveness, time point three	PC_INT_T3
Category c.	

Child social involvement, time point one	CH_INV_T1
Child social involvement, time point two	CH_INV_T2
Child social involvement, time point three	CH_INV_T3
Category d.	
Child negative emotionality, time point one	CH_WIT_T1
Child negative emotionality, time point two	CH_WIT_T2
Child negative emotionality, time point three	CH_WIT_T3
Category e.	
Dyadic reciprocity, time point one	DY_REC_T1
Dyadic reciprocity, time point two	DY_REC_T2
Dyadic reciprocity, time point three	DY_REC_T3
Category f.	
Dyadic negative states, time point one	DY_NEG_T1
Dyadic negative states, time point two	DY_NEG_T2
Dyadic negative states, time point three	DY_NEG_T3

To evaluate the course of the mother-child interaction throughout the parent education program "Sicherer Hafen" a repeated measures design was chosen - the repeated measurement analysis of variance (rmANOVA). The test assumptions for rmANOVA are:

(1) the sample has to be dependent,
(2) the dependent variable is at least interval scaled,
(3) the dependent variable should be normally distributed for each level of the within-subject factor,
(4) the sphericity should be given (Rasch et al., 2014, p. 71).

After the test assumptions have been checked, the final interpretation of the results followed. At first, the significance of the sphericity was interpreted. If the sphericity was given (significance level of 0.05), the significance of the within-subject effects was interpreted (significance level of 0.05). To determine which time point's significant differences exist, a Bonferroni-adjusted post-hoc analysis was performed. If the H0-Hypothesis regarding the sphericity was not violated, a Greenhouse-Geisser or Huynh-Feldt test was used to correct the results (Rasch et al., 2014, p. 72 ff.). The calculations were performed with the statistical program SPSS version 27. The syntax can be found in appendix I.

4.6 Group Comparison

To gain more knowledge about the participants and the course of the mother-child interaction, four characteristics were used for group comparison. The information on the mother's individual immigration background, the health status, the family status and the education level was used. Table 4 shows the variable names, their meaning, the information the variable contains and the sample sizes of each group. A variable which contained more than two answer options was recoded into two.

Table 4: Variable characteristics for group comparison

Variable Name	Meaning	Values/ groups	n
Mi_back	Immigration background	*Yes/No*	7/9
Fam_Stat	Family status	*With partner* (Married; Constantly living with partner)/	14/2
		No partner (Divorced; Widowed; Single)	
Hea_Stat	Health status	*Good* (Very good; Good; Satisfying)/	15/2
		Bad (Less well; Bad)	
Edu_Lev	Education level	*Low* (No degree; School without graduation; School for special needs; Secondary school (Hauptschule); Secondary School (Realshchule))/	6/10
		High (High school diploma (Abitur); Vocational baccalaureate diploma (Fachabitur); University of Applied Sciences degree; University degree)	
Psych_Be	Mental burden or illness	*Yes/ No*	12/5

Due to the small sample sizes, the group comparison is only described descriptively. The overall means for each group and each time point were computed with SPSS and compared tabularly.

5 Results

The following chapter describes the participating sample. It also shows the results and the interpretation of the IRR, the rmANOVA test assumptions, the final results of the rmANOVA, and the group comparison.

5.1 Sample Description

In total, 17 mothers and their children were included in the evaluation. Most women (6/ 35.3%) participated in the education program in Bergedorf (Table 5). All mothers were between 21 and 40 years old. The participating children were between 2 and 5 months (M=3.6; SD=0.9) at time point one (Table 6).

Table 5: Location of the parenting school participants, n=17

	n	%
Barmbek	4	23.5
Bergedorf	6	35.3
Kirchdorf-Süd	5	29.4
Wilhelmsburg	2	11.8

Table 6: Children's age in months at different time points, n=17

	Range	M[a]	SD[b]
Time point one	2-5	3.6	0.9
Time point two	6-10	7.4	1.2
Time point three	12-16	14.4	1.2

[a]M=Mean; [b]SD=Standard deviation

Ten (62.5%) of the women were married, four (25.0%) lived together with a partner, one was widowed and one was single. 13 (76.5%) women live with the father of their child. In four (23.5%) households live further biological children.

Seven (53.8%) mothers have no other children. Five (31.3%) mothers have graduated from university and nine (75%) are employed. Also, nine (52.9%) of the women describe their current health status as good and one as bad. Regarding mental stress or mental illness, twelve (70.6%) women report to be affected. However, only one woman is physically stressed or ill. Seven (41.2%) women have a immigration background. Table 7 shows detailed listings of the sample characteristics.

Table 7: Sample description, socio-demographic information, n=17

	n	%
Relationship status [a]		
Married	10	62.5
Living with a partner permanently	4	25.0
Widowed	1	6.3
Single	1	6.3
Living with the father of the child [b]		
Yes	13	86.7
No	2	13.3
Further biological children [c]		
Yes	13	76.5
No	4	23.5
Children < 18 years living in the household [d]		
No children	7	53.8
One child	3	23.1
Two children	1	7.7
Three children	1	7.7
Four children	1	7.7

Current health status [c]		
Very good	6	35.3
Good	9	52.9
Less good	1	5.9
Bad	1	5,9
Education [a]		
Secondary school (Hauptschule)	3	18.8
Secondary school (Realschule)	3	18.8
Abitur/ Fachabitur	2	12.5
University of Applied Sciences	3	18.8
University degree	5	31.3
Current occupation [c]		
Full time	1	5.9
Part time	1	5.9
Not employed	3	17.6
Maternity leave/ Parental leave	11	64.7
Student	1	5.9
Occupational status [e]		
Worker (Arbeiter)	1	5.9
Employee (Angestellter)	9	52.9
Official (Beamter)	1	5.9
Student	1	5.9
Mental stress or illness [c]		
No	5	29.4
Yes	12	70.6
Physical stress or illness [c]		

No	16	94.1
Yes	1	5.9
Immigration background [c]		
No	10	58.8
Yes	7	41.2
Participation [c]		
Midwife	1	5.9
Friends	1	5.9
Counselling	8	47.1
Parenting school	4	23.5
Internet	2	11.8
Various	1	5.9

Notations: [a] 1 missing; [b] 2 missing; [c] 0 missing; [d] 4 missing; [e] 5 missing

5.2 Inter-Rater Reliability Assessment

In total, 1881 rated items were included in the IRR assessment, 627 from each coder. For the assessment, logical missing's and missing's were excluded. The average means of each coder were as follows:

Coder 1: M=2.5 (SD=1.2),

Coder 2: M=2.3 (SD=1.2),

Coder 3: M=2.5 (SD=1.2).

The average ICC, using an absolute agreement definition, is 0.83 (CI: 0.82-0.85; p-value: <0.0001; df:1880). This level of reliability can be regarded as good to excellent (Koo & Li, 2016, p. 158).

5.3 Test Assumptions for Repeated Measurement ANOVA

Specific assumptions should be fulfilled for computing rmANOVA.

(1) The sample has to be dependent:

- Assumption met – The examined sample is only one group and was investigated at three different time points.

(2) The dependent variable is at least interval scaled:

- Assumption met – The dependent variable is interval scaled.

(3) The dependent variable should be normally distributed for each level of the within-subject factor:

- Assumption partly met – The skewness and the kurtosis of each category were computed in SPSS to test the normal distribution. Boxplots and histograms were also determined. Finally, the Shapiro-Wilk test was computed and assessed. A normal distribution is given when the assumption of the H0-Hypothesis (H0=the data is not normally distributed) is violated (significance level of 0.05). The results are as follows:

Table 8: Test on normal distribution with the Shapiro-Wilk test

Variable	*P**
PC_SEN_T1	**0.338**
PC_INT_T1	0.014
CH_INV_T1	**0.055**
CH_WIT_T1	0.001
DY_REC_T1	**0.203**
DY_NEG_T1	0.000
PC_SEN_T2	**0.398**
PC_INT_T2	0.001
CH_INV_T2	**0.005**
CH_WIT_T2	0.000
DY_REC_T2	**0.089**

DY_NEG_T2	0.000
PC_SEN_T3	**0.239**
PC_INT_T3	0.000
CH_INV_T3	0.023
CH_WIT_T3	0.000
DY_REC_T3	**0.233**
DY_NEG_T3	0.000

*significance level of 0.05

Ten variables do not fulfil the assumption of the normal distribution as assessed by the Shapiro-Wilk test ($p<0.05$) (Table 8). Nevertheless, rmANOVA will still be performed since it is relatively robust to violations of the normal distribution assumption (Berkovits et al., 2000; Pagano, R. R., 2010).

(4) The sphericity should be given:

- Assumption partly met – Mauchly's test of sphericity was performed in SPSS for each category at three time points. Sphericity is given when the assumption of the H0-Hypothesis (H0=the variances between the groups are not equal) is violated (significance level of 0.05). The results are as follows (Table9):

Table 9: Mauchly's test of sphericity for each category at three time points

Variable	***P****
PC_SEN_T1,T2, T3	**p>0.05**
PC_INT_T1, T2, T3	**p>0.05**
CH_INV_T1, T2, T3	**p>0.05**
CH_WIT_T1, T2, T3	**p>0.05**
DY_REC_T1, T2, T3	**p>0.05**
DY_NEG_T1, T2, T3	p<0.05

*significance level of 0.05

Sphericity is not given for "dyadic negative states" as assessed by Mauchly's test of sphericity ($p<0.05$).

5.4 Repeated Measurement ANOVA

The results of the rmANOVA calculation for the overall comparison show three significant outcomes. A significant result of rmANOVA means that at least two time points are statistically significantly different from each other. Table 10 gives an overview of the rmANOVA calculations of the whole sample.

Table 10: Overall results of rmANOVA, n=17

	Time point 1		**Time point 2**		**Time point 3**			
	M	*SD*	*M*	*SD*	*M*	*SD*	*F (df)*	*P**
Parental sensitivity[a]	3.2	0.5	3.3	0.5	3.4	0.5	1.9 (2/32)	0.167
Parent intrusiveness[b]	1.5	0.4	1.3	0.3	1.2	0.3	6.9 (2/32)	**0.003**
Child social involvement[a]	2.8	0.3	3.1	0.4	3.3	0.4	15.7 (2/32)	**<0.001**
Child withdrawal[b]	1.5	0.6	1.3	0,5	1.2	0.3	3.1 (2/32)	0.060
Dyadic reciprocity[a]	2.9	0.7	2.9	0.7	3.4	0.7	4.7 (2/32)	**0.017**
Dyadic negative states[b]	1.0	0.1	1.1	0.2	1.2	0.4	-**	-**

*significance level 0.05; **Sphericity not given; [a]increase is positive; [b]decrease is positive

The analysis of the category *Parental sensitivity* does not show a statistically significant result, also not by correction with a Greenhouse-Geisser or Huynh-Feldt test ($F= (2/32)\ 1.9$; $p>0.05$). Considering only the mean values, the increase in parental sensitivity can be observed (Figure 2).

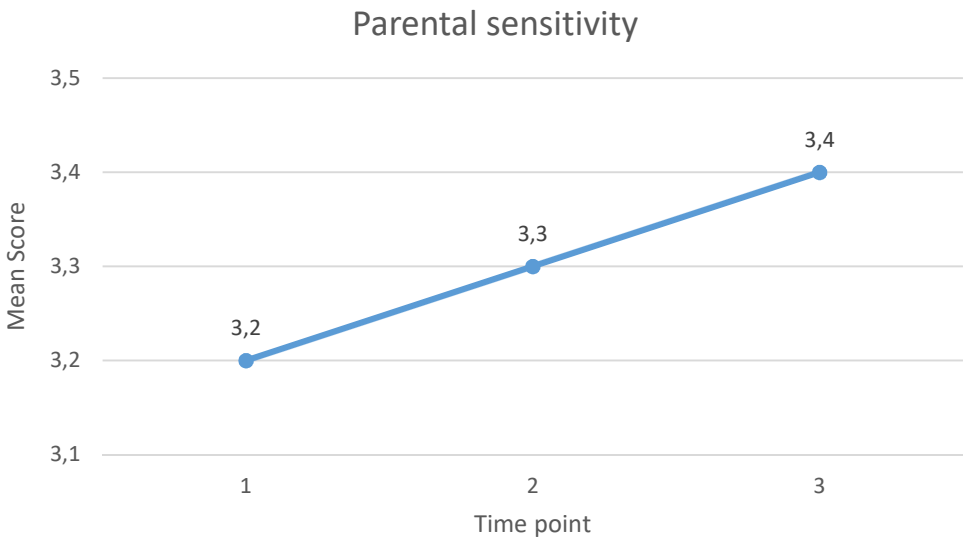

Figure 2: Mean values for Parental sensitivity, n=17

A significant result was found in the *Parent intrusiveness* category (F= (2/32) 6.9; p<0.05). The Bonferroni-adjusted post-hoc analysis revealed a significant difference *(*p<0.05) between time point one and three (mean difference: 0.32; 95%-CI [-0.2, 0.5], p<0.05). The mean scores decrease, from time point one (M=1.5) to two (M=1.3) to three (M=1.2), as all items in this category are reversed, and a low score is positive (Figure 3).

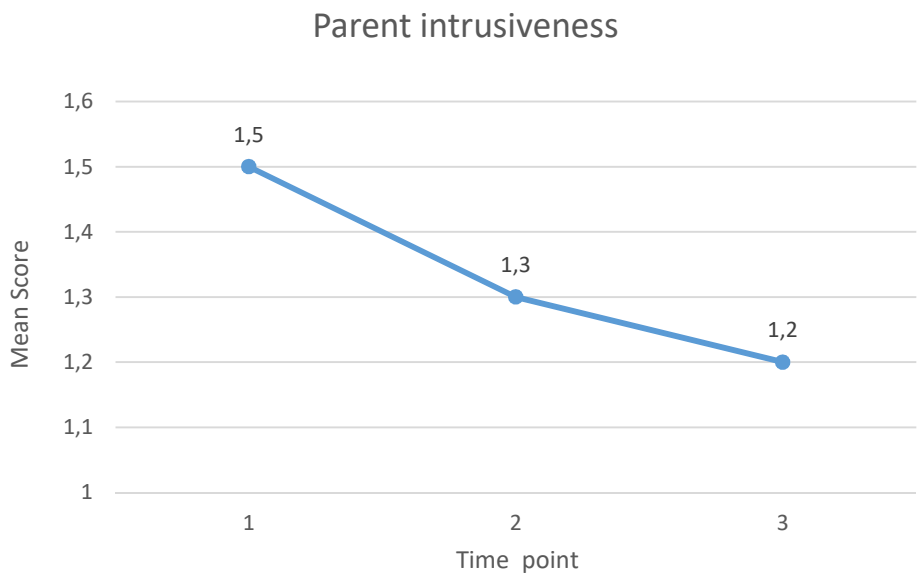

Figure 3: Mean values, Parent intrusiveness, n=17

The third tested category *child social involvement* also showed a significant result (F= (2/32) 15.7; p<0.001). The Bonferroni-adjusted post-hoc test proves that time point one and two (mean difference: 0.30; 95%-CI [0.1, 0.5, p<0.05]), and one and three (mean difference: 0.5; 95%-CI [0.2, 0.7], p<0.05) differ significantly from each other (Figure 4).

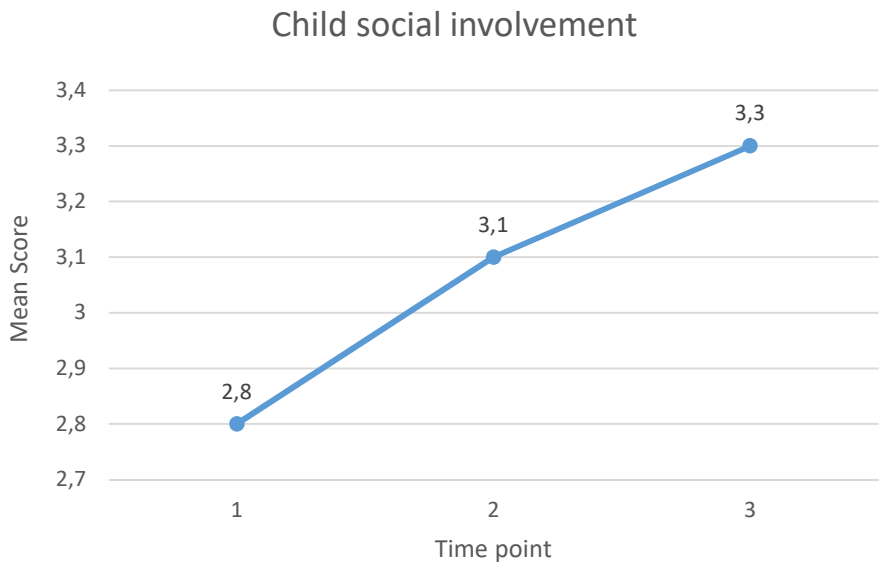

Figure 4: Mean values, Child social involvement, n=17

No statistically significant result was found in the category *Child withdrawal* (F= (2/32) 3.1; p>0.05). The mean scores decrease, from time point one (M=1.5) to two (M=1.3) to three (M=1.2), as all items in this category are reversed, and a low score is positive (see Figure 5).

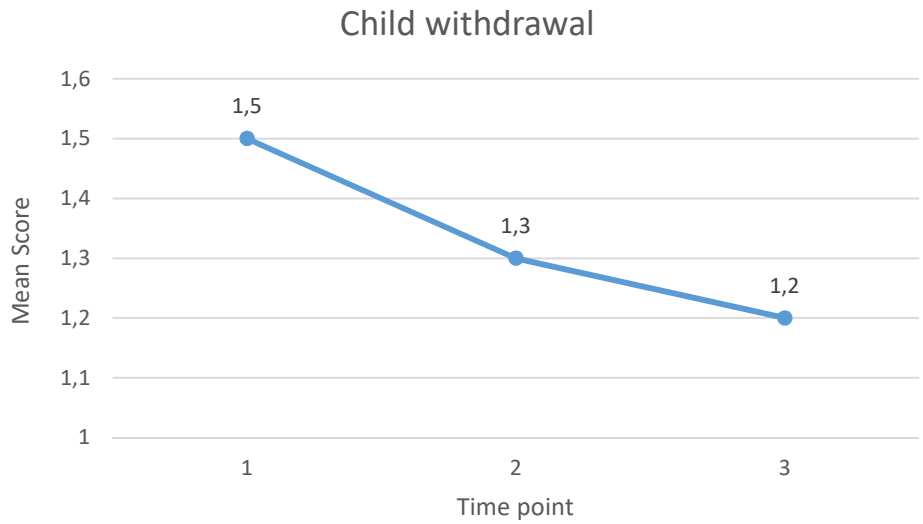

Figure 5: Mean values, Child withdrawal, n=17

The category *Dyadic reciprocity* shows statistically significant results (F= (2/32) 4.7; p<0.05). The Bonferroni-adjusted post-hoc test shows a significant difference between time point two and three (mean difference: 0.5; 95%-CI [0.1, 0.8, p<0.05]) (Figure 6).

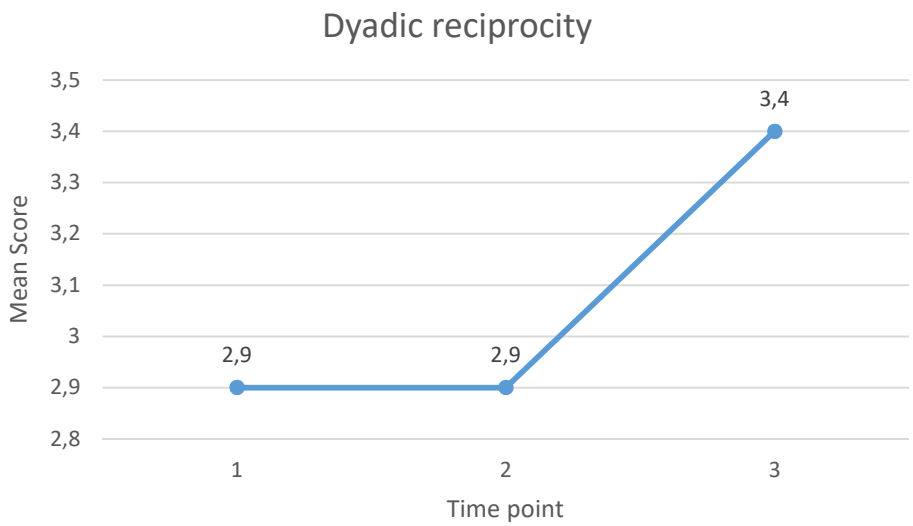

Figure 6: Mean values, Dyadic reciprocity, n=17

The mean scores of the sixths category *Dyadic negative states* increase over time (Figure 7). The test assumption shpericity was violated for this category - therefore the rmANOVA was not performed.

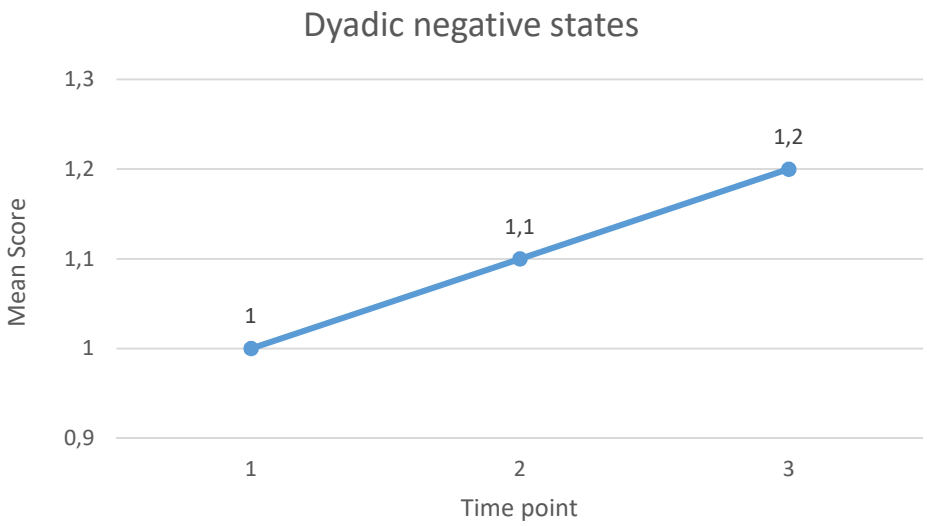

Figure 7: Mean values, Dyadic negative states, n=17

5.5 Group Comparison

The following tables show the group comparison of the variables described in chapter 4.6. The mean scores are compared regarding the CIB categories and the time points. The computation was also performed with SPSS, the syntax can be found in the appendix I.

Table 11 shows the comparison of mothers with and without an immigration background. The mean scores for *parental sensitivity* increase equally for both groups by 0.1 over all time points. In the *parent intrusiveness* category, mothers without an immigrant background show an improvement of 0.4 in the mean scores, while mothers with an immigrant background show an improvement of 0.3 with stagnation from time point two to three. *Dyadic reciprocity* increased by 0.5 in both groups after the second time point.

Table 11: Group comparison between mothers with (n=7) and without (n=10) an immigration background

	Time point 1		**Time point 2**		**Time point 3**	
	Yes	No	Yes	No	Yes	No
			M (SD)			
Parental sensitivity	3.3 (0.6)	3.2 (0.5)	3.4 (0.4)	3.3 (0.6)	3.5 (0.2)	3.4 (0.6)
Parent intrusiveness	1.5 (0.6)	1.6 (0.3)	1.2 (0.3)	1.4 (0.4)	1.2 (0.2)	1.2 (0.3)
Child social involvement	2.9 (0.4)	2.8 (0.3)	3.1 (0.3)	3.1 (0.4)	3.3 (0.5)	3.3 (0.4)
Child withdrawal	1.5 (0.7)	1.5 (0.5)	1.2 (0.4)	1.3 (0.5)	1.2 (0.2)	1.2 (0.4)
Dyadic reciprocity	3.0 (0.8)	2.8 (0.6)	3.0 (0.6)	2.8 (0.8)	3.5 (0.5)	3.3 (0.9)
Dyadic negative states	1.0 (0.2)	1.0 (0.1)	1.1 (0.2)	1.5 (0.2)	1.2 (0.4)	1.2 (0.3)

The group comparison between mothers with a partner and without a partner is shown in Table 12. Mothers with partners have lower baseline scores than mothers without partners in four categories. *Parental sensitivity* increased by 0.5 across all time points for mothers without a partner and by 0.3 for mothers with a partner. *Dyadic negative states* increased by 0.8 in mothers without a partner and by 0.1 in the comparison group.

Table 12: Group comparison between mothers with (n=14) and without (n=2) a partner

	Time point 1		**Time point 2**		**Time point 3**	
	With Partner	No Partner	With Partner	No Partner	With Partner	No Partner
	M (SD)					
Parental sensitivity	3.2 (0.5)	3.3 (0.0)	3.3 (0.5)	3.4 (0.6)	3.5 (0.5	3.8 (0.3)
Parent intrusiveness	1.5 (0.5)	1.5 (0.3)	1.3 (0.3)	1.4 (0.6)	1.2 (0.3)	1.3 (0.2)
Child social involvement	2.8 (0.2)	3.3 (0.6)	3.1 (0.4)	3.2 (0.5)	3.3 (0.4)	3.5 (0.2)
Child withdrawal	1.4 (0.4)	2.0 (1.5)	1.2 (0.4)	1.5 (0.7)	1.1 (0.3)	1.5 (0)
Dyadic reciprocity	2.8 (0.6)	3.3 (0.9)	2.9 (0.8)	2.8 (0.7)	3.5 (0.8)	3.2 (0.2)
Dyadic negative states	1.0 (0.1)	1.0 (0.0)	1.0 (0.1)	1.3 (0.4)	1.1 (0.3)	1.8 (0.4)

Regarding the education level (Table 13), an increase of *parental sensitivity* by 0.3 can be observed for mothers with a high education level. Mothers with low educational level show an increase of 0.1 from time point one to two, but drop back to baseline at time point three. The initial values for *parent intrusiveness* were different, but both groups showed a positive change in the mean score of 0.3 over the course of the study. In the context of *dyadic reciprocity*, a positive change

in the mean score of 0.2 can be observed for mothers with a low level of education. In the comparison group, the value increases by 0.7.

Table 133: Group comparison between mothers with low (n=6) and high (n=10) education level

	Time point 1		**Time point 2**		**Time point 3**	
	Low	High	Low	High	Low	High
			M (SD)			
Parental sensitivity	3.4 (0.6)	3.1 (0.5)	3.5 (0.3)	3.2 (0.6)	3.4 (0.4)	3.4 (0.5)
Parent intrusiveness	1.4 (0.3)	1.6 (0.5)	1.3 (0.3)	1.3 (0.4)	1.1 (0.1)	1.3 (0.3)
Child social involvement	2.9 (0.2)	2.7 (0.3)	3.2 (0.2)	3.0 (0.4)	3.3 (0.5)	3.3 (0.4)
Child withdrawal	1.3 (0.3)	1.7 (0.7)	1.3 (0.3)	1.3 (0.6)	1.2 (0.2)	1.2 (0.4)
Dyadic reciprocity	3.1 (0.7)	2.7 (0.6)	2.9 (0.7)	2.8 (0.8)	3.3 (0.6)	3.4 (0.8)
Dyadic negative states	1.0 (0.1)	1.1 (0.2)	1.0 (0.1)	1.1 (0.2)	1.0 (0.1)	1.2 (0.3)

In table 14, mothers with and without mental burdens or illnesses are compared. Regarding *parental sensitivity*, mothers with psychological burdens or illnesses, mean scores increase by 0.4, with the comparison group showing a decrease of 0.1. Similarly, an improvement of 0.4 can be observed in the *child withdrawal* category for stressed mothers, and 0.1 for the comparison group. Over three time points, the *dyadic reciprocity* shows a decrease of the mean scores by 0.3 for mothers without psychological stress, and an improvement of 0.8 for mothers with psychological stress.

Table 14: Group comparison between mothers with (n=12) and without (n=5) a mental burden or illness

	Time point 1		Time point 2		Time point 3	
	Yes	No	Yes	No	Yes	No
	M (SD)					
Parental sensitivity	3.2 (0.6)	3.3 (0.5)	3.4 (0.4)	3.1 (0.6)	3.6 (0.4)	3.2 (0.5)
Parent intrusiveness	1.5 (0.5)	1.6 (0.3)	1.2 (0.3)	1.4 (0.4)	1.2 (0.2)	1.3 (0.4)
Child social involvement	2.8 (0.3)	2.7 (0.4)	3.2 (0.2)	2.9 (0.5)	3.4 (0.4)	3.1 (0.5)
Child withdrawal	1.5 (0.6)	1.5 (0.6)	1.2 (0.3)	1.6 (0.6)	1.1 (0.2)	1.4 (0.5)
Dyadic reciprocity	2.8 (0.7)	3.1 (0.7)	3.0 (0.7)	2.5 (0.5)	3.6 (0.6)	2.8 (0.5)
Dyadic negative states	1.0 (0.1)	1.0 (0.1)	1.0 (0.1)	1.1 (0.2)	1.1 (0.3)	1.3 (0.4)

6 Discussion

The presented study aimed to determine the course of the interactional behaviour patterns between the mother and the child in the parent education training "Sicherer Hafen". During the training, mothers and their children were filmed in a home play situation and afterward counselled by trained counsellors based on the EPB, regarding their interaction behaviour with their child. This study includes 17 mothers and their children. The evaluation of this thesis included three consecutive video recordings per family. The children were on average 3.6, 7.4, and 14.4 months old during the video recordings. Using the CIB manual, the video recordings were evaluated by three independent coders with regard to parent-child interaction. In the following, the methodology is critically discussed, the results are interpreted and discussed based on the literature, and the limitations are presented.

6.1 Methodological Discussion

In general, research around mother-infant interaction represents a challenging research setting. The use of valid and reliable methods to evaluate interactional behaviour is beneficial. Accordingly, the CIB method of the American researcher Ruth Feldman provides a suitable methodological framework for this study. It has been applied in a wide variety of contexts and numerous cultures and countries. It shows good psychometric properties. Usually, official training has to be taken to be fully qualified to apply the method CIB. For this evaluation one of the three coders took the CIB seminar to be qualified as a coder for CIB. Two of the three coders for this study had only one training, taught by the coder who attended the official training. Hallgren (2012) recommends conducting several trainings, and specifying an a priori level of IRR, which has to be reached before coding the final data (Hallgren, 2012, p. 4). Nevertheless, all coders rated very similarly referring to the means of the IRR (M=2.5 (SD=1.2), M=2.3 (SD=1.2), M=2.5 (SD=1.2)). This is another indication of the fit of the method for this study and the good psychometric properties.

Regarding the sample size, it can be stated that it is rather small. Due to different procedures and conditions during the video recordings (described in the following) and the length of the parenting training, there were many drop outs. Pregnancy and being and becoming a parent can be a stressful situation, as described in Chapter 2.1, and can mean that not all training appointments can be attended. Larger sample size could lead to more conclusive results.

Regarding the video recordings, several discussion points arise, which are discussed in the following. Not every family had the same counsellor. Thus the recording of the videos occurred differently. Some counsellors allowed themselves to be involved in conversations or nonverbal interactions during the recording, while others did not. The length of the recordings also varied greatly. Unfortunately, there was no guide or protocol with instructions on how to record the videos. Accordingly, deficient lighting conditions and poor sound quality made it difficult to evaluate three videos. Similarly, facial expressions and directions of gaze were challenging to recognize in six videos because they were filmed exclusively with one camera, so not all angles could be captured. In three videos, languages were spoken that the coders could not translate. Thus, the evaluation of, e.g., praising, criticizing, or limit setting was only possible to a limited extent. By avoiding bias through standard work procedures and defined frameworks, a larger sample could have been analysed.

Furthermore, the length of the video sequences assessed (two minutes) is rather short. Studies in which comparable methods were applied often assessed a length of at least five minutes. The manual by Feldman (1998) also states that the video should be assessed over its entire length.

Also, the play situation during video recording represents an unnatural situation. It can cause uncertainty in the mother and unnatural behaviours. However, trained counsellors can recognize differences or unnatural maternal behaviours, due to the child's irritating behaviour (Ziegenhain & Derksen, 2006, p. 149).

Due to the numerous possible influences on the mother-child interaction, no cause-and-effect associations can be proven. A known confounder in studies with repeated measures can be the position effect. The position effect refers to the behaviour of the participant. For example, even the explanation regarding the video recording and its reason can lead to a change in the mother's behaviour.

6.2 Discussion of Results

Concerning the research question, the significances presented in Table 10 (Section 5.2) emerge. Using rmANOVA, significant differences were found in three of six CIB categories - *Parent intrusiveness*, *Child social involvement*, and *Dyadic reciprocity*.

The category P*arent intrusiveness* includes negative behaviours of the mother towards the child such as forcing, overriding, or anger. In the study by Feldman & EIdelman (2009), a significant decrease in maternal intrusiveness was found with the increase in the child age. As expected, *Parent intrusiveness* also changed significantly to the positive across all three time points in this study. One explanation for this may be the mother's growing self-confidence. The mother's self-confidence strengthens as the child grows older, so that negative maternal behaviours decrease (Collis & Schaffer, 1975, p. 319). Over the months, the mother gets to know and accept her child and herself better in the new role and can react more positively to her child. In addition to the progressive development of the child, the parent training with the EPB consultations may have generated an effect. Questionable is the sustainability of the positive change regarding the negative maternal behaviours. Problems that affect the mother in the long term, such as bad childhood experiences, partnership conflicts, or financial problems, may reverse the positive change in mother-child interaction after the training is completed.

Child social involvement includes, among other items, the child's gaze and vocalization, alert, and the competent use of the environment. It is expected to find a low baseline score, and a larger increase from the second to the third video

recording (Feldman & Eidelman, 2009, p. 198). The older the child gets, the more clearly it can communicate verbally or nonverbally. The mother and the child get to know each other better and better and understand each other better. Thus, the mother can respond appropriately to the child's behaviour and increases child social involvement (Collis & Schaffer, 1975, p. 319 f.). The results show a relatively low baseline and a moderate significant positive trend across all three time points.

The category *Dyadic reciprocity* is related to the child's social involvement. As expected, it will start with a low baseline score and increase from the second to the third time point (Feldman & Eidelman, 2009, p. 197). Also the study from Steele et al. (2019), where mothers and children participated in the group intervention GABI (chapter 2.4), shows a higher level of dyadic reciprocity after intervention in the GABI-group, than in the comparison group (Steele et al., 2019, p. 210 f.). The category *Dyadic reciprocity* includes adaptation-regulation and fluency between the mother and the child. As expected, the results for the parent training "Sicherer Hafen" show a low baseline value. From time point one to two, the mean values stagnated. At time three, however, the interactional behaviour in this category changed positively and significantly. This may be due to the training effect as well as the child's development.

In general, in the context of the theoretical models of Gloger-Tippelt (1988) (Chapter 2.1) and Bowlby (1975) (Chapter 2.2.2), and the age of the children during the recording of the video, it can be concluded that the children are in the *Orientation and signals directed at one or more different persons* – phase, when the first video is recorded. Accordingly, the mother is in the *challenge and transition phase in the adaptation*. This means that the mother and child are in a phase of adjustment and must get used to the current conditions and adapt to each other. Accordingly, a low initial value or only a moderate positive development in the analysed categories of mother-child interaction from the first to the second time point can be explained. From the second video recording, the children are in the *Maintaining closeness to a differentiated person by movement and signals*- phase, and the mother is in the *Adjustment phase to parenthood* –

phase. This means routines and habits are established; the mother feels more secure in dealing with the child's needs, because the child shows explicit attachment behaviour. It prefers a primary caregiver, follows the mother and seeks her closeness through the active attachment behaviour. Therefore, the theoretical models described in chapter two support the result regarding a larger positive increase in the mother-child interaction patterns from the second to the third video recording.

No significances could be calculated for the categories P*arental sensitivity* and *Child withdrawal*. The non-significant results could be the outcome of the rather small sample size. However, based on the results, a trend of change in mother-child interaction patterns can be seen. Due to the criticism of the significance of the p - value, attention should also be paid to the non-significant results of the rmANOVA (Nuzzo, 2014, p. 151 f.). According to Nuzzo (2014), the p-value provides only a summary assessment of the data examined and not the final statement about the representativeness of a study.

The category *Parental sensitivity* includes joint attention, positive affect, and vocal appropriateness, among other items. According to Feldman & Eidelman (2009), and the theoretical models from chapter 2, the expected results are a moderate increase from the first to the second time point, and a substantial increase from the second to the third time point. The results for this category are not significant. Looking at the mean values of the variables, the trend shows a slight increase over all time points. The cause here may be the lack of maternal sensitivity or the lack of understanding of the concept of maternal sensitivity as a starting point.

The category *Child withdrawal* includes factors such as emotional lability and the child's avoidance of the mother. The results for this category are not significant. The mean scores show a low initial value, which is positive, and decrease slightly over all time points, which is also a positive trend. With a positive development of maternal sensitivity and parent intrusiveness, a positive result regarding child withdrawal is also to be expected.

Group comparison

In general, a similar pattern of interactional behaviour can be observed for all CIB categories in this group comparison. Regarding the immigration background, it is to be expected that mothers with a immigration background are disadvantaged (Hagen & Kurth, 2007, p. 28). However, in every category analysed, mothers with an imimmigrant background have a better or equal baseline score than mothers without an immigrant background (Table 11). When interpreting the results, the question arises as to the origin and cultural background of the mothers. German language skills are also crucial in the context of the parenting training. Likewise, how long they have lived in Germany and have adopted the German culture with the German understanding of upbringing. Cultural differences also mean differences in parenting styles and the understanding of motherhood and family (Trommsdorff, 2001, p. 45 ff.).

When comparing mothers with and without a partner (Table 11), it is noticeable that mothers with a partner have a lower baseline score in four of the CIB categories than mothers without a partner. Accordingly to (Egle & Hardt, 2014, p. 111), single mothers are disadvantaged, consequently an opposite result was expected. It can be assumed that partnership conflicts put much strain on the couples and thus impair interactional behaviour. The higher increase in *Parental sensitivity* in mothers without a partner also suggests possible partnership conflicts in the comparison group. However, the course of the mean values in the category D*yadic negative states* is striking and also contradictory. An increase in the mean values in this category indicates a negative course of interactional behaviour. For mothers with a partner, a small increase in the mean value can be observed at the end of the training, and for mothers without a partner, a high increase. The reason for this may be the increasing burden in childcare due to the lack of help from a partner. Similarly, single parents have to bear sole responsibility and are often exposed to financial burdens.

In the group comparison between mothers with high and low education levels (Table 12), the interaction patterns were also expected to be better in the mothers with high education levels (Schenk et al., 2007, p. 592). In the category *Parental*

sensitivity, the expectation is supported. Mothers with a low level of education show a minimal increase in this category but then fall back to the baseline value. The reason for this could be a lack of resources to implement the newly learned knowledge in the long term. In general, the mean values of the individual categories in this group comparison show that the courses of the interaction patterns are more positive for mother's with a high educational level than for the comparison group. Frequently, mothers with a low educational level come from families with the same educational level. Thus, it can be assumed that the mother's negative attachment experiences were now continued with her own child (BMFSFJ, 2021, p. 25). It is also conceivable that the training content is not suitable for this target group.

Also, based on the literature, it can be assumed that the group with mental burdens or illnesses has more negative interaction patterns compared to the group without mental burdens (Table 13) (Bowlby & Stern, 2006, p. 331). In three categories, mothers with psychological stress show poorer baseline scores. In the categories *Parental sensitivity* and *Dyadic reciprocity*, a clear improvement in the mean values can be observed among the stressed mothers. In contrast, a decrease can even be observed in the comparison group. This may be due to the fact that the EPB method is suitable for this target group.

6.3 Limitations and Strengths

The results of this thesis are tied to a list of limitations and strengths that will be presented in the following.

As described in chapter 2, numerous factors influence the mother-child interaction. On the one hand, the influencing variables can promote the course of mother-child interaction. On the other hand, they can prevent or slow down the development of a positive interaction pattern. Therefore, it is not possible to generate causal associations in this study. Possible influences can be the personal past of the mother, the temperament of the child, the partnership relationship of the parents, or the social status. Mothers who seek help and undergo such training are open to counselling and are ready for a change. If the father or another person was the

driving force regarding the attendance of the parent training, the mother's motivation might be limited. Similarly, social expectation plays a role. Participation in parent training may be the mother's response to the pressure of expectations to portray a perfect mother. The individual personality characteristics of the mother and the child, such as personal emotional and cognitive resources, also condition different outcomes and are not included as influencing variables in this study.

The video recording of the mother-child interaction represents an unnatural situation, and is a momentary image (Ziegenhain & Derksen, 2006, p. 148). Factors such as fatigue, stress, hunger, and uncertainty in an unfamiliar situation can lead to the fact that the typical interaction pattern is not represented in the analysis. In addition, frequent and rapid developmental processes take place in early childhood, as in no other age (Bowlby, 2008, p. 228). The developmental progress occurs in each child, but is highly individual in intensity and timing. This is not a concern for the parent training, as this can be discussed with the counsellor. However, with regard to the results of this study, it is difficult to distinguish whether the progress of the interaction patterns refers to the child's development or other influences, such as the parent training (Windaus, 2014, p. 510).

Finally, the mother's behaviour towards the child in the video situation can be played, i.e., not be honest. Reasons for this can be insecurity, fears or the pressure of expectations towards the counsellor. The counsellors recognize such situations in the child's reactions. However, for this study, it would mean a false positive development in the categories *Parent sensitivity* and *Parent intrusiveness*.

In addition to the limitations, strengths of this study may also be highlighted. The theoretical background, based on evident scientific literature, offers studies that justify the necessity of this work. In addition, reliable and valid methods such as the EPB and the CIB were used, whereby clear structures and standardized evaluation parameters were predefined. Based on the evaluation by statistical methods and the accompanying calculations, as well as a clear presentation of the results, the comprehensibility of the results is given. Further, repeated meetings among coders regarding agreements in the CIB coding scheme provide the study

with more valid results. Although the sample size is rather small, this study gives a first indication of the trend of interaction patterns between the mother and the child during the parent education program "Sicherer Hafen". In addition, recommendations for future action can be derived from this study and the planning of further steps for potential advanced studies in this research field can be determined.

7 Recommendations for Action

In general, based on this study, it can be recommended to conduct an extended study with a larger sample. Furthermore, other potentially influencing factors should be included in the analysis. For example, it would be helpful to include data on child temperament, maternal childhood experiences related to attachment, partnership satisfaction, or currently stressful factors.

An initial individual interview with the mother or parents regarding the reason for participation is recommended. At the same time, a short paper-pencil questionnaire about their own childhood experiences related to attachment should be conducted. This survey can be included in the individual home-based counselling. This is because processing maternal childhood experiences stabilizes the cognitive and emotional mother-child bond and thus promotes mother-child interaction. Consequently, on the one hand, the interaction patterns in the course can be analysed and considered in more detail, and on the other hand, a positive development can be promoted.

The scientific observation of the play situation represents an unnatural situation. Suppose this situation is a persistent problem for mothers. In that case, mothers could be encouraged and trained to make video recordings themselves, which would be discussed at the counsellor appointments and used for the analysis. This has proven successful in other studies (Papousek, 2000, p. 614).

Longitudinal studies have proven to be effective in determining long-term effects of interventions in early childhood (Windaus, 2014, p. 505). A video analysis every six months is recommended to determine the sustainability and effective predictors of "Sicherer Hafen". The risk of falling back into old behaviour patterns after the end of parenting training also speaks in favour of prolonging home visits. Due to the constant development of the child, the high demands on the mother require continuous adaptation processes on the mother's part. The regularly changed situations and new challenges may require further consultation.

In order to continue to offer help and support to parents after the parent training program has been completed, the creation of a handbook is recommended. This handbook could contain information about mother-child interaction, further developmental steps of the child, with addresses and telephone numbers for further help offers, potential risk factors, and literature tips. The counsellors could also hand out this book during the parenting visits. The mothers could write down in it which tips were helpful for them and how they mastered difficult situations.

Regarding the methodology, a protocol for the production of the videos is recommended, especially if different people conduct the recordings. Here, the length of the recordings, lighting and sound conditions, the angle of view and the language should be taken into account and ultimately predefined in the protocol. This will help to avoid drop outs. Likewise, the use of two or more cameras could facilitate the analysis of the participants' facial expressions and gestures. Collaboration with translators is recommended regarding the language, as several videos could not be fully analysed due to the language.

Likewise, an interview protocol is recommended. A structured and consistent interview protocol about the EPB in the context of the video recordings, information about the psychological well-being, and the couple relationship can ensure a connection to the training program. Also, the analysis of video recordings of multiple contexts, such as playing, feeding, and diapering would allow a determination whether the existing pattern of interaction can be found in all situations or whether it occurs only under limited conditions (Ziegenhain & Derksen, 2006, p. 147).

Furthermore, the inclusion of the participation in the entire program, or training sessions that the mother did not attend was not included in the analysis. Also, stratification by the content imparted in the training may provide a more informative picture regarding the association of the mother-child interaction and the training program.

As in every city, districts in Hamburg are developed differently in terms of social status. The participants come from several different districts of Hamburg, and thus live in different social classes. An analysis of mother-child interaction stratified by districts could provide further insight and information about the course of interaction patterns.

8 Conclusion

The research question - *Does the mother-child interaction change throughout the parent education program "Sicherer Hafen"* can be answered with yes.

The analysis of the videos with the CIB method and a subsequent statistical evaluation with the rmANOVA, showed a significant improvement of the mother-child interaction patterns in the categories *Parent intrusiveness*, *Child social involvement*, and *Dyadic reciprocity*. The categories *Parental sensitivity* and *Child withdraw*al did not yield significant results but showed a positive trend based on the mean scores. The category *Dyadic negative states* could not be calculated or interpreted because the test assumption sphericity was violated, possibly due to the small sample size. The group comparisons were assessed solely based on the mean scores because the sample size did not meet the minimum requirements. For the most part, these showed the expected results in relation to the theory described in chapter 2.

Determining the program's effect on mother-child interaction patterns is not possible due to the heterogeneous sample and numerous influencing factors. An analysis with reference to the training content and a structured protocol on the EPB in connection with the video recordings could provide the basis for establishing an association. However, it can be assumed that the parent training at least supported or did not negatively affect the course of development of interactional behaviour. The initial results of this study would need to be repeated and confirmed in further studies.

The resulting psychological stability helps children to find their place in the society. Likewise, psychologically stable people are characterized by the capacity for attachment (Bowlby, 2008, p. 98) and pass this on to their own offspring. Those who become mothers remain so throughout their lives; this bond cannot be severed. Thus, establishing of preparation for motherhood or fatherhood through parent education programs should find social acceptance and be seen as positive.

The importance of promoting positive patterns of interaction and attachment is well established in science. The transfer to the population, however, has not yet been

widely achieved. The establishment of the parenting course "Sicherer Hafen" is accordingly of great importance in supporting children's rights, promoting health from an early stage, preventing maltreatment and violence against children, and creating positive circles of influence.

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10 Affidavit

I certify that I have written this thesis independently without assistance and that I have used only the resources indicated. Passages taken verbatim or in the sense of other works are marked with an indication of the source.

Hamburg, _____

Maike Heiser

11 Appendix I

Syntax:

```
*****Sample description.*********
DATASET ACTIVATE DataSet1.
FREQUENCIES VARIABLES=KURSORT A3 A5 A6.1 A6.2 A7.1 A7.2 A8.1 A9 A10 A11 A12 A13 B8_B10 AGE_MU
    Geschw.1 Psych_Be.1 Körp_Be.1 Mi_hi_Mu.1 Zugang.1
  /ORDER=ANALYSIS.


*****Childrens Age calculation*****
*****Average age at different time points****
DATASET ACTIVATE DataSet1.
FREQUENCIES VARIABLES=Age_V1 Age_V2 Age_V3
  /STATISTICS=STDDEV RANGE MINIMUM MAXIMUM MEAN
  /ORDER=ANALYSIS.


******* Inter-rater reliability analysis ***** two way, mixed model with absolute agreement***
USE ALL.
COMPUTE filter_$=(Rater1_Julia >= 0 & Rater2_Leonie >= 0 & Rater3_Maike >= 0).
VARIABLE LABELS filter_$ 'Rater1_Julia >= 0 | Rater2_Leonie >= 0 | Rater3_Maike >= 0 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.

RELIABILITY
  /VARIABLES=Rater1_Julia Rater2_Leonie Rater3_Maike
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE
  /SUMMARY=MEANS
  /ICC=MODEL(MIXED) TYPE(ABSOLUTE) CIN=95 TESTVAL=0.
Filter OFF.



***** rmANOVA ALL*****
*****************************************************************************************.
*** RECODE START***.
*****************************************************************************************.
RECODE
B_08_T1 B_08_T2 B_08_T3 (1=5) (2=4) (3=3) (4=2) (5=1) (ELSE=SYSMIS).
EXECUTE.
*****************************************************************************************.
*** RECODE END ***.
*****************************************************************************************.


*****************************************************************************************.
*** CATEGORIES START ***. *** T1 *** *** T1 *** *** T1 ***.
*****************************************************************************************.
```

```
*** T1 ***.
*** PARENT - SENSITIVITY *** (high Score = good).
COMPUTE PC_SEN_T1 = MEAN.6 (A_03_T1, A_04_T1, A_05_T1, A_06_T1, A_07_T1, A_11_T1, A_13_T1,
A_15_T1, A_18_T1, A_20_T1, A_22_T1).
EXECUTE.

*** PARENT - INTRUSIVENESS *** (high Score = bad).
COMPUTE PC_INT_T1 = MEAN.3 (A_01_T1, A_02_T1, A_09_T1, A_10_T1, A_12_T1, A_19_T1).
EXECUTE.

*** CHILD - INVOLVEMENT *** (high Score = good).
COMPUTE CH_INV_T1 = MEAN.5 (B_01_T1, B_02_T1, B_06_T1, B_07_T1, B_08_T1, B_09_T1, B_10_T1,
B_15_T1, B_16_T1).
EXECUTE.

*** CHILD - WITHDRAWAL *** (high Score = bad).
COMPUTE CH_WIT_T1 = MEAN.2 (B_03_T1, B_04_T1, B_05_T1, B_14_T1).
EXECUTE.

*** DYAD - DYADIC RECIPROCITY *** (high Score = good).
COMPUTE DY_REC_T1 = MEAN.2 (C_01_T1, C_02_T1, C_03_T1).
EXECUTE.

*** DYAD - DYADIC NEGATIVE STATES *** (high Score = bad).
COMPUTE DY_NEG_T1 = MEAN.1 (C_04_T1, C_05_T1).
EXECUTE.

*********************************************************************************************.
*** CATEGORIES END ***. *** T1 *** *** T1 *** *** T1 ***.
*********************************************************************************************.

*********************************************************************************************.
*** CATEGORIES START ***. *** T2 *** *** T2 *** *** T2 ***.
*********************************************************************************************.
*** T2 ***.
*** PARENT - SENSITIVITY *** (high Score = good).
COMPUTE PC_SEN_T2 = MEAN.6 (A_03_T2, A_04_T2, A_05_T2, A_06_T2, A_07_T2, A_11_T2, A_13_T2,
A_15_T2, A_18_T2, A_20_T2, A_22_T2).
EXECUTE.

*** PARENT - INTRUSIVENESS *** (high Score = bad).
COMPUTE PC_INT_T2 = MEAN.3 (A_01_T2, A_02_T2, A_09_T2, A_10_T2, A_12_T2, A_19_T2).
EXECUTE.

*** CHILD - INVOLVEMENT *** (high Score = good)..
COMPUTE CH_INV_T2 = MEAN.5 (B_01_T2, B_02_T2, B_06_T2, B_07_T2, B_08_T2, B_09_T2, B_10_T2,
B_15_T2, B_16_T2).
EXECUTE.

*** CHILD - WITHDRAWAL *** (high Score = bad).
COMPUTE CH_WIT_T2 = MEAN.2 (B_03_T2, B_04_T2, B_05_T2, B_14_T2).
EXECUTE.

*** DYAD - DYADIC RECIPROCITY *** (high Score = good).
COMPUTE DY_REC_T2 = MEAN.2 (C_01_T2, C_02_T2, C_03_T2).
EXECUTE.

*** DYAD - DYADIC NEGATIVE STATES *** (high Score = bad).
COMPUTE DY_NEG_T2 = MEAN.1 (C_04_T2, C_05_T2).
```

```
EXECUTE.
*************************************************************************************.
*** CATEGORIES END ***. *** T2 *** *** T2 *** *** T2 ***.
*************************************************************************************.

*************************************************************************************.
*** CATEGORIES START***. *** T3 *** *** T3 *** *** T3 ***.
*************************************************************************************.
*** T3 ***.
*** PARENT - SENSITIVITY *** (high Score = good).
COMPUTE PC_SEN_T3 = MEAN.6 (A_03_T3, A_04_T3, A_05_T3, A_06_T3, A_07_T3, A_11_T3, A_13_T3,
A_15_T3, A_18_T3, A_20_T3, A_22_T3).
EXECUTE.

*** PARENT - INTRUSIVENESS *** (high Score = bad).
COMPUTE PC_INT_T3 = MEAN.3 (A_01_T3, A_02_T3, A_09_T3, A_10_T3, A_12_T3, A_19_T3).
EXECUTE.

*** CHILD - INVOLVEMENT *** (high Score = good).
COMPUTE CH_INV_T3 = MEAN.5 (B_01_T3, B_02_T3, B_06_T3, B_07_T3, B_08_T3, B_09_T3, B_10_T3,
B_15_T3, B_16_T3).
EXECUTE.

*** CHILD - WITHDRAWAL *** (high Score = bad).
COMPUTE CH_WIT_T3 = MEAN.2 (B_03_T3, B_04_T3, B_05_T3, B_14_T3).
EXECUTE.

*** DYAD - DYADIC RECIPROCITY *** (high Score = good).
COMPUTE DY_REC_T3 = MEAN.2 (C_01_T3, C_02_T3, C_03_T3).
EXECUTE.

*** DYAD - DYADIC NEGATIVE STATES *** (high Score = bad).
COMPUTE DY_NEG_T3 = MEAN.1 (C_04_T3, C_05_T3).
EXECUTE.
*************************************************************************************.
*** CATEGORIES END ***. *** T3 *** *** T3 *** *** T3 ***.
*************************************************************************************.

*************************************************************************************.
*** DESCRIPTIVES *** T1 *** T2 *** T3 ***
*************************************************************************************.
FREQUENCIES VARIABLES=  PC_SEN_T1 PC_INT_T1 CH_INV_T1 CH_WIT_T1 DY_REC_T1
   DY_NEG_T1 PC_SEN_T2 PC_INT_T2 CH_INV_T2 CH_WIT_T2 DY_REC_T2 DY_NEG_T2 PC_SEN_T3
   PC_INT_T3 CH_INV_T3 CH_WIT_T3 DY_REC_T3 DY_NEG_T3
 /NTILES=4
 /STATISTICS=MINIMUM MAXIMUM MEAN
 /ORDER=ANALYSIS.

DESCRIPTIVES VARIABLES= PC_SEN_T1 PC_INT_T1 CH_INV_T1 CH_WIT_T1 DY_REC_T1
   DY_NEG_T1 PC_SEN_T2 PC_INT_T2 CH_INV_T2 CH_WIT_T2 DY_REC_T2 DY_NEG_T2 PC_SEN_T3
   PC_INT_T3 CH_INV_T3 CH_WIT_T3 DY_REC_T3 DY_NEG_T3
 /STATISTICS=MEAN STDDEV MIN MAX.
*************************************************************************************.
*** DESCRIPTIVES END *** T1 *** T2 *** T3 ***
*************************************************************************************.

*************************************************************************************.
*** TEST ON NORMAL DISTRIBUTION START *** T1 *** T2 *** T3 ***
*************************************************************************************
```

```
DATASET ACTIVATE DataSet1.
FREQUENCIES VARIABLES=PC_SEN_T1 PC_INT_T1 CH_INV_T1 CH_WIT_T1 DY_REC_T1 DY_NEG_T1
PC_SEN_T2
    PC_INT_T2 CH_INV_T2 CH_WIT_T2 DY_REC_T2 DY_NEG_T2 PC_SEN_T3 PC_INT_T3 CH_INV_T3
CH_WIT_T3 DY_REC_T3
    DY_NEG_T3
  /FORMAT=NOTABLE
  /STATISTICS=SKEWNESS SESKEW KURTOSIS SEKURT
  /HISTOGRAM NORMAL
  /ORDER=ANALYSIS.


EXAMINE VARIABLES=PC_SEN_T1 PC_INT_T1 CH_INV_T1 CH_WIT_T1 DY_REC_T1 DY_NEG_T1 PC_SEN_T2
PC_INT_T2
    CH_INV_T2 CH_WIT_T2 DY_REC_T2 DY_NEG_T2 PC_SEN_T3 PC_INT_T3 CH_INV_T3 CH_WIT_T3
DY_REC_T3 DY_NEG_T3
  /PLOT BOXPLOT NPPLOT
  /COMPARE GROUPS
  /STATISTICS DESCRIPTIVES
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.
**********************************************************************************.
*** TEST ON NORMAL DISTRIBUTION END *** T1 *** T2 *** T3 ***
**********************************************************************************

**********************************************************************************.
*** COURSE ALL*** T1 *** T2 *** T3 *** START ***
**********************************************************************************.
*** PC_SENSITIVITY ***.
DATASET ACTIVATE DataSet1.
GLM PC_SEN_T1 PC_SEN_T2 PC_SEN_T3
  /WSFACTOR=PC_SEN 3 Polynomial
  /METHOD=SSTYPE(3)
  /PLOT=PROFILE(PC_SEN) TYPE=LINE ERRORBAR=NO MEANREFERENCE=NO YAXIS=AUTO
  /EMMEANS=TABLES(PC_SEN) COMPARE ADJ(BONFERRONI)
  /PRINT=DESCRIPTIVE ETASQ
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=PC_SEN.

*** PC_INTRUSIVENESS ***.
GLM PC_INT_T1 PC_INT_T2 PC_INT_T3
  /WSFACTOR=PC_INT 3 Polynomial
  /METHOD=SSTYPE(3)
  /PLOT=PROFILE(PC_INT) TYPE=LINE ERRORBAR=NO MEANREFERENCE=NO YAXIS=AUTO
  /EMMEANS=TABLES(PC_INT) COMPARE ADJ(BONFERRONI)
  /PRINT=DESCRIPTIVE ETASQ
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=PC_INT.

*** CH_INVOLVEMENT ***.
GLM CH_INV_T1 CH_INV_T2 CH_INV_T3
  /WSFACTOR=CH_INV 3 Polynomial
  /METHOD=SSTYPE(3)
  /PLOT=PROFILE(CH_INV) TYPE=LINE ERRORBAR=NO MEANREFERENCE=NO YAXIS=AUTO
  /EMMEANS=TABLES(CH_INV) COMPARE ADJ(BONFERRONI)
  /PRINT=DESCRIPTIVE ETASQ
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=CH_INV.
```

```
*** CH_WITHDRAWEL ***.
GLM CH_WIT_T1 CH_WIT_T2 CH_WIT_T3
  /WSFACTOR=CH_WIT 3 Polynomial
  /METHOD=SSTYPE(3)
  /PLOT=PROFILE(CH_WIT) TYPE=LINE ERRORBAR=NO MEANREFERENCE=NO YAXIS=AUTO
  /EMMEANS=TABLES(CH_WIT) COMPARE ADJ(BONFERRONI)
  /PRINT=DESCRIPTIVE ETASQ
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=CH_WIT.

*** DY_DYADIC RECIPROCITY ***.
GLM DY_REC_T1 DY_REC_T2 DY_REC_T3
  /WSFACTOR=DY_REC 3 Polynomial
  /METHOD=SSTYPE(3)
  /PLOT=PROFILE(DY_REC) TYPE=LINE ERRORBAR=NO MEANREFERENCE=NO YAXIS=AUTO
  /EMMEANS=TABLES(DY_REC) COMPARE ADJ(BONFERRONI)
  /PRINT=DESCRIPTIVE ETASQ
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=DY_REC.

*** DY_DYADIC NEGATIVE STATES ***.
GLM DY_NEG_T1 DY_NEG_T2 DY_NEG_T3
  /WSFACTOR=DY_NEG 3 Polynomial
  /METHOD=SSTYPE(3)
  /PLOT=PROFILE(DY_NEG) TYPE=LINE ERRORBAR=NO MEANREFERENCE=NO YAXIS=AUTO
  /EMMEANS=TABLES(DY_NEG) COMPARE ADJ(BONFERRONI)
  /PRINT=DESCRIPTIVE ETASQ
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=DY_NEG.
*************************************************************************************.
*** COURSE ALL*** T1 *** T2 *** T3 *** END *** .
*************************************************************************************.
```

********* GROUP COMPARISON *********

```
*************************************************************************************.
***GROUP COMPARISON - SINGLE/ WITH PARTNER
*************************************************************************************.
DATASET ACTIVATE DataSet1.
SORT CASES  BY Mi_back.
SPLIT FILE LAYERED BY Mi_back.

DESCRIPTIVES VARIABLES= PC_SEN_T1 PC_INT_T1 CH_INV_T1 CH_WIT_T1 DY_REC_T1
    DY_NEG_T1 PC_SEN_T2 PC_INT_T2 CH_INV_T2 CH_WIT_T2 DY_REC_T2 DY_NEG_T2 PC_SEN_T3
    PC_INT_T3 CH_INV_T3 CH_WIT_T3 DY_REC_T3 DY_NEG_T3
  /STATISTICS=MEAN STDDEV MIN MAX.

Filter OFF.
Use ALL.
*************************************************************************************


*************************************************************************************.
***GROUP COMPARISON - FAMILY STATUS
*************************************************************************************.
RECODE Fam_Stat (1=1) (2=1) (3=2) (4=2) (5=2) (9999=9999) (8888=8888) INTO Fam_Stat_2.
VARIABLE LABELS  Fam_Stat_2 'group comp.'.
```

```
VALUE LABELS Fam_Stat_2
1 'with partner'
2 'no partner'.
EXECUTE.

SORT CASES  BY Fam_Stat_2.
SPLIT FILE LAYERED BY Fam_Stat_2.

DESCRIPTIVES VARIABLES= PC_SEN_T1 PC_INT_T1 CH_INV_T1 CH_WIT_T1 DY_REC_T1
    DY_NEG_T1 PC_SEN_T2 PC_INT_T2 CH_INV_T2 CH_WIT_T2 DY_REC_T2 DY_NEG_T2 PC_SEN_T3
    PC_INT_T3 CH_INV_T3 CH_WIT_T3 DY_REC_T3 DY_NEG_T3
  /STATISTICS=MEAN STDDEV MIN MAX.

Filter OFF.
Use ALL.

*************************************************************************************.
***GROUP COMPARISON - HEALTH STATUS
*************************************************************************************.
RECODE Hea_Stat (1=1) (2=1) (3=1) (4=2) (5=2) (9999=9999) (8888=8888) INTO Hea_Stat_2.
VARIABLE LABELS  Hea_Stat_2 'group comp.'.
VALUE LABELS Hea_Stat_2
1 'good'
2 'bad'.
EXECUTE.

SORT CASES  BY Hea_Stat_2.
SPLIT FILE LAYERED BY Hea_Stat_2.

DESCRIPTIVES VARIABLES= PC_SEN_T1 PC_INT_T1 CH_INV_T1 CH_WIT_T1 DY_REC_T1
    DY_NEG_T1 PC_SEN_T2 PC_INT_T2 CH_INV_T2 CH_WIT_T2 DY_REC_T2 DY_NEG_T2 PC_SEN_T3
    PC_INT_T3 CH_INV_T3 CH_WIT_T3 DY_REC_T3 DY_NEG_T3
  /STATISTICS=MEAN STDDEV MIN MAX.

Filter OFF.
Use ALL.
*************************************************************************************



*************************************************************************************.
***GROUP COMPARISON - EDUCATION LEVEL
*************************************************************************************.

RECODE Edu_Lev (1=1) (2=1) (3=1) (9999=9999) (8888=8888) (4=1) (5=1) (6=2) (7=2) (8=2) INTO
    Edu_Lev_2.
VARIABLE LABELS  Edu_Lev_2 'group comp.'.
VALUE LABELS Edu_Lev_2
1 'low'
2 'high'.
EXECUTE.

SORT CASES  BY Edu_Lev_2.
SPLIT FILE LAYERED BY Edu_Lev_2.

DESCRIPTIVES VARIABLES= PC_SEN_T1 PC_INT_T1 CH_INV_T1 CH_WIT_T1 DY_REC_T1
    DY_NEG_T1 PC_SEN_T2 PC_INT_T2 CH_INV_T2 CH_WIT_T2 DY_REC_T2 DY_NEG_T2 PC_SEN_T3
    PC_INT_T3 CH_INV_T3 CH_WIT_T3 DY_REC_T3 DY_NEG_T3
  /STATISTICS=MEAN STDDEV MIN MAX.
```

```
Filter OFF.
Use ALL.


*************************************************************************************.
***GROUP COMPARISON -MENTAL HEALTH
*************************************************************************************.

SORT CASES  BY Psych_Be.
SPLIT FILE LAYERED BY Psych_Be.

Filter OFF.
Use ALL.
*************************************************************************************
```