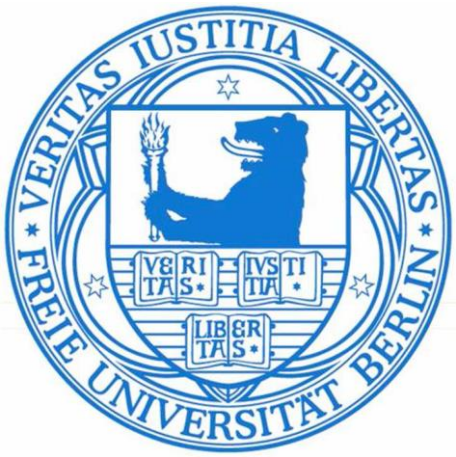
On the Consistency and Specificity of Patterns of Attachment in Emerging Adulthood



Dissertation

zur Erlangung des akademischen Grades

Doktor der Philosophie (Dr. phil.)

am Fachbereich Erziehungswissenschaften und Psychologie

der Freien Universität Berlin

vorgelegt von

Johannes Bohn, M.Sc.

Berlin, 2021

Erstgutachter: Prof. Dr. Michael Eid

Zweitgutachterin: Prof. Dr. Maike Luhmann

Tag der Disputation: 25. Juni 2021

Abstract

This dissertation examines the consistency and specificity of attachment patterns in emerging adulthood. The theoretical basis of this dissertation is attachment theory. Originally, attachment theory emerged to describe the attachments between children and their parents. Nowadays, attachments in adulthood are also described within its own framework. It can be expected from previous research that there is a great deal of consistency (in the sense of agreement) between attachments to different attachment figures and that attachments are very stable over time.

This dissertation takes a closer look at the concept of consistency. In addition to the consistency of attachments to different figures and the consistency of attachment over time, it also distinguishes the consistency of mutual attachments within parent-child dyads and the consistency of self- and informant perceptions of attachment.

The data base for this dissertation is a study of 2014 high school graduates who were asked about their attachments to parents, friends, and partners at four measurement occasions in the year after their high school graduation. Parents, friends, and partners also participated in the study and described their attachments to the emerging adults. In addition, the parents also assessed the emerging adults' attachment and well-being.

The three empirical studies in this dissertation examined different issues. The first study examined the relationship between emerging adults' attachment to their parents and their well-being. This showed that attachment was strongly related to well-being. Furthermore, this study showed that parents were good at assessing their emerging adult children's attachment.

In the second study of this dissertation, a new statistical model is presented that allows the temporal stability and consistency of reciprocal attachments to be examined simultaneously. This

model showed that attachments were very stable even during the turbulent first year after high school graduation, and that emerging adults' attachments to their parents and parents' attachments to emerging adults were strongly correlated. This correlation was higher for the stable elements of the attachment than for the changeable elements.

The third study examined attachment to different attachment figures. This showed that attachments to parents, friends, and partners had strong similarities. However, there was also a large proportion that was specific to the individual attachments and could not be explained by a general attachment style. In this study each emerging adult described attachments to multiple friends, as a result it was shown that these attachments to friends had more commonality. This suggests that individuals' attachment representations contain elements that are specific to certain domains of attachment figures, such as friends in this case.

Across all studies, it appeared that many of the assumptions of attachment theory were confirmed even when more accurate and measurement error-free models were used. However, the more accurate methodology allowed for a more sophisticated examination of the different types of consistency. Attachments are quite stable over time and they strongly agree within parent-child dyads.

Zusammenfassung

Diese Dissertation untersucht die Konsistenz und Spezifität von Bindungsmustern im frühen Erwachsenalter. Die theoretische Basis dieser Dissertation ist dabei die Bindungstheorie. Ursprünglich entstand die Bindungstheorie, um die Bindungen zwischen Kindern und ihren Eltern zu beschreiben. Inzwischen werden auch Bindungen im Erwachsenenalter in dessen Rahmen beschrieben. Dabei lässt sich aus der bisherigen Forschung erwarten, dass zwischen Bindungen an unterschiedliche Personen eine große Konsistenz (im Sinne einer Übereinstimmung) besteht und dass Bindungen zeitlich sehr stabil sind.

Diese Dissertation betrachtet den Begriff der Konsistenz genauer und unterscheidet neben der Konsistenz der Bindungen an unterschiedliche Personen und der Konsistenz der Bindung über die Zeit auch noch die Konsistenz von gegenseitigen Bindungen innerhalb von Eltern-Kind-Dyaden und die Konsistenz der Selbst- und Fremdwahrnehmung von Bindung.

Die Datengrundlage dieser Dissertation bildet eine Studie an Abiturienten des Jahrganges 2014, die im Jahr nach ihrem Schulabschluss zu vier Messzeitpunkten nach ihren Bindungen an Eltern, Freunde und Partner befragt wurden. Es nahmen auch die Eltern, Freunde und Partner an der Studie teil und beschrieben wiederum ihre Bindung an die jungen Erwachsenen. Außerdem schätzten die Eltern noch die Bindung und das Wohlbefinden der jungen Erwachsenen ein.

Auf dieser Basis untersuchten die drei empirischen Studien dieser Dissertation unterschiedliche Fragestellungen. In der ersten Studie wurde der Zusammenhang zwischen der Bindung der jungen Erwachsenen an ihre Eltern und ihrem Wohlbefinden untersucht. Dabei zeigte sich, dass die Bindung stark mit dem Wohlbefinden zusammenhing. Außerdem zeigte diese Studie, dass die Eltern die Bindung ihrer Kinder gut einschätzen konnten.

In der zweiten Studie dieser Dissertation wird ein neues statistisches Modell vorgestellt, dass es ermöglicht, die zeitliche Stabilität und die Konsistenz von gegenseitigen Bindungen gleichzeitig zu untersuchen. Dieses Modell zeigte, dass die Bindungen auch im turbulenten ersten Jahr nach dem Abitur sehr stabil waren und dass die Bindungen der jungen Erwachsenen an ihre Eltern und die Bindungen der Eltern an die jungen Erwachsenen stark korreliert waren. Diese Korrelation war dabei höher für die stabilen Anteile der Bindung als für die veränderlichen Anteile.

In der dritten Studie wurde die Bindung an unterschiedliche Bindungsfiguren untersucht. Dabei zeigte sich, dass die Bindungen an Eltern, Freunde und Partner starke Ähnlichkeiten aufwiesen. Allerdings gab es auch einen großen Anteil, der spezifisch für die einzelnen Bindungen war und sich nicht durch einen alles umfassenden Bindungsstil erklären ließen. Da in dieser Studie die Bindungen an mehrere Freunde pro Person untersucht wurden, konnte gezeigt werden, dass diese Bindungen an Freunde eine größere Gemeinsamkeit aufwiesen. Dies spricht dafür, dass die Bindungsrepräsentationen von Personen Elemente enthalten, die spezifisch sind für bestimmte Domänen von Bindungsfiguren wie in diesem Fall die Freunde.

Über alle Studien hinweg zeigte sich, dass sich viele Annahmen der Bindungstheorie auch bei der Verwendung genauerer und messfehlerfreier Modelle bestätigten. Die genauere Methodik ermöglichte es jedoch, die unterschiedlichen Arten der Konsistenz differenzierter zu untersuchen. Bindungen sind zeitlich recht stabil und sie stimmen innerhalb von Eltern-Kind-Dyaden stark überein.

Danksagung

Eine Dissertation wie meine, die mit einer längeren und teilweise verschlungenen Geschichte verbunden ist, wäre ohne die Inspiration, Unterstützung und den Zuspruch von vielen Seiten niemals Realität geworden.

Mein erster Dank geht an Michael, der mich nicht nur überhaupt erst in die Wissenschaft geholt hat, sondern dessen Begeisterung für die Ergebnisse und die Modellierung immer ansteckend waren. Egal wie verknotet ein Problem auch wirkte, nach einer Konsultation mit Michael war der Knoten gelöst und das Resultat musste „nur noch runtergeschrieben“ werden. In seinem Arbeitsbereich konnte ich mit begnadeten Kolleg:innen zusammenarbeiten, wobei mich besonders meine langjährige Sitznachbarin Jana mit ihrer überragenden methodischen Kenntnis vor vielen Fehlern gerettet hat, wofür ich ihr sehr dankbar bin. Dankbar bin ich auch so wunderbaren Individuen wie Claudia, Tobias, Esther, Martin und Georg, die mit einer speziellen Kombination von methodischer Fachkenntnis, lakonischem Humor, wissenschaftlicher Begeisterung und einer erstaunlichen Feierfreude meine Zeit am Arbeitsbereich Methoden und Evaluation versüßt haben.

Ich danke auch Maike sehr, die immer wieder genauso motivierend wie warnend dafür sorgte, dass ich mich nicht in meinen Formeln verliere, sondern den Inhalt im Blick behalte.

Nachdem ich im Methodenbereich mit meinem eher angewandten Thema eher der Anwender unter den Methodikern war, wechselte ich in den Arbeitsbereich Klinisch-Psychologische Intervention und wurde damit zu einem Methodiker unter Anwendern. Für die Aufnahme und die seitdem anhaltende vertrauensvolle Anleitung und Förderung danke ich Christine. Dankbar bin ich auch für die fulminante Zusammenarbeit mit Pavle und Manuel, beide in ihrer jeweils

eigenen Art exzellente Forscher. Sie sind auch deshalb fabelhafte Kollegen, da sie beide die wunderbare Fähigkeit zur maximalen Niveauvarianz haben. Vielen grandiosen Kolleg:innen bin ich dankbar für die Anregungen, die neuen Einsichten und das vorzügliche Teamwork, wobei ich frei assoziierend besonders Christina, Sebastian, Helen, Carina und Hannah danken möchte.

Für mich war die Arbeit in der Wissenschaft immer eng mit der Idee der Lehre verbunden und ich verdanke es dem Vertrauen von Lars, Stefan und Babette, dass ich schon früh in die Lehre einsteigen durfte und seitdem viel im Austausch mit den Studierenden gelernt habe. Neben der Lehre gehörte die Arbeit in universitären Gremien auch immer zu meiner Tätigkeit, was teilweise ungeahnte Ausmaße annehmen konnte. Ich bin Lars, Anna und Nina sehr dankbar für die famose Zusammenarbeit auch unter Hochdruck.

Dass ich jetzt dennoch eine Dissertation fertig gestellt habe, verdanke ich Manuel und seinen Anmerkungen zur Methodik, Rayan und ihren hilfreichen Kommentaren und Leonie, die mich beim Verstehen der psychoanalytischen Theorien unterstützt hat.

Ich danke auch meinen nicht austauschbaren Freunden, die mich mit ihrer Freundschaft, ihrem Vertrauen und ihrem Interesse unterstützt haben. Ein besonderer Dank geht hierbei an Jenny, die durch das Beisteuern der Bilder der Bindungspersonen diese Doktorarbeit anschaulicher gemacht hat. Ich danke meiner Familiensippe und besonders meinen Eltern für das Bestärken, das Anschauungsmaterial und den sicheren Hafen für Schreibzeiten mit Vollversorgung.

Der größte Dank geht an meine Frau Lin, die nicht nur die Hauptleidtragende dieser ganzen Promotion war, sondern auch die strengste Erstleserin. Vor allem aber war sie die sichere Basis zu dieser wissenschaftlichen Exploration.

Table of Contents

List of Tables

List of Figures

1. Introduction

This dissertation examines the consistency and specificity of patterns of attachment in emerging adulthood. Consistency always describes a correspondence of different entities, while specificity rather emphasizes the separation and difference of these entities. The entities examined in my dissertation are different aspects of attachment. I investigate whether attachments to different people are similar, whether attachments are stable over time, whether the mutual attachments that connect people are similar, and finally whether other people can perceive those attachments correctly. These investigations form the core elements of my dissertation.

In Chapter 2, I present the attachment theory and its history. The purpose of this chapter is to clarify the fundamental assumptions about attachment, especially adult attachment. At the same time, the chapter shows how issues of consistency and specificity are related to recent issues in the current attachment research.

Chapter 3 explains the basics of the statistical models I used in order to find answers to current questions in attachment research. The models used were adapted to the specific questions of attachment research. This also results in new interpretations for the concepts of consistency and specificity, which are also discussed in this chapter.

In Chapter 4, I present the study which all empirical studies in this dissertation are based on. It describes how the different attachments to parents, romantic partners, and friends were assessed and which instruments were used to measure attachment quality. This chapter also describes the sample of emerging adults that was examined in the empirical studies.

Chapter 5 contains Study 1 in which the relationship between attachment and well-being was examined. In addition, the study examined the extent to which parental and self-perceptions of attachment and well-being coincide.

Chapter 6 includes Study 2 which introduces a new statistical model to represent attachment stability and change. This model also allows to examine if the mutual attachments of emerging adults and their parents change differently.

Chapter 7 contains Study 3 which examined the consistency of attachments to different attachment figures. The question was whether people have a general working model of attachment that ensures that attachments to very different people evolve similarly.

Finally, Chapter 8 contains the concluding discussion in which I summarize the results of the three empirical studies. Based on the merged results, implications for theory and application are discussed that arise from this dissertation.

The eighth chapter is followed by the Appendices, which contain, among other things, the supplementary materials of the empirical studies.

2. Attachment

Attachment theory is already about 70 years old, yet it is still a fruitful theory that drives diverse research (Thompson et al., 2021). Throughout its history, the theory was expanded. Nowadays, more relationships are considered attachments, and furthermore considerations have shifted from the behavioral level to the level of mental models. The historicity of attachment theory makes it necessary to trace the development of the theory in broad outlines to make the current issues and research understandable. This chapter will trace this development from the precursor theories to classical attachment theory and then finally to adult attachment. Such a historical examination could be much more extensive. Nevertheless, in this chapter the focus will be on the central developments that ultimately had an impact on the studies of this dissertation.

2.1 Early History

2.1.1 Psychoanalysis

In the beginning was Sigmund Freud, this at least holds for the attachment theory. In Freud's psychoanalysis, the experiences in the early years of a person's life occupy a central position for the development of the personality. According to Freud (1924), boys desire their mothers sexually. The prevention of the fulfillment of this very drive, coming from the father and society, is supposed to produce the formation of the psychic apparatus with its separation between ego, id and superego.

In addition to the influences of the Oedipus complex on the development of a child, Freud (1940) also presented theories on influences that correspond even more closely to what was called

attachment in later theories. Freud (1940) described that the mother is the first erotic object for a child. In his work 'Outline of Psychoanalysis' the corresponding, often quoted passage reads:

> This first object subsequently becomes completed into the whole person of the child's mother, who not only feeds him but also looks after him and thus arouses in him many other physical sensations pleasant and unpleasant. By her care of the child's body she becomes his first seducer. In these two relations lies the root of a mother's importance, unique, without parallel, laid down unalterably for a whole life-time, as the first and strongest love-object and as the prototype of all later love-relations—for both sexes. (Freud, 1940, p. 65)

It is a central feature of Freud's theories that he does not make a fundamental distinction between what will later be called attachment and sexual desire, but rather understands this as expressions of the same libidinous force (Bischof, 2009). In his late work, Freud calls the unifying drive of sexuality and attachment Eros and distinguishes it from the destructive death drive (Fahrenberg, 2015). In the quoted text excerpt, it is clear how these libidinous urges are combined with physical pleasure when certain parts of the body are stimulated. Elsewhere, Freud (1924) states that this development of the particularly sensitive regions passes through an oral, anal, and phallic phase.

In Freud's writings, the central position of the mother as the first attachment figure is already laid out. This idea is picked up later again in a transformed form in attachment theory. In contrast to later theories, Freud focuses on libidinous drives and the attachment to the mother grows rather secondarily from the drive satisfaction. An important note for Freud's theories is that he derived them retrospectively from adult memory.

Anna Freud further developed Sigmund Freud's theories through observations and studies of children. During World War II, she and Dorothy Burlingham studied children in England who were placed in a residential war nursery (Burlingham & Freud, 1942). They observed the impact of separations from their parents and described that the absence of a mother figure has a strong impact on emotional development of children from 5 months of age (Burlingham & Freud, 1944). They already used the term *attachment* for example by stating that children normally "develop attachment to a stable mother figure" (Burlingham & Freud, 1944). They also recommended that children should be assigned a specific person in life as a mother substitute and describes how this can alleviate children's distress.

While Anna Freud continued to support her father's drive-theoretical assumptions in principle, she broadened the view in the ego psychology she founded (Freud, 1936 / 1993). In her reflections, she focused on the defense against drives. When a child appears to be avoiding their parents, according to this theory it can be understood as a defense against fear and anger (Freud, 1936 / 1993).

Psychoanalysis in children was also explored by Melanie Klein (1952), who laid foundations in her object relations theory that were later incorporated into attachment theory. Melanie Klein developed her object relations theory from the Hungarian school of psychoanalysis. In contrast to the theories described by Sigmund Freud, Klein focused on the relationship to objects outside of one's own body. Instead of one's own sensitive, erogenous zones, the child's innate drive refers to the mother's breast (Klein, 1952). In the process, according to Klein, the infant also develops aggressive feelings toward the mother's breast, as she also withdraws affection from the child and leaves the child to hunger. The representatives of the emerging attachment theory were bothered

by the fact that Klein interpreted the bond between child and mother too much in the context of the satisfaction of food and warmth needs (Ainsworth, 1969; Bowlby, 1958).

2.1.2 Bowlby's Early Works on Deprivation

The beginning of John Bowlby's research, like Anna Freud's, was the study of children who had been separated from their mothers for long periods of time due to hospitalization or evacuation during World War II. He distinguished between partial and total deprivation; the latter being characterized by the absence of a mother substitute (Bowlby, 1953). Total deprivation occurred primarily among children in institutional care. Bowlby (1953) described multiple long-term consequences of total deprivation. He observed a delay in emotional, intellectual and language development, furthermore the inability to form real relationships and friendships, increased aggressiveness, a tendency for bed-wetting, depression, anxiety and even an higher probability to commit crimes.

The extent of Bowlby's presumed influences might seem extreme from today's perspective. One reason could be that total deprivation is rarer today and institutions have changed, which was also a result of attachment theory. However, recent research exists on children who spent their early childhood in states of total deprivation in Romanian orphanages of the 1980s and early 1990s and who were adopted later on. These children showed similar changes to those described by Bowlby. They confirmed Anna Freud's and John Bowlby's observation that damage is less severe and largely reversible when deprivation ends before six months of age (Kreppner et al., 2007). When deprivation lasted longer, orphans from Romania showed deficits in mental development at age 6 (Rutter & O'Connor, 2004) and at age 11 (Kreppner et al., 2007). The children

also showed reduced weight at age 6 compared with other adopted children who had not previously been exposed to total deprivation (Rutter & O'Connor, 2004). Social behavior was also impaired and about 20% of the children adopted after 6 months of age exhibited extremely deviant social behavior at age 6 (Kreppner et al., 2007). A controlled randomized trial of institutionalized Romanian children demonstrated that prolonged institutionalization resulted in more severe mental harm than adoption (Nelson et al., 2007). Thus, many of Bowlby's observations on total deprivation appear to be confirmed.

Bowlby was already collaborating in his research on total deprivation with Mary Ainsworth, who worked in England for some time. As part of this collaboration, they began to shift research from the severely disturbed to more regular mother-child relationships. Mary Ainsworth went to Uganda in 1954 to observe mother-child relationships with in-depth behavioral observations in a field research project (Ainsworth, 1964). Her observations of mother-child interactions were an important template for the later Baltimore study and for the development of attachment theory.

2.1.3 Ethological Influences

The development of attachment theory was significantly influenced by ethological research. Bowlby refers extensively to the work of Konrad Lorenz on imprinting in geese (Bowlby, 1969). Attachment theory also adopted the idea of control systems that purposefully organize and regulate behavior from ethology (Waters, Bretherton, & Vaughn, 2015). Such control systems ensure that a target state is reached through a multitude of individual behavioral steps, whereby the behavioral sequence is continuously adapted to the distance between state and target (Bischof, 2009).

Animal studies had an important role in the development of attachment theory. Harlow's studies with rhesus monkeys were particularly influential. In these studies, rhesus monkeys developed an attachment to a mother substitute made of cloth in the absence of their real mothers (Harlow & Zimmermann, 1959). The monkeys were also attached to this mother substitute even when they received their food from another mother substitute that was made only of wire. These studies impressively disproved earlier theories, which had declared the food supply to be the center of the bond between child and mother. In Harlow's studies, the monkeys also fled to their attachment figure when frightened and used it as a source of security (Harlow & Zimmermann, 1959). Based on these studies and other observations, Ainsworth later described attachment figures as safe havens (Waters, Bretherton, & Vaughn, 2015). Bowlby (1980) declared ethology to be his main source of inspiration for the development of attachment theory.

2.2 The Classical Era of Attachment Theory

2.2.1 Paradigm Shift

The history of attachment theory in a narrow sense began with Bowlby's article 'The Nature of the Child's Tie to his Mother' in 1958, in which Bowlby distinguished himself from the prevailing psychoanalytic theories of the bond between child and mother. Based on findings from ethology, he criticizes several theories. Bowlby described that the secondary drive theory assumes attachment only as a consequence of the child's physiological needs. Bowlby assigns Anna Freud to this theory and criticizes that she did not move away from the theory despite contrary observations in the orphanage.

Bowlby (1958) also distanced himself from Melanie Klein and her theories on the central role of the mother's breast in the relationship between child and mother. Bowlby contrasted this with a biologically influenced view. He assumed that the function of attachment is independent of the provision of food, the satisfaction of drives, or the stimulation of erogenous zones. Thus, Bowlby also distinguished clearly between sexuality and attachment. Instead, Bowlby assumed that the primary function of attachment is its survival value. He supported this assumption by referring to the studies of Harlow and many others from the field of ethology.

With this differentiation from previous theories, Bowlby initiated a paradigm shift in the Kuhnian sense. In doing so, Bowlby himself stated: "I emphasize that at present this is no more than my belief and that whether or not ethology will prove a fruitful approach to psycho-analytic problems is yet to be shown" (1958, p. 365). The future of the approach was still unclear. Bowlby and Ainsworth subsequently elaborated on the theory, and through Ainsworth's studies, the paradigm of attachment theory was formed over the next several years.

2.2.2 Core Assumptions and Central Concepts

Like any major theory, attachment theory has central concepts and assumptions, most of which were originally introduced by Bowlby and Ainsworth. These will be described here. In the course of extending attachment theory to adult attachment, some concepts have been refined (see Chapter 2.3.1), but their basic meaning has not changed.

Attachment. Attachment is an enduring bond between a child and a mother figure (Ainsworth et al., 1978/2015). Even though the mother is often used to describe this bond, Bowlby (1969) and Ainsworth et el. (1978/2015) both emphasized that another person who acts as a primary caregiver

can also take on the role of mother figure. While attachment itself is not biological, children are biologically predisposed to form an attachment with one or more specific figures (Bowlby, 1969). Incidences of children not developing any attachment are only possible in cases of total deprivation such as institutionalization, but children in families always develop an attachment, even if the parents are hard-hearted and dismissive (Ainsworth et al., 1978/2015).

Attachment Behavior. The term attachment behavior needs to be distinguished from attachment. It represents a behavioral system similar to the ones known from ethology. This behavioral system can comprise many different concrete behaviors. With attachment behavior, children try to get security from the primary caregiver (Bowlby, 1969). Depending on the situation and the age of the child, attachment behavior can include things like crying, smiling, or crawling to the primary caregiver (Bowlby, 1969). Attachment behavior is activated in the face of danger or emotional distress (Mikulincer & Shaver, 2016). So, while attachment as an enduring bond always exists, attachment behaviors only show up sometimes (Ainsworth et al, 1978/2015).

Bowlby (1969) describes four developmental stages of attachment behavior, whereby the child gradually learns to better incorporate the behavior of the primary caregiver into his or her behavior. According to Bowlby's theory, the fourth and final stage, the goal-corrected partnership, should begin in the third year of life (Bowlby, 1969). The child's behavior in this phase is aligned with set-goals (Ainsworth et al., 1978/2015). These set-goals can change due to external (danger) and internal (hunger, fatigue) influences (Bowlby, 1969).

Ainsworth et al. (1978/2015) described that attachment behavior is interconnected in a control loop with another behavioral system, namely the exploration behavior. In attachment theory, this connection is described as the safe base or (somewhat less militarily) the safe haven. The child

uses the primary caregiver as a safe base and as long as they feels safe, the exploration behavior is active, and the child explores the area. As soon as a danger is perceived (because something surprising happens, for example), exploration behavior is inhibited, and attachment behavior is activated. Thus, a shift of the set-goal takes place. Sometimes it may be enough for the child to reassure itself by looking back at the primary caregiver (in the sense of making contact with the base). In other cases, closeness to the primary caregiver is established through attachment behavior. This can happen by crying so that the primary caregiver picks up the child or by moving towards the primary caregiver.

Working Models. The child's behavior is influenced by stable mental representations about the attachment figure and the relationship, the so-called working model of attachment (Bowlby, 1973). This working model is formed in the context of experiences with the attachment figure and forms a knowledge store. With this working model of attachment, the child can improve on predicting the behavior of the attachment figure in future situations, for example by knowing which behaviors are most likely to achieve the goal of closeness (Mikulincer & Shaver, 2016). For adults, the solidified working models are also called attachment representations (Mikulincer & Shaver, 2016).

Multiple Attachments. In the early years after its emergence, attachment theory referred mainly to the child's attachment to the primary caregiver. However, it has always been clear that a child can also have attachments to other figures. Bowlby (1969) even described bond to toys and cuddle cloths as attachment. If a child has multiple attachment figures, he or she does have multiple individual attachments rather than an attachment to a group of people. Bowlby (1969)

described it as an exciting question to what extent these attachments coincide (this is one of the questions to which this dissertation would like to add further insight, even after 50 years).

Attachments of different people (and within one person) may differ in terms of their attachment style. For example, an attachment may be more or less anxious (Bowlby, 1969). Note that the typical distinction between strong and weak attachment, which lay people tend to make, is not a distinction that is made within the framework of attachment theory (Forslund, et al., 2021). The distinctions of different attachment styles go back to the research of Ainsworth et al. (1978) which will be described in more detail below.

2.2.3 The Strange Situation Procedure

In their classic study, Ainsworth et al. (1978/2015) examined the development of 106 children from Baltimore area families. The first step was visiting those families at their homes. During the observations they made thereby they paid special attention to the attachment behavior. But since these observations made in the home environment rarely revealed any clearly identifiable attachment behavior, a laboratory investigation was developed that became known as the Strange Situation Procedure (SSP; Ainsworth et al., 1978/2015). It consists of an approximately twenty-minute sequence of a total of eight episodes. The sequence starts with the mother alone in a room with her child (the children in the original study were about one year old). A stranger joins in and the baby is left with the stranger in an initial separation phase while the mother has left the room. The mother returns and there is a second separation where the baby is completely alone and then first the stranger and finally with mother returns (for a detailed description of the phases see Ainsworth et al., 1978/2015, Chapter 2). The build-up of the SSP is supposed to activate attachment

behavior to an ever-increasing degree and indeed the children showed the most distinct behaviors towards the end, according to which they were subsequently also classified.

Based on Bowlby's theoretical expectations, many individual behaviors were coded to evaluate the original SSP study. For further research, a more qualitative and explorative approach proved to be more fruitful, in which the children's behavior was described in three broad categories, especially during the reunion with the mother. Those three categories were initially labeled A, B, and C. Later on they each underwent several individual renamings, but they still form the foundation of the classification of children's attachment style. Ainsworth viewed the categories as a starting point for further exploration and she believed other categories of attachment styles were possible (Ainsworth et al., 1978/2015, Chapter 3). In fact, Main (who was involved in the SSP studies as a collaborator with Bowlby) and Solomon (1986) later defined a fourth attachment style, which they called D. These four attachment styles form the basis of most subsequent measurements of attachment.

2.2.4 Attachment Styles

The following description of the four attachment styles summarizes the main observations of Ainsworth et al. (1978/2015) and links them to the classifications and explanations of other researchers. For a detailed description of the attachment styles, see Ainsworth et al. (1978/2015, Chapter 3 and 15). Ainsworth used only letters to designate the styles; later generations of scholars instead used different names for the styles.

Style B. The largest group of children was assigned to attachment style B by Ainsworth et al. (1978/2015). These children actively seek proximity to the mother or want to interact with her. In

doing so, they prefer interaction with the mother to interaction with the stranger. Some of these children showed a lot of stress when the mother was away, others showed less. If they showed stress, the stranger could never fully calm them down and they wanted to go to their mother. When the mother returned, they reacted with joy or rapprochement. Ainsworth et al. (1978/2015) distinguished four subtypes that differed primarily in the amount of stress they showed during the separation.

Ainsworth et al. (1978/2015) referred to these children as securely attached children (and for this style there are no deviating designations). They were less anxious than children with other attachment styles and have greater confidence in the availability of the primary caregiver. This was also confirmed by observations of the children at home. Only when the separation from the mother in the artificial and foreign environment of the SSP became too prolonged and obvious, some of them showed restlessness and crying. However, they allowed themselves to be calmed down again by the mother, especially by close physical contact. In further investigations of the Baltimore study, the children showed themselves to be more eager to discover and more cooperative.

Attachment style B is the most common style in studies in the nonclinical population. Meta-analyses have shown that over 60% of children in the normal population were securely attached to their mothers (Ahnert et al., 2006; Fox et al., 1991; Van Ijzendoorn & Kroonenberg, 1988; Van Ijzendoorn et al., 1999). The meta-analyses also showed that more than 60% of the children were also securely attached to their fathers (Ahnert et al., 2006; Fox et al., 1991) and around 40% were securely attached to their nonparental care providers (Ahnert et al., 2006).

Style A. The children with attachment style A showed avoidance of closeness to the mother in the SSP during the reunification episodes (Ainsworth et al. 1978/2015). Some of these children showed stress when left alone, but as soon as the stranger was present, they calmed down again. Overall, they seemed to differentiate less than other children between the stranger and the primary caregiver. Ainsworth et al. (1978/2015) distinguished two subtypes of Style A, one largely ignoring the mother and not actively seeking proximity. The second subtype showed more mixed behavior with a tendency to make contact with the mother, which was then repeatedly interrupted by turning away and ignoring.

The children with attachment style A have less confidence in the availability and responsiveness of their primary caregiver than style B children (Ainsworth et al., 1978/2015). The goal of their behavior is to lower and deactivate their need for attachment (Mikulincer & Shaver, 2016). Therefore, they tend to avert their gaze from the mother to reduce their increased tension in the separation situation (Ainsworth et al., 1978/2015). Ainsworth et al. (1978/2015) assumed that this behavior results from negative experiences with the mother. The children have experienced a rejection of their need for physical and emotional closeness and try to prevent such experiences by de-activating their attachment system with avoiding behaviors.

Based on the description of Ainsworth et al. (1978/2015), the attachment style A was labeled 'insecure-avoidant' (e.g., Main, 1990) or just 'avoidant' (e.g., Asendorpf et al., 1997; Fox et al., 1991; Mikulincer & Shaver, 2016). Meta-analyses showed that between 15% and 20% of North American middle-class children have an avoidant attachment with their mother (Fox et al., 1991; Van Ijzendoorn et al., 1999). Another meta-analysis indicated that this attachment style is more common in Western European countries (Van Ijzendoorn & Kroonenberg, 1988).

Style C. Children with attachment style C showed ambivalent behavior (Ainsworth et al., 1978/2015). On the one hand, they resisted contact with the mother, on the other hand, they showed a clear search for closeness. They did not ignore the mothers (as the children of Style A had done). Ainsworth et al (1978/2015) distinguished two subgroups, one showing primarily a great deal of anger toward both the mother and the stranger. The second subgroup was very passive and showed little exploratory behavior even when the mother was present.

Ainsworth et al. (1978/2015) described children with this attachment style as anxious with little trust in the primary caregiver. But instead of deactivating behaviors (like children with style A), they use hyperactivating strategies to achieve proximity to their primary caregiver (Mikulincer & Shaver, 2016). At the same time, their high distress and high arousal can lead to an angry ambivalence with their attachment figure (Ainsworth et al., 1978/2015).

This attachment style is labeled 'insecure-ambivalent' (e.g., Main, 1990), 'anxious-ambivalent' (e.g., Asendorpf et al., 1997), 'anxious' (e.g., Mikulincer & Shaver, 2016), or 'resistent/ambivalent' (e.g., Main, 2000). According to meta-analyses, between 9% and 14% of North American middle-class children have an anxious attachment with their mother (Fox et al., 1991; Van Ijzendoorn et al., 1999). Another meta-analysis indicated a similar frequency in Western European countries (Van Ijzendoorn & Kroonenberg, 1988).

Attachment styles A and C are both characterized by insecure attachment and thus form a contrast to attachment style B. Ainsworth et al. (1978/2015) reported that there was little difference in the behavior of the insecurely attached children at home and that the difference between the two insecure styles only became apparent in the very stressful SSP. Thus, the security versus

insecurity of attachment style represents a key distinction that Bowlby (1969) had previously theorized to exist.

Style D. Attachment style D was not described until later studies of SSP by Main and Salomon (1986). Children with this attachment style exhibit an incoherent mix of behaviors that are fearful, aimless, disoriented, or inconsistent (Mikulincer & Shaver, 2016). Particular behaviors are freezing in motion or responding anxiously to the parent. These behaviors are uncommon in the normal population but are more common in maltreated or high-risk groups (Waters et al., 2015).

Main and Solomon (1986) referred to this attachment style as 'disorganized/disoriented'. This name is meant to express that this attachment contrasts with the three organized attachment styles A, B and C. Attachment style D is also insecure, with the degree of insecurity being the strongest in this attachment style (Mikulincer & Shaver, 2016). An alternative name for this style is 'fearful avoidant' (Mikulincer & Shaver, 2016). A meta-analysis found 15% of North American middle-class children have a disorganized attachment with their mother, in samples with a low socioeconomic status the percentage of disorganized infants was 25% (Van Ijzendoorn et al., 1999).

2.2.5 Maternal Sensitivity

Attachment theory assumes that the child's attachment behavior forms a control loop with the mother's nurturing behavior (Bowlby, 1969). As a secure base, the primary caregiver is not a passive person, but their behavior influences the attachment of the children. Ainsworth et al. (1978/2015) reported a higher maternal sensitivity for mothers of children with style B. The mothers of children with style A were very reserved toward them and tended to reject physical

closeness. Mothers of style C children were less responsive to children's crying, as were less rejecting.

These different maternal behaviors are referred to as maternal sensitivity (Ainsworth et al., 1978/2015). Maternal sensitivity describes the immediate, continuous, and adequate response to the child's emotional needs. Sensitivity versus insensitivity is a central dimension of maternal care through which children can learn that their signals are understood and valued (Grossmann et al., 2013). The security in the attachment of a child was moderately associated with the sensitivity in the caregiving behavior for mothers (De Wolff & Van Ijzendoorn, 1997). The corresponding association for fathers was only weak, but still significant (Lucassen, et al., 2011).

2.3 Adult Attachment

2.3.1 A Cognitive Turn

A Move to the Level of Representation. Attachment theory continued to evolve, and as the 1980s progressed, the cognitive elements of attachment theory received more attention (Thompson et al., 2021). The original studies on SSP were very much focused on child and parent behavior. In 1985, Main et al. published a programmatic article, bringing working models of attachment more into focus. This reflection had begun as the children observed in the studies grew older (some were also studied repeatedly in long-term studies). Instead of pure behavior, the statements of older children about their thoughts and feelings could also be observed.

Bowlby (1980) had described that working models of attachment are formed from experience and then contain accumulated information about the self, the attachment figure, and the shared

relationship. These internalized working models then function partly automatically and below conscious awareness. Bowlby also assumed that working models stabilize over time.

Main et al. (1985) argued that working models of attachment include affective and cognitive components. The observed behavioral differences in the various attachment styles are directly attributable to differences in the working models of attachment. Main et al. assumed that these differences in working models are reflected in language and structures of mind. Accordingly, their study showed that children could also be classified based on their statements about an imagined separation from their parents.

As attachment research shifted to working models of attachment, extensive studies of parents' working models also emerged. Main and her colleagues developed the Adult Attachment Interview in the 1980s (see Main, 2000). In their studies, they distinguished three types of parental working models ('secure/autonomous', 'dismissing', and 'preoccupied'), each corresponding to a child attachment style. In 75% of the cases, the security/uncertainty-dichotomy of the parental working model and the child style matched.

Main (2000) described that style B in children tends to correspond with parents classified as 'secure/autonomous'. These parents coherently describe their own attachment-related experiences and can clearly describe pleasant and unpleasant experiences. Style A in children tends to correspond with parents who are classified as 'dismissing'. These parents describe their own childhood attachment experiences very positively and deny an influence of negative experiences. Often only a few things are remembered. Style C in children tends to correspond with parents who are classified as 'preoccupied'. These parents react very emotionally to the memories of their own attachment experiences with anger, fear, or with strong passivity.

The Adult Attachment Interview studies are less central to the content of this dissertation, but the categories did have an impact on the adult attachment classification introduced below. The shift to the representational level and studies of parents also lay the groundwork for examining attachment in individuals beyond childhood.

Attachment Quality. In connection with the increased focus on working models, attachment quality also moved into the focus of research. Attachment styles differ in terms of the quality of attachment experienced. While individuals of style B have a secure attachment quality, the attachment qualities of styles A, C and D are rather insecure (Ainsworth et al., 1978/2015). Attachment styles and attachment quality are related constructs that both describe interindividual differences in attachments. Attachment quality examines (mostly dimensional) differences between attachment styles and the corresponding the working models. Attachment quality captures the child's expectation about the availability of the attachment figure in times of need (Forslund, et al., 2021). A securely attached child trusts that the attachment figure would be available in times of need. An insecurely attached child does not have this trust and, depending on the attachment style, reacts with avoidant or hyperactive attachment behavior (Mikulincer & Shaver, 2016).

This dissertation examines the consistency and specificity of attachment quality. It is assumed that attachment quality is closely related to the working models of attachment. Facets of attachment security are also considered, such as trust in the attachment figure, the assumed openness of the attachment figure to communication, as well as the perceived relatedness of the attachment figure (Armsden & Greenberg, 1987).

Attachments beyond Infancy. In the course of extending the concept of attachment to later stages of life, Ainsworth (1989) provided a more detailed definition of attachment and distinguished affective bonds from relationships. Affective bonds are more long-term than relationships and, unlike relationships, they are not always dyadic. Affective bonds are characteristics of an individual who experiences a long-lasting connection with a partner. In these affective bonds, the partner is never interchangeable. Hence, this partner does not fulfill a certain role, but the affective bond refers to him as an individual.

Ainsworth (1989) defined attachment as a special form of an affective bond. In attachment, the partner as an attachment figure provides security and comfort and thus represents a secure base. This does not mean that all attachments are secure, but even in the case of an anxious or avoidant attachment, security is sought (but may not be found) with the attachment figure. Ainsworth (1989) further argued that partnership relationships and friendships can also be attachments if the partners serve as a secure base for each other in a symmetrical one. However, asymmetrical constellations are also conceivable, where one partner is an attachment figure for the other, but not vice versa.

2.3.2 Romantic Love as an Attachment

Hazan and Shaver. The starting point of the research on adult attachment is usually attributed to the article by Hazan & Shaver (1987) and the subsequent one by Bartholomew & Horowitz (1991). Hazan and Shaver (1987) explained romantic love as an attachment process, building heavily on the idea of working models of attachment. In a bold argument, they conclude:

> According to Bowlby, working models (which we will also call mental models) and the behavior patterns influenced by them are central components of personality. The claim of cross-situational and cross-age continuity is still controversial but is supported by a growing list of longitudinal studies from infancy through the early elementary school years.(Hazan & Shaver, 1987, p. 512)

The also cite some studies, but none of the studies from that time had explored the stability of attachment from childhood to adulthood. Bowlby (1973) actually wrote that the working models of attachment stabilize over the course of a person's life, and that attachment experiences shape individuals in a variety of ways. In this vein, Hazan and Shaver (1987) described the working models more like personality traits.

Hazan and Shaver then used Ainsworth et al. (1978/2015) categories of secure, anxious/ambivalent, and avoidant attachment as a basis for describing romantic attachment styles. Based on the categories, they created brief descriptions, describing attachment styles as global ways of forming attachments to others. The working models examined hereby are global (with a focus on romantic relationships).

Bartholomew and Horowitz. In the studies of Bartholomew and Horowitz (1991) emerging adults (who were called young adults in the article) were interviewed about their friendships, romantic relationships, and their worship of close relationships in general. Based on these interviews, the emerging adults were classified in one of four attachment patterns. These four attachment patterns are derived from two axes like the quadrants of a coordinate system. These two axes are meant to describe how much a person depends on others because of a negative self-image and how much they avoid other people because of a negative image of other people.

When naming the attachment patterns, Bartholomew and Horowitz (1991) followed Main's classifications from the AAI (see Chapter 2.3.1). They designated individuals with low dependence and low avoidance as secure. Individuals with a high dependence and a low avoidance were labeled as preoccupied. The preoccupied category is most likely to correspond to an ambivalent type according to Hazan and Shaver (1987) and Ainsworth et al (1978/2015). For individuals with high avoidance, Bartholomew and Horowitz (1991) again distinguished two patterns. Those who combine high avoidance with low dependence were described as dismissing. Individuals with high avoidance and high dependence were described as fearful.

Unlike Hazan and Shaver (1987), Bartholomew and Horowitz's (1991) model was clearly designed as a dimensional model, and the four labels do not represent separate categories but only illustrate the quadrants. The model is elegant; unfortunately, later research showed that the two axes are not independent, but that the three non-safe patterns are opposite the safe one, which again makes the safe-unsafe axis of attachment dominant (Asendorpf et al., 1997).

Communalities of the Theories. Despite all the differences in the location of attachment styles, there are great similarities in the approaches of Hazan and Shaver (1987) and Bartholomew and Horowitz (1991), which then became formative for many studies of adult attachment. Instead of attachments to clearly named attachment figures, attachment now conceals the formation of relationships to many different figures from quite some different domains. By referring to Main's studies on adult attachment, it becomes explicit that the attachment of the adult person is seen as the result of his or her childhood experiences.

By viewing attachment through working models of self and others, attachment is often seen as a general trend in relationship formation in studies of adult attachment (see also Mikulincer

and Shaver, 2016, Chapter 6). The working models formed in early attachment experiences with the primary caregiver are thus thought to be the basis for quite different attachment relationships later in life. This approach thus assumes a strong stability of attachment and a strong correspondence between the different attachments within a person. This implies a general and trait-like working model of attachment, which clearly goes beyond the interpretation that Ainsworth created for adult attachment (see Chapter 2.3.1).

2.4 Emerging Adulthood

2.4.1 A New Developmental Stage

This dissertation considers only a narrow age range after high school graduation. The participants in the study are therefore referred to as emerging adults. In 2000, Arnett presented his theory on emerging adulthood as a new life stage. Arnett described that in Western countries, the age of marriage (a possible sign of adulthood) had shifted significantly backward, with a median age beyond 25. Arnett (1998) described three criteria that young people apply to describe themselves as adults: Taking responsibility for themselves, making independent decisions, and being financially independent. Based on these criteria, many young Americans between the ages of 18 and 25 described themselves as not yet adults. A significant influencing factor here was that they portrayed themselves as not financially independent. For this reason, Arnett (2000) suggested that individuals in Western cultures between 18 and 25 should be referred to as emerging adults. Later articles moved the end of emerging adulthood to 29 years (see Arnett et al., 2011).

In addition to later marriage times, moving out of the parental home is also an important developmental step that is usually taken during emerging adulthood (Jonkmann et al., 2014). In

doing so, moving out causes a boost in achieving independence and an increase in well-being (Kins & Beyers, 2010). The establishment of first long-term, serious romantic relationships is also associated with emerging adulthood (Neyer & Lehnart, 2007). At the same time, it is the age phase of study, training and first professional experiences (Buhl, Wittmann, & Noack, 2003).

Unlike other life stages, emerging adulthood is characterized by a variety of possible social roles, worldviews, and lifestyles (Arnett, 2000). During this phase of life, attitudes about one's parents, about sexuality and religiousness are more likely to change than in other phases of life (Lefkowitz, 2005). During this time shifts from an asymmetrical to a more symmetrical relationship within the parent-child relationship occur, in doing so the relationship between a child and their mother can already reach a symmetrical status in this phase (Buhl, 2009).

2.4.2 Important Critique of the Concept

In posting the new life stage of emerging adulthood, Arnett pointed out that a forgotten half of young people's cohorts has too often been overlooked by psychological research. He is referring to those young people who do not attend college. Arnett hoped that this half would become a better focus of research under the paradigm of emerging adulthood. Regarding this point, Hendry and Kloep (2007a) formulated a very pointed critique. They pointed out that Arnett's theory was not only ethnocentric, but also contained biases regarding social class and gender. In addition, Hendry and Kloep (2007b) emphasized that developmental stages do not explain anything, so that emerging adults can at most be a label for a more or less homogeneous group of people.

There is not enough space within this dissertation to fully unroll this debate about the existence of emerging adulthood; but for a further read, Arnett and his critics have elaborated this

elsewhere (see Arnett et al., 2011). In summary, the variable role expectations and the unstable relationship between dependence and independence from parents is primarily an aspect that affects students and people with a higher education degree in Western societies. In the context of this dissertation, we are concerned with young people who have completed a German Abitur, so the concept of emerging adults can be applied to them.

2.5 Recent Research

2.5.1 General Working Model of Attachment

In more current research on adult attachment, attachment is often conceptualized in light of general working models of attachment (Fraley, Heffernan et al., 2011). In the relevant studies, attachment is used as a description of the person's basic way of forming relationships. Examples of studies examining emerging adults examined the association of more secure general attachment with less envy (Baumel & Berant, 2015) and higher well-being (Kafetsios & Sideridis, 2006; Karreman & Vingerhoets, 2012). More secure general attachment was associated with less loneliness and more social support (Bernardon et al., 2011). Secure attachment was also associated with developmentally appropriate timing for moving out of the parental home (Seiffge-Krenke, 2006).

The use of general working models to describe attachment is particularly common in clinical psychology. In some cases, the attachment style is described as a fixed character trait. A review article for psychotherapists on attachment styles by Meyer & Pilkonis (2001) summarizes this position very explicitly:

> Adult attachment styles describe people's comfort and confidence in close relationships, their fear of rejection and yearning for intimacy, and their preference for self-sufficiency or interpersonal distance […]. Attachment styles are formed in response to real-life experiences with caregivers and other people, and they reflect mental representations ("internal working models") of others, of oneself in relation to others, and of relationships in general. (Meyer & Pilkonis, 2001, p. 466)

These descriptions clearly go beyond the statements of classical attachment theory. However, Bowlby (1988) himself, in his late work, reflected on the application of attachment theory in psychotherapy, strongly emphasizing the aspect of transferring acquired working models of attachment to new relationships. He wrote:

> Nevertheless, as the child grows older, the pattern [of attachment] becomes increasingly a property of the child himself, which means that he tends to impose it, or some derivate of it, upon new relationships such as with a teacher, a foster-mother, or a therapist. (Bowlby, 1988, p. 127)

This emphasizes more strongly than earlier writings the idea of a general and trait-like working model (see also Mikulincer & Shaver, 2016, Chapter 14). In a meta-analysis, higher anxiety in this general attachment style was found to predict poorer outcome after therapy (Levy et al., 2011). Other studies showed that higher general attachment security was associated with lower psychological distress (Lopez & Gormley, 2002; Scharfe & Cole, 2006) and depression (Wei, Shaffer et al., 2005; Wei, Russell et al., 2005).

The idea of a general working model of attachment is often accompanied by the idea of stability. It is assumed that attachment in early childhood has a continuing influence on

attachment even in adulthood (see Bowlby 1988, Meyer & Pilkonis, 2001). However, in a meta-analysis, Pinquart et al. (2013) showed that attachment ratings from childhood to young adulthood are not correlated. Thus, the theory of general attachment style as a stable personality trait is on shaky ground.

2.5.2 Relationship-Specific Working Models of Attachment

The idea of focusing attachment on a general work model has been challenged by many studies (e.g., Caron et al., 2012; Doyle et al., 2009; Furmann et al. 2002; La Guardia et al., 2000; Ross & Spinner, 2001). Fraley, Heffernan et al. (2011) summarized the criticisms of general working models of attachment. In doing so, they emphasized that many questionnaires on the general working model of attachment are unclear in their wording and reference (when individual items refer more to romantic relationships and others refer more to one's relationship with one's parents). Furthermore, according to Fraley, Heffernan et al. (2011) a general working model of attachment is not able to represent the intraindividual variance of attachments within a person. It was shown that ratings on specific attachments were not equivalent to ratings on general attachment (Ross & Spinner, 2001). In a long-term study, general and specific attachments had different trajectories of change (Hudson et al., 2015).

Following the logic of specific attachments, several studies investigated the relationships between the different attachments (Asendorpf & Wilpers, 2000; Doyle et al., 2009; Fraley, Heffernan et al., 2011; Fraley, Vicary et al., 2011; Furman et al., 2002). These studies showed that although different attachments are associated, the association is not high enough to reduce attachment to a general attachment style. In emerging adulthood, security in specific attachments

to different figures was positively associated with well-being (Caron et al., 2012; La Guardia et al., 2000). Specific attachment with parents was negatively associated with psychological distress (Hiester et al., 2009). And even specific attachment to pets is positively correlated with well-being (Luhmann & Kalitzki, 2016). Attachments to parents (e.g., Cook & Kenny, 2005), friends (e.g., Cook et al., 2016), or romantic partners (e.g., Lehnart & Neyer, 2006) are most examined in emerging adults.

2.6 Aims of this Dissertation

2.6.1 Current Questions

In a current programmatic article, Fraley and Dugan (2021) emphasized that the consistency of attachment security across time and relationships is one of the current issues in attachment research. The issues of consistency and specificity raised by Fraley and Dugan (2021) include multiple questions. It is precisely these questions that this dissertation seeks to answer. The most obvious is the question on the degree of attachment stability, that is, consistency over time. Here, preliminary studies suggest higher stability over shorter periods (Fraley, 2002), whereas stability over long periods is likely to be much lower (Pinquart et al., 2013).

Consistency across different relationships is the second of Fraley and Dugan's (2021) questions. The questions of consistency across attachments to different domains of attachment figures is also the question of the existence of general or specific working models of attachment as described in the previous chapter. There are conflicting theories about this question in attachment research (Fraley, 2019).

The question of consistency within a person quickly leads to the question of consistency of mutual attachments within a dyad. Sroufe (2021) described it as one of the current questions in attachment research, to what extent the attachments in dyads are consistent. In doing so, Sroufe's consideration of dyads went beyond romantic dyads, where mutual attachment has been an issue for some time (e.g., Seiffge-Krenke & Burk, 2012).

A fourth question about consistency is less discussed in attachment research. It is the question of the consistency of self and informant perceptions of attachment. It is important that one attachment partner can perceive the attachment of the other correctly, especially within attachment dyads. This dissertation also wants to investigate this aspect of consistency in the sense of congruence of perceptions.

2.6.2 Limitations of Previous Research

Answering all of the above questions is complicated by methodological problems. Issues of consistency require that the variables involved be measured with as little measurement error as possible, otherwise the measures of correlation are more difficult to interpret (Fraley & Dugan, 2021). This problem is particularly large in the study of consistency over time, where it may become impossible to distinguish instability from unreliability (Eid & Kutscher, 2014).

This dissertation addresses different kinds of attachment consistency in young adulthood. Consistency refers to the agreement of attachment ratings across raters, the agreement of attachment ratings over time, or the agreement of attachments to different individuals (see Chapter 3.2 for a detailed description of different kinds of consistency). The idea of a general and trait-like working model of attachment would suggest greater consistency in most of these cases

(except for consistency between different raters). These different kinds of consistency are the focus of each of the three studies in this dissertation.

If the interrelationships of attachments from different domains are studied, the models must be adapted to this data structure. If several attachments from the same domain are nested within persons, multi-level models may even be necessary. This usefulness of using latent structural equation models to adequately represent the theories under investigation contrasts with a rather rare use of such models so far (some exceptions are Fraley et al., 2011 and Wilkinson, 2004). Therefore, the purpose of this dissertation is also to bring appropriate models into use in order to find more precise answers to the current questions.

2.6.3 The empirical Studies of this Dissertation

Study 1 of this dissertation examined the extent to which specific attachment to parents is related to emerging adults' well-being. Both self-rated and parent-rated attachment were considered (see Chapter 5). Study 2 examined how consistent specific attachments are over time (see Chapter 6). Study 3 of this dissertation examined the consistency of different specific attachments within emerging adults. This also provides an outline of how maximally effective a general working model of attachment might be (see Chapter 7).

In all three studies, the current state of research is presented with respect to the corresponding research question. In all three studies, new statistical models are used for attachment research. These models did not only enable the possibility to capture attachments without measurement error, but they are also particularly suitable for representing aspects of consistency and the opposing aspects of specificity. These models will be introduced in the next chapter.

3. Statistical Models

This dissertation examines the consistency and specificity of attachment patterns in emerging adulthood. For this purpose, statistical models are applied that are particularly suitable for investigating various aspects of consistency and specificity. These models have never been used before in the context of attachment research and they come from a tradition of models that have evolved from the correlated trait/correlated method minus one model (CTC(M-1) model; Eid, 2000). This chapter presents the foundations of this tradition of models and how they can be applied to the special context of attachment research.

3.1 The CTC(M-1) Tradition

3.1.1 The Origin of the CTC(M-1) model

The tradition of the CTC(M-1) model is rooted in multitrait-multimethod (MTMM) investigations. In 1959, Campbell and Fiske published their very influential article on the investigation of construct validity through the MTMM correlation matrix. This article is one of the most cited methodological articles in psychology (Eid & Nussbeck, 2009). Campbell and Fiske's approach can be used, if more than one trait is measured with more than one method. Each test score or observed variable can be described as a combination of the measured trait and the used method and therefore is called a trait-method unit (Campbell & Fiske, 1959). The MTMM matrix depicts the correlations of all trait-method units. Convergent validity is given, if the correlations of the same trait measured with different methods are higher than those for different traits with different methods. Discriminant validity is given if the correlation of different traits is low. This is especially important for those trait-method units, which are measured with the same methods.

Although classical MTMM correlation matrices provide valuable information on the convergence and divergence of the observed variables, there are some shortcomings associated with this approach. If the reliabilities of the trait-method units differ, the differences in the correlations are hard to interpret (Eid, 2010). In addition, it is not possible to test specific hypotheses (Eid & Nussbeck, 2012). But the main idea of the MTMM matrix is still important. To separate the influences of trait from the influences of method more than one trait and more than one method must be considered in the validation process (Eid & Nussbeck, 2009).

The CTC(M-1) model is a confirmatory factor model for analyzing MTMM data. In its most original form, each manifest indicator represents a trait-method unit (Eid, 2000). In a multi-indicator model every trait-method unit is represented by more than one indicator (Eid et al., 2003). The CTC(M-1) model is well-defined, for detailed descriptions of the assumptions and definitions see Eid (2000), Eid et al. (2003), and Koch et al. (2018). In the following, I will only give a brief overview of the features of the model and the coefficients that are central for the applications in this dissertation.

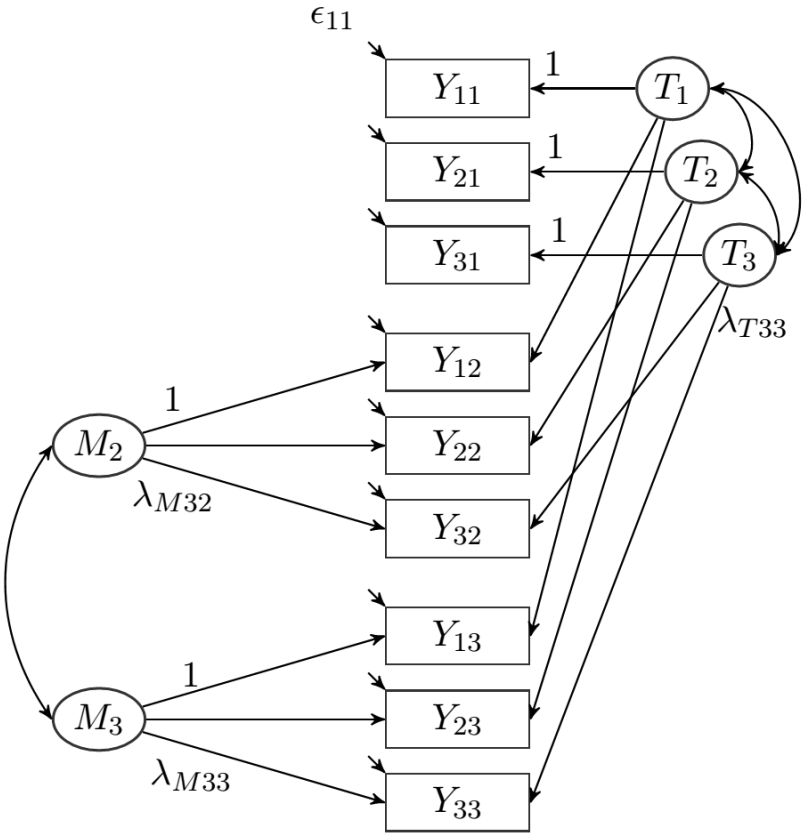
3.1.2 Central Features of the CTC(M-1) Model

In a CTC(M-1) model, each trait T_i is measured with several methods M_k, each indicator Y_{ik} represents a trait-method unit, and one method is declared to be the reference method (Eid, 2000). The selection of the reference method depends on the objective of the study. As an example, let us assume that emerging adults who are currently in a partnership give a self-report about their well-being on three items. Additionally, two informant reports on well-being are collected for each emerging adult. First, the mother assesses the well-being of the emerging adult. A second

informant report comes from the emerging adult's romantic partner. The purpose of this example study is to examine how well the two third-party reports match the self-report. For this reason, the self-report is selected as the reference method. A suitable model for this example is displayed in Figure 3.1.

Figure 3.1

A CTC(M-1) Model with 3 Methods



Note. This CTC(M-1) model has three traits and three methods. The first method is chosen as the reference and the true values of these indicators are captured in indicator-specific trait factors.

In Figure 3.1, the indicators Y_{ik} represent the well-being ratings with k as the index for the method and i as the index for three indicators (the three items). In this model $k = 1$ (the self-rating)

is chosen as the reference and $k = 2$ (mother informant rating) and $k = 3$ (partner informant rating) are non-reference methods. The trait factors T_i represent the true values of the three well-being items measured with the reference method, i.e., the self-rating (for the definition of the true values and the errors see Eid, 2000; Eid et al., 2003, 2008). The method factor M_2 represents the deviation of the mothers' ratings on well-being from the expected value based on the self-rating (similar for M_3). A person with a positive value on M_2 has a higher mother rating of their well-being than expected based on their self-rated well-being.

The method factors are residual factors that are uncorrelated with the trait factors. However, the method factors are correlated with each other. This represents potential similarities of the ratings that cannot be explained by the ratings of the reference method. In our example, it might be possible that the same emerging adults are overestimated concerning their well-being by mothers and romantic partners alike (while others are systematically underestimated).

This example represents a model with indicator-specific trait factors. Every trait represents one well-being item. These models are especially suited if the items of a scale are not homogeneous. This model with indicator-specific traits is a variant of a single-indicator CTC(M-1) model (Eid, 2000). Models with indicator-specific traits were used in Study 2 and Study 3 of this dissertation.

Central to further understanding is the fact that the variance of the non-reference methods can be decomposed in the following way (following Eid, 2000; Eid et al., 2003):

$$\mathrm{Var}(Y_{ik}) = \lambda^2_{Tik} * \mathrm{Var}(T_i) + \lambda^2_{Mik} * \mathrm{Var}(M_k) + \epsilon_{ik} \qquad \text{(for k > 1)}$$

Based on this decomposition, two central coefficients can be defined. The consistency coefficient (CON) is defined as:

$$\mathrm{CON}(Y_{ik}) = \frac{\lambda_{Tik}^2 * \mathrm{Var}(T_i)}{\lambda_{Tik}^2 * \mathrm{Var}(T_i) + \lambda_{Mik}^2 * \mathrm{Var}(M_k)} \qquad \text{(for k > 1)}$$

The consistency coefficient describes the proportion of true (measurement error-free) variance that can be explained by the trait factor (measured with the reference method). In the example, the consistency would describe how much of the variance in the mothers' (resp. romantic partners') ratings is predicted by the self-ratings. If there is no association of self-ratings and mothers' ratings, the consistency coefficient would be 0. A high consistency coefficient would indicate that both methods report similar results. In our example this would mean that mothers are good at assessing their children's well-being.

The second coefficient is the method specificity coefficient (MS), which is defines as:

$$\mathrm{MS}(Y_{ik}) = \frac{\lambda_{Mik}^2 * \mathrm{Var}(M_k)}{\lambda_{Tik}^2 * \mathrm{Var}(T_i) + \lambda_{Mik}^2 * \mathrm{Var}(M_k)} \qquad \text{(for k > 1)}$$

The method specificity coefficient describes the proportion of true variance that cannot be explained by the trait factor and which is therefore specific to this method. In our example, the method specificity coefficient would describe the true variance in the mothers' ratings that is linearly independent of the self-rated well-being. CON and MS add up to 1, since they divide the total variance into exactly two disjoint parts.

3.1.3 Interchangeable and Structurally Different Methods

Different Types of Methods. The idea of the CTC(M-1) models developed steadily. An important developmental step was the inclusion of interchangeable methods in the CTC(M-1) models. Eid et al. (2008) described the difference of structurally different and interchangeable

methods. The difference of interchangeable and structurally different methods is also important for this dissertation. Let us again consider the case of different informant ratings on an emerging adults' well-being as methods. In the case of structurally different methods, it is immediately clear which person provides the corresponding informant rating, when the emerging adult is drawn. A mother rating comes from the mother and the rating of a relationship partner from the relationship partner. In the case of interchangeable methods, there is a double drawing process. First, the emerging adult is drawn and then the actual raters must be drawn from a larger set of possible raters. This could be a friend rating. Each person has several friends and now randomly selects one or more of them to receive a friend rating (or several friend ratings) for the study. Unlike the structurally different methods, however, it is not specified which friends is drawn.

In cases of interchangeable models only, a multilevel confirmatory factor analysis – multitrait-multimethod model can be used (Eid et al., 2008). In cases of structurally different methods and of combinations of interchangeable and structurally different methods, an extended CTC(M-1) model can be used, if the reference method is structurally different from the other methods (Eid et al., 2008; Nussbeck et al., 20089).

In the case of rater selection, it also becomes clear that the distinction between interchangeable and structurally different methods depends on certain framework conditions. Children of a gay couple would have two possible fathers to choose from and therefore a father rating would be an interchangeable method for them. The same is true for relationship partner ratings for polyamorous individuals.

When multiple interchangeable ratings are included in a model, a multi-level structure is generated. For example, multiple friend ratings are nested within one person. With the

appropriate versions of the CTC(M-1) model, the method specificity can be further decomposed into one part that is specific to these raters but shared by the different raters of the same type and another part that is unique to the individual rater (see Eid et al., 2008). Such a multilevel model is used in Study 3 (see there for a more detailed description).

Interchangeable Attachment Figures. A potential confusion may arise through the double meaning of 'interchangeable' within attachment theory and in the tradition of CTC(M-1) models. In this dissertation the attachments to different friends are treated as interchangeable methods in Study 3. However, Ainsworth (1989) defines attachment figures as non-interchangeable, meaning that an attachment figure is never just a representation of a role (such as friend, teacher, parent). Attachment always refers to that very specific friend or that very specific parent. It is possible that attachments to different friends are similar, but a person is not attached to a group of friends, but to each of them (and possibly to with a different quality).

In Study 3 of this dissertations, the interchangeable methods represent attachments to different friends nested within the emerging adult. Thus, each emerging adult reported attachments to multiple friends. Interchangeability in the methodological sense means that the chosen friends are assumed to have been drawn from a (presumably somewhat larger group) of friends. Each friend is equally representative for the whole group of friends. The emerging adult has a mean attachment to her or his friends. The emerging adult randomly selects a few friends and describes their attachment to them. This creates a nonsystematic bias in the estimate of the mean attachment to friends due to sampling error.

This can also be illustrated more practically with an example. Suppose the emerging adult Zania has friends named Alfred, Brigitte, Charlotte, Daniela, Ergün, and Frederik. She has a

distinct and non-interchangeable attachment to each of her friends. If Zania participates in the study and now describes the attachment to three randomly chosen friends, all six friends have the same probability of being drawn and they all represent the attachment to *a* friend in the same sense (they are interchangeable in the methodological sense). So, it is possible that the attachments to Alfred, Daniela, and Frederik are described, or the attachments to Brigitte, Ergün, and Frederik. Depending on the composition of the group of friends drawn, Zania's mean attachment to friends will probably be somewhat different, but the mean of the means of all possible combinations is equal to the mean of the attachments to all friends.

Thus, interchangeability in the sense of attachment theory and interchangeability in the methodological sense do not represent a contradiction. As long as the attachment figures come from the same domain (in the studies of this dissertation these are friends) they can be regarded as methodologically interchangeable. Only in these cases the mean value of the attachment to the figures of a domain also has a substantive sense.

3.1.4 Further Growth of the Tradition

Longitudinal Data. For this dissertation, one branch of the development of the CTC(M-1) tradition is particularly important. The models of the CTC(M-1) tradition were extended by Geiser (2008) for several measurement occasions. This made them applicable to multitait-multimethod-multioccasion data. Koch (2013) developed these models furthermore by including traits besides states and by making them usable for interchangeable methods. Finally, Holtmann (2017) made these models applicable to categorical data.

Study 2 presents an additional CTC(M-1) model, that sprouts from this branch. This multi-rater latent state-trait model with autoregressive effects is based on a latent autoregressive state-trait model by Eid et al (2012) and one of the MTMM models presented by Koch (2013), incorporating the revised latent-state trait theory (Steyer et al., 2015; see also Eid, Holtmann et al., 2017). This model allows to show the consistency and specificity of different methods in the stable and variable elements of multitait-multimethod-multioccasion data.

Application on G-Factor Models. The idea of CTC(M-1) models was also introduced to different research areas. Eid, Geiser et al. (2017) expanded the model's scope of application to situations where the 'methods' represent different specific factors in g-factor models. This has been applied in studies of clinical psychology, where the various specific factors represent symptoms of clinical disorders (Heinrich et al., 2018) and where the question is examined to which extent there are overriding general factors of psychopathology (Heinrich, et al., 2020). The application of the CTC(M-1) models in this dissertation is also an application to data not with different methods in a narrow sense, but different aspects, facets, and perspectives of attachment.

3.2 Four Kinds of Consistency

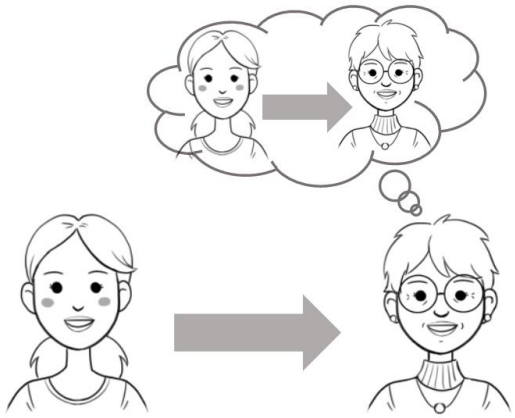
3.2.1 Cross-Method Consistency

In this dissertation, models from the CTC(M-1) family are applied to attachment data, which in some cases may result in changes in the meaning of the coefficients. The different versions of the coefficients do not result in different calculations (with the exception of time consistency), but mainly change the substantive meaning of the coefficients. The kind of consistency which represents the original meaning of the conceptions of the models (Eid, 2000; Eid et al., 2003) is the

consistency between different methods. I call this first type of consistency the *cross-method consistency*.

Figure 3.2

Illustration of Cross-Method Consistency



Note. The Illustration depicts the attachment of an emerging adult to their parent. There is also an idea of the parent about the emerging adult's attachment.

Figure 3.2 illustrates an example of cross-method consistency in this dissertation. There is a self-report and a parent-report of the emerging adult's attachment security (like in Study 1). In this case, consistency shows agreement between the self and parent reports (just as in the well-being example in Chapter 3.1.2). Thus, a high consistency indicates that parents have a good assessment of their child's attachment. Method specificity, on the other hand, shows how specific the parents' rating is (i.e., how much it is linearly independent of their child's self-report).

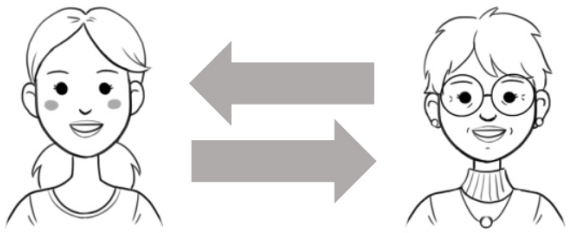
3.2.2 Rater Consistency

A different data situation arises when an emerging adult and a parent each indicate their attachment to each other. The emerging adult thus indicates how securely they is attached to the parent, and the parent in turn indicates how securely he or she is attached to the emerging adult (see Figure 3.3 for an illustration). Thus, dyadic data on mutual attachments are available. We can apply the model in this case as well, but instead of different methods, different raters of the corresponding self-reports are now mapped in the data. Consistency in this case describes the correspondence between the attachments of the two raters. Such a case is present in Study 1 and especially in Study 2 and there the term *rater consistency* is used for this.

High rater consistency indicates similar mutual attachments within the dyad. High rater consistency indicates that those emerging adults who are more securely attached to their parents (compared to other emerging adults) have parents, who are more securely attached to them (compared to other parents). A high rater specificity indicates that the mutual attachments are independent from one another. In cases of high rater consistency, it is possible to assume a more secure attachment of the parent to the child when the attachment of the child to the parent is more secure (under the assumption that the consistency is based on a positive association; theoretically, a high consistency could also be due to a high negative association).

Figure 3.3

Illustration of Rater Consistency



Note. The Illustration depicts the mutual attachments between of an emerging adult and their parent.

If a CTC(M-1) model is used to examine rater consistency, one of the two individuals is designated as the reference. This selection of the reference is even more dependent on the perspective of the study than in the case of cross-method consistency and is ultimately of secondary importance for the calculation of consistency (especially since rater consistency only refers to dyadic data where there are only two 'methods'). In the studies of this dissertation, the emerging adult's report is used as a reference, since they are the starting point of the study and the relationships with the parents are considered from their side of the dyad.

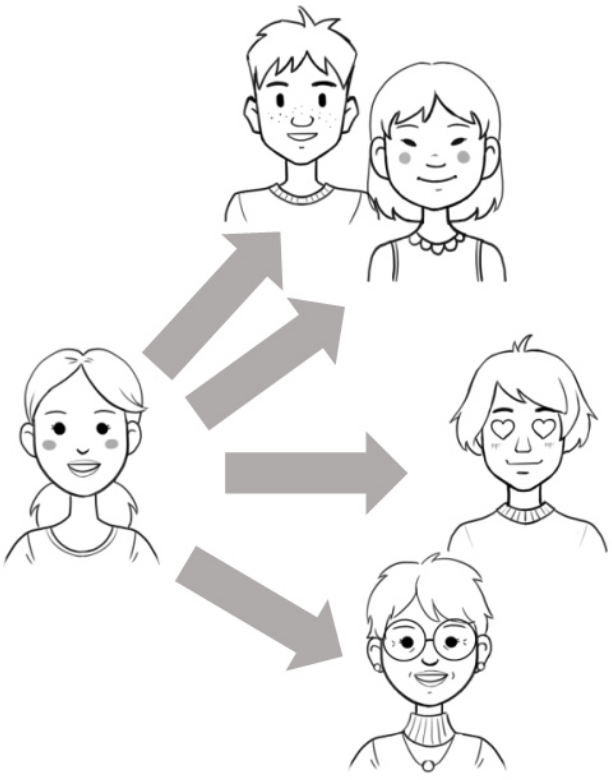
3.2.3 Figure Consistency

When individuals in a study describe their attachments to several different attachment figures, the data situation is different again. In this case, all reports are self-reports. The different 'methods' in this case are the different attachment figures to which the attachment refers. Study 3 examines the attachment quality of emerging adults' attachments to parents, romantic partners, and friends (see Figure 3.4 for an illustration). Consistency in this case describes the consistency of the different attachments within the emerging adults. I call this type of consistency *figure consistency*.

High figure consistency indicates that attachments to different attachment figures are very similar. For example, the emerging adults report similar attachment security to their parents as to their romantic partners. In contrast, figure specificity describes the distinctiveness of the attachment to the corresponding figure. In this constellation, the model is particularly well suited for examining the different influences of general versus specific attachment styles and working models.

Figure 3.4

Illustration of Figure Consistency



Note. The Illustration depicts several attachments of an emerging adult to their parent, their romantic partner, and two friends.

A reference must be selected here as well. When the attachment to one figure is selected as a reference, the consistency describes the correspondence of an attachment to another figure with the attachment to the reference figure. According to attachment theory (see Chapter 2), parents are the first and formative attachment figures. Based on this presumption, it makes sense to determine them as a reference. Thus, consistency describes the correspondence of other attachments with the attachments to parents. This model also allows to study the possible influence of a general working model on different attachments (like in Study 3).

In this constellation, the correlation of the residual factors is also particularly interesting. If the emerging adults describe their attachment to a parent (as reference), a friend, and a romantic partner, this correlation describes the relationships between attachments to friends and partners that cannot be explained by attachment to parents. If romantic relationships and friendships are similar (because both tend to be symmetrical relationships with persons of a similar age), they may also have commonalities in attachment beyond a general attachment style.

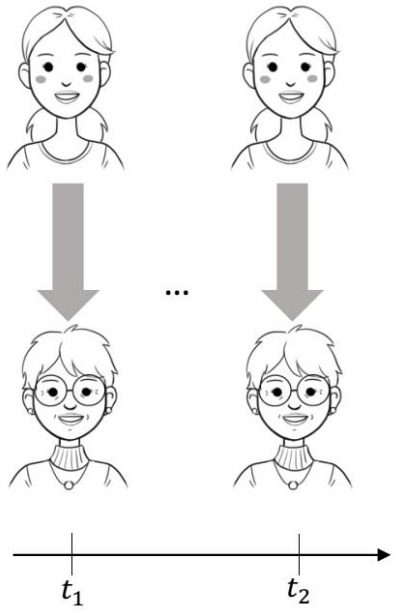
3.2.4 Time Consistency

When attachments are examined over multiple measurement occasions, the consistency describes how much of the measurement error-free (true) variance at this measurement occasion could be predicted by the trait values and the state values of earlier measurement occasions (for a description on trait and state see (Steyer et al., 2015). In the models used in this dissertation, it can also be said from the second measurement occasion onwards that consistency describes how strongly the true values are related to the true values of earlier measurement occasions. This kind of consistency is called *time consistency*. Figure 3.5 shows an illustration for time consistency.

A high time consistency indicates that the trait of the first measurement occasion and the occasion-specific deviations from the trait at earlier measurement occasion are valuable predictors for this measurement occasions. This also indicates little change in the standardized attachment scores (changes at the mean level are not reflected in the consistency). The occasion specificity is not equivalent with the method specificity. The occasion specificity describes the degree of deviation of this measurement occasion from the value predicted by the trait of the first measurement occasion.

Figure 3.5

Illustration of Time Consistency



Note. The Illustration depicts an emerging adult's attachment to their parent over two measurement occasions.

The calculation of time consistency is based on different models than the other kinds of consistencies are. The coefficients of time consistency are pure descriptions of the explained

variance and their square roots cannot be interpreted as correlations as in the other models. For a more detailed description of time consistency, see Study 2.

3.2.5 Combinations of different kinds of consistency

The four kinds of consistency can be explored within in the same study. In Study 1 cross-method consistency and rater consistency of attachment is examined within the same model. Depending on the data situation, it is also possible to consider combinations of different types of consistencies. In Study 2, the rater consistency and specificity of the time consistency (and the occasion specificity) was explored. That way, it is possible to investigate whether change processes are similar for different raters.

All possible combinations of these consistencies can be investigated. For example, it is possible to look at how high the cross-method consistency is within dyads with respect to rater consistency. However, the models quickly become very extensive and not very descriptive. In addition, large samples are necessary to obtain results that can be interpreted well.

4. General Description of the Study

The longitudinal study was carried out within the framework of the project "Further development of models of multi-method change measurement and their application in the field of well-being research (*Weiterentwicklung von Modellen der multimethodalen Veränderungsmessung und deren Anwendung im Bereich der Wohlbefindensforschung*)", funded by the German Research Foundation (DFG; Grand Number EI379/6-2) under the direction of Prof. Michael Eid. The Ethics Commission of the Freie Universität Berlin evaluated the study on June 13, 2013. The aim of the study was to investigate the development of attachment patterns, well-being, and loneliness over the first year after high school graduation. The study was intended to record not only the self-reports of the emerging adults, but also the assessments of one parent, the romantic partner, and several friends. In the following chapters, emerging adults who were asked for self-reports, will be called 'targets' in order to distinguish them from the participating friend and partners.

4.1 Data Collection

4.1.1 Recruitment

Following approval by the Senate Administration for Education, Youth and Science (*Senatsverwaltung für Bildung, Jugend und Wissenschaft*) in Berlin and the approval of the Ministry of Education, Youth and Sports of the State of Brandenburg (*Ministerium für Bildung, Jugend und Sport des Landes Brandenburg*), the study was presented to prospective high school graduates in schools in Brandenburg and in Berlin. In Brandenburg, interested parties were able to sign up for our study in written lists, whereas in Berlin the graduates received flyers and could sign up for the study independently in the Internet on our web page. There were further invitations to high

school graduates throughout Germany via the Internet and posters in schools (see Figure 4.1). In addition, the study was advertised at a stand at the study information day which took place at the Freie Universität Berlin and the link to the information homepage was divided into facebook groups for high school graduates. Email addresses were available from all interested high school graduates.

Figure 4.1

Advertising Poster for the Study

4.1.2 Participation in Detail

First measurement occasion. On September 1st, 2014, a total of 981 targets were invited to participate in the study, all of them with functioning e-mail addresses. Of these, 715 started to fill out the questionnaire and 558 completed it. Initially, the targets were informed that they could fill out the questionnaire until September 8th, this deadline was then extended until September 11th,

and on September 12th the questionnaire went offline. Reminders were sent out to the people who had not yet completed the questionnaire.

The targets also provided the e-mail addresses of parents and partners (if available) in their questionnaire. The parents were then invited in groups on September 4th, September 8th, and September 12th. A total of 558 parents were invited, 440 started the questionnaire and 405 completed it. The partners were invited on September 5th, September 8th, and September 12th, the number was smaller than the number of parents due to the large proportion of singles. About 270 partners were invited in total, 150 started the questionnaire, 138 completed it. In some cases address entries were incorrect, but could partly be corrected after several mails. The questionnaires for parents and partners were taken offline on September 14th.

Second measurement occasion. On December 1st, 2014, the 558 targets with complete questionnaires from the first measurement date were re-invited. They had time until December 10th in the afternoon to complete the questionnaire (the deadline was again initially indicated as being until December 8th). From these persons, 497 started to fill in the questionnaire and 447 completed it to the end. Reminders were sent out to invite people who had not yet completed the questionnaire. An invitation was also sent out to another 428 persons who had not submitted a (complete) questionnaire at the time of the first measurement but had originally expressed interest in the study. Of these, 48 started the study and only 16 completed the questionnaire. So, a total of 463 targets entered a complete questionnaire.

On December 1st, 553 parents were invited to participate in the study (some parents had unsubscribed). Of these, 367 started the questionnaire and 350 completed it. In addition, further e-mails were sent to parents whose addresses had been corrected by the participants and to those

of participants who only entered the study at the second measurement date. A total of 384 parent questionnaires were completed. The parents' questionnaire was also online until December 10th. A total of 201 partners were invited over several rounds of invitations. A total of 139 partners completed their questionnaires. The questionnaire for partners ended on December 15th.

The targets described their attachment to 1 to 5 friends each. On average, the targets with complete questionnaires described the attachment to 2.94 friends (with a median and mode of 3). The targets also provided the e-mail addresses of those friends, they described their attachment to. From December 3rd on, a total of 1364 friends were invited, of which 878 started a questionnaire and 800 friends completed the questionnaire. The questionnaire for friends ended on December 15th.

Third measurement occasion. On March 2nd, 463 invitations were sent out to targets who had participated in the second survey. Of these, 437 started the questionnaire and 428 completed it completely. Several reminders were sent out on, and the questionnaire itself was closed on March 12th. An error in the logical links meant that the questions about the attachment to the fourth friend were not displayed to the targets. This was noticed immediately after the study and a questionnaire was redesigned which contained exactly these questions. This questionnaire was sent to the 100 targets who were affected (who had entered at least 4 friends) on March 12th. From this group, 69 targets started the survey and 66 completed it before it was taken offline again on March 16th.

The 110 targets who had participated in the first measurement occasion (but not in the second) were invited to re-enter the study. From this group, 27 started the questionnaire and 13 completed

it. These persons also indicated new friends. The questionnaire for the re-entrants was closed on March 9th. A total of 441 targets entered a complete questionnaire.

On March 2nd, 569 parents were invited to participate in the study, 347 of whom started the questionnaire and 341 also completed it. Several reminders were sent out. The questionnaire itself was closed on March 12th. On March 2nd, 1307 friends were invited to the study, of which 627 started the questionnaire and 567 completed it. Several reminders were sent out before the questionnaire was taken offline on March 12th.

Of the reinvited targets, additional friends were indicated, who were contacted in two waves depending on the time of entry. The first wave consisted of 23 invitations, of which 11 started and 10 finished questionnaires, and the second wave consisted of 8 invitations, of which all started and finished the questionnaires. The first wave received a reminder on March 10th and at the same time the second wave was first written to. The questionnaire was deactivated on March 15.

The partners were again continuously invited alongside the study. There were three waves of invitations. The first wave consisted of 113 invitations, of which 66 started and 62 finished questionnaires, the second wave consisted of 55 invitations, of which 30 started and 28 finished the questionnaires, and the third wave consisted of 11 invitations, of which 8 started and 8 finished the questionnaires. The partners were invited for the first time between March 5th and March 12th. A total of 98 partners completed the questionnaire. The questionnaire for partners was taken offline on March 15th.

Fourth measurement occasion. The fourth survey started on June 1st, 2015. 476 targets (who had participated in the second or third measurement occasion) were invited. Out of those, 429

completed the questionnaire. Several reminders were sent out and on June 10th the questionnaire was finally taken offline.

A total of 573 parents were invited to the study, 329 of them started the questionnaire and 323 also completed it. A total of 168 partners were invited to the study, 81 started it and 79 completed the questionnaire. A total of 1347 friends were invited to the study, 548 started the questionnaire and 511 completed it. Reminders were sent out to parents, partners, and friends. The questionnaires for parents, partners, and friends were taken offline on March 11th.

4.1.3 Compensation

The targets received a reward of 12.50 Euro for each measurement occasion and an additional reward of 50 Euro if they participated in all four measurement occasions. In this way, the participants could receive a total of 100 Euros. The targets received their reward after the last measurement occasion. The participating parents, partners, and friends took part in a lottery. The names of these persons were thrown into the lottery drum once for each completed questionnaire and thus had a higher chance of winning if they participated several times. After the last measurement occasion, 100 cinema tickets worth 10 euros each and 3 iPad mini were raffled off to participants in the lottery (i.e. parents, partners and friends in the study).

4.2 Scales and Measurement

The participants were asked for different facets of attachment as part of the study. Other questionnaires related to well-being, loneliness, personality, social support, and demographic

information including the living situation, relationship status, and occupation. To facilitate completion of the questionnaires, five-point response scales were used for most questionnaires.

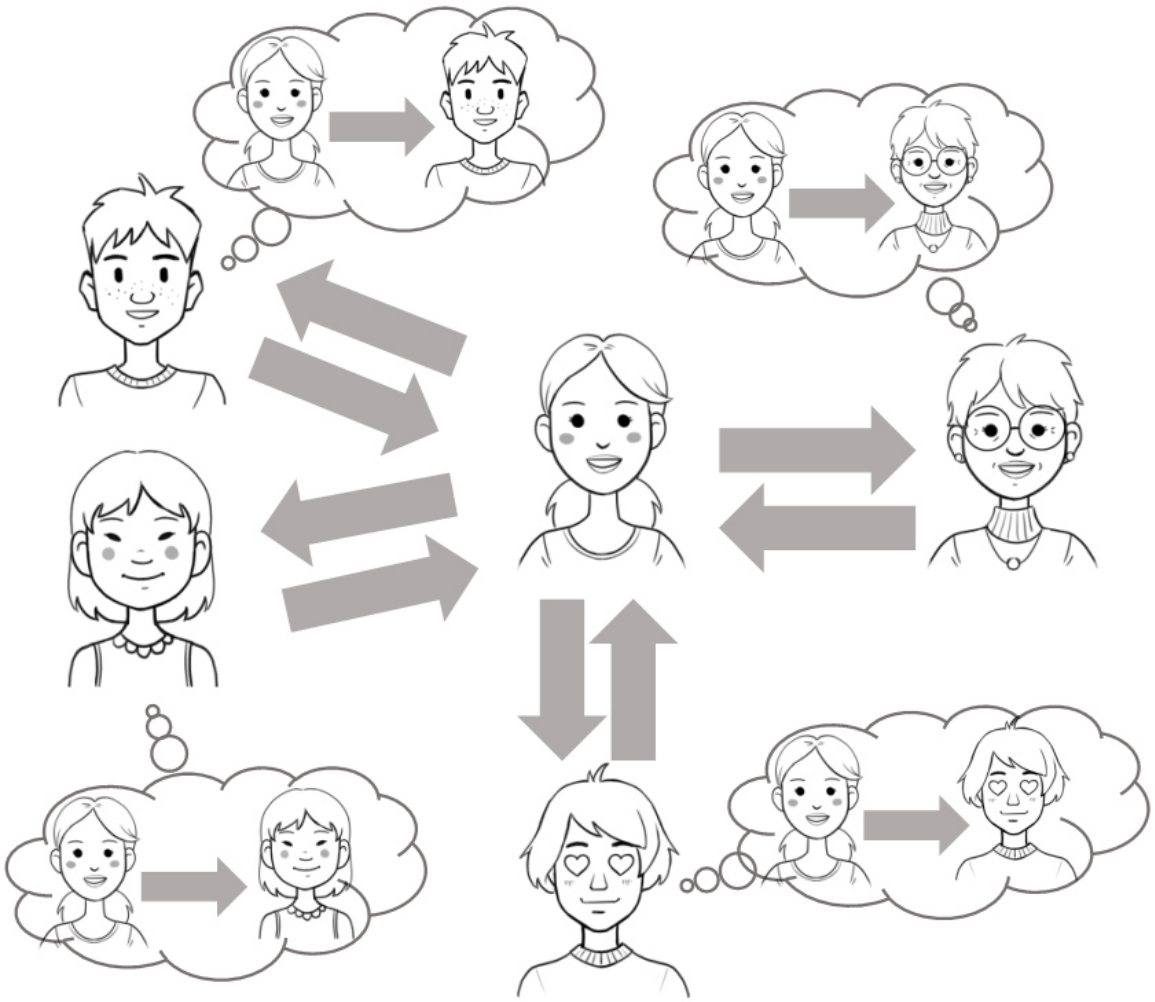
The Relationship-Specific Attachment Scales were used to assess attachment quality (Asendorpf et al., 1997). The questionnaire captures two dimensions. The first dimension captures how anxious versus secure a person is attached to an attachment figure. The second dimension captures how dependent versus independent a person is from an attachment figure. The two dimensions were designed as orthogonal dimensions by Asendorpf et al. (1997). In total, the questionnaire includes 14 items, of which 6 items are intended to measure attachment security and 8 items are intended to measure dependence. Half of the items are inverted. Analyses in the context of Study 1 (see there) showed that the 4 inverted items on dependence only inadequately depicted the construct. Therefore, only the 4 non-inverted items on dependence were used for the analyses.

The Inventory of Parent and Peer Attachment (IPPA) also captured attachment quality (Armsden & Greenberg, 1987). The IPPA includes three scales: trust, communication, and alienation. High trust, high communication, and low alienation are all indications of secure attachment quality. The original version of the questionnaire was developed for adolescents and asks about their attachment to their parents and to friends (Armsden & Greenberg, 1987). For this study, three items were selected for each of the three scales to create a short version of the scale (for more information on the development of this scale, see Study 1 and associated Appendix B). As part of this development, the third scale was also inverted and labeled relatedness so that all three scales would represent facets of attachment security at higher scores.

The questions on attachment were thereby presented in different versions and related to different attachments. Figure 4.2 shows an illustration of the attachments collected from the second measurement occasion onward. Targets answered the items on attachment multiple times each. They described their attachment to a parent and to their partner if they were in a relationship. From the second measurement occasion on, they also had to describe their attachment to several friends.

Figure 4.2

Illustration of the Different Attachments Rated in the Study



Note. The Illustration depicts all attachments that were rated at the second and later measurement occasions. The illustration shows an emerging adult, a parent, a romantic partner and two friends (as an example for the group of friends).

The items of the attachment questionnaires were adapted in their wording to the respective attachment figure. For mothers, fathers, and partners, these were each the corresponding labels. Targets provided a nickname for each friend, which was then inserted in the appropriate place in the items. The parents, partners, and friends each completed the attachment questionnaires twice. In one case, they were asked to indicate the extent to which they were attached to the target. Through this rating, it is possible to determine the consistency of mutual attachments within the corresponding dyad (i.e., mother - target, for example). In addition, the parents, partners, and friends filled out the questions in an adapted formulation to describe how the target was attached to them. This is a classic informant rating, with which it is possible to determine how much the self-ratings and informant ratings of the attachment converge. The items of the Relationship-Specific Attachment Scales used in their different versions are presented in Appendix A as an example.

4.3 Sample statistics

4.3.1 Descriptive Statistics

The targets were asked about their ages only at the first measurement occasion. There, they were on average $M = 18.22$ years old ($SD = 0.59$). Additional demographics of the targets are shown in Table 4.1.

Table 4.1

Targets' Demographics

		MO1	MO2	MO3	MO4
Completer	n	558	463	441	429
Female Gender	n (%)	368 (66%)	321 (69%)	308 (70%)	299 (70%)
Mother invited	n (%)	435 (78%)	368 (80%)	347 (79%)	341 (80%)
Single	n (%)	347 (62%)	270 (58%)	262 (59%)	261 (61%)
Moved since graduation	n (%)	181 (32%)	231 (50%)	230 (52%)	232 (54%)
Living Situation					
Own apartment	n (%)	56 (10%)	81 (18%)	75 (17%)	85 (46%)
Shared apartment	n (%)	87 (16%)	112 (24%)	119 (27%)	113 (26%)
Parent's house/ apartment	n (%)	368 (66%)	229 (50%)	203 (46%)	190 (44%)
Other	n (%)	47 (8%)	41 (9%)	44 (10%)	41 (10%)
Occupation					
Study	n (%)	223 (40%)	236 (51%)	221 (50%)	226 (53%)
Training	n (%)	71 (13%)	55 (12%)	55 (13%)	53 (12%)
Voluntary service	n (%)	58 (10%)	54 (12%)	57 (13%)	51 (12%)
Military service	n (%)	2 (0,4%)	3 (0,6%)	2 (0,5%)	1 (0,2%)
Professional activity	n (%)	39 (7%)	23 (5%)	21 (5%)	23 (5%)
Other	n (%)	165 (30%)	92 (20%)	85 (19%)	75 (18%)

Note. MO = measurement occasion; Completer = number of completed target's questionnaires. All percentages relate to the completer of the corresponding measurement occasion.

Throughout the study, more female than male targets participated. The proportion of participating mothers and singles among the targets also remained constant. A change was seen in the housing situation. In one question, targets were asked if they had moved since leaving school a few weeks before the study. At the first measurement occasion, 32% had already moved

and this number rose to over 50% over the course of the study. In most cases, these moves probably involved moving out of the parental home. The proportion of targets still living in the parental household decreased during the study and at the end of the study less than half of the targets were still living with their parents. Many of the targets took this characteristic developmental step for emerging adulthood during the first year after graduating from high school. The locations that had indicated a different living situation were mostly described in a free text as a hostel or a host family.

Some targets had already started their studies at the first measurement occasion in September 2014. Studies at universities of applied sciences in Germany usually start in September and at universities in October. It is therefore possible that some targets also identified themselves as students shortly before they started their studies. As of the second measurement occasion, the percentage of students was 50%. This is a pleasingly low value, since half of the participating targets are thus not students. Since only people with high school diplomas could participate, the study is far from representing a cross-section of the cohort, but at least parts of the "forgotten half" (see Arnett, 2000) are part of the study. Behind the other activities were internships, au pair stays, work and travel and, in the beginning, waiting for studies. For more descriptive statistics on the attachment of targets and parents at the first measurement occasion see Study 1 (and the corresponding Appendix B)

4.3.1 Intercorrelations of attachment facets

The three scales of the IPPA, trust, communication, and relatedness, are intended to represent all aspects of attachment security. The relationship-specific attachment scales have one scale to

directly measure attachment security and a second scale to measure dependence, which should be as independent as possible from security.

In order to investigate how the different facets of attachment quality are interrelated and whether the theoretically expected correlations actually show up, the correlations of all facets were calculated. The data from the second measurement occasion were used, since this was the first one to include the friends. The evaluations referred to the targets' statements on their attachment to the respective attachment figure. For the friend attachment, the attachment to the first named friend was used. The calculation for the correlation of the attachment facets was always done within the attachment to one attachment figure, for the correlation of the attachments to different attachment figures see Study 3 of this dissertation.

A structural equation model was calculated for each correlation. The correlations are therefore free of measurement error. The same items were used to calculate the respective factor as in Study 1 (see there for more detailed information). Since most indicators were categorical, the WLSMV estimator was used.

All models showed at least acceptable model fit. The correlations are shown in Table 4.2.

Table 4.2

Correlations of Different Facets of Attachment Quality

	Trust	Communication	Relatedness	Dependency
	.827*	.708*	.855*	.208*
Security	.778*	.651*	.792*	.206*
	.752*	.581*	.753*	.339*
		.778*	.872*	.205*
Trust		.772*	.855*	.210*
		.749*	.792*	.377*
			.836*	.405*
Communication			.882*	.580*
			.856*	.541*
				.391*
Relatedness				.449*
				.464*

Note. The table contains measurement error-free correlations between different facets of attachment quality. The correlations refer to different attachment figures. From top to bottom, the correlations relate to attachment to parents, the first-named friend, and the romantic partner.

The different facets of attachment security were highly correlated. For security, trust, and relatedness the intercorrelations were .75 and above. The correlations of communication with security were a little lower, but communication had strong correlations of .75 and higher with trust and relatedness. Trust and relatedness, and to a somewhat lesser extent communication, can thus indeed be seen as facets of attachment security. As expected, the correlations between dependency and the facets of attachment security were lower than the other correlations. Dependency had correlations around .25 with security and trust, around .4 with relatedness and around .5 with communication.

In most cases, the correlation patterns of attachment to parents, friends, and romantic partners were similar. The only clear differences were the associations of dependence with facets of attachment security. These were higher for attachment to partners. This means that in the case of attachment to romantic partners, the feeling of dependence and attachment security are more clearly related than in the case of attachment to friends and parents.

4.4 Articles Based on the Longitudinal Study

As part of the long-term study and based on their data, several studies were conducted in addition to the studies in this dissertation. Luhmann et al. (2016) investigated to what extent self- and informant ratings of loneliness corresponded. The more methodological articles and chapters of Eid et al. (2018), Holtmann et al. (2017), Holtmann et al. (2020), and Koch et al. (2018) used data on well-being and personality from this longitudinal study as empirical illustrations.

The three studies in this dissertation are all based on this longitudinal study. They are described in the following chapters. Study 1 examines the relationship between attachment and well-being and the consistency of attachment across methods (Chapter 5). Study 2 examines the time consistency of attachment and the rater consistency of that time consistency (Chapter 6). Study 3 examines the figure consistency of attachment (Chapter 7).

5. Attachment to Parents and Well-Being after High School Graduation: A Study using Self- and Parent Ratings (Study 1)

Johannes Bohn and Jana Holtmann

Freie Universität Berlin

Maike Luhmann

Ruhr University Bochum

Tobias Koch

Psychologische Hochschule Berlin

Michael Eid

Freie Universität Berlin

This Study was published in the Journal of Happiness Studies. Due to copyright restrictions, it is not part of the digital copy of this doctoral thesis. Pages 63 to 123 are omitted. The original publication can be found here:

Bohn, J., Holtmann, J., Luhmann, M., Koch, T., & Eid, M. (2020). Attachment to parents and well-being after high-school graduation: A study using self- and parents ratings. *Journal of Happiness Studies*, *21* (*7*), 2493-2525. https://doi.org/10.1007/s10902-019-00190-y

The supplementary material is presented in Appendix B of this dissertation.

6. Analyzing Stability and Change in Dyadic Attachment: The Multi-Rater Latent State-Trait Model with Autoregressive Effects (Study 2)

Johannes Bohn[1*], Jana Holtmann[2#], Esther Ulitzsch[3], Tobias Koch[4], Maike Luhmann[5], Michael Eid[1]

[1]Department of Education and Psychology, Freie Universität Berlin, Germany

[2]Psychologische Hochschule Berlin, Germany

[3]Leibniz Institute for Science and Mathematics Education, Kiel, Germany

[4]Department of Psychology, Friedrich Schiller University Jena, Germany

[5]Department of Psychology, Ruhr University Bochum, Germany

[#]Research done while at Department of Education and Psychology, Freie Universität Berlin

This Study is published as:

Bohn, J., Holtmann, J., Ulitzsch, E., Koch, T., Luhmann, M., & Eid, M. (2021). Analyzing stability and change in dyadic attachment: The multi-rater latent state-trait model with autoregressive effects. *Frontiers in Psychology, 12*, https://doi.org/10.3389/fpsyg.2021.604526

Keywords: parental attachment, latent state-trait, multitrait-multimethod, dyadic data, emerging adulthood, stability

This is the accepted manuscript version. The numbering of sections, tables and figures has been adjusted. The supplementary material is presented in Appendix C of this dissertation.

6.1 Abstract

Previous research suggests that parental attachment is stable throughout emerging adulthood. However, the relationships between the mutual attachments in the dyads of emerging adults and their parents are still unclear. Our study examines the stability and change in dyadic attachment. We asked 574 emerging adults and 463 parents at four occasions over one year about their mutual attachments. We used a latent state-trait model with autoregressive effects to estimate the time consistency of the attachments. Attachment was very stable, and earlier measurement occasions could explain more than 60% of the reliable variance. Changes of attachment over time showed an accumulation of situational effects for emerging adults but not for their parents. We estimated the correlations of the mutual attachments over time using a novel multi-rater latent state-trait model with autoregressive effects. This model showed that the mutual attachments of parents and emerging adults were moderately to highly correlated. Our model allows to separate the stable attachment from the changing attachment. The correlations between the mutual attachments were higher for the stable elements of attachment than for the changing elements of attachment. Emerging adults and their parents share a stable mutual attachment, but they do not share the changes in their respective attachments.

6.2 Theory

6.2.1 Introduction

Many studies indicate that the quality of attachment to one's parents is very stable over time (Fraley, 2002; Fraley et al., 2011; Jones et al., 2018). However, other studies are showing that the quality of attachment changes over the life course (e.g., Pinquart et al., 2013). In particular, in stressful life periods and in times of transition, attachment can change (Fraley, 2019). Due to these dynamics of attachment, the stability of attachment differs between different periods of life: While the stability of attachment is very high in childhood after the age of six years (Pinquart et al.,2013), it is only moderate to high in emerging adulthood (Allen et al., 2018; Asendorpf & Wilpers, 2000; Hiester et al., 2009).

According to Bowlby's attachment theory, attachment experiences with attachment figures (in most cases, the parents) in early childhood create a working model that influences attachment in later relationships (Bowlby, 1969). Attachment is dimensional (Fraley et al., 2015), and it ranges from insecure to secure attachment (Asendorpf et al., 1997). The difference between insecure versus secure attachment is the most critical distinction in studies about attachment (Fox et al., 1991), especially in non-clinical studies where a majority is securely attached (Mikulincer & Shaver, 2016). In more clinical samples, the insecure pole of the attachment dimension can be further divided into more anxious insecurity and more avoidant insecurity (Mikulincer & Shaver, 2016).

In adolescence and emerging adulthood, the number of potential attachment figures (like parents, friends, romantic partners, or siblings) grows. Emerging adulthood is a period with many

changes in lifestyle and normative expectations (Arnett, 2000), which have different effects on different relationships. However, many studies investigating attachment in emerging adulthood examine a global attachment style (e.g., Allen et al., 2018; Baldwin & Fehr, 1995; Bartholomew & Horowitz, 1991; Davila et al., 1997; Lopez & Gormley, 2002; Scharfe & Bartholomew, 1994; Scharfe & Cole, 2006; Shaver & Brennan, 1992). The global attachment style describes the tendency of persons to behave similarly in relationships with different figures. Global attachment styles are of medium stability (Baldwin & Fehr, 1995; Lopez & Gormley, 2002; Scharfe & Bartholomew, 1994). Stability is higher in times of stressful life events like breakups (Scharfe & Cole, 2006). An important limitation of studies on global attachment style is that they neglect that attachment is at least partially specific to a specific attachment figure (Ainsworth, 1989; Bowlby, 1969). Therefore, the stability and change of attachment to specific attachment figures should be examined.

In childhood, parents are the most influential attachment figures, and parental attachment remains important in emerging adulthood. Many emerging adults leave their parents' homes, which can improve the quality of attachment between the parents and the emerging adult (Golish, 2000), especially for males (Hiester et al., 2009). A secure attachment to important figures (like parents, friends, and romantic partners) is related to various positive life outcomes in emerging adulthood such as higher well-being (Karreman & Vingerhoets, 2012; La Guardia et al., 2000), lower levels of distress (Caron et al., 2012), and better college adjustment (Hiester et al., 2009; Lopez & Gormley, 2002). Given its influence on relevant life outcomes, the analysis of stability and change of parental attachment in emerging adulthood is important.

The examination of attachment over time was limited in many studies because these studies focused on the view of one person in each dyad (e.g., Baldwin & Fehr, 1995; De Goede et al., & Meeus, 2012; Fraley et al., 2011; Hiester et al., 2009; Jones et al., 2018; Kirkpatrick & Hazan, 1994; Lopez & Gormley, 2002; Scharfe & Bartholomew, 1994; Scharfe & Cole, 2006). However, in a relationship-specific view of attachment, attachment has a strong dyadic component. In order to understand attachment in dyadic relationships appropriately, the perspectives of both parties involved need to be considered. Concerning the dynamics of attachment, change processes could be similar or different for the two parties in an attachment dyad. In this vein, the analysis of the stability and change of attachment in relationships presumes that both partners' views must be assessed and analyzed jointly over time. Such an assessment of mutual attachments was used in studies on romantic couples (e.g., Seiffge-Krenke & Burk, 2012) and studies on mothers and their adolescent child (e.g., Cook & Kenny, 2005).

Although previous studies revealed important insights into the stability and change of attachment they are limited by the fact that attachment has been analyzed on the level of observed variables (e.g., Cook & Kenny, 2005; De Goede et al., 2012; Furmann et al., 2002; Hiester et al., 2009; Scharfe & Cole, 2006; Seiffge-Krenke & Burk, 2012) or manifest categories (e.g., Baldwin & Fehr, 1995; Davila et al., 1997; Kirkpatrick & Hazan, 1994; Lopez & Gormley, 2002; Pinquart et al., 2013). However, in the presence of measurement error, estimates of instability are confounded with unreliability. A low retest correlation coefficient, for example, could indicate high stability but low reliability, low stability, and high reliability, or low stability, and low reliability. To

separate unreliability from instability, latent variable models are necessary (e.g., Eid & Kutscher, 2014; Little, 2013; McArdle & Nesselroade, 2014).

6.2.2 The Stability of Working Models of Attachment

The stability of attachment is highly influenced by the stability of the working models of attachment. These working models contain the stored knowledge of interactions with an attachment figure and allow predicting future interactions and the optimal amount of proximity or avoidance (Bowlby, 1973; Mikulincer & Shaver, 2016). Fraley (2002) distinguished two perspectives on the mechanisms underlying stability and change of attachment. First, according to the prototype perspective, the attachment representations form a prototype that continues to shape attachment patterns throughout the life span (Fraley, 2002). Although the working models of attachment can change through new experiences, the underlying prototype remains stable (Fraley et al., 2011). Second, according to the revisionist perspective, new experiences update the working models of attachment and they can completely wipe out the initial working model of attachment over time (Fraley, 2002).

The two perspectives on stability and change of attachment lead to different expectations for the patterns of stability in attachment ratings (Fraley, 2002; Fraley et al., 2011). Under the revisionist perspective, stability (in this case defined as the correlation between two measurement occasions) should continuously decrease over longer test-retest intervals. Under the prototype perspective, stability might also decrease with longer test-retest intervals but should stabilize at a value greater than zero. That is, according to the prototype perspective, stability should not be

affected by the distance between two measurement occasions once a certain distance is exceeded. The difference between the two perspectives can only be observed with more than two measurement occasions (Fraley et al., 2011). Previous studies contrasting the revisionist and the prototype perspective supported the prototype perspective with young adults (Fraley et al., 2011) and adolescents (Jones et al., 2018). However, in these studies stability and change were analyzed on the level of observed variables.

For such analyses, one approach is particularly useful. The revised version of the latent state-trait (LST-R) theory (Steyer et al., 2015) allows separating measurement error from stable trait components (e.g., prototype factors) and occasion-specific components in longitudinal measurements. The reported attachment of a person at one measurement occasion is seen as their current state score. This state score can be decomposed into a trait score and an occasion-specific score. The trait is defined as the expected score of the state variable for a specific person and time point, irrespective of the situational factors realized for the respective person at this time point (Steyer et al., 2015). Note that according to LST-R theory (Steyer et al., 2015), this trait is not necessarily stable over time, as persons may change across time. The occasion-specific score captures the deviation from this trait score at a measurement occasion. A person might rate their parental attachment below the actual trait score if she or he is in a bad mood or had an argument with their parent shortly before the measurement occasion. The rating might be above the trait score if the person is in a good mood or had a pleasant event with the parents. A working model (and especially a prototypical element of a working model) influences the expected state score and therefore poses an aspect of the trait. A stronger influence of a prototype in the working

models of attachment should lead not only to higher correlations between the trait scores of different measurement occasions but also to a similar (above zero) correlation of one trait score with all later trait scores beyond a specific test-retest interval. Moreover, LST models were extended to LST models with autoregressive effects (Cole et al., 2005; Eid et al., 2017) that allow to represent both perspectives (revisionist and prototype perspective) and to analyze which perspective might be more appropriate.

6.2.3 Aims of the Present Study

As outlined above, research on stability and change of parental attachment can profit from a relationship-specific view of attachment assessed by both emerging adults and their parents over time. In order to consider measurement error, latent variable models are needed that can separate measurement error from true instability. The main aim of the present study is to show how longitudinal latent variable models that have been developed in the context of multimethod research (Eid, 2000; Geiser, 2008; Koch, 2013) can be adapted to analyze the stability and change of attachment to parents over time. The new multi-rater LST model with autoregressive effects (MR-LST-AR model) presented in this article allows to quantify the degree of consistency between the parents and the emerging adults concerning the stability and change of their mutual attachments.

The secondary aim is to use these models to contribute to a more comprehensive understanding of stability and change of parental attachment in emerging adulthood, a critical

transition period between adolescence and adulthood. In particular, we are interested in the following research questions:

1) How stable is attachment of emerging adults to their parents and attachment of parents to their emerging adult children?

Based on previous findings, we expected a medium to high stability of the emerging adults' attachment to their parents. We expected that prototypical elements in the attachment would influence the stability. Using the LST-models, we wanted to estimate the extent of the prototypical influence. Since there were no studies about the attachment of parents to their emerging adult children, we had no expectations as to whether their attachment would be more stable than the attachment of the emerging adults to their parents.

2) How consistent is attachment within dyads?

For dyads of parents and their emerging adult children, we expected a high consistency for attachment. Consistency in this context refers to the mutual agreement in the attachments of emerging adults to their parents and their parents' attachments to their emerging adult child, as quantified in correlational terms. We assume that a higher attachment of one member of the dyad strengthens the attachment of the other member such that attachments mutually stabilize each other. Therefore, we expected a higher consistency in the stable parts of attachment and a lower consistency in the short-term deviations.

6.3 Methods

6.3.1 Procedure and Design

Our investigation is part of a longitudinal study on the stability and change of attachment patterns of German emerging adults during their first year after high school graduation. The emerging adults in this study graduated from high school in 2014 and were recruited through presentations in schools before their graduation (a minority was recruited through other methods such as flyers, university fairs, and Facebook). Only emerging adults who graduated in 2014 in Germany were included in the study (besides that, there were no further criteria of inclusion or exclusion). The emerging adults who participated in the study are called *targets* in the following to distinguish them from the participating parents.

The data collection comprised four measurement occasions from September 2014 to June 2015 (with 3 months intervals between the measurement occasions). The targets were invited to an online questionnaire on each measurement occasion. On the first measurement occasion, each target also named one parent who was invited to an online questionnaire on each of the four measurement occasions. The targets were paid 12.50 Euro for each measurement occasion and an extra 50 Euro if they participated on all four measurement occasions. Parents took part in a lottery that awarded tablet computers and cinema tickets after the last measurement occasion. Data from this study were also used to explore issues related to self-perceptions and informant perceptions of loneliness (Luhmann et al., 2016), the relationship between attachment and well-being (Bohn et al, 2020), and methodological extensions of models (Holtmann et al., 2017; Holtmann et al., 2020; Koch et al., 2018).

6.3.2 Sample

A total of N = 575 targets (379 female, M_{age} = 18.2, SD_{age} = 0.6) participated on at least one measurement occasion (T1: N = 558, T2: N = 463, T3: N = 428, T4: N = 429). A total of N = 462 parents (368 mothers and 94 fathers, M_{age} = 47.7, SD_{age} = 4.9) participated on at least one measurement occasion (T1: N = 405, T2: N = 384, T3: N = 341, T4: N = 323). For a more detailed information on the sample and the longitudinal study see Bohn et al (2020).

6.3.3 Scales and Measurement

Attachment was measured with the Relationship-Specific Attachment Scales (Asendorpf et al., 1997). The targets rated their attachment to the parent who they nominated to participate in the study. Parents rated their attachment to the target. The wording of the items was adapted to match the specific relationship. All responses were provided on a 5-point rating scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

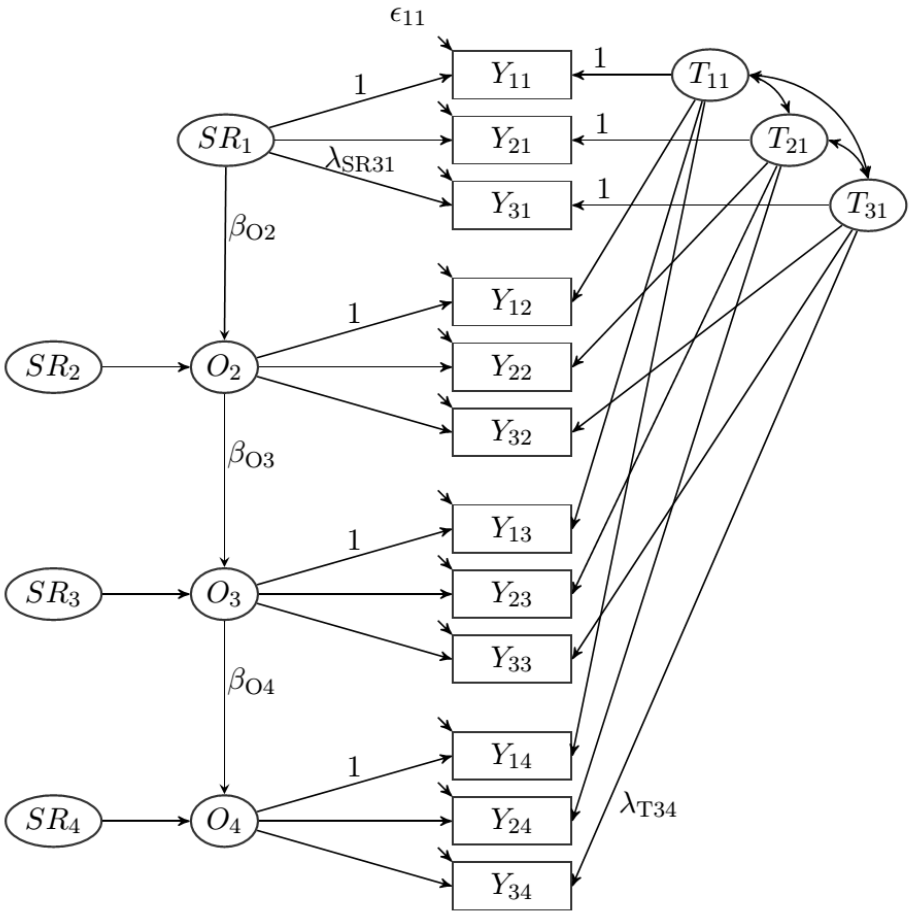
The six items for attachment were merged into three parcels for the analysis. Each parcel comprised a positively worded item and an inversed negative item on the same aspect of attachment. The first parcel contained items on acceptance, the second parcel contained items on dependability, and the third parcel contained items on closeness. Higher values in all parcels reflected higher security (vs. insecurity) of attachment.

6.3.4 Latent State-Trait Model with Autoregressive Effects

The analytic model was based on LST-R theory (Steyer et al., 2015). LST-R models allow

disentangling trait components from occasion-specific components and measurement error in longitudinal measurements. To account for temporal dependency between adjacent measurement occasions, we used the extended LST model with autoregressive effects (LST-AR model, see Eid et al., 2012, 2017). An LST-AR model for three observed variables and four measurement occasions is depicted in Figure 6.1. LST-AR models have already been used in other studies to separate trait, occasion-specific, and accumulated situational effects (Scarpato et al., 2021).

Figure 6.1
Latent State-Trait Model with Autoregressive Effects



This model is the starting point of our modeling approach. Eid et al. (2017) describe this model in detail and we will only sketch its major propositions concerning our application. In our application, the indicators Y_{il} (i: indicator; l: measurement occasion) are the observed attachment ratings of the targets on the four measurement occasions. The indicators represent different aspects of attachment ($i = 1$: acceptance; $i = 2$: dependability; $i = 3$: closeness). To describe the model, we start with the first indicator ($i = 1$) of the target's rating on the first measurement occasion ($l = 1$). The observed variable Y_{11} is decomposed into a latent state variable S_{11} and a measurement error term E_{11}:

$$Y_{11} = a_{11} + S_{11} + E_{11} \quad (1)$$

where a_{11} is an intercept parameter. The state variable S_{11} represents latent individual differences in attachment on the first measurement occasion, corrected for measurement error E_{11}. Hence, a high value on the variable S_{11} corresponds to a high self-reported true attachment of the target to the parent on the first measurement occasion. Because we centered the latent state variable, that means that $E(S_{11}) = 0$, a_{11} equals the expected value of the observed variable Y_{11}: $a_{11} = E(S_{11})$. The latent state variable S_{11} is then further decomposed into different components. The trait factor T_{11} captures the expected acceptance (as the first indicator of attachment) of the target on the first measurement occasion across all possible situations that could occur on the first measurement occasion. This model has indicator-specific trait factors. According to LST-R theory, the trait is defined as the expectation of the state variable for a specific person and time point, irrespective of the situational factors realized for the respective person at this time point (Steyer et al., 2015). In addition to the trait component, the latent state of a target

at occasion 1 contains an occasion-specific component, which captures situational influences the target encounters or target-situation interactions at this specific measurement occasion. The state residual variable SR_1 represents this occasion-specific deviation from the trait. A positive value on the factor SR_1 indicates that the target's reported state attachment is higher than the target's trait value. A higher attachment means a more secure attachment. Hence, the variables S_{11} and Y_{11} are decomposed in the following way:

$$S_{11} = T_{11} + SR_1 \quad (2)$$

$$Y_{11} = a_{11} + T_{11} + SR_1 + E_{11} \quad (3)$$

Because the state variable S_{11} was centered also the latent trait variable had to be centered ($E(T_{11}) = 0$). Moreover, the expected values of SR_1 and E_{11} are 0, as they are defined as residual variables (see Eid et al., 2017). The second indicator Y_{21} and the third indicator Y_{31} are decomposed similarly. Furthermore, it is assumed that state residual variables are unidimensional across indicators. This results in the following equations for the first measurement occasion (see Figure 6.1):

$$Y_{21} = a_{21} + T_{21} + \lambda_{\mathrm{SR}21} SR_1 + E_{21} \quad (4)$$

$$Y_{31} = a_{31} + T_{31} + \lambda_{\mathrm{SR}31} SR_1 + E_{31} \quad (5)$$

where $\lambda_{\mathrm{SR}il}$ are loading parameters.

The decomposition for measurement occasions $l > 1$ is slightly different. According to the LST-AR model, the later states are influenced by the trait of the first occasion and accumulated situational influences that occurred between the first and the current measurement occasion (Eid

et al., 2017). Therefore, the latent state variables on measurement occasions $l > 1$ are composed of the weighted trait-factor T_{i1} and an occasion-specific factor O_l, that is:

$$S_{il} = \lambda_{\mathrm{T}il} T_{i1} + \lambda_{\mathrm{O}il} O_l \tag{6}$$

and consequently:

$$Y_{il} = a_{il} + \lambda_{\mathrm{T}il} T_{i1} + \lambda_{\mathrm{O}il} O_l + E_{il} \tag{7}$$

where $\lambda_{\mathrm{T}i1}$ and $\lambda_{\mathrm{O}il}$ are loading parameters, with $\lambda_{\mathrm{O}1l}$ (i = 1) set to 1 for all occasions l for identification reasons. Moreover, the occasion-specific factor O_l is decomposed in the following way:

$$O_l = \beta_{\mathrm{O}l} O_{l-1} + SR_l \qquad \text{for all } l > 1 \tag{8}$$

$$O_1 = SR_1 \tag{9}$$

where larger values of the autoregressive parameter $\beta_{\mathrm{O}l}$ represent a stronger influence of occasion-specific deviations of the last measurement occasion on the present measurement occasion. That is, the latent state variable on a measurement occasion $l > 1$ is a linear combination of the trait-factor T_{i1} and the occasion-specific factor O_{il}. Furthermore, this occasion-specific factor is a linear combination of the occasion-specific factor of the previous measurement occasion and a state residual variable SR_l (Eid et al., 2017). That state residual variable SR_l ($l > 1$) captures those parts in the variable Y_{il} that are due to the situation or person-situation interactions and cannot be explained by the trait or carry-over effects from previous measurement occasions. Assuming measurement invariance over time in this model, the factor loadings of the occasion-specific variables O_l are set equal over time. Additionally, the variances of state residual variables SR_l and

the autoregressive parameters β_{Ol} can be set equal over time to incorporate the assumption of a homogeneous change process.

Note that the model includes indicator-specific trait factors T_{11}, T_{21}, and T_{31} to account for potential indicator-specific effects. Assuming that all indicators measure attachment, the trait factors should strongly correlate, while a low correlation would be a sign for heterogeneity between the indicators.

Variance Decomposition. The variance of the indicators Y_{i1} of the first measurement occasion ($l = 1$) can be decomposed in the following way:

$$\mathrm{Var}(Y_{i1}) = \mathrm{Var}(T_{i1}) + \lambda^2_{\mathrm{SR}il}\mathrm{Var}(SR_1) + \mathrm{Var}(E_{i1}) \tag{10}$$

For the later measurement occasions ($l > 1$), the variance of the indicators can be decomposed as follows:

$$\mathrm{Var}(Y_{il}) = \lambda^2_{\mathrm{T}il}\mathrm{Var}(T_{i1}) + \lambda^2_{\mathrm{O}il}\mathrm{Var}(O_l) + \mathrm{Var}(E_{il}) \tag{11}$$

with

$$\mathrm{Var}(O_l) = \beta^2_{\mathrm{O}l}\mathrm{Var}(O_{l-1}) + \mathrm{Var}(SR_l) \tag{12}$$

Based on these variance decompositions, several coefficients that quantify relative variance proportions can be calculated. The reliability coefficient $Rel(Y_{il})$ represents the proportion of an indicator's variance that is true (error-free) variance and is given by

$$\mathrm{Rel}(Y_{il}) = 1 - \frac{\mathrm{Var}(E_{il})}{\mathrm{Var}(Y_{il})} \tag{13}$$

Other coefficients illustrate different aspects of stability and change of attachment. The time consistency coefficient $TCon(Y_{il})$ can be calculated for the second and later measurement occasions ($l > 1$). The time consistency coefficient describes the proportion of an indicator's true (error-free)

variance that can be explained by observations on the same indicator on former measurement occasions. The time consistency coefficient $TCon(Y_{il})$ is defined as:

$$\mathrm{TCon}(Y_{il}) = \frac{\lambda_{\mathrm{T}il}^2 \mathrm{Var}(T_{i1}) + \lambda_{\mathrm{O}il}^2 \beta_{\mathrm{O}l}^2 \mathrm{Var}(O_{l-1})}{\mathrm{Var}(Y_{il}) - \mathrm{Var}(E_{il})} \quad (14)$$

The time consistency coefficient can be decomposed into two parts to separate the influence of the trait on the first measurement occasion from accumulated situational effects. The predictability by trait$_1$ coefficient $Pred_{\mathrm{trait1}}(Y_{il})$ describes the proportion of an indicator's true (error-free) variance that can be predicted by the trait variable on the first measurement occasion. A high $Pred_{\mathrm{trait1}}(Y_{il})$ indicates that the trait on the first measurement occasion is a good predictor for this measurement occasion. The predictability by trait$_1$ coefficient $Pred_{\mathrm{trait1}}(Y_{il})$ is defined as:

$$\mathrm{Pred}_{\mathrm{trait1}}(Y_{il}) = \frac{\lambda_{Til}^2 \mathrm{Var}(T_{i1})}{\mathrm{Var}(Y_{il}) - \mathrm{Var}(E_{il})} \quad (15)$$

The unpredictability by trait$_1$ coefficient $UPred_{\mathrm{trait1}}(Y_{il})$ quantifies the time-consistent proportion of an indicator's true variance that cannot be explained by the trait value on the first measurement occasion. This coefficient represents the influence of accumulated situational effects throughout the study. It can only be calculated after the first measurement occasion. The $UPred_{\mathrm{trait1}}(Y_{il})$ is defined as:

$$\mathrm{UPred}_{\mathrm{trait1}}(Y_{il}) = \frac{\lambda_{\mathrm{O}il}^2 \beta_{\mathrm{O}l}^2 \mathrm{Var}(O_{l-1})}{\mathrm{Var}(Y_{il}) - \mathrm{Var}(E_{il})} \quad (16)$$

The predictability by trait$_1$ coefficient and the unpredictability by trait$_1$ coefficient add up to the time consistency coefficient.

The occasion-specificity coefficient $OS(Y_{il})$ describes the proportion of an indicator's true (error-free) variance that can be explained by the state residual variable. This variance is specific to a measurement occasion and cannot be explained by the trait factor of the first measurement

occasion or carry-over effects from previous occasions. A high *OS* shows that the indicator is subject to strong occasional variations, i.e., a high proportion of the variables' variance is due to unexplained occasion-specific situational and person-situation interaction effects. The occasion-specificity coefficient $OS(Y_{il})$ is defined as:

$$\mathrm{OS}(Y_{il}) = \frac{\lambda_{\mathrm{O}il}^2 \mathrm{Var}(SR_l)}{\mathrm{Var}(Y_{il}) - \mathrm{Var}(E_{il})} \tag{17}$$

A potential prototype in the working model would be a part of the trait at the first measurement occasion. The prototype is supposed to be stable. So, the trait on the first measurement occasion can be used to predict the prototypical elements of the attachment at later measurement occasions and there should be no autoregressive effects. Therefore, the predictability by trait_1 coefficient should approach a nonzero value for later measurement occasions under the prototype perspective. Under the revisionist perspective, the predictability by trait_1 coefficient should get smaller with every measurement occasion and approach zero (see also Fraley, 2002; the period covered in the present study, however, might be too short for the predictability by trait_1 coefficient to actually reach zero).

In earlier studies that investigated these different perspectives (e.g., Fraley, 2002; Fraley et al., 2011), the correlations of the first measurement occasion with several later occasions were examined. To enhance comparability of our results with results from previous studies, we also calculate a measurement error-free correlation between the states on the later measurement occasions and the state on the first measurement occasion. For the second measurement occasion, this correlation is:

$$r(S_{i1}, S_{i2}) = \frac{\lambda_{Ti2}\mathrm{Var}(T_{i1}) + \lambda_{\mathrm{SR}i1}\lambda_{\mathrm{O}i2}\beta_{\mathrm{O}2}\mathrm{Var}(SR_1)}{\sqrt{\mathrm{Var}(Y_{i1}) - \mathrm{Var}(E_{i1})}\sqrt{\mathrm{Var}(Y_{i2}) - \mathrm{Var}(E_{i2})}} \tag{18}$$

For the third measurement occasion, the correlation is:

$$r(S_{i1}, S_{i3}) = \frac{\lambda_{Ti3}\mathrm{Var}(T_{i1}) + \lambda_{SRi1}\lambda_{Oi3}\beta_{O2}\beta_{O3}\mathrm{Var}(SR_1)}{\sqrt{\mathrm{Var}(Y_{i1}) - \mathrm{Var}(E_{i1})}\sqrt{\mathrm{Var}(Y_{i3}) - \mathrm{Var}(E_{i3})}} \quad (19)$$

For the fourth measurement occasion, the correlation is:

$$r(S_{i1}, S_{i4}) = \frac{\lambda_{Ti4}\mathrm{Var}(T_{i1}) + \lambda_{SRi1}\lambda_{Oi3}\beta_{O2}\beta_{O3}\beta_{O4}\mathrm{Var}(SR_1)}{\sqrt{\mathrm{Var}(Y_{i1}) - \mathrm{Var}(E_{i1})}\sqrt{\mathrm{Var}(Y_{i4}) - \mathrm{Var}(E_{i4})}} \quad (20)$$

The LST-AR model was used to examine the different aspects of stability and change of the targets' attachment to their parents. The same model was also used to examine the parents' attachment to their emerging adult children.

6.3.5 Multi-Rater Latent State-Trait Model with Autoregressive Effects

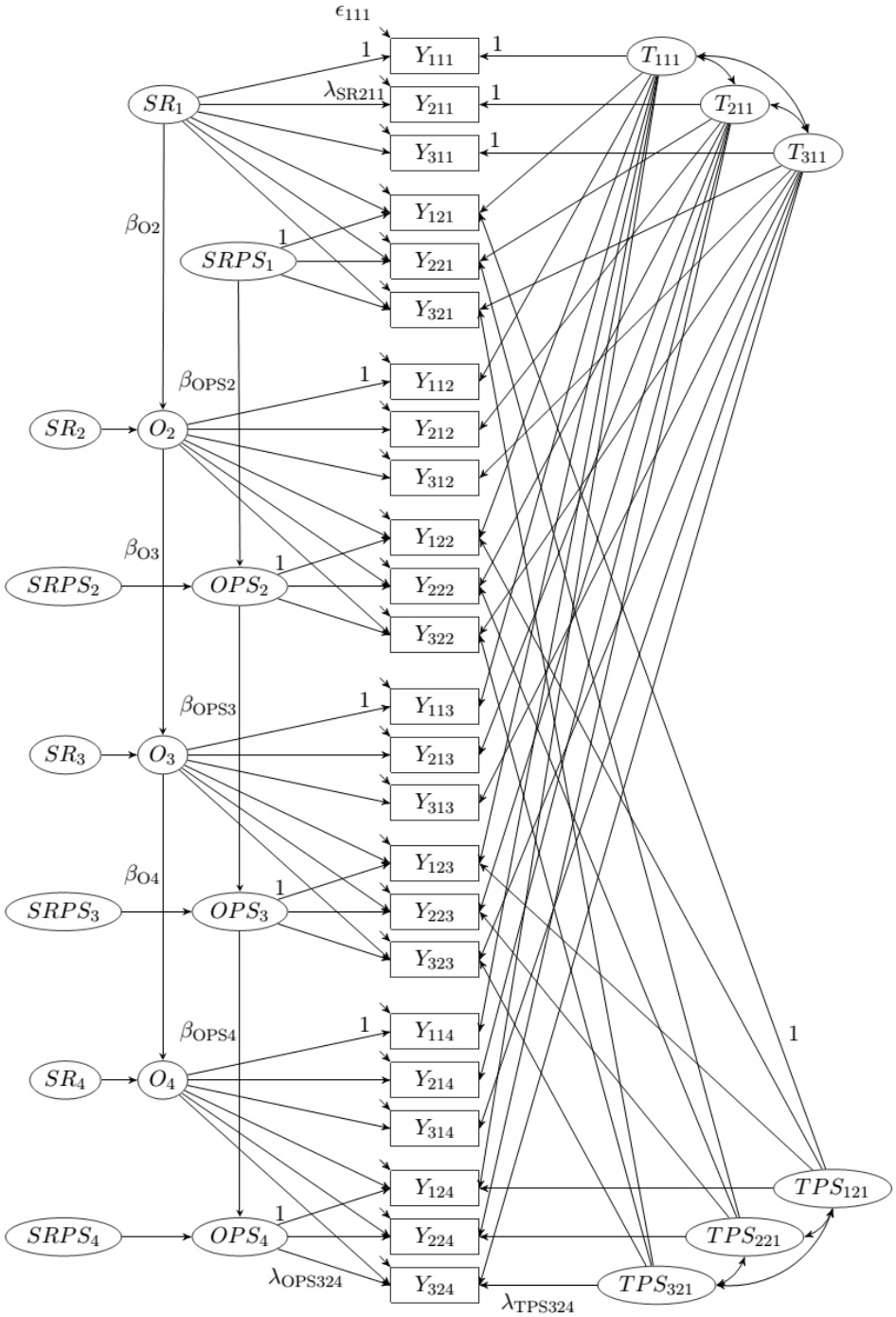
To examine the convergence of the attachment ratings over time, we combined the ratings of the mutual attachments of parents and targets in one model. Our model is an extension of a model presented by Courvoisier et al. (2008), which combines the ideas of multitrait-multimethod analysis (MTMM; Campbell & Fiske, 1959) and autoregressive LST models (e.g., Cole et al., 2005; Eid et al., 2017). Confirmatory factor analysis MTMM models allow separating trait, method, and error components of a measurement. The specific MTMM model used for the present analysis is the correlated trait-correlated methods minus one (CT-C[M-1]) model (Eid, 2000; Eid et al., 2003), which is an appropriate model for analyzing MTMM data with structurally different methods (Eid et al., 2008; Eid, Geiser & Koch, 2016; Koch et al., 2018, Nussbeck et al., 2009). In this model, a reference method is chosen (here: target report) and all other methods (here: parent report) are contrasted against this reference method (Eid, 2000; Eid et al., 2003). In our model, the target report and the parent report do not represent different methods in a narrow sense, but they represent

the view of different raters on their mutual attachment. Figure 6.2 depicts the employed multi-rater LST-model with autoregressive effects (MR-LST-AR model) for attachment, measured by three indicators with two methods (target and parent report) at 4 measurement occasions.

The indicators Y_{ikl} (i: indicator; k: rater; l: measurement occasion) are the observed attachment ratings on the four measurement occasions. For the indicators of the targets' ratings (k = 1), the decomposition of the variables is equivalent to the LST-AR model presented in Figure 6.1 and defined in Equations (2)-(9). The trait factors T_{i11} and the occasion-specific factors O_l have the same meaning for the targets' ratings as in the LST model. The decomposition of indicators of the parents' ratings (k = 2) is explained in the following. In line with the CT-C(M-1) approach to multimethod modeling, we use the targets' attachment to predict the parents' attachment. This regression is included on the trait level (regressing the parents' trait attachment on the targets' trait attachment) as well as on the occasion-specific level (regressing the parents' occasion-specific attachment on the targets' occasion-specific attachment). The size of the respective standardized regression coefficients reflect the strength of the association between the targets' and their parents' attachment. These coefficients correspond to the standardized factor loadings in the model.

Figure 6.2

Multi-Rater Latent State-Trait Model with Autoregressive Effects



The component of the parents' attachment that cannot be explained by the targets' attachment is captured in the parent-specific trait factors TPS_{i21} and the parent-specific occasion factors OPS_l. Note that the parent-specific trait factors TPS_{i21} are indicator-specific factors. As they are defined as residual factors, the factors TPS_{i21} have a mean of zero and are uncorrelated with the respective trait factor T_{i11} by definition. They represent the deviation of the parents' trait attachment as measured by indicator *i* from the value expected based on the target's trait attachment on the first measurement occasion. A positive value on the factor TPS_{i21} indicates that the parent's trait attachment on the first measurement occasion is higher (meaning more secure) than expected based on the target's trait attachment. Mean differences between the targets' and parents' attachments are captured in the intercepts of the corresponding observed variables since all trait factors are modeled with a mean of zero.

The occasion- and parent-specific factors OPS_l capture those parts of the variance in the parent ratings that are occasion-specific and not shared with the targets' occasion-specific attachments. As the factors OPS_l are defined as residual factors with respect to the targets' occasion-specific factors, they have a mean of zero and are uncorrelated with the respective occasion-specific factor O_1 by definition. A positive value on OPS_l indicates that the parent's momentary, occasion-specific attachment is higher than expected based on the target's momentary, occasion-specific attachment.

Altogether the observed variables of the parent reports (k = 2) can be decomposed in the following way:

$$Y_{i2l} = a_{i2l} + \lambda_{\mathrm{T}i2l}T_{i11} + \lambda_{\mathrm{TPS}i2l}TPS_{i21} + \lambda_{\mathrm{O}i2l}O_l + \lambda_{\mathrm{OPS}i2l}OPS_l + E_{i2l} \quad (21)$$

where the loading parameter $\lambda_{\mathrm{TPS}i21}$for the first measurement occasion (l = 1) is set to 1 for identification reasons, such that TPS_{i21} is defined as the parent-specific trait factor at the first measurement occasion. Carry-over effects in the occasion- and parent-specific view are captured by the inclusion of autoregressive effects on the factors OPS_l. The autoregressions can be expressed as:

$$OPS_l = \beta_{\mathrm{OPS}l} OPS_{l-1} + SRPS_l \qquad \text{for all } l > 1 \qquad (22)$$

$$OPS_1 = SRPS_1 \qquad (23)$$

with $SRPS_l$ being a state residual factor for the parent-specific attachment, that is, that part in the parents' attachment that can neither be explained by the targets' attachment on the same measurement occasion nor by previous deviations of the parents' attachment from the targets' attachment. Since all factors have a mean of zero, overall changes in the level of attachment are visible in changes of the intercepts a_{ikl}.

Variance components. The variance decomposition of the observed variables of the targets' ratings (k = 1) is completely analogous to the LST-AR model presented above, compare Equations (10)-(12). The variance of the observed variables of the parents' ratings (k = 2) can be decomposed in the following way:

$$\mathrm{Var}(Y_{i2l}) = \lambda^2_{\mathrm{T}i2l}\mathrm{Var}(T_{i11}) + \lambda^2_{\mathrm{TPS}i2l}\mathrm{Var}(TPS_{i21}) + \lambda^2_{\mathrm{O}i2l}\mathrm{Var}(O_l) + \lambda^2_{\mathrm{OPS}i2l}\mathrm{Var}(OPS_l) + \mathrm{Var}(E_{i2l}) \qquad (24)$$

with

$$\mathrm{Var}(OPS_1) = \mathrm{Var}(SRPS_1) \qquad (25)$$

$$\mathrm{Var}(OPS_l) = \beta^2_{\mathrm{OPS}l}\mathrm{Var}(OPS_{l-1}) + \mathrm{Var}(SRPS_l) \qquad \text{for all } l > 1 \qquad (26)$$

Equation 11 and 12 also apply for the parents' ratings (k = 2). Based on these variance decompositions, the same coefficients, as in the LST-AR model, can be calculated. These coefficients are displayed in the Supplementary Material and their meaning is the same as in the LST-AR model. However, the MR-LST-AR model allows to calculate additional coefficients that quantify different aspects of consistency between the raters (in our case, the targets and the parents). In this article, we use the term 'rater consistency' for the convergence between raters. This term should not be confused with the 'time consistency', which describes the consistency over time.

The variance of the parents' ratings (k = 2) can be separated into a part that is explained by the targets' ratings and a part that is specific to the parents. The rater specificity coefficient ($RS(Y_{i2l})$) refers to the proportion of true (error-free) variance in the parents' ratings that is not shared with the targets' ratings on a specific measurement occasion. The counterpart of the rater specificity is the rater consistency ($RCon(Y_{i2l})$ between the ratings of targets and the parents.

The rater specificity coefficient $RS(Y_{i2l})$ is defined as:

$$\mathrm{RS}(Y_{i2l}) = \frac{\lambda^2_{\mathrm{TPS}i2l}\mathrm{Var}(TPS_{i21}) + \lambda^2_{\mathrm{OPS}i2l}\mathrm{Var}(OPS_l)}{\mathrm{Var}(Y_{i2l}) - \mathrm{Var}(E_{i2l})} \tag{27}$$

The rater consistency coefficient $RCon(Y_{i2l})$ is defined as:

$$\mathrm{RCon}(Y_{i2l}) = \frac{\lambda^2_{\mathrm{T}i2l}\mathrm{Var}(T_{i11}) + \lambda^2_{\mathrm{O}i2l}\mathrm{Var}(O_l)}{\mathrm{Var}(Y_{i2l}) - \mathrm{Var}(E_{i2l})} \tag{28}$$

The $RS(Y_{i2l})$ and the $RCon(Y_{i2l})$ add up to 1. The square root of the consistency coefficient equals the true (error-free) correlation between the targets' and the parents' ratings. A high consistency coefficient (and therefore low rater specificity) indicates that those targets who are

more securely attached to their parent (as compared to other targets) tend to have parents who are also more securely attached to them (as compared to other parents).

Analogously, coefficients of rater-specificity and a rater-consistency can be defined on the trait and the occasion-specific levels, as well as for time-consistent components and components predictable and unpredictable by trait_1. To examine the rater consistency on the level of inter-individual trait differences that go back to the first time point, we can calculate the rater-consistent predictability by trait_1 coefficient $RConPred_{\text{trait1}}(Y_{i2l})$. The $RConPred_{\text{trait1}}(Y_{i2l})$ captures that amount of variance in inter-individual differences that goes back to the trait on the first measurement occasion that is shared by targets and parents. The $RConPred_{\text{trait1}}(Y_{i2l})$ is defined as:

$$\text{RConPred}_{\text{trait1}}(Y_{i2l}) = \frac{\lambda^2_{\text{T}i2l}\text{Var}(T_{i11})}{\lambda^2_{\text{T}i2l}\text{Var}(T_{i11})+\lambda^2_{\text{TPS}i2l}\text{Var}(TPS_{i21})} \quad (29)$$

Its counterpart is the rater-specific predictability by trait_1 coefficient $RSPred_{\text{trait1}}(Y_{i2l})$, which quantifies the degree to which variance due to inter-individual differences in trait attachment on the first measurement occasion is specific to the parents and not shared with the targets (see Supplementary Material for a mathematical definition). The two coefficients $RConPred_{\text{trait1}}(Y_{i2l})$ and $RSPred_{\text{trait1}}(Y_{i2l})$ add up to 1 for the same indicator. If the $RConPred_{\text{trait1}}(Y_{i2l})$ is high (and the $RSPred_{\text{trait1}}(Y_{i2l})$ therefore low) the influence of inter-individual differences in the trait values on the first measurement occasion on later occasions can be explained by attachment features that are shared by both targets and parents.

On the level of time-consistent components of attachment, the rater-consistent time consistency coefficient $RConTCon(Y_{i2l})$ describes the proportion of the time consistent variance in the parents' attachment that can be explained by the targets' time consistent attachment. Time

consistency in this context means that rater consistency is calculated with respect to the variance that carries over from former measurement occasions (by effects of trait$_1$ or accumulated situational effects). The rater-consistent time consistency coefficient $RConTCon(Y_{i2l})$ is defined as:

$$\mathrm{RConTCon}(Y_{i2l}) = \frac{\lambda^2_{\mathrm{T}i2l}\mathrm{Var}(T_{i11}) + \lambda^2_{\mathrm{O}i2l}\beta^2_{\mathrm{O}l}\mathrm{Var}(O_{l-1})}{\lambda^2_{\mathrm{T}i2l}\mathrm{Var}(T_{i11}) + \lambda^2_{\mathrm{TPS}i2l}\mathrm{Var}(TPS_{i21}) + \lambda^2_{\mathrm{O}i2l}\beta^2_{\mathrm{O}l}\mathrm{Var}(O_{l-1}) + \lambda^2_{\mathrm{OPS}i2l}\beta^2_{\mathrm{OPS}l}\mathrm{Var}(OPS_{l-1})} \quad (30)$$

The rater-consistent occasion specificity coefficient $RConOS(Y_{i2l})$ describes the percentage of state-residual variance in the parents' attachment ratings that is consistent with the state-residual variance in the targets' ratings. This coefficient is defined as:

$$\mathrm{RConOS}(Y_{i2l}) = \frac{\lambda^2_{\mathrm{O}j2l}\mathrm{Var}(SR_l)}{\lambda^2_{\mathrm{O}j2l}\mathrm{Var}(SR_l) + \lambda^2_{\mathrm{OPS}j2l}\mathrm{Var}(SRPS_l)} \quad (31)$$

That is, the $RConOS(Y_{i2l})$ captures the amount of unexplained variance in attachment at a specific measurement occasion that is shared between parents and targets. A high $RConOS(Y_{i2l})$ indicates that unexpected temporal deviations in attachment values (from those attachment values expected based on previously observed attachment patterns) covary between targets and their parents. That is, a higher attachment of the target on a given time point (as compared to the attachment that is expected based on the targets' previous attachment to the parent) is associated with a higher than expected attachment of the parent at this time point. The square root of the consistent occasion specificity coefficient can be interpreted as a measurement error-free correlation between the unexplained occasion-specific deviations of targets' and parents' attachments (these unexplained occasion-specific deviations are captured in the state residual variables). In applications with strong measurement invariance (and therefore equal variances and loadings of the occasion specific factors), the rater-consistent occasion specificity for the same indicator is equal for all measurement occasions.

The rater-specific occasion specificity coefficient can be calculated as a counterpart of the rater-consistent occasion specificity coefficient. Additionally, further coefficients (like the rater-consistent unpredictability by $trait_1$ coefficient) can be specified that might be useful in other applications of the MR-LST-AR model. An overview of all possible coefficients can be found in the Supplementary Material.

6.3.6 Estimation

To examine the stability and change of attachment as well as the convergence between targets' and parents' attachments, we applied the models introduced above to the item parcels capturing the three attachment dimensions acceptance, dependability, and closeness. In a first step, we fitted two separate LST-AR models, one for the targets and one for the parents. In a second step, we estimated the MR-LST-AR model.

All models were estimated with the robust maximum likelihood estimator in MPlus 8.0 (Muthén & Muthén, 1998-2017). Full information maximum likelihood was used to handle missing values. The confidence intervals for the variance components were estimated via bootstrapping (5000 samples) using the maximum likelihood estimator. We assumed measurement invariance with equal loadings of the occasion-specific factors and equal variances of the state residual factors over time. In addition, to examine gender effects, the LST-AR models were run again separately for male and female targets.

We used the χ^2-test, the CFI, and the RMSEA to examine the goodness-of-fit. A non-significant χ^2-test (or at least a value of $\chi^2 < 2 * df$), a CFI > 0.97 and a RMSEA < 0.05 are signs of a good model fit (Schermelleh-Engel et al., 2003).

6.4 Results

6.4.1 Model Fit Criteria

All models fit the data well (targets' LST-AR model: $\chi^2(47) = 60.218$; $p = .093$; RMSEA = .022; CFI = .993; parents' LST-AR model: $\chi^2(47) = 68.399$; $p = .022$; RMSEA = .031; CFI = .981; MR-LST-AR model: $\chi^2(217) = 261.321$; $p = .021$; RMSEA = .018; CFI = .989).

6.4.2 LST-AR Model

The first research question on the stability and change of attachment can be answered with the LST-AR models.

Variance coefficients and intercepts of the LST-AR model of targets' attachment are displayed in Table 6.1. The reliability of the indicators ranged from .660 to .803, which indicates good reliability.

The stability over time was generally high, as indicated by time consistency coefficients $TCon(Y_{il})$ ranging from .597 to .672 for the acceptance indicators, from .602 to .640 for the dependability indicators, and from .853 to .862 for the closeness indicators. Time consistency coefficients of the same indicator were comparably high for all measurement occasions. Still, closeness had a higher time consistency than the other two indicators (with no overlap in the

confidence intervals). The corresponding occasion specificity coefficients $OS(Y_{il})$ ranged from .138 to .403.

The predictability by trait$_1$ coefficient $Pred_{trait1}(Y_{il})$ ranged from .521 to .617 for the acceptance indicators, from .539 to .574 for the dependability indicators and from .826 to .837 for the closeness indicators. That is, the closeness trait value on the first measurement occasion could explain over 80% of the true variance of the closeness indicators on the second and later measurement occasions. The values of $Pred_{trait1}(Y_{il})$ were similar for the different measurement occasions. That is, time consistencies are largely due to a high impact of interindividual differences in the traits at the first measurement occasion. The unpredictability by trait$_1$ coefficients $UPred_{trait1}(Y_{il})$ were smaller than .08 in all cases, indicating that accumulated situational effects can explain only 8% or less in true interindividual differences at later measurement occasions. Such accumulated situational effects are carry-over effects from occasion-specific interindividual differences at previous measurement occasions.

Table 6.1

Results of the LST-AR Model of Targets' Attachment

	a_{ij}	Rel	OS	TCon	Pred	Unpred	$r(S_{i1}, S_{il})$
Y_{11}	4.52	.720	.381	.619	.619		
		[.63, .82]	[.26, .52]	[.48, .74]	[.48, .74]		
Y_{21}	4.48	.666	.413	.587	.587		
		[.56, .78]	[.29, .56]	[.44, .71]	[.44, .71]		
Y_{31}	4.08	.660	.180	.820	.820		
		[.59, .72]	[.11, .28]	[.72, .89]	[.72, .89]		
Y_{12}	4.49	.793	.330	.670	.617	.053	.760
		[.71, .87]	[.22, .46]	[.55, .78]	[.45, .75]	[.01, .15]	[.65, .85]
Y_{22}	4.46	.669	.398	.602	.539	.063	.724
		[.57, .76]	[.27, .53]	[.47, .73]	[.33, .70]	[.01, .20]	[.62, .81]
Y_{32}	4.02	.789	.141	.859	.836	.022	.892
		[.72, .85]	[.08, .22]	[.78, .92]	[.71, .91]	[.00, .09]	[.84, .94]
Y_{13}	4.42	.773	.328	.672	.611	.060	.671
		[.68, .87]	[.22, .44]	[.56, .78]	[.38, .75]	[.01, .23]	[.56, .77]
Y_{23}	4.43	.787	.360	.640	.574	.066	.642
		[.70, .87]	[.24, .49]	[.51, .76]	[.32, .73]	[.01, .26]	[.53, .74]
Y_{33}	3.95	.799	.138	.862	.837	.025	.854
		[.73, .86]	[.08, .21]	[.79, .92]	[.69, .91]	[.00, .12]	[.78, .91]
Y_{14}	4.42	.716	.403	.597	.521	.076	.593
		[.61, .82]	[.27, .53]	[.47, .73]	[.27, .69]	[.01, .30]	[.46, .71]
Y_{24}	4.41	.712	.376	.624	.554	.071	.595
		[.61, .82]	[.24, .51]	[.49, .76]	[.29, .73]	[.01, .30]	[.46, .72]
Y_{34}	4.00	.803	.147	.853	.826	.028	.833
		[.74, .87]	[.09, .22]	[.78, .91]	[.66, .90]	[.00, .14]	[.75, .90]

Note. a_{ij}: intercept; Rel: reliability coefficient; OS: occasion specificity coefficient; TCon: time consistency coefficient; Pred: predictability by trait$_1$ coefficient; Unpred: unpredictability by trait$_1$ coefficient; $r(S_1, S_l)$: measurement error-free correlation between this measurement occasion and the first measurement occasion.

Y_{ij} with *i*: indicator (1: acceptance; 2: dependability; 3: closeness); *l*: measurement occasion; the bootstrapped 95%-confidence intervals in parenthesis.

The correlations of the latent attachment states on later measurement occasions (S_{il}) with the state on the first measurement occasion (S_{i1}) decreased throughout the study (from .760 to .593 for acceptance and from .724 to .595 for dependability). For closeness, these correlations also decreased from .892 to .833, which was still a high test-retest correlation. The intercepts show that the targets rated their closeness slightly lower as compared to their acceptance and dependability, with no changes in the mean level of attachment over time.

In the model for the targets' attachment, trait factor correlations between trait acceptance, dependability, and closeness at the first measurement occasions medium to high, with r = .506 for acceptance and dependability, r = .544 for acceptance and closeness, r = .668 for dependability and closeness. These trait correlations indicate that the three facets of attachment were strongly related, with every facet also capturing a unique part of attachment.

Variance coefficients and intercepts of the LST-AR model of parents' attachment are displayed in Table 6.2. Reliability coefficients ranged from .582 to .745 for most indicators, indicating good reliability. For Y_{22} the reliability coefficient was only .498, which showed low reliability of the dependability indicator on the second measurement occasion.

The stability of the parent's attachment was high. The time consistency coefficient $TCon(Y_{il})$ ranged from .673 to .737 for the acceptance indicators, from .799 to .838 for the dependability indicators and from .714 to .748 for the closeness indicators. The differences between the different indicators were smaller than in the LST-AR model of the targets' attachment. The corresponding occasion specificity coefficients $OS(Y_{il})$ ranged from .162 to .327.

Table 6.2

Results of the LST-AR Model of Parents' Attachment

	a_{ij}	Rel	OS	TCon	Pred	Unpred	$r(S_{i1}, S_{il})$
Y_{11}	4.53	.726	.225	.775	.775		
		[.61, .91]	[.11, .35]	[.65, .89]	[.65, .89]		
Y_{21}	4.42	.584	.128	.872	.872		
		[.46, .72]	[.07, .21]	[.79, .93]	[.79, .93]		
Y_{31}	4.29	.667	.241	.759	.759		
		[.53, .95]	[.13, .37]	[.63, .87]	[.63, .87]		
Y_{12}	4.55	.697	.263	.737	.733	.004	.783
		[.52, .85]	[.16, .40]	[.60, .84]	[.46, .84]	[.00, .20]	[.64, .90]
Y_{22}	4.52	.498	.201	.799	.796	.003	.853
		[.37, .64]	[.10, .34]	[.66, .90]	[.53, .90]	[.00, .17]	[.76, .92]
Y_{32}	4.32	.680	.286	.714	.710	.004	.766
		[.55, .81]	[.14, .50]	[.50, .86]	[.24, .86]	[.00, .29]	[.66, .86]
Y_{13}	4.57	.597	.327	.673	.668	.005	.723
		[.44, .77]	[.20, .48]	[.52, .80]	[.33, .79]	[.00, .33]	[.59, .83]
Y_{23}	4.52	.582	.162	.838	.836	.002	.856
		[.43, .72]	[.08, .28]	[.72, .92]	[.54, .92]	[.00, .22]	[.76, .93]
Y_{33}	4.29	.745	.252	.748	.744	.004	.755
		[.62, .86]	[.12, .45]	[.55, .88]	[.23, .88]	[.00, .37]	[.58, .87]
Y_{14}	4.60	.666	.303	.697	.692	.004	.733
		[.53, .82]	[.18, .44]	[.56, .82]	[.35, .80]	[.00, .36]	[.59, .83]
Y_{24}	4.55	.642	.162	.838	.836	.002	.854
		[.49, .80]	[.08, .27]	[.74, .92]	[.57, .91]	[.00, .23]	[.75, .92]
Y_{34}	4.34	.706	.270	.730	.726	.004	.743
		[.57, .86]	[.13, .44]	[.56, .87]	[.20, .86]	[.00, .44]	[.51, .86]

Note. a_{ij}: intercept; Rel: reliability coefficient; OS: occasion specificity coefficient; TCon: time consistency coefficient; Pred: predictability by trait$_1$ coefficient; Unpred: unpredictability by trait$_1$ coefficient; $r(S_1, S_l)$: measurement error-free correlation between this measurement occasion and the first measurement occasion.

Y_{ij} with *i*: indicator (1: acceptance; 2: dependability; 3: closeness); *l*: measurement occasion; the bootstrapped 95%-confidence intervals in parenthesis.

The predictability by trait$_1$ coefficient $Pred_{trait1}(Y_{il})$ ranged from .668 to .733 for the acceptance indicators, from .796 to .836 for the dependability indicators and from .710 to .744 for the closeness indicators. This means that in all cases a large proportion of the true variance in the attachment ratings of the second and later measurement occasion could be explained by the trait value at the first measurement occasion. The values of $Pred_{trait1}(Y_{il})$ showed no systematic pattern over time. With values of .005 and below, the unpredictability by trait$_1$ coefficient $UPred_{trait1}(Y_{il})$ showed that accumulated situational effects were practically non-existent.

The same was true for the correlations of the latent state values of later measurement occasions with the first measurement occasion. The measurement error-free correlations of the latent states of the second, third, and fourth measurement occasion with those of the first measurement occasion were similar with a huge overlap in the confidence intervals and no visible trend. The correlations for the acceptance and the closeness indicators were similar with values between .723 and .783; the correlations for dependability were higher with values between .853 and .856. The intercepts showed no indication of changes in the mean level of attachment over time.

In the LST-AR model of parents' attachment, the correlation between trait acceptance and trait dependability was r = .565, between trait acceptance and trait closeness r = .700, and between trait dependability and trait closeness r = .539.

To examine gender differences, we calculated the LST-AR model for the female and male targets separately. Both models had an acceptable model fit and all results can be found in the supplementary material[2]. The were no global differences between coefficients of the male sample

[2] The supplementary material is displayed in Appendix C of this dissertation.

and the coefficients of the female sample. For the dependability items, time consistency and predictability were slightly higher in the female sample. For acceptance, time consistency and predictability were slightly higher in the male sample. We also calculated two LST-AR models separately for mothers and fathers. While the model fit was good for the mother sample, the model fit was bad for the father sample. The model of the father sample had also theta estimation problems and therefore no trustworthy results. The estimation problems are likely due to the rather sample size of fathers that is too small and not appropriate for such complex structural equation models. Therefore, only the results of the mother sample are displayed in the supplementary material.

6.4.3 MR-LST-AR Model

All coefficients calculated and reported for the LST-AR models are similar in the MR-LST-AR model with only minor deviations and are therefore not repeated here. The results for all coefficients concerning different aspects of rater consistency are displayed in Table 6.3 (more model parameters can be found in the Supplementary Material).

Table 6.3

Results of the MR-LST-AR Model

	RS	RCon	$\sqrt{\text{RCon}}$	RConOS	RConTCon	RConPred
Y_{121}	.835	.165	.406	.068		
	[.68, .93]	[.07, .32]	[.26, .56]	[.01, .21]		
Y_{221}	.910	.090	.300	.067		
	[.74, .97]	[.03, .26]	[.16, .51]	[.00, .27]		
Y_{321}	.805	.195	.442	.051		
	[.67, .91]	[.09, .33]	[.29, .57]	[.00, .21]		
Y_{122}	.793	.207	.455	.068	.254	.251
	[.61, .91]	[.09, .39]	[.30, .63]	[.01, .21]	[.09, .49]	[.09, .51]
Y_{222}	.846	.154	.392	.067	.268	.266
	[.65, .95]	[.05, .35]	[.23, .59]	[.00, .27]	[.09, .54]	[.09, .55]
Y_{322}	.792	.208	.456	.051	.268	.266
	[.67, .89]	[.11, .33]	[.36, .58]	[.00, .21]	[.14, .44]	[.14, .58]
Y_{123}	.846	.154	.392	.068	.194	.189
	[.65, .95]	[.05, .35]	[.22, .56]	[.01, .21]	[.05, .41]	[.04, .43]
Y_{223}	.921	.079	.281	.067	.081	.079
	[.60, .99]	[.01, .40]	[.10, .63]	[.00, .27]	[.00, .48]	[.00, .48]
Y_{323}	.795	.205	.453	.051	.254	.252
	[.67, .89]	[.11, .33]	[.32, .58]	[.00, .21]	[.12, .43]	[.12, .57]
Y_{124}	.837	.163	.404	.068	.201	.197
	[.66, .94]	[.06, .34]	[.25, .58]	[.01, .21]	[.06, .43]	[.05, .45]
Y_{224}	.885	.115	.339	.067	.123	.121
	[.71, .96]	[.04, .29]	[.19, .54]	[.00, .27]	[.03, .33]	[.02, .34]
Y_{324}	.848	.152	.390	.051	.187	.185
	[.74, .93]	[.07, .26]	[.27, .51]	[.00, .21]	[.08, .33]	[.07, .45]

Note. RS: rater specificity coefficient; RCon: rater consistency coefficient; $\sqrt{\text{RCon}}$: measurement error free correlation between target and parent ratings; RConOS: rater-consistent occasion specificity coefficient; RConTCon: rater-consistent time consistency coefficient; RConPred: rater-consistent predictability by trait$_1$ coefficient;

Y_{ikl} with *i*: indicator (1: acceptance; 2: dependability; 3: closeness); *k*: rater (2: parent); *l*: occasion of measurement; the bootstrapped 95%-confidence intervals in parenthesis.

The rater consistency coefficients $RCon(Y_{i2l})$ ranged from .079 to .208. That is, 8 to 20% of the variance in true, measurement-error free inter-individual differences in the parents' attachments can be explained by inter-individual differences in the targets' attachments at a given measurement occasion. There were no systematic differences between the three attachment dimensions, with large overlaps in the confidence intervals. This corresponds to measurement error-free correlations between the targets' and parents' attachments ranging from .281 to .455, implying a medium to very large effect size (Funder & Ozer, 2019).

The rater-consistent predictability by trait_1 coefficient $RConPred_{\text{trait1}}(Y_{i2l})$ ranged from .079 to .266, with no systematic differences between the indicators. This means that there was a meaningful overlap in those parts of the ratings of targets' and parents' that could be explained by the trait value at the first measurement occasion. The rater-consistent time consistency coefficients $RConTCon(Y_{i2l})$ ranged from .081 to .268. Therefore, the time consistent parts in the attachments of parents and targets correlated between .285 and .518, implying a medium to very large effect (Funder & Ozer, 2019). This means that the stable and time consistent elements in the ratings of targets and parents were highly correlated.

The rater-consistent occasion specificity coefficient $RConOS(Y_{i2l})$ ranged from .051 to .068. Because of measurement invariance settings (equal variances of the state residual factors and equal occasion-specific loadings over time), the rater-consistent occasion specificity coefficients were equal across measurement occasions. Only a small percentage of the state residual variance in parents' attachments was shared with the targets. The corresponding measurement error-free

correlations ranged from .226 to .261, implying a medium effect size (Funder & Ozer, 2019). There were no systematic differences between the indicators concerning the *RConOS*.

6.5 Discussion

6.5.1 Applicability of the MR-LST-AR Model

The MR-LST-AR model is a new model that combines the LST-AR model with the CTC(M-1) model (Eid, 2000; Eid et al., 2003; Eid et al., 2008; Koch, 2013). In the CTC(M-1) model, one method is chosen as a reference method and all other methods are contrasted against this reference method. In our case, the model is used for attachment ratings in dyads. Therefore, the consistency in this model is not a sign for agreement between methods, but for the agreement of both raters concerning the quality of their mutual attachments. By extending the scope of application of the CTC(M-1) model, the present study further illustrates that the CTC(M-1) model can address a wide range of psychological research questions.

In the model, the ratings of the target were chosen as a reference. Therefore, the attachment of the parents was regressed on the attachment of the target and the parent-specific factors captured the residuum. The decision to choose the targets' rating as a reference was based on the substantial perspective of this study. The emerging adults were the starting point of this examination of attachment. It would also be possible to choose the parents as a reference and to set up the model accordingly. In that case, we could examine the deviation of the emerging adult's attachment from the expected level based on the parent's attachment. While the stability and the model fit would not be affected by the chosen reference, the consistency coefficient would differ.

6.5.2 Stability of Attachment (LST-AR Models)

The second aim of the present study was to examine stability and change of mutual attachments between emerging adults and their parents. To do so, we used LST-R theory and introduced a new multi-rater latent state-trait model. The degree of attachment security versus insecurity was relatively stable for the targets as well as for the parents. Observed stability was primarily due to inter-individual differences in trait attachment at the first measurement occasion (measured by predictability by $trait_1$). Accumulated situational effects were practically absent in the parents' attachment, and they were small in the targets' attachment. The low influence of accumulated situational effects is a sign of the low plasticity of attachment. The results indicate that this plasticity is even lower for the parents. This can be due to the higher age of the parents or because the parents had developed a more stable model of their attachment representations. At the same time, the targets experienced their first year after high school graduation. The changes in this year, like leaving the parental home or starting their courses at the university or elsewhere, might lead to new experiences that allow for some small adjustments in the targets' attachment to their parents.

The equally high predictability by $trait_1$ coefficients over the entire course of the study and the low autoregressive effects support the prototype perspective. The predictability by $trait_1$ coefficients were decreasing only for acceptance in the model of the targets' attachment. In all other cases, the trait values on the first measurement occasion were equally predictive for all later measurement occasions. Such a pattern is hard to explain under the revisionist perspective.

Furthermore, the period of this study represents turbulent times in the first year after high school graduation. The emerging adults made many new experiences, but the predictability by $trait_1$ coefficients of dependability and closeness were not affected by that. Overall, these results are more in line with the prototype perspective stating that there are elements of the working models of attachment that are not changed (at least not over one year) by situational influences.

While the correlations between the states of later measurement occasions and the first measurement occasion were stable for the parents, they were decreasing in the model of the targets' attachment. These decreasing correlations are caused by accumulating situational effects. This means that there are changes in the traits' working models of attachment. The prototype, however, is part of the trait (at every measurement occasion). The influence of the trait of the first measurement occasion is not decreasing for dependability and closeness. The distinction between trait and occasion-specific effects in LST-R models allows examining the prototype with greater precision.

The Relationship-Specific Attachment Scales has items on acceptance, dependability, and closeness. In this study, the three aspects of attachment showed some heterogeneity and different stability. While closeness was the most stable aspect in the model of the targets, this was not the case in the model of the parents. Although the first year after high school graduation is a year with many changes, the closeness of the targets was extremely stable on the mean level and in the inter-individual differences. Closeness is less connected to actual behavior than dependability and acceptance. Acceptance can be expressed or shown more easily than closeness. Dependability can

be observed directly. Closeness needs to be felt, and new experiences might less influence this feeling.

6.5.3 Consistency between Parent and Target (MR-LST-AR Model)

The mutual attachments of the emerging adults and their parents showed medium to large correlations, indicating that emerging adults who are more securely attached to their parents tend to have parents who are more securely attached to them. However, the rater specificity coefficients around .80 and higher also show that more than three-quarters of the measurement error-free variance was specific to the parents. This means that the mutual attachments of parents and emerging adults cannot be seen as a characteristic of their relationship but as characteristics of each person within the dyadic relationship. Nevertheless, the correlation also indicates that the mutual attachments are not independent of each other.

The rater-consistent time consistency coefficient showed that around 20% of the time consistent variance of the parents' attachment was shared with the targets' time consistent attachment. The trait value (which would include a possible prototype) seems to be the most important factor behind the consistency. These coefficients can be transformed into correlations from .40 to .50 between the time consistent attachments of parents and emerging adults. These correlations were smaller for dependability at the third and fourth measurement occasion. A possible reason is that dependability can be more one-sided in a relationship than the other aspects of a relationship. It is possible that one person in a dyadic relationship (e.g., the emerging

adult) relies on the second person (e.g., the parent) but not vice versa. Such a constellation seems less likely regarding closeness and acceptance.

The rater consistent occasion specificity coefficients were very similar for the different aspects of attachment. Around 6% of the occasion-specific variance of the parents' ratings was shared with the targets' rating. Therefore, the occasion-specific deviations of targets and parents had a correlation around .25. This correlation between the occasion-specific deviations was smaller than the correlation between the stable attachments. This means that the consistency between the mutual attachments of emerging adults and their parents is stronger in the long run than it is for short term changes. Nevertheless, this small to medium correlation shows that parents and emerging adults have at least some commonality in their updating of their mutual attachments.

6.5.4 Therapeutic Implications

Psychotherapy can change attachment security (Mikulincer & Shaver, 2016). Psychotherapy can be considered a special interpersonal experience. Our study shows that emerging adults' attachment changes through cumulative experiences. Therapy might make use of this mechanism. The high correlations between the mutual attachments of emerging adults and parents show that it may be useful to involve both parties in therapy to change attachment. The higher stability in the parents' attachments may mean that therapeutic attachment change is more difficult for them.

6.5.5 Limitations

Our study has some important limitations. First, it is important to note that the targets choose the participating parent. For targets who have different attachments to their parents (maybe because the relationship to one parent is ruined after a complicated divorce), they should have invited the parent they have the closest relationship with. Targets who have a functional relationship with both parents used different criteria to choose the parent. We asked the remaining targets after the last measurement occasion, and the answers ranged from a better attachment over more free time of this parent to technical reasons (e.g., only one parent uses the internet). It is reasonable to assume that the reported attachment to the chosen parent was better than or equal to the attachment to the not chosen parent, but we cannot be sure about this.

Second, our study did not investigate the possible mechanisms behind the stability and change of attachment directly. The prototype perspective and the revisionist perspective lead to different expectations regarding the shape of repeated test-retest correlations (Fraley et al., 2011). This is an indirect way to compare the two perspectives, and our results can only be indirect support for the prototype perspective.

Third, our study had a limited period of nine months between the first and last measurement occasion. Many change processes in the development of attachment likely need longer studies to be observed. The time spans between the four measurement occasions were fixed, so we have no information about the attachment between the measurement occasions.

Fourth, the first year after high school graduation is very volatile and the results cannot be generalized to other life periods. However, it is interesting to see that attachment is so stable in a time of so many changes in life.

6.6 Conclusion

The LST-AR models were able to show the high degree of stability of the attachments between emerging adults and their parents. The results foster the prototype perspective of a stable working model of attachment.

The new MR-LST-AR model is a useful model to describe the rater consistency of stability and change. In this application, the mutual attachments of parents and emerging adults were related, and this relationship was stronger for the stable elements of attachment than for the short-term changes.

6.7 References

Ainsworth, M. D. (1989). Attachments beyond infancy. *American Psychologist, 44*(4), 709-716.

Allen, J. P., Grande, L., Tan, J., & Loeb, E. (2018). Parent and peer predictors of change in attachment security from adolescence to adulthood. *Child Development, 89*(4), 1120-1132. doi:10.1111/cdev.12840

Arnett, J. J. (2000). Emerging adulthood. A theory of development from the late teens through the twenties. *American Psychologist, 55*(5), 469-480. doi:10.1037/0003-066X.55.5.469

Asendorpf, J. B., & Wilpers, S. (2000). Attachment security and available support: Closely linked relationship qualities. *Journal of Social and Personal Relationships, 17*(1), 115-138.

Asendorpf, J. B., Banse, R., Wilpers, S., & Neyer, F. J. (1997). Beziehungsspezifische Bindungsskalen für Erwachsene und ihre Validierung durch Netzwerk- und Tagebuchverfahren [Relationship-specific attachment scales for adults and their validation with network and diary procedures]. *Diagnostica, 43*(4), 289-313.

Baldwin, M. W., & Fehr, B. (1995). On the instability of attachment style ratings. *Personal Relationships, 2*, 247-261.

Bartholomew, K., & Horowitz, L. M. (1991). Attachment styles among young adults: A test of a four-category model. *Journal of Personality and Social Psychology, 61*(2), 226-244.

Bohn, J., Holtmann, J., Luhmann, M., Koch, T., & Eid, M. (2020). Attachment to parents and well-being after high-school graduation: A study using self- and parents ratings. *Journal of Happiness Studies, 21* (7), 2493-2525. doi:10.1007/s10902-019-00190-y

Bowlby, J. (1969). *Attachment and loss: Vol. 1. Attachment*. New York: Basic Books.

Bowlby, J. (1973). *Attachment and loss: Vol. 2. Separation: Anxiety and anger*. New York: Basic Books.

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psycholoical Bulletin, 56*(2), 81-105.

Caron, A., Lafontaine, M.-F., Bureau, J.-F., Levesque, C., & Johnson, S. M. (2012). Comparisions of close relationships: An evaluation of relationship quality and patterns of attachment to

parents, friends, and romantic partners in young adults. *Canadian Journal of Behavioral Science, 44*(4), 245-256.

Cole, D. A., Martin, N. C., & Steiger, J. H. (2005). Empirical and conceptual problems with longitudinal trait-state models: Introducing a trait-state-occasion model. *Psychological Methods, 10*(1), 3-20. doi:10.1037/1082-989X.10.1.3

Cook, W. L., & Kenny, D. A. (2005). The actor-partner interdependence model: A model of bidirectional effects in developmental studies. *International Journal of Behavioral Development, 29*(2), 101-109. doi:10.1080/01650250444000405

Courvoisier, D. A., Nussbeck, F. W., Eid, M., Geiser, C., & Cole, D. A. (2008). Analyzing the convergent and discriminant validity of states and traits: Development and applications of multimethod latent state-trait models. *Psychological Assessment, 20*, 270-280. doi:10.1037/a0012812

Davila, J., Burge, D., & Hammen, C. (1997). Why does attachment style change? *Journal of Personality and Social Psychology, 73*(4), 826-838.

De Goede, I. H., Branje, S., van Duin, J., VanderValk, I. E., & Meeus, W. (2012). Romantic relationship commitment and its linkages with commitment to parents and friends during adolescence. *Social Developement, 21*(3), 425-442. doi:10.1111/j.1467-9507.2011.00633.x

Eid, M. (2000). A multitrait-multimethod model with minimal assumptions. *Psychometrika, 65*(2), 241-261.

Eid, M., & Kutscher, T. (2014). Statistical models for analyzing stability and change in happiness. In K. M. Sheldon, & R. E. Lucas, *Stability of happiness. Theories and evidence on whether happiness can change* (pp. 263-297). Amsterdam: Elsevier.

Eid, M., Courvoisier, D. S., & Lischetzke, T. (2012). Structural equation modeling of ambulatory assessment data. In M. R. Mehl, & T. S. Conner, *Handbook of research methods for studying daily life* (pp. 384-406). New York: Guilford Press.

Eid, M., Geiser, C., & Koch, T. (2016). Measuring method effects: From traditional to design-oriented approaches. *Current Directions in Psychological Science, 25*(4), 275-280.

Eid, M., Holtmann, J., Santangelo, P., & Ebner-Priemer, U. (2017). On the definition of latent state-trait models with autoregressive effects: Insights from LST-R theory. *European Journal of Psychological Assessment, 33*(4), 285-295. doi:10.1027/1015-5759/a000435

Eid, M., Lischetzke, T., Nussbeck, F., & Trierweiler, L. (2003). Separating trait effects from trait-specific method effects in multitrait-multimethod models: A multiple-indicator CT-C(M-1) model. *Psychological Methods, 8*(1), 38-60.

Eid, M., Nussbeck, F. W., Geiser, C., Cole, D. A., Gollwitzer, M., & Lischetzke, T. (2008). Structural equation modeling of multitrait-multimethod data: Different models for different types of methods. *Psychological Methods, 13*(3), 230-253.

Fox, N. A., Kimmerly, N. L., & Schafer, W. D. (1991). Attachment to mother/attachment to father: A meta-analysis. *Child Developement, 62*, 210-225.

Fraley, R. C. (2002). Attachment stability from infancy to adulthood: Meta-analysis and dynamic modeling of developmental mechanisms. *Personality and Social Psychology Review, 6*(2), 123-151.

Fraley, R. C. (2019). Attachment in adulthood: Recent developments, emerging debates, and future directions. *Annual Review of Psychology, 70*(1), 401-422. doi:10.1146/annurev-psych-010418-102813

Fraley, R. C., Hudson, N. W., Heffernan, M. E., & Segal, N. (2015). Are adult attachment styles categorical or dimensional? A taxometric analysis of general and relationship-specific attachment orientations. *Journal of Personality and Social Psychology, 109*(2), 354-368. doi:10.1037/pspp0000027

Fraley, R. C., Vicary, A. M., Brumbaugh, C. C., & Roisman, G. I. (2011). Patterns of stability in adult attachment: An empirical test of two models of continuity and change. *Journal of Personality and Social Psychology, 101*(5), 974-992. doi:10.1037/a0024150

Funder, D. C., & Ozer, D. J. (2019). Evaluating effect size in psychological research: Sense and nonsense. *Advances in Methods and Practices in Psychological Science, 2*(2), 156-168. doi:10.1177/2515245919847202

Furmann, W., Simon, V. A., Shaffer, L., & Bouchey, H. A. (2002). Adolescents' working model and styles for relationsships with parents, friends, and romantic partners. *Child Developement, 73*(1), 241-255.

Geiser, C. (2008). *Structural equation modeling of multitrait-multimethod-multioccasion data*. Berlin. Retrieved from http://www.diss.fu-berlin.de/diss/receive/FUDISS_thesis_000000004986

Golish, T. D. (2000). Changes in closeness between adult children and their parents: A turning point analysis. *Communication Reports, 13*(2), 79-97.

Hiester, M., Nordstrom, A., & Swenson, L. M. (2009). Stability and change in parental attachment and adjusment outcomes during the first semester transition to college life. *Journal of College Student Development, 50*(5), 521-538.

Holtmann, J., Koch, T., Bohn, J., & Eid, M. (2017). Bayesian analysis of longitudinal multitrait-multimethod data with ordinal response variables. *British Journal of Mathematical and Statistical Psychology, 70*, 42-80.

Holtmann, J., Koch, T., Bohn, J., & Eid, M. (2020). Multimethod assessment of time-stable and time-variable interindividual differences: Introduction of a new multitrait-multimethod latent state-trait IRT model. *European Journal of Psychological Assessment*, 1-20. doi:10.1027/1015-5759/a000577

Jones, J. D., Fraley, R. C., Ehrlich, K. B., Stern, J. A., Lejuez, C. W., Shaver, P. R., & Cassidy, J. (2018). Stability of attachment style in adolescence: An empirical test of alternative developmental processes. *Child Development, 89*(3), 871-880. doi:10.1111/cdev.12775

Karreman, A., & Vingerhoets, A. J. (2012). Attachment and well-being: The mediating role of emotion regulation and resilience. *Personality and Individual Differences, 53*, 821-826. doi:10.1016/j.paid.2012.06.014

Kirkpatrick, L. A., & Hazan, C. (1994). Attachment styles and close relationships: A four-year prospective study. *Personal Relationships, 1*, 123-142.

Koch, T. (2013). Multilevel structural equation modeling of mulitrait-multimethod-multioccasion data (Unpublished doctoral dissertation). Freie Universität Berlin. Retrieved from http://www.diss.fu-

berlin.de/diss/servlets/MCRFileNodeServlet/FUDISS_derivate_000000013668/Thesis_Koch_gedreht.pdf?hosts=

Koch, T., Holtmann, J., Bohn, J., & Eid, M. (2018). Explaining general and specific factors in longitudinal, multimethod, and bifactor models: Some caveats and recommendations. *Psychological Methods*. doi:10.1037/met0000146

La Guardia, J. G., Ryan, R. M., Couchman, C. E., & Deci, E. L. (2000). Within-person variantion in security of attachment: A self-determination theory perspective on attachment, need fulfillment, and well-being. *Journal of Personality and Social Psychology, 79*(3), 367-384. doi:10.1037//0022-3514.79.3.367

Little, T. D. (2013). *Longitudinal equation modeling*. New York: The Guilford Press.

Lopez, F. G., & Gormley, B. (2002). Stability and change in adult attachment style over the first-year college transition: Relations to self-confidence, coping, and distress patterns. *Journal of Counseling Psychology, 49*(2), 355-364.

Luhmann, M., Bohn, J., Holtmann, J., Koch, T., & Eid, M. (2016). I'm lonely, can't you tell? Convergent validity of self- and informant ratings of loneliness. *Journal of Research in Personality, 61*, 50-60.

McArdle, J. J., & Nesselroade, J. R. (2014). *Longitudinal data analysis using structural equation models*. Washington, DC: American Psychological Association.

Mikulincer, M., & Shaver, P. R. (2016). *Attachment in adulthood* (2. ed.). New York: Guilford Press.

Muthén, L. K., & Muthén, B. O. (1998 - 2017). *Mplus user`s guide. Eighth Edition*. Los Angeles, CA: Muthén & Muthén.

Nussbeck, F., Eid, M., Geiser, C., Courvosier, D., & Lischetzke, T. (2009). A CTC(M-1) model for different types of raters. *Methodology European Journal of Research Methods for the Behavioral and Social Sciences, 5*(3), 88-98. doi:10.1027/1614-2241.5.3.88

Pinquart, M., Feußner, C., & Ahnert, L. (2013). Meta-analytic evidence for stability in attachments from infancy to early adulthood. *Attachment & Human Development, 15*(2), 189-218. doi:10.1080/14616734.2013.746257

Scarpato, B. S., Swardfager, W., Eid, M., Ploubidis, G. B., & Cogo-Moreira, H. (2021). Disentangling trait, occasion-specific, and accumulated situanional effects of psychological distress in adulthood: evidence from the 1958 and 1970 British birth cohorts. *Psychological Medicine*, 51, 804-814. doi:10.1017/S0033291719003805

Scharfe, E., & Bartholomew, K. (1994). Reliability and stability of adult attachment patterns. *Personal Relationships, 1*, 23-43.

Scharfe, E., & Cole, V. (2006). Stability and change of attachment representations during emerging adulthood: An examination of mediators and moderators of change. *Personal Relationships, 13*, 363-374.

Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online, 8*(2), 23-74.

Seiffge-Krenke, I., & Burk, W. J. (2012). Friends or lovers? Person- and variable-oriented perspectives on dyadic similarity in adolescent romantic relationships. *Journal of Social and Personal Relationships, 30*(6), 711-733. doi:10.1177/0265407512467562

Shaver, P. R., & Brennan, K. A. (1992). Attachment styles and the "Big Five" personality traits: Their connection with each other and with romantic relationship outcomes. *Personality and Social Psychology Bulletin, 18*(5), 536-545.

Steyer, R., Mayer, A., Geiser, C., & Cole, D. A. (2015). A theory of states and traits - revised. *Annual Review of Clinical Psychology, 11*, 71-98. doi:10.1146/annurev-clinpsy-032813-153719

Acknowledgments

We are grateful to Jana Stein and Caterina Betz for their assistance in data collection.

7. Consistency and Specificity of Attachments to Parents, Friends, and Romantic Partners in Emerging Adulthood (Study 3)

Johannes Bohn[1], Jana Holtmann[2], Maike Luhmann[3], Tobias Koch[4], Michael Eid[1]

[1]Department of Education and Psychology, Freie Universität Berlin, Germany

[2]Psychologische Hochschule Berlin, Germany

[3]Department of Psychology, Ruhr University Bochum, Germany

[4]Department of Methodology and Evaluation Research, Friedrich Schiller University Jena, Germany

This Study was submitted in March 2021.

Keywords: parental attachment, friendship, emerging adulthood, consistency

This is the submitted manuscript version. The numbering of sections, tables and figures has been adjusted. The original Appendix is presented at the end of this Chapter.

7.1 Abstract

Attachment theory and the idea of a general working model of attachment suggest a high similarity among the attachments to different attachment figures. However, many empirical results show that attachments to different attachment figures differ substantially. In this study, 512 emerging adults rated their attachment quality to one parent, the romantic partner, and several friends over three measurement occasions. We used a multilevel structural equation model developed for the analysis of multitrait-multimethod data to examine the degree of consistency (this shows the correspondence between the attachments) and different aspects of specificity (this shows the difference between the attachments). Attachment to parents was strongly associated with the attachment to friends (around r = .4) and less strongly with the attachment to romantic partners (around r = 0.3). However, most of the variance was specific to the different attachment figures. Attachments to friends were more strongly correlated with each other than with the attachments to figures of other domains. The results hint at the existence of specific attachment patterns for every domain of attachment figures. Thus, any theory focusing on global attachment styles or working models should incorporate additional assumptions regarding specificity in subsets of attachment figures.

7.2 Theory

7.2.1 Introduction

One of the central questions of attachment research is how consistent attachments are across different attachment figures (Fraley & Dugan, 2021). The consistency of attachments is the extent of correspondence between attachments to different figures. The opposite of consistency is the specificity, the extent to which the attachments differ. Thus, specificity is also the measure of the distinctiveness of the different attachments. In this study, we examine the consistency and the specificity of attachment quality in emerging adulthood.

According to Bowlby (1969, 1980), children develop an inner working model of attachment during the first years of life. The attachment to their primary caregiver (in many cases, the mother) constitutes the most essential foundation for the inner working model of attachment. This working model is considered a stable cognitive base that influences the quality of attachment in later relationships (Bowlby, 1988). The attachment quality can be more or less secure, and an insecure attachment can either be anxious (the child strongly shows the attachment needs by crying and clinging) or avoidant (the child suppresses the attachment needs and seems dismissive; Ainsworth et al., 1978/2015; Mikulincer & Shaver, 2016). Most small children do not have just one attachment but develop multiple attachments to different attachment figures (Posada et al., 2013; Forslund et al., 2021), as, for instance, a mother, a father, and a nonparental care provider. Meta-analyses showed that the qualities of attachments to mothers, fathers and other care providers are weakly to moderately correlated (Ahnert et al., 2006; Fox et al., 1991).

Whereas the attachment to the parents already begins in infancy, the first friendships are typically formed during childhood. Preschool children have different but related working models for their relationships with parents and friends (Vu, 2014). In adolescence, the attachment to parents is related to the quality of friendships (Zimmermann, 2004). Also, during adolescence, romantic partners evolve as another domain of attachment figures besides parents and friends. Intimate partner relationships fulfill the same functions as best friends in early adolescence and develop into a loving and caring bond with an attachment quality in early adulthood (Meeus et al., 2007). Whereas some studies indicate a strong connection between the different domains of relationships (e.g., De Goede et al., 2012), other studies indicate different working models and different attachment qualities for different domains of relationships (e.g., Caron et al., 2012; Doyle et al., 2009; Furmann et al. 2002; Imamoğlu & Imamoğlu, 2006; La Guardia et al., 2000; Ross & Spinner, 2001; Umemura et al., 2015). For example, Furman et al. (2002) observed associations between the attachments to friends and those to parents and between the attachments to friends and those to romantic partners. However, when controlling for the attachment to friends, the attachment to the romantic partner and the attachment to parents were not associated (Furmann et al., 2002). In emerging adulthood, attachment to partners more closely resembles the attachment to friends than the attachment to parents (Klohnen et al., 2005). Friendships seem to be the testing ground for romantic partnerships. However, other studies indicate that attachment to parents is more closely related to attachment to partners than to attachment to friends (Ratto et al., 2016).

Fraley et al. (2011) reported correlations around . 2 among the attachments to figures of different domains. These correlations across different relationships indicate that there might be

an overall tendency of a person to establish a similar attachment security level in their different attachments. Such a general attachment style would be based on a general working model of attachment. A general working model of attachment is analyzed in many studies (e.g., Freeman & Brown, 2001; Levy et al., 2011; Meyer & Pilkonis, 2001). The general attachment style is also described as a factor in the different ways people establish new relationships with, for example, psychotherapists (Levy et al., 2011).

The idea of a general attachment style is only useful if attachments to different attachment figures within a person have significant overlap. The shared aspects of different attachments within a person can be described as a general working model of attachment. However, the non-perfect overlap and the attachment differences in different relationships also point to the existence of specific working models. In some studies, these specific mental models for different relationships appeared to be more strongly associated with properties of those relationships than general mental models (Cozzarelli et al., 2000). Mothers, fathers, best friends, and romantic partners were used differently as a secure base, safe haven, and for proximity in adolescence and emerging adulthood (Markiewicz et al., 2006). Representations of relationships with parents, friends, and romantic partners were primarily predictive for interactions in the same type of relationships (Furman et al., 2013).

The specific peculiarities of the attachments to different persons would also become apparent from the different associations of these attachments with other external variables. For instance, only attachment to peers but not attachment to parents was predictive for grades (Burack et al., 2013). Attachment to parents and teachers was associated with delayed onset of alcohol

consumptions and cigarette smoking, while attachment to close friends was associated with earlier onset of substance use (Han et al., 2016). Romantic attachment had a higher association with well-being than attachment to friends in emerging adulthood (Guarnieri et al., 2015). Fraley et al. (2011) showed that relationship-specific measures of attachment predict intra- and interpersonal outcomes like commitment and satisfaction in a relationship better than measures of global attachment, whereas global measures were higher associated with personality traits and depression. There are also gender differences in the associations of attachments with other variables. Only for girls, insecurity with romantic partners and mothers was predictive of depression in adolescence (Margolese et al., 2005). For adolescent girls, the relationship between parental attachment and depression was mediated by emotion regulation; for peer attachment, this was only partial mediation, and for adolescent boys, the mediations were smaller (Kullik & Petermann, 2013).

Many of the cited studies examined attachment to friends. However, they all have a limitation in terms of capturing attachment. Some studies measured attachment to friends by asking about attachment to a best friend (Doyle et al., 2009; Fraley et al., 2011; Klohnen et al., 2005; La Guardia et al., 2000; Margolese et al., 2005; Markiewicz et al., 2006; Meeus et al., 2007); other studies captured attachment to a group of friends or friends in general (Burack et al., 2013; Caron et al., 2012; Furman et al., 2002; Furmann et al., 2013; Guarnieri et al., 2015; Han et al., 2016; Imamoğlu & Imamoğlu, 2006; Kullik & Petermann, 2013; Umemura et al., 2015). Ross & Spinner (2001) examined attachment to several individual friends but then averaged these attachments. However, attachments are always specific to a particular figure (Ainsworth, 1989; Fraley et al.,

2011). At the same time, attachments to different friends are likely to have similarities. Therefore, the three described approaches of previous studies have limitations in revealing attachments to friends.

The previous studies show that there are two general approaches for understanding consistency and specificity in attachment: A general working model that is rooted in early attachment to parents or specific working models that evolve over the lifetime. Both approaches can be integrated into a general model of attachment consistency and specificity. Such a general approach would allow analyzing to which degree attachment to attachment figures later in life are related to attachment to parents and to which degree they are specific. In order to analyze how strongly attachment to parents is associated with attachment in other relationships it is essential to integrate different domains of relationships. Moreover, it is necessary to separate unsystematic measurement error from systematic attachment-specific influences to obtain unbiased estimates of attachment consistency and specificity.

In this paper, we will extend previous studies on attachment consistency and specificity by showing how modern psychometric models that separate measurement error from attachment-specific influences and take the peculiarities of different relationships into account can be applied to analyze the predictive power of attachment to parents as a working model for other relationships. For the first time, we use a model that allows us to look specifically at the attachment to multiple individual friends. This model allows us to represent friends as a domain of attachment figures and examine the similarities of attachments within that domain beyond the similarities of attachments over different domains of attachment figures.

7.2.2 Aims of the Present Study

This article examines the relationships between the attachments to different attachment figures in emerging adulthood. We focus on the attachments to parents, friends, and romantic partners. We examine whether these different types of relationships have different attachment patterns or, in contrast, if every emerging adult has one general working model underlying these different attachments. According to attachment theory, the parents are, in most cases, the first attachment figures. A general working model of attachment would therefore be founded in the attachment to the parents. A general working model of attachment should lead to a high consistency between the attachment to parents and the attachment to partners and friends. If the different attachments are more specific and less correlated, the general working model has less or no influence. We use multilevel structural equation models to achieve a measurement error-free estimation of the consistency. The applied models stem from the tradition of multitrait-multimethod confirmatory factor analysis. These models allow us to differentiate between the attachment to friends in general and the attachments to individual friends.

7.3 Method

7.3.1 Sample

This study is part of a more extensive longitudinal study on emerging adults' psychological adaptation during their first year after high school graduation (for more details, see Bohn et al.,

2020). The study was approved by the ethics committee of the Freie Universität Berlin. The sample comprised of emerging adults from Germany who graduated high school in July 2014.

On the first measurement occasion, each emerging adult chose one parent and rated the attachment to this parent. The emerging adults rated their attachment to the same parent over the whole course of the longitudinal study. If the emerging adults were in a romantic partnership, they were also asked to describe the attachment to their partner. At the second measurement occasion in December 2014, the emerging adults chose 1 to 5 friends and described their attachment to each of them. In total, the emerging adults described attachments to 1368 friends, which is an average of 2.67 friend attachments per person. Our study mainly uses data of the second measurement occasion which is the first occasion that included the attachment to friends. At the second measurement occasion, 208 emerging adults with a partner and 304 emerging adults without a partner participated. The average length of the relationship between the emerging adults and their partners had been 20.0 months.

The emerging adults with a partner had a mean age of 18.2 (SD_{age} = 0.54; 72% female) at the first measurement occasion. The emerging adults without a partner also had a mean age of 18.2 (SD_{age} = 0.60; 64% female). In the following, we will use the phrase *partner group* for emerging adults with a partner and *single group* for emerging adults without a partner.

To verify that the results are robust and not specific for only one measurement occasion, we also computed the models for the study's third and fourth measurement occasions. At the third measurement occasion, 190 emerging adults with a partner and 264 emerging adults without a partner participated. At the fourth and final measurement occasion, 168 emerging adults with a

partner and 263 emerging adults without a partner participated. Due to break-ups and new relationships, some emerging adults had switched the groups between measurement occasions. The average length of the relationships was 21.3 months at the third measurement occasion and 22.5 months at the fourth measurement occasion. In the following model descriptions, the emerging adults will be called targets as they are the target persons for whom the attachment to different attachment figures is investigated.

Simulation studies showed that comparable models with categorial items and Bayesian estimation require a sample size of 100 emerging adults, if each emerging adult describes the attachments to four friends (Holtmann et al., 2016, 2017). Since the number of friendship attachments per emerging adult was less than 4, a larger sample of 200 per group is appropriate. In the partner group of the third and fourth measurement occasion, the sample sizes were below 200, so the results here should be treated with greater caution. In particular, the within-level loadings may be biased (see Holtmann et al., 2016)

7.3.2 Scales

A short version of the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987) was used to measure attachment quality. The IPPA measures three aspects of secure attachment: trust, communication, and relatedness. Trust represents the conviction that the other person will be there in times of need. Communication describes the extent and quality of the verbal communication with the respective attachment figure. Relatedness describes closeness and low alienation (see also Armsden & Greenberg, 1987; for the short version see Bohn et al., 2020).

The short version of the IPPA comprised nine items. Each item was answered on a five-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The targets answered the IPPA items for each attachment figure. Therefore, there are multiple attachment ratings nested within each target.

7.3.3 Model

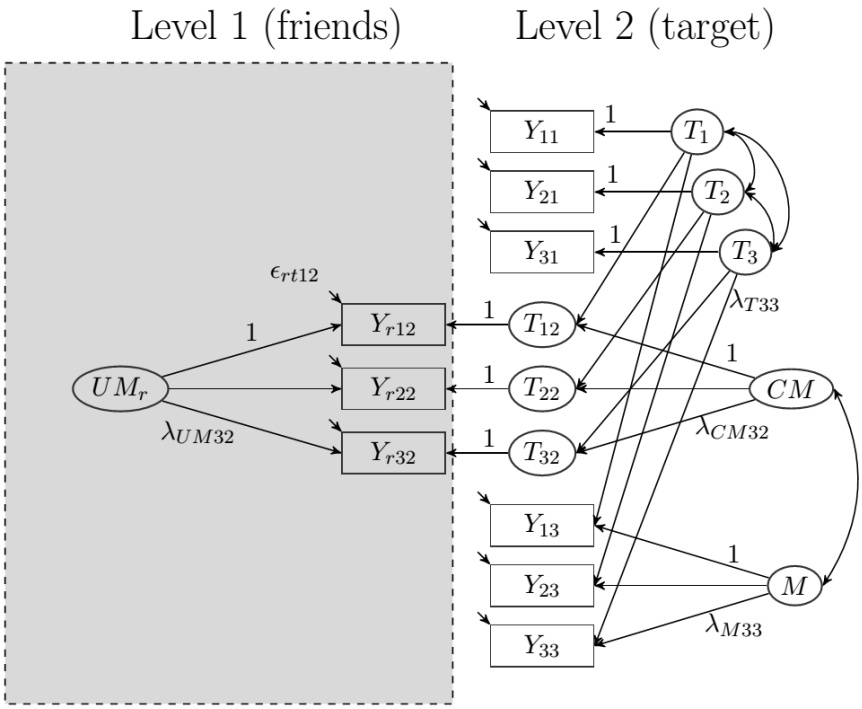
Model Structure. To examine the relationships between the attachments to different attachment figures, we used a multilevel confirmatory factor analysis model for the combination of structurally different and interchangeable raters introduced by Eid et al. (2008). This model is based on the correlated trait – correlated method -1 model (CTC(M-1) model; Eid, 2000; Eid et al., 2003) and extends it by including interchangeable ratings using a multilevel structure. This model is often applied for the combined analysis of different methods measuring the same traits in the context of multitrait-multimethod analysis (e.g., Carretero-Dios et al., 2011). In this study, we use an extended CTC(M-1) model to examine different attachments within one target person. We used two versions of the model. The larger version of the model was used for those targets who had a romantic partner and reported attachments to parents, friends, and romantic partners. The smaller version of the model was used for those targets without a partner, who reported attachments to parents and friends only. The larger version of the model is displayed in Figure 7.1.

In Figure 7.1, the indicators Y_{i1} represent the three items (i = 1, 2, 3) measuring attachment to the parents. The true (measurement error-free) value of the attachment to the parent is represented in an indicator-specific trait factor T_i. The three indicator-specific trait factors are correlated, with

high correlations indicating item homogeneity. According to attachment theory, parents are the first attachment figures, and the attachment to the parents is the building ground for a working model of attachment. Therefore, the attachment to the parents is chosen as the reference factor for the attachments to other attachment figures in the model.

Figure 7.1

The Larger Version of the Multilevel CTC(M-1) Model



The indicators Y_{i3} represent the three items measuring the attachment to the partner. The trait factors are used to predict the values in these indicators (for a detailed description including the formulas, see Appendix A). Therefore, the factor *M* describes that part of the true variance in the attachment to the partner that cannot be predicted by attachment to parents. The factor *M* is a

latent residual factor with a mean of 0. The factors *T* and *M* are uncorrelated. Targets with a positive (negative) value on *M* have a higher (lower) attachment to the partner than predicted based on their attachment to the parent. The indicators of the attachment to the partner are missing in the smaller version of the model used for the single group.

The indicators Y_{ri2} represent the three items for the attachment to individual friends. Each target describes the attachment to several friends such that attachments to friends are nested within targets. This nesting implies a hierarchical data structure. On the within-person level (Level 1), the indicators represent the different attachment to different friends. On the between-person level (Level 2), the variable T_{i2} represents the target-specific average latent attachment to the different friends. Like attachments to partner, averaged attachments to friends are predicted by the trait factors. The CM factor captures differences between the targets` average attachments to their friends that cannot be predicted by their attachment to their parents. The UM factor captures the deviations of targets' attachments to individual friends from the targets' average attachments to their respective friends. These deviations represent aspects of attachment to individual friends that are not shared across friends.

In the larger version of the model (see Figure 7.1), the two residual factors on Level 2 (*CM* and *M*) are correlated. This correlation captures the association between the attachment to the partner and the average attachment to friends after controlling for the attachment to the parents. If this correlation is high, the attachments to friends and partners share something that is not present in the attachment to the parents. If this correlation is zero, all similarity between attachments to friends and partners can be explained by the attachment to the parents. Since the attachment to

the parents is chosen as a reference, it also represents the general attachment style. If the general attachment style is the only reason for associations among the attachments to different attachment figures, the correlations between the residual factors should be zero.

Variance Decomposition and Coefficients. The research questions of this study can be answered by different coefficients that are based on variance decompositions. Due to the multilevel structure of friendship attachments, there are multiple coefficients for decomposing the variance of friendship attachments (see Eid et al., 2008; Koch et al., 2018). All coefficients denote proportions of the true (measurement error-free) variance, and they represent different aspects of consistency and specificity. As variance components, all coefficients have a range of values from 0 to 1. The formulas for defining the coefficients can be found in Table A1 in Appendix A.

The communality coefficient is defined as the proportion of true (measurement error-free) variance that is shared over the attachments to different friends. A high communality coefficient shows that attachments to different friends are very similar.

The unique figure specificity coefficient (UFS) describes the proportion of true variance that is unique to the specific friend attachments and that is neither shared with the attachments to other friends or the parents. The UFS is the counterpart to the communality coefficient (UFS = 1 - Communality). A high UFS indicates that attachments are highly dependent on the individual friend and not shared across different friends.

The communality in the attachments to different friends can be further divided into a part which can be explained by the attachment to the parents and a part that cannot be explained by the attachment to the parents. The former is termed consistency coefficient (CON), and the latter

is termed common figure specificity coefficient. The common figure specificity coefficient (CFS) describes the proportion of variance in the individual friend attachments that is shared across all friends but is not shared with the attachment to the parents. If the targets have similar attachments to their different friends that are not predictable by the attachment to their parents, the CFS is high. If the targets have similar attachments to their different friends only because of one general attachment style, this attachment style should also be visible in their attachment to their parents. In this case, the consistency would be high, while the CFS would be low. CON, CFS, and UFS add up to 1.

The Level 2-consistency coefficient (L2-CON) describes the proportion of variance that can be explained by the attachment to the parents in relation to all variance that is shared among the attachments to different friends. The L2-CON indicates how strong the (statistical) influence of attachment to parents is relative to the common attachment to friends. If the L2-CON is greater than 0.5, then more L2 variance is explained by attachment to parents than by shared attachment to friends.

For the attachment to the partner, only two coefficients can be defined. The first is the consistency coefficient, which describes the proportion of true variance that can be explained by the attachment to the parents. This coefficient has the same meaning as for the attachment to friends. The figure specificity coefficient (FS) describes the proportion of true variance that is specific to the attachment to the partners and that cannot be predicted by the attachment to the parent. CON and FS add up to 1. A high FS shows that the attachment to the partners cannot be predicted by the attachment to the parents. If emerging adults have a strong general attachment

style that influences all their attachments, the FS should be low and the consistency should be high.

The consistency coefficient's square root can be interpreted as the measurement error-free correlation of the attachment to the parent and the (common) attachment to the friends or partner, respectively.

Model Estimation. We used Bayesian Markov-Chain Monte-Carlo (MCMC) estimation in MPlus 8 (Muthén & Muthén, 1998-2017) to estimate the multilevel models with categorical indicators. We used 3 MCMC chains and a minimum of 400,000 iterations with a thinning of 20, resulting in a minimum of 10,000 post burn-in iterations used for the construction of posterior distributions. MCMC chains were assumed to have converged when the Potential Scale Reduction (PSR) factor fell below 1.01 for the first time after the minimum number of iterations was reached. The model fit was judged by posterior predictive *p*-values (PPP value). A PPP value near 0.5 indicates a very good model fit.

7.4 Results

The PPP values for all six models ranged from .288 to .436, indicating good model fit. Visual inspection of trace plots showed good convergence.

7.4.1 Attachment to Friends

The results for the attachments to friends are displayed in Table 7.1. The communality coefficient ranged from .36 to .53 for most indicators in the partner group and from .33 to .57 for

the indicators in the single group. Between one-third and half of the true variance in the attachments to different friends is shared among the attachments and is not specific to the individual friend. For the third indicator of trust in the partner group, the communality coefficient is remarkably higher, with a value of .72. The corresponding values of the unique specificity coefficient ranged from .28 to .64 in the partner group and from .43 to .68 in the single group. These values show the large amount of uniqueness in the individual attachments to different friends.

Values of the consistency coefficient hint to a substantial but comparatively small association between the attachments to friends and the parent. The variance proportions of the attachment to friends in the partner group are shown in Figure 7.2, and those in the single group are shown in Figure 7.3. The consistency coefficient ranged from .14 to .24 in the partner group and from .10 to .13 in the single group. That is, between 10 and 24% of the true variance in the attachment to friends could be explained by the attachment to the parent. These values correspond to measurement error-free correlations between the attachment to the parent and the attachment to friends ranging from .31 to .49, indicating a substantial degree of consistency among the attachments to the different attachment figures (here: parents and friends The translation of consistency coefficients into measurement error-free correlations are shown in the last column of Table 7.1. However, the consistency coefficient was smaller than the common figure specificity coefficient in nearly all cases and smaller than the unique figure specificity coefficient in all cases.

Figure 7.2

Variance Proportions in the Partner Group

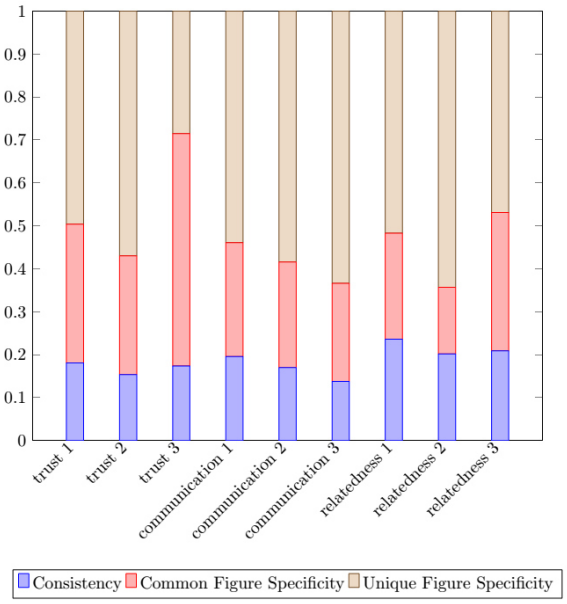


Figure 7.3

Variance Proportions in the Single Group

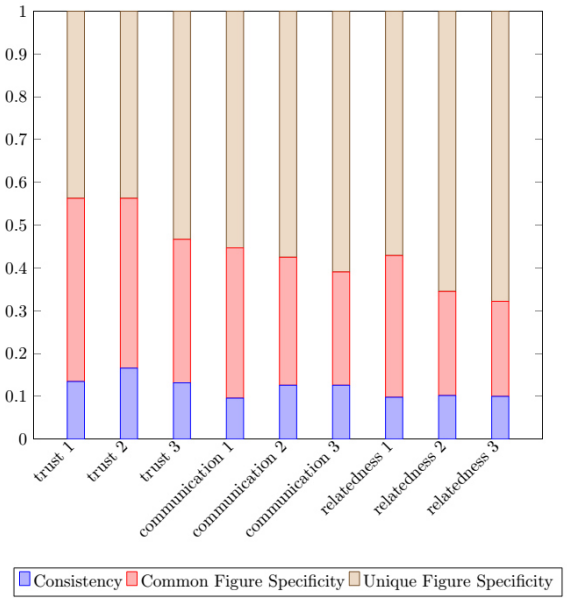


Table 7.1

Latent Variance Coefficients for the Items of Attachment to Friends

Item	Communality	CON	CFS	L2-CON	UFS	*r*
			Partner group			
trust 1	.51	.18	.32	.36	.49	.43
	[.34, .66]	[.09, .30]	[.17, .48]	[.18, .57]	[.35, .66]	[.30, .54]
trust 2	.44	.15	.28	.36	.56	.39
	[.28, .59]	[.07, .26]	[.14, .43]	[.17, .59]	[.41, .72]	[.27, .51]
trust 3	.72	.17	.54	.24	.28	.42
	[.58, .83]	[.07, .31]	[.37, .70]	[.09, .44]	[.17, .42]	[.25, .56]
communication 1	.47	.20	.27	.43	.53	.44
	[.32, .60]	[.11, .30]	[.14, .40]	[.24, .64]	[.40, .68]	[.33, .55]
communication 2	.42	.17	.25	.41	.58	.41
	[.27, .55]	[.10, .26]	[.11, .38]	[.22, .65]	[.45, .73]	[.31, .51]
communication 3	.37	.14	.23	.38	.63	.37
	[25, .49]	[.07, .22]	[12, .34]	[.21, .58]	[.51, .75]	[.27, .47]
relatedness 1	.49	.24	.25	.49	.51	.49
	[.29, .66]	[.12, .36]	[.08, .44]	[.26, .76]	[.34, .71]	[.35, .60]
relatedness 2	.36	.20	.16	.57	.64	.45
	[.21, .51]	[.11, .31]	[.03, .29]	[.33, .87]	[.49, .79]	[.33, .55]
relatedness 3	.53	.21	.32	.40	.47	.46
	[.35, .65]	[.11, .32]	[.12, .46]	[.20, .70]	[.35, .65]	[.33, .57]
			Single group			
trust 1	.57	.14	.43	.24	.43	.37
	[.44, .68]	[.06, .23]	[.30, .55]	[.11, .40]	[.32, .56]	[.25, .48]
trust 2	.57	.17	.40	.30	.43	.41
	[.42, .70]	[.08, .27]	[.25, .54]	[.15, .48]	[.30, .58]	[.29, .52]
trust 3	.47	.13	.34	.28	.53	.36
	[.31, .63]	[.06, .23]	[.19, .49]	[.13, .48]	[.37, .69]	[.24, .48]
communication 1	.45	.10	.35	.22	.55	.31
	[.31, .58]	[.04, .17]	[.21, .48]	[.09, .39]	[.42, .69]	[.20, .41]
communication 2	.43	.13	.30	.30	.57	.36
	[.30, .55]	[.06, .20]	[.18, .42]	[.16, .47]	[.45, .70]	[.25, .45]
communication 3	.39	.13	.27	.32	.61	.36
	[.28, .50]	[.07, .19]	[.16, .37]	[.19, .49]	[.50, .72]	[.27, .44]
relatedness 1	.43	.10	.33	.23	.57	.31
	[.30, .55]	[.04, .18]	[.20, .45]	[.09, .42]	[.45, .70]	[.20, .42]
relatedness 2	.35	.10	.24	.30	.65	.32
	[.22, .47]	[.05, .18]	[.13, .36]	[.14, .52]	[.53, .78]	[.21, .42]
relatedness 3	.33	.10	.22	.31	.68	.32
	[.19, .47]	[.04, .18]	[.10, .36]	[.14, .57]	[.53, .81]	[.21, .42]

Note. Communality = communality coefficient; CON = consistency coefficient; CFS = common figure specificity coefficient; L2-CON = Level 2 consistency coefficient; UFS = unique figure specificity coefficient; *r* = measurement error-free correlation between parental attachment and the mean attachment to friends (at Level 2). 95% credibility intervals are given in parentheses.

For relatedness, consistency coefficients were smaller in the single group than in the partner group. In the single group, the CON values were close to .1 (corresponding to correlations around .3); in the partner group, the CON values were close to .2 (corresponding to correlations around .45). The communality coefficients for relatedness were similar between both groups. Hence, the degree of communality among the attachments to different friends is comparable for singles and targets in a relationship. Nevertheless, for targets in a relationship, this common relatedness to friends has a higher correlation with the relatedness to the parent than for targets who are singles. In the case of trust and communication, slightly lower values of the consistency coefficient were found in the single group for almost all indicators.

The L2-CON indicated that the larger part of the Level 2-variance of the attachment to friends is specific to friendships and is not associated with the attachment to the parent. The L2-CON was below .5 in most cases, indicating that less than half of the Level 2 variance can be predicted by the attachment to the parent. For almost all indicators, L2-CON was substantially higher in the partner group than in the single group. This means that the common share of friendship attachment is more strongly related to attachment to parents among persons in a partnership than among singles.

7.4.2 Attachment to Partners

The results for the attachment to partners are displayed in Table 7.2. Consistency coefficients for the attachment to partners were lower than for the attachment to friends in most cases. Consistency was especially low for the communication with the partner, with values ranging from

.01 to .02. These correspond to measurement error-free correlations between the communication with the partner and the communication with parents ranging from .09 to .34. For relatedness, values of the consistency coefficient for the partners ranged from .08 to .16. That is, consistency levels for relatedness are comparable for partners and friends in the single group. Consistency for the indicators of trust differed strongly among the three indicators, with values between .02 and .18. The consistency of the first indicator was comparable to consistency with respect to the attachment to friends, but the second and third indicators had lower values.

Table 7.2

Latent Variance Coefficients for the Attachment to Partners

Item	CON	FS	*r*
trust 1	.18	.82	.42
	[.05, .36]	[.64, .95]	[.22, .60]
trust 2	.06	.94	.25
	[.00, .24]	[.76, 1.0]	[.03, .49]
trust 3	.02	.99	.12
	[.00, .11]	[.90, 1.0]	[.01, .33]
communication 1	.01	.99	.09
	[.00, .08]	[.92, 1.0]	[.00, .28]
communication 2	.11	.89	.34
	[.02, .27]	[.73, .98]	[.13, .52]
communication 3	.02	.98	.13
	[.00, .10]	[.90, 1.0]	[.01, .31]
relatedness 1	.09	.91	.30
	[.01, .25]	[.75, .99]	[.08, .50]
relatedness 2	.08	.92	.29
	[.01, .20]	[.80, .99]	[.11, .45]
relatedness 3	.16	.84	.40
	[.05, .30]	[.70, .95]	[.23, .55]

Note. CON = consistency coefficient; FS = figure specificity coefficient; *r* = measurement error-free correlation between the attachment to parents and the attachment to partners. 95% credibility intervals are given in parentheses.

In the partner group models, the common residual factor of the attachment to friends (*CM*) and the residual factor of the attachment to partners (*M*) were correlated. These correlations represent an association between the attachments to friends and partners after controlling for the attachment to parents. In the model of trust this correlation was r = .13 (95%-KI: [-.12, .36]), in the model of communication this correlation was r = .28 (95%-KI: [-.01, .56]), and in the model of relatedness this correlation was r = .08 (95%-KI: [-.22, .34]). In no case, the association provably deviated from 0. There were no shared aspects in the attachments to friends and partners beyond the parental attachment for all aspects of attachment security. All correlations between the attachments to friends and partners could be explained by the attachment to parents, which was also an indicator for the global attachment style.

Table 7.3

Correlations Between the Indicator-Specific Trait Factors

facet of attachment	$r(T_1, T_2)$	$r(T_1, T_3)$	$r(T_2, T_3)$
	Partner group		
trust	.94	.90	.87
	[.86, .98]	[.66, .91]	[.75, .95]
communication	.80	.91	.90
	[.69, .89]	[.84, .96]	[.83, .95]
relatedness	.91	.79	.91
	[.81, .96]	[.65, .89]	[.83, .96]
	Single group		
trust	.97	.85	.87
	[.94, .99]	[.76, .93]	[.77, .94]
communication	.81	.90	.81
	[.69, .91]	[.82, .96]	[.72, .89]
relatedness	.94	.93	.93
	[.87, .97]	[.86, .97]	[.85, .97]

Note. All six models had three correlated indicator-specific trait factors. *r*: correlation; T_i: indicator-specific latent trait factor for indicator *i* of the respective attachment facet. 95% credibility intervals are given in parentheses.

The correlations between the indicator-specific trait factors in all six models are displayed in Table 7.3. The correlations ranged from .79 to .97, which showed a high item homogeneity in the three scales. At the same time, these correlations were too small to use a model with a general trait factor, which effectively would have restricted these correlations to be 1.

7.4.3 Results for Later Measurement Occasions

To test if the results are replicable, we estimated the same models for the remaining two measurement occasions (the third and fourth measurement occasion of the study). Results are provided in the Appendices (Tables B1 to B3 for the third and Tables C1 to C3 for the fourth measurement occasion). The PPP-values ranged from .283 to .431 for the third measurement occasion and from .216 to .477 for the fourth measurement occasion, indicating a good Model Fit for all models.

Coefficients for the attachment to friends were mostly similar to those of the second measurement occasion. The communality coefficients for relatedness were smaller on the third measurement occasion, with values ranging from .30 to .38 in the partner group and values between .18 and .30 in the single group. Additionally, consistency coefficients for the relatedness on friends were smaller at the third measurement occasion in the partner group, with values around .13. Moreover, the third indicator of trust had a communality coefficient of .45, which was a regular and no longer extreme value. The fourth measurement occasion repeated the results of the third with one remarkable exception: the consistency of the indicators of trust in the partner group had their highest values ranging from .19 to .26 at the fourth measurement occasion.

The results for the attachment to partners changed for the later measurement occasions. The consistency coefficients increased from the second to the third and then again at the fourth measurement occasion. On the fourth measurement occasion, consistency ranged from .34 to .50 for trust, from .16 to .32 for communication, and from .26 to .40 for relatedness. These values correspond to measurement error-free correlations around .5 and higher. The correlations between the trait-specific factors showed no systematic differences to the second measurement occasion.

The correlations between the common residual factor of attachment to friends and the residual factor of attachment to partners were higher on the third and fourth measurement occasion than on the second one. On the third measurement occasion, the correlation was $r = .54$ (95%-KI: [.31, .74]) in the model of trust, in the model of communication the correlation was $r = .53$ (95%-KI: [.25, .76]), and in the model of relatedness $r = .38$ (95%-KI: [.12, .61]). On the fourth measurement occasion the correlation was $r = .39$ (95%-KI: [.11, .65]) in the model of trust, in the model of communication the correlation was $r = .59$ (95%-KI: [.32, .82]), and in the model of relatedness $r = .23$ (95%-KI: [-.07, .51]). These correlations were substantially greater than zero in most cases.

In summary, attachments to friends did not change in a substantive degree for the later measurement occasions. However, the values for attachments to romantic partners changed significantly over the course of the longitudinal study. The consistency of the attachment in the later measurement occasions is substantially higher.

7.5 Discussion

In this study, we examined the degree of consistency and specificity of attachments to different attachment figures. The study results support the idea of a general working model of attachment, but they also clearly show that there is an even larger proportion in attachment specific to a particular domain of attachment figures or even to the individual attachment figure.

7.5.1 ***Consistency of Attachment***

The consistency between the attachment to parents and the other attachments can be seen as a sign for a general working model of attachment. We used structural equation models, and therefore the consistency can be transformed to measurement error-free correlations. The correlations between the attachments to parents and the attachments to friends have values around .3 and .4 for the attachments to friends. Such values indicate large or even very large effect sizes (Funder & Ozer, 2019). These correlations are larger than those reported by Fraley et al. (2011). The correlations between the attachments to parents and the attachments to partners had values around .1 in some cases, which are small effect sizes, but the correlations reached values above .5 at later measurement occasion, which are very large effect sizes (Funder & Ozer, 2019). These correlations show that the targets described similar levels of trust, communication, and relatedness to their parents and to other attachment figures. The high consistency between the different attachments is an argument for a general working model of attachment.

The consistency is smaller than the specificity in all cases. However, one should not merely conclude that the relationship between ties to different individuals should be neglected. To better

illustrate the effect sizes of consistency, we can use Rosenthal and Rubin's procedure (Rosenthal & Rubin, 1982). With a correlation of .4, as in several cases in our study (and assuming a normal distribution of values), the probability that a person with above-average secure attachment to the parent also has above average secure attachment to the other attachment figure is 70%. At the same time, this means that the probability of a below-average secure attachment to another attachment figure would be just 30%.

7.5.2 Specificity of Attachment

Two results are particularly relevant to foster the idea of attachment figure-specific working models of attachment. Such specific working models would lead to similar attachment quality in the attachments to similar attachment figures. The first relevant result is that the common figure specificity coefficients show the large amount of shared variance among the attachments to different friends. The common figure specificity coefficients were higher than the consistency coefficients in nearly all cases, showing that the communality among the attachments to different friends is mainly due to the common attachment to friends that is unrelated to the attachment to the parents. The same information is also visible in the Level 2-consistency coefficient, which was below .5 in most cases. Emerging adults report similar attachments to different friends. These commonalities are not solely the result of a general attachment style but are mainly based on a similar design of different friendship attachments. A friendship-specific working model of attachment could explain this similarity. Alternatively, it is also possible that a more general

working model contains subsystems with the commonalities and specificities for a particular domain of attachment figure (in this case, friends).

Overall, this study joins the ranks of studies that emphasize the specificity of different attachments (Caron et al., 2012; Cozzarelli et al., 2000; Doyle et al., 2009; Furmann et al. 2002; Furman et al., 2013; Imamoğlu & Imamoğlu, 2006; La Guardia et al., 2000; Markiewicz et al., 2006; Ross & Spinner, 2001; Umemura et al., 2015). This study can contribute to the knowledge beyond the mentioned studies through the attention to several attachments to friends in one person. In this way, it was possible to show that attachments to different attachment figures of the same domain are more strongly related than different attachments within a person in general. The emerging adults in our study developed similar attachments to their friends, and this similarity cannot be described simply in terms of a general attachment style.

The second relevant result for the attachment figure specificity of attachment lies in the correlations between the residual factors. At the second measurement occasion, these correlations were not significantly different from zero. This result was not in line with earlier studies that found a correlation between the attachments to friends and partners beyond the attachment to parents (Furman et al., 2002; Klohnen et al., 2005). However, for the two later measurement occasions, the correlations were remarkably larger. This result showed that the attachments to friends and the attachment to a partner are related, and this relationship cannot be explained by a general attachment style alone. Unlike the first argument for attachment specificity, this argument is limited in its impact by the very different results at different measurement occasions.

Most of the variance in this study remained specific to the individual bond. Because we used structural equation models, these large proportions of variance cannot be explained by measurement error influences but rather describe this bond's peculiarities. Ainsworth (1989, see also Ainsworth et al., 1978/2015) and Bowlby (1969) described that a bond is always related to a specific person, and this aspect is evident in our data. Attachment figures are unique, and thus attachments to different figures within a person are also different (Mikulincer & Shaver, 2016). This large degree of specificity indicates that while there are clear commonalities between attachments to different figures, the influence of general working models should not be overestimated.

7.5.3 Romantic Attachment

At the second measurement occasion, the attachment to partners had only a low correlation with the attachment to parents and the attachment to friends. For many items (especially those regarding communication), credibility intervals of the consistency coefficient covered 0. We can only speculate why the attachment to partners deviated from the other attachments at this measurement occasion. Our study captured the first year after high school graduation with many changes and new experiences. In many cases, emerging adulthood is the time of the first significant and long-lasting romantic partnership. Romantic partnerships have a much shorter history than relationships with parents and friends; this might lead to a lower consistency with other attachments. Because consistency is higher at the later measurement occasions, attachments to the partner may become more like a person's other attachments over time. This effect could be

amplified if relationships whose attachment is less in line with other attachments are less stable and dissolve more quickly.

Emerging adults without a partner had lower consistency coefficients than those with a partner. The relatedness with friends was less associated with the relatedness with parents. Interestingly, this did not lead to considerable differences in the communality coefficients. That is, singles also experience a similar degree of communality among the attachments to different friends as non-singles, but for singles the attachments to friends were less associated with the attachments to parents. Singles do not have a partner, a particular form of an attachment figure; this might lead to a more substantial differentiation among the attachments to other attachment figures.

7.5.4 Theoretical Implications

In summary, our study supports Fraley et al.'s (2011) idea of specific working models of attachment. General working models of attachment are limited in their explanatory power. Our findings contradict (to some degree) the assumption of *one* general working model of attachment or, at least, suggest that there are multiple overlapping working models. It is possible to interpret this overlap as a general working model of attachment. We could show that the association between the attachments is indeed useful for predicting attachment to other figures. However, these results do not fit well with a global working model of attachment and/or a general attachment style (as postulated by Bowlby, 1988; Levy et al., 2011; Meyer & Pilkonis, 2001).

Through our study and the use of new models, we were able to add new insights to the theory of specific working models. The different attachments to figures of the same domain correlate more strongly than the attachments as a whole. Thus, the specific working models for these attachment figures show a greater overlap. We assume, that the specific working models are influenced by the domain of the relationship (e.g., friendship, partnership). These specific working models contain subjective expectations and beliefs that the person has regarding topics such as friendship or love. These overarching beliefs in turn provide greater consistency of attachments within a domain. This consistency of attachments within a domain is an exiting topic for future research and theories.

7.5.5 Limitations

Due to the dropout and switches between groups, this study does not examine the stability of outcomes over time. Many of our results could be replicated across different measurement occasions. However, the partner communication results showed varying degrees of consistency across time. unfortunately, we do not have a clear-cut answer for these results.

Our sample was rather homogenous with respect to age. (almost all targets were 18 or 19 years old). In addition, all targets had just passed the Abitur in Germany, a qualification that only about half of a cohort achieves. Therefore, this study ignores large parts of the 'forgotten half' (Arnett, 2000). Although our study, unlike many others, is not limited to students, the results should not be readily generalized to other age groups or social or cultural contexts.

7.6 Conclusion

Our study shows that the theory of a general attachment style is limited in its explanatory power and that attachments mainly contain specific components. The results of our study fit well with the theory of specific working models of attachment. By examining attachment to multiple friends per person, we were able to show that attachments to a specific domain of attachment figure are more strongly related than the attachments within a person per se. Thus, the specific working models of emerging adult attachments appear to contain similarities for figures in the same domain.

7.7 References

Ahnert, L., Pinquart, M., & Lamb, M. E. (2006). Security of children's relationship with nonparental care providers: A meta-analysis. *Child Development, 74*(3), 664-679. doi:10.1111/j.1467-8624.2006.00896.x

Ainsworth, M. D. (1989). Attachments beyond infancy. *American Psychologist, 44*(4), 709-716.

Ainsworth, M. D., Blehar, M. C., Waters, E., & Wall, S. N. (2015). *Patterns of attachment: A psychological study of the strange situation.* New York: Psychology Press. (Original work published 1978).

Arnett, J. J. (2000). Emerging adulthood. A theory of development from the late teens through the twenties. *American Psychologist, 55*(5), 469-480. doi:10.1037/0003-066X.55.5.469

Bohn, J., Holtmann, J., Luhmann, M., Koch, T., & Eid, M. (2020). Attachment to parents and well-being after high-school graduation: A study using self- and parents ratings. *Journal of Happiness Studies, 21*(7), 2493-2525. doi:10.1007/s10902-019-00190-y

Bowlby, J. (1969). *Attachment and loss: Vol 1. Attachment.* New York: Basic.

Bowlby, J. (1980). *Attachment and loss: Vol. 3. Loss: Sadness and depression.* New York: Basic.

Bowlby, J. (1988). *A secure base: Clinical applications of attachment theory.* London: Routledge.

Burack, J. A., D'Arrisso, A., Ponizovsky, V., Troop-Gordon, W., Mandour, T., Tootoosis, C., . . . Fryberg, S. (2013). 'Friends and grades': Peer preference and attachment predict academic success among Naskapi youth. *School Psychology International, 34*(4), 371-386. doi:10.1177/0143034312446888

Caron, A., Lafontaine, M.-F., Bureau, J.-F., Levesque, C., & Johnson, S. M. (2012). Comparisions of close relationships: An evaluation of relationship quality and patterns of attachment to parents, friends, and romantic partners in young adults. *Canadian Journal of Behavioral Science, 44*(4), 245-256.

Carretero-Dios, H., Eid, M., & Ruch, W. (2011). Analyzing multitrait-multimethod data with multilevel confirmatory factor analysis: An application to the validation of the state-trait cheerfulness inventory. *Journal of Research in Personality, 45*, 153-164. doi:10.1016/j.jrp.2010.12.007

Cozzarelli, C., Hoekstra, S. J., & Bylsma, W. H. (2000). General versus specific mental models of attachment: Are they associated with different outcomes? *Personality and Social Psychology Bulletin, 26*(5), 605-618.

De Goede, I. H., Branje, S., van Duin, J., van der Valk, I., & Meeus, W. (2012). Romantic relationship commitment and its linkages with commitment to parents and friends during adolescence. *Social Developement, 21*(3), 425-442. doi:10.1111/j.1467-9507.2011.00633.x

Doyle, A. B., Lawford, H., & Markiewicz, D. (2009). Attachment style with other, father, best friend, and romantic partner during adolescence. *Journal of Research on Adolescence, 19*(4), 690-714. doi:10.1111/j.1532-7795.2009.00617.x

Eid, M. (2000). A multitrait-multimethod model with minimal assumptions. *Psychometrika, 65*(2), 241-261.

Eid, M., Lischetzke, T., Nussbeck, F., & Trierweiler, L. (2003). Separating trait effects from trait-specific method effects in multitrait-multimethod models: A multiple-indicator CT-C(M-1) model. *Psychological Methods, 8*(1), 38-60.

Eid, M., Nussbeck, F. W., Geiser, C., Cole, D. A., Gollwitzer, M., & Lischetzke, T. (2008). Structural equation modeling of multitrait-multimethod data: Different models for different types of methods. *Psychological Methods, 13*(3), 230-253.

Forslund, T., Granqvist, P., van IJzendoorn, M. H., Sagi-Schwartz, A., Glaser, D., Steele, M., . . . Duschinsky, R. (2021). Attachment goes to court: Child protection and custody issues. *Attachment & Human Development*. doi:10.1080/14616734.2020.1840762

Fox, N. A., Kimmerly, N. L., & Schafer, W. D. (1991). Attachment to mother/Attachment to father: A meta-analysis. *Child Developement, 62*, 210-225.

Fraley, R. C. (2002). Attachment stability from infancy to adulthood: Meta-analysis and dynamic modeling of developmental mechanisms. *Personality and Social Psychology Review, 6*(2), 123-151.

Fraley, R. C., & Dugan, K. A. (2021). The consistency of attachment security across time and relationships. In R. A. Thompson, J. A. Simpson, & L. J. Berlin, *Attachment. The fundamental questions* (pp. 147-153). New York: The Guilford Press.

Fraley, R. C., Heffernan, M. E., Vicary, A. M., & Brumbaugh, C. C. (2011). The Experiences in Close Relationships - Relationships Structures Questionnaire: A method for assessing attachment orientations across relationships. *Psychological Assessment, 23*(3), 615-625. doi: 10.1037/a0022898

Freeman, H., & Brown, B. B. (2001). Primary attachment to parents and peers during adolescence: Differences by attachment style. *Journal of Youth and Adolescence, 30*(6), 653-674.

Funder, D. C., & Ozer, D. J. (2019). Evaluating effect size in psychological research: Sense and nonsense. *Advances in Methods and Practices in Psychological Science, 2*(2), 156-168. doi:10.1177/2515245919847202

Furman, W., Simon, V. A., Shaffer, L., & Bouchey, H. A. (2002). Adolescents' working model and styles for relationsships with parents, friends, and romantic partners. *Child Developement, 73*(1), 241-255.

Furman, W., Stephenson, J. C., & Rhoades, G. K. (2013). Positive interactions and avoidant and anxious representations in relationships with parents, friends, and romantic partners. *Journal of Research on Adolescence, 24*(4), 615-629. doi:10.1111/jora.12052

Guarnieri, S., Smorti, M., & Tani, F. (2015). Attachment relationships and life satisfaction during emerging adulthood. *Social Indicators Research, 121*, 833-847. doi:10.1007/s11205-014-0655-1

Han, Y., Kim, H., & Lee, D. (2016). Application of social control theory to examine parent, teacher, and close friend attachment and substance use initiation among Korean youth. *School Psychology International, 37*(4), 340-358. doi:10.1177/0143034316641727

Holtmann, J., Koch, T., Bohn, J., & Eid, M. (2017). Bayesian analysis of longitudinal multitrait-multimethod data with ordinal response variables. *British Journal of Mathematical and Statistical Psychology, 70*, 42-80.

Holtmann, J., Koch, T., Lochner, K., & Eid, M. (2016). A comparison of ML, WLSMV and Bayesian methods for multilevel structural equation models in small samples - A simulation study. *Multivariate Behavioral Research, 51*, 661-680. doi:10.1080/00273171.2016.1208074

Imamoğlu, S., & Imamoğlu, E. O. (2006). Relationship between general and context-specific attachment orientations in a Turkish sample. *The Journal of Social Psychology*, 261-274.

Klohnen, E. C., Weller, J. A., Luo, S., & Choe, M. (2005). Organization and predictive power of general and relationship-specific attachment models: One for all, and all for one? *Personality and Social Psychology Bulletin, 31*(12), 1665-182. doi:10.1177/0146167205278307

Koch, T., Eid, M., & Lochner, K. (2018). Multitrait-multimethod analysis: The psychometric foundation of CFA-MTMM models. In P. Irwing, T. Booth, & D. J. Hughes, *The Wiley handbook of psychometric testing: A multidisciplinary reference on survey, scale and test development* (pp. 781-846). West Sussex, UK: John Wiley & Sons.

Kullik, A., & Petermann, F. (2013). Attachment to parents and peers as a risk factor for adolescent depressive disorders: The mediating role of emotion regulation. *Child Psychiatry & Human Development, 44*, 537-548. doi:10.1007/s10578-012-0347-5

La Guardia, J. G., Ryan, R. M., Couchman, C. E., & Deci, E. L. (2000). Within-person variation in security of attachment: A self-determination theory perspective on attachment, need fulfillment, and well-being. *Journal of Personality and Social Psychology, 79*(3), 367-384. doi:10.1037/0022-3514.79.3.367

Levy, K. N., Ellison, W. D., Scott, L. N., & Bernecker, S. L. (2011). Attachment style. *Journal of Clinical Psychology: In Session, 67*(2), 193-203. doi:10.1002/jclp.20756

Margolese, S. K., Markiewicz, D., & Doyle, A. B. (2005). Attachment to parents, best friend, and romantic partner: Predicting different pathways to depression in adolescence. *Journal of Youth and Adolescence, 34*(6), 637-650. doi:10.1007/s10964-005-8952-2

Markiewicz, D., Lawford, H., Doyle, A. B., & Haggart, N. (2006). Developmental differences in adolescents' and young adults' use of mothers, fathers, best friends, and romantic

partners to fulfill attachment needs. *Journal of Youth and Adolescence, 35*(1), 127-140. doi:10.1007/s10964-005-9014-5

Meeus, W. H., Branje, S. J., van der Valk, I., & de Wied, M. (2007). Relationships with intimate partner, best friend, and parents in adolescence and early adulthood: A study of the saliency of the intimate partnership. *International Journal of Behavioral Development, 31*(6), 569-580.

Meyer, B., & Pilkonis, P. A. (2001). Attachment style. *Psychotherapy, 38*(4), 466-472. doi:10.1037/0033-3204.38.4.466

Mikulincer, M., & Shaver, P. R. (2016). *Attachment in adulthood* (2. ed.). New York: Guilford Press.

Muthén, L. K., & Muthén, B. O. (1998-2017). *Mplus user's guide.* (8. ed.). Los Angeles, CA: Muthén & Muthén.

Posada, G., Lu, T., Trumbell, J., Kaloustian, G., Trudel, M., Planta, S. J., . . . Monteiro, L. (2013). Is the secure base phenomenon evident here, there, and anywhere? A cross-cultural study of child behavior and experts' definitions. *Child Development, 84*(6), 1896-1905. doi:10.1111/cdev.12084

Ratto, N., Doyle, A.-B., & Markiewicz, D. (2016). Attachment with mother and adolescents' conflict with romantic partner or close friend. *Canadian Journal of Behavioural Science, 48*(1), 68-77. doi:10.1037/cbs0000031

Rosenthal, R., & Rubin, D. B. (1982). A simple, general purpose display of magnitude of experimental effect. *Journal of Educational Psychology, 74*(2), 166-169.

Ross, L. R., & Spinner, B. (2001). General and specific attachment representations in adulthood: Is there a relationship? *Journal of Social and Personal Relationships, 18*(6), 747-766.

Umemura, T., Lacinová, L., & Macek, P. (2015). Is emerging adults' attachment preference for the romantic partner transferred from their attachment preferences for their mother, father, and friends? *Emerging Adulthood, 3*(3), 179-193. doi:10.1177/2167696814561767

Vu, J. A. (2014). Children's representations of relationships with mothers, teachers, and friends, and associations with social competence. *Early Child Development and Care, 185*(10), 1695-1713. doi:10.1080/03004430.2015.1022538

Zimmermann, P. (2004). Attachment representations and characteristics of friendship during adolescence. *Journal of Experimental Child Psychology, 88*, 83-101. doi:10.1016/j.jecp.2004.02.002

Appendix A: A More Detailed Description of the Model

The model is depicted in Figure 7.1. The indicators Y_{i3} represent the three items measuring the attachment to the partner. The true value of these indicators can be separated into several parts:

$$Y_{i3} = \alpha_{i3} + \lambda_{Ti3} * T_i + \lambda_{Mi3} * M + \epsilon_{i3}$$

where α_{i3} is an intercept parameter and ϵ_{i3} is a residual variable. The summand $\lambda_{Ti3} * T_i$ represents the part of the attachment to the partner that can be predicted by the attachment to the parents. The summand $\lambda_{Mi3} * M$ represents the part of the attachment to the partner that cannot be predicted by the attachment to the parents and that is specific to the attachment to the partner.

The indicators Y_{ri2} represent the three items for the attachment to individual friends. On Level 1, the indicators represent the different attachment ratings with r as the respective friend index. On Level 2, the variable T_{i2} represents the target-specific average latent attachment to the different friends. Like the indicator of the attachment to the partner, the variable Y_{i2} is decomposed in the following way:

$$Y_{ri2} = \alpha_{i2} + \lambda_{Ti2} * T_i + \lambda_{CMi2} * CM + \lambda_{UMi2} * UM_r + \epsilon_{ri2}$$

where α_{i2} is an intercept parameter and ϵ_{ri3} is a residual variable. The summand $\lambda_{Ti2} * T_i$ represents the part of the attachment to a friend that can be predicted by the attachment to the parents. The summands $\lambda_{CMi2} * CM$ and $\lambda_{UMi2} * UM_r$ represent the part of the attachments to friends that the attachment to parents cannot predict. The summand $\lambda_{CMi2} * CM$ represents the deviation from the prediction that is shared by the attachments to all friends. The summand $\lambda_{UMi2} * UM_r$ captures the deviation from the predicted value that is unique to the individual attachment to one individual friend.

The variances of the attachments to friends can be decomposed in the following way:

$$\mathrm{Var}(Y_{i2}) = \lambda_{Ti2}^2 * \mathrm{Var}(T_i) + \lambda_{CMi2}^2 * \mathrm{Var}(CM) + \lambda_{UMi2}^2 * \mathrm{Var}(UM_r) + \mathrm{Var}(\epsilon_{i2})$$

The variances of the attachments to the partner can be decomposed in the following way:

$$\mathrm{Var}(Y_{i3}) = \lambda_{Ti3}^2 * \mathrm{Var}(T_i) + \lambda_{Mi3}^2 * \mathrm{Var}(M) + \epsilon_{i3}$$

Based on these two variance decompositions several coefficients can be defined (see Table A1).

Table A1

Variance Decompositions and Coefficients

Coefficient	Definition
	Attachment to Friends
Communality	$\text{Communality}(Y_{i2}) = \frac{\lambda_{Ti2}^2 * \text{Var}(T_i) + \lambda_{CMi2}^2 * \text{Var}(CM)}{\lambda_{Ti2}^2 * \text{Var}(T_i) + \lambda_{CMi2}^2 * \text{Var}(CM) + \lambda_{UMi2}^2 * \text{Var}(UM_r)}$
Consistency	$\text{CON}(Y_{i2}) = \frac{\lambda_{Ti2}^2 * \text{Var}(T_i)}{\lambda_{Ti2}^2 * \text{Var}(T_i) + \lambda_{CMi2}^2 * \text{Var}(CM) + \lambda_{UMi2}^2 * \text{Var}(UM_r)}$
Common Figure Specificity	$\text{CFS}(Y_{i2}) = \frac{\lambda_{CMi2}^2 * \text{Var}(CM)}{\lambda_{Ti2}^2 * \text{Var}(T_i) + \lambda_{CMi2}^2 * \text{Var}(CM) + \lambda_{UMi2}^2 * \text{Var}(UM_r)}$
Unique Figure Specificity	$\text{UFS}(Y_{i2}) = \frac{\lambda_{UMi2}^2 * \text{Var}(UM_r)}{\lambda_{Ti2}^2 * \text{Var}(T_i) + \lambda_{CMi2}^2 * \text{Var}(CM) + \lambda_{UMi2}^2 * \text{Var}(UM_r)}$
Level 2-Consistency	$\text{L2} - \text{CON}(Y_{i2}) = \frac{\lambda_{Ti2}^2 * \text{Var}(T_i)}{\lambda_{Ti2}^2 * \text{Var}(T_i) + \lambda_{CMi2}^2 * \text{Var}(CM)}$
	Attachment to Romantic Partner
Consistency	$\text{CON}(Y_{i3}) = \frac{\lambda_{Ti3}^2 * \text{Var}(T_i)}{\lambda_{Ti3}^2 * \text{Var}(T_i) + \lambda_{Mi3}^2 * \text{Var}(M)}$
Figure Specificity	$\text{FS}(Y_{i3}) = \frac{\lambda_{Mi3}^2 * \text{Var}(M)}{\lambda_{Ti3}^2 * \text{Var}(T_i) + \lambda_{Mi3}^2 * \text{Var}(M)}$

Note. The coefficients are based on variance decompositions. Because multiple friend attachments are nested within an individual, variance in attachments to friends can be decomposed more diversely than attachments to partners.

Appendix B: Results for the Third Measurement Occasion

Table B1

Latent Variance Coefficients for the Items of Attachment to Friends on the third Measurement Occasion

Item	Communality	CON	CFS	L2-CON	UFS	*r*
			Partner group			
trust 1	.51 [.38, .64]	.14 [.05,.26]	.37 [.22, .51]	.28 [.10, .50]	.49 [.36, .63]	.38 [.23, .51]
trust 2	.44 [.30, .57]	.14 [.05,.25]	.30 [.16, .44]	.31 [.12, .56]	.56 [.43, .70]	.37 [.22, .50]
trust 3	.45 [.29, .53]	.12 [.04, .24]	.32 [.16, .48]	.28 [.08, .54]	.56 [.40, .71]	.35 [.19, .49]
communication 1	.45 [.31, .58]	.20 [.10, .30]	.25 [.13, .38]	.44 [.24, .66]	.55 [.42, .69]	.44 [.32, .55]
communication 2	.35 [.19, .51]	.19 [.10, .29]	.15 [.03, .30]	.56 [.32, .85]	.65 [.49, .81]	.44 [.32, .54]
communication 3	.30 [.18, .42]	.13 [.07, .21]	.17 [07, .28]	.44 [.24, .68]	.70 [.58, .82]	.36 [.26, .46]
relatedness 1	.30 [.17, .46]	.14 [.07, .23]	.16 [.05, .31]	.47 [.23, .74]	.70 [.54, .83]	.37 [.26, .48]
relatedness 2	.38 [.25, .52]	.12 [.05, .21]	.26 [.13, .40]	.31 [.14, .54]	.62 [.48, 75]	.34 [.23, .46]
relatedness 3	.35 [.22, .48]	.13 [.07, .23]	.21 [.10, .34]	.39 [.20, .63]	.65 [.52, .78]	.37 [.26, .47]
			Single group			
trust 1	.49 [.36, .60]	.16 [.08, .24]	.33 [.21, .45]	.32 [.17, .50]	.51 [.40, .64]	.39 [.29, .49]
trust 2	.48 [.36, .59]	.23 [.14, .32]	.24 [.13, .37]	.49 [.31, .68]	.52 [.41, .64]	.48 [.38, .57]
trust 3	.36 [.22, .51]	.21 [.13, .30]	.15 [.04, .29]	.58 [.36, .85]	.64 [.49, .78]	.45 [.35, .55]
communication 1	.48 [.35, .59]	.16 [.10, .24]	.31 [.20,.43]	.34 [.20, .50]	.52 [.41, .65]	.40 [.31, .49]
communication 2	.40 [.26, .52]	.10 [.05, .17]	.30 [.17, .42]	.25 [.12, .43]	.60 [.48, .74]	.31 [.21, .41]
communication 3	.43 [.32, .53]	.10 [.05, .17]	.33 [.22, .43]	.24 [.12, .38]	.57 [.47, .68]	.32 [.23, .41]
relatedness 1	.23 [.13, .37]	.15 [.08, .23]	.08 [.02, .20]	.65 [.38, .89]	.77 [.63, .87]	.38 [.28, .48]
relatedness 2	.18 [.08, .34]	.12 [.06, .19]	.06 [.00, .19]	.67 [.36, .99]	.82 [.67, .92]	.34 [.25, .43]
relatedness 3	.30 [.17, .42]	.07 [.02, .13]	.23 [.11, .35]	.22 [.08, .44]	.71 [.58, .83]	.25 [.14, .36]

Note. Communality = communality coefficient; CON = consistency coefficient; CFS = common figure specificity coefficient; L2-CON = Level 2 consistency coefficient; UFS = unique figure specificity coefficient; *r* = measurement error-free correlation between parental attachment and the mean attachment to friends (at Level 2). 95% credibility intervals are given in parentheses.

Table B2

Latent Variance Coefficients for the Attachment to Partners on the Third Measurement Occasion

Item	CON	FS	*r*
trust 1	.21 [.06, .39]	.79 [.61, .94]	.46 [.25, .63]
trust 2	.30 [.13, .49]	.70 [.52, .87]	.55 [.37, .70]
trust 3	.20 [.06, .39]	.80 [.61, .95]	.45 [.23, .63]
communication 1	.12 [.02, .27]	.88 [.73, .98]	.34 [.13, .52]
communication 2	.20 [.07, .37]	.80 [.63, .93]	.45 [.26, .61]
communication 3	.09 [.01, .21]	.92 [.79, .99]	.29 [.11, .46]
relatedness 1	.17 [.05, .33]	.83 [.67, .95]	.41 [.22, .58]
relatedness 2	.20 [.08, .34]	.80 [.66, .92]	.44 [.28, .58]
relatedness 3	.18 [.06, .34]	.82 [.66, .94]	.43 [.25, .58]

Note. CON = consistency coefficient; FS = figure specificity coefficient; *r* = measurement error-free correlation between the attachment to parents and the attachment to partners. 95% credibility intervals are given in parentheses.

Table B3

Correlations between the Indicator Specific Trait Factors on the Third Measurement Occasion

facet of attachment	$r(T_1, T_2)$	$r(T_1, T_3)$	$r(T_2, T_3)$
	Partner group		
trust	.98 [.94, .99]	.95 [.90, .98]	.95 [.88, .98]
communication	.73 [.59, .84]	.92 [.84, .96]	.85 [.75, .92]
relatedness	.96 [.91, .98]	.93 [.85, .97]	.90 [.81, .95]
	Single group		
trust	.98 [.95, .99]	.89 [.82, .95]	.84 [.75, .92]
communication	.76 [.64, .85]	.92 [.86, .97]	.83 [.72, .91]
relatedness	.90 [.82, .96]	.93 [.85, .97]	.90 [.82, .96]

Note. All six models had three correlated indicator-specific trait factors. *r*: correlation; T_i: indicator-specific latent trait factor for indicator *i* of the respective attachment facet. 95% credibility intervals are given in parentheses.

Appendix C: Results of the Fourth Measurement Occasion

Table C1

Latent Variance Coefficients for the Items of Attachment to Friends on the Fourth Measurement Occasion

Item	Communality	CON	CFS	L2-CON	UFS	*r*
			Partner group			
trust 1	.48 [.31, .62]	.19 [.10, .31]	.28 [.12, .43]	.41 [.21, .67]	.52 [.38, .69]	.44 [.31, .56]
trust 2	.54 [.39, .66]	.26 [.15, .38]	.28 [.14, .42]	.48 [.28, .70]	.46 [.34, .61]	.51 [.38, .62]
trust 3	.45 [.29, .61]	.26 [.15, .39]	.18 [.05, .35]	.59 [.34, .87]	.55 [.39, .71]	.51 [.38, .63]
communication 1	.37 [.24, .51]	.16 [.08, .26]	.21 [.09, .35]	.44 [.22, .70]	.63 [.49, .76]	.40 [.28, .51]
communication 2	.20 [.10, .33]	.11 [.05, .20]	.09 [.01, .21]	.56 [.25, .90]	.80 [.67, .90]	.33 [.22, .44]
communication 3	.32 [.20, .45]	.14 [.07, .24]	.18 [.07, .30]	.45 [.23, .71]	.68 [.55, .80]	.38 [.26, .49]
relatedness 1	.48 [.32, .62]	.20 [.11, .31]	.28 [.12, .43]	.42 [.23, .66]	.52 [.38, .68]	.45 [.32, .55]
relatedness 2	.38 [.24, .52]	.19 [.10, .28]	.19 [.08, .32]	.50 [.29, .74]	.62 [.49, .76]	.43 [.32, .53]
relatedness 3	.40 [.26, .52]	.18 [.10, .28]	.21 [.09, .33]	.47 [.27, .70]	.61 [.48, .74]	.43 [.32, .53]
			Single group			
trust 1	.36 [.24, .48]	.15 [.08, .24]	.21 [.10, .32]	.43 [.24, .65]	.64 [.52, .76]	.39 [.29, .48]
trust 2	.41 [.29, .53]	.16 [.08, .25]	.25 [.13, .38]	.39 [.21, .60]	.59 [.47, .71]	.40 [.29, .50]
trust 3	.40 [.26, .53]	.12 [.05, .21]	.28 [.14, .42]	.30 [.13, .53]	.60 [.47, .74]	.35 [.22, .46]
communication 1	.33 [.22, .43]	.14 [.08, .22]	.18 [.08, .28]	.45 [.27, .67]	.68 [.57, .79]	.38 [.28, .47]
communication 2	.24 [.10, .38]	.07 [.03, .13]	.16 [.04, .30]	.30 [.11, .65]	.76 [.62, .91]	.26 [.16, .36]
communication 3	.32 [.21, .42]	.07 [.03, .13]	.24 [.14, .34]	.23 [.10. .42]	.69 [.58, .80]	.27 [.17, .36]
relatedness 1	.19 [.08, .37]	.08 [.03, .15]	.10 [.02, .26]	.45 [.19, .80]	.82 [.63, .92]	.29 [.18, .39]
relatedness 2	.21 [.12, .33]	.11 [.06, .18]	.10 [.03, .19]	.54 [.31, .80]	.79 [.68, .88]	.33 [.24, .42]
relatedness 3	.37 [.26, .48]	.11 [.05, .19]	.26 [.16, .37]	.30 [.14, .49]	.63 [.52, .74]	.34 [.22, .43]

Note. Communality = communality coefficient; CON = consistency coefficient; CFS = common figure specificity coefficient; L2-CON = Level 2 consistency coefficient; UFS = unique figure specificity coefficient; *r* = measurement error-free correlation between parental attachment and the mean attachment to friends (at Level 2). 95% credibility intervals are given in parentheses.

Table C2

Latent Variance Coefficients for the Attachment to Partners on the Fourth Measurement Occasion

Item	CON	FS	*r*
trust 1	.50 [.30, .69]	.50 [.31, .70]	.71 [.55, .83]
trust 2	.34 [.16, .54]	.66 [.47, .84]	.59 [.40, .73]
trust 3	.34 [.16, .53]	.67 [.47, .84]	.58 [.40, .73]
communication 1	.16 [.03, .33]	.84 [.67, .97]	.40 [.18, .57]
communication 2	.32 [.15, .51]	.68 [.49, .85]	.57 [.39, .72]
communication 3	.22 [.08, .38]	.78 [.62, .92]	.47 [.29, .49]
relatedness 1	.40 [.21, .59]	.60 [.41, .79]	.63 [.46, .77]
relatedness 2	.26 [.13, .42]	.74 [.58, .88]	.51 [.35, .65]
relatedness 3	.34 [.17, .51]	.66 [.49, .83]	.58 [.41, .71]

Note. CON = consistency coefficient; FS = figure specificity coefficient; *r* = measurement error-free correlation between the attachment to parents and the attachment to partners. 95% credibility intervals are given in parentheses.

Table C3

Correlations between the Indicator Specific Trait Factors on the Fourth Measurement Occasion

facet of attachment	$r(T_1, T_2)$	$r(T_1, T_3)$	$r(T_2, T_3)$
	Partner group		
Trust	.96 [.91, .98]	.95 [.88, .98]	.92 [.84, .97]
communication	.91 [.81, .96]	.89 [.80, .95]	.93 [.85, .97]
relatedness	.97 [.94, .99]	.88 [.79, .94]	.91 [.84, .95]
	Single group		
trust	.98 [.95, .99]	.94 [.87, .98]	.95 [.89, .98]
communication	.78 [.65, .88]	.95 [.90, .98]	.82 [.70, .91]
relatedness	.93 [.86, .97]	.90 [.80, .96]	.92 [.84, .97]

Note. All six models had three correlated indicator-specific trait factors. *r*: correlation; *Ti*: indicator-specific latent trait factor for indicator *i* of the respective attachment facet. 95% credibility intervals are given in parentheses.

8. General Discussion

In this chapter, I will first recapitulate the results of the three empirical studies and discuss important topics in more depth. The discussion of the results on the different types of consistency forms the center of this chapter. Theoretical implications and approaches for further research are also discussed for the different types of attachment. The results of a qualitative analysis are presented, that examined the different reasons to include mothers and fathers in the study. Additional topics covered in this chapter include reflections on methodology and limitations and practical implications for therapists.

8.1 Central Aspects of the Studies

8.1.1 Study 1

Attachment and Well-Being. The first study examined the relationship between attachment and well-being. It showed large correlations of different facets of attachment security with eudaimonic, affective, and cognitive well-being. This confirmed the findings of previous studies. These correlations also held when parent ratings of the emerging adult's well-being were taken into account. This replication with a second method supports the validity of the results.

The study utilized an extended CTC(M-1) model taking into account both emerging adults' and parents' self-reports of attachment as well as parents' informant assessments of emerging adults' attachment. The results for the cross-method consistency and the rater consistency are discussed below in Chapter 8.2. Particularly interesting is the association between the residual factor of maternal attachment security and emerging adults' eudaimonic well-being. This association was shown for attachment security as well as relatedness and trust. This demonstrates

that the both attachments in the dyadic relationship between parent and emerging adult are related to well-being. This is a strong argument for the benefits of a dyadic view of attachment.

Attachment and Dependency. The attachment security scale of the Relationship-Specific Attachment Scales and the three IPPA showed similar patterns of association with well-being in Study 1. However, the correlation patterns of dependence were completely different from the other four. This showed even more strongly than the correlations of the different facets (see Table 4.2) how much dependence deviates from the other dimensions of attachment security. Asendorpf et al. (1997) intended to create dependency orthogonal to attachment security. However, this orthogonality does not exist as clearly as desired (correlations with facets of security were .2 and higher, see Table 4.2).

The term dependency refers to a construct that Bowlby stated was inadequate to describe the quality of attachment (1969). Nor do the correlation patterns allow dependence to be located within attachment styles. Attachment security (and their highly correlated facets trust and relatedness and to a lesser degree also communication) describe the differences between a secure attachment style (including the working model associated with it) and the insecure attachment styles. Dependence, on the other hand, does not show a comparable structure. Dependence is an exciting facet of interpersonal relationships, but it does not seem to be a facet of attachment quality. Because of this difficulty to locate it within theory, dependence plays a minor role in answering the central questions of this dissertation.

8.1.2 Study 2

Study 2 examined stability and change in dyadic attachment. The new multi-rater latent state-trait model with autoregressive effects (MR-LST-AR model) was presented in the article. This study examined the attachment of emerging adults to their parents and the attachment of parents to emerging adults across the four measurement occasions of the study. Results provide information on rater consistency and time consistency of attachment. These results are discussed in more detail in Section 8.2.

The model is further able to describe the link between the two types of consistency by describing the (rater) consistency of the time-consistent of and variable attachment quality. The applicability and possible use cases of this model are described in Chapter 8.3.3.

8.1.3 Study 3

Study 3 examined the consistency and specificity of attachments. Figure consistency was examined, as different attachments were nested within the emerging adults. The results on figure consistency and specificity are presented in Chapter 8.2.

In study 3, the later measurement occasions were used to check whether the results of the models would show up repeatedly. This is not a replication in the strict sense, since the same sample was used, but this check at least allows to test the results for stability. It was found that the consistency of attachments to friends and parents was similar across all measurement occasions. In fact, the later measurement occasions were very useful, as they showed that more extreme values of individual items were again closer to the average. If only one measurement occasion had been available, this might have been reason to overinterpret the deviating values of

these items. The other two measurement occasions helped to put the results into better perspective.

With regard to the correspondence between attachment to parents and attachment to partner, however, the situation was the opposite; here the results were very different across the three measurement occasions, which made interpretation more difficult. The results on the consistency of partner commitment can therefore only be interpreted with greater caution.

8.2 Consistency and Specificity of Attachment

8.2.1 Interpretation of the effect sizes

The following sections present the results of the coefficients of the different types of consistency and specificity. Consistency and specificity are both represented by variance proportions of the measurement error-free variance. For cross-method consistency, rater consistency, and figure consistency, the consistency coefficient and the specificity coefficient always add up to 1. When attachments to friends are used in the form of interchangeable methods, the specificity coefficient of the corresponding indicators of friend attachments is split into two proportions. One of the proportions then describes those part of the variance all friend attachments have in common, but which they do not share with the reference attachment. The other proportion describes the proportion that is unique for the individual attachments.

For cross-method consistency, rater consistency, and figure consistency (but not for time consistency), the square root of the consistency coefficient can be interpreted as a correlation. This correlation is the measurement error-free correlation of the attachment measured with a non-reference 'method' and the attachment measured with the reference 'method' (for indicator-

specific trait factors, this means the reference attachment measured with the corresponding indicator). These correlations can then be classified as small, medium, and large using appropriate conventions. In the classical classification according to Cohen (1988), the limits for this are $r = .1$, $r = .3$, and $r = .5$ (these values would correspond to consistency coefficients of .01, .09, and .25).

Cohen's limits are subject to criticism because they were chosen in a rather arbitrary manner and large effects are rarely observed in actual studies (Funder & Ozer, 2019). Based on the actual distribution of effects found, Funder and Ozer proposed $r = .1$, $r = .2$, and $r = .3$ as bounds for small, medium, and large effects, respectively (corresponding to consistency coefficients of .01, .04, and .09). Funder and Ozer describe correlations of $r = .4$ and larger (corresponding consistency coefficients would be .16 and larger) as very large effects. Funder and Ozer emphasize that such very large effects are mostly an overestimate. It should be noted, however, that measurement error-free correlations can assume larger values without being overestimates.

Since correlations can be interpreted as effect strengths as opposed to variance proportions in their relative magnitudes ($r = .2$ is twice as large an effect as $r = .1$), I translate the consistency coefficients into correlations for ease of comparison. Funder and Ozer's (2019) benchmarks are used for effect size classification. However, the time consistency can only be interpreted in terms of explained variance.

8.2.2 Cross-Method Consistency

In Study 1 the self-rated attachment of the emerging adults was examined and also the parent ratings on this attachment. This is a classical study comparing a self- and an informant rating. As informants on the facets of attachment security, mothers achieved effect sizes ranging from $r = .42$

(relatedness) to r = .55 (communication). Fathers, as informants, achieved effect sizes of r = .45 (relatedness) to r = .58 (communication). The effect sizes of cross-method consistencies between parents and emerging adults were very large in this dissertation.

Theoretic Implications und Future Research. Parents were good raters of their children's attachment, achieving accuracy as in studies of self- and informant ratings of well-being (Schneider & Schimmack, 2009; Luhmann et al., 2016) and loneliness (Luhmann et al., 2016). With this degree of self-informant agreement, parent can be valid informants of their emerging adult child's attachment quality (Vazire, 2006).

Our model also allowed us to show that half of the variance that was specific for parent ratings could be explained by parents' own attachment. Thus, parents used their own attachment to their emerging adult child to estimate their child's attachment. If they had a stronger (or weaker) attachment to the children than would have been expected based on the emerging adult's attachment they tended to overestimate (underestimate) the emerging adult's attachment.

Given the acceptable validity of the parents' informant ratings, studies on the correspondence of attachments in dyads of emerging adults and parent could also be conducted with only the parent, which is noticeably more economical. Thus, researchers who are to investigate how the two attachments of a dyad or their concordance affect another variable could, with some justification, ask participating parents in their study to rate both their own attachment quality and their emerging adult child's attachment quality.

Our results on high cross-method consistency are also based only on parents' ratings. They have known their children for a long time and have observed many attachment-related behaviors in them. The quality of their children's attachment has also had implications for their interactions

with them. Therefore, they may be particularly good judges (Funder, 1995). Future studies should therefore investigate whether other people can also assess attachments similarly well. If this is the case, informant ratings might also be used in other dyads.

8.2.3 Rater Consistency

Rater consistency was examined as part of Study 1 and Study 2. In both cases, mutual attachments in the emerging adult-parent dyad were examined. In Study 1, ratings for attachment security, trust, communication, and relatedness from the first measurement occasion were considered separately for mothers and fathers. In Study 2, values for attachment security were analyzed over all four measurement occasions. For these analyses, the three indicators of attachment security from the Relationship-Specific Attachment Scales (acceptance, dependability, closeness; each consisting of two items) are available as indicator-specific factors in model.

At the first measurement occasion, rater consistency scores for relatedness showed a large effect for both mothers (r = .32) and fathers (r = .34). Rater consistency was higher with very large effect sizes for attachment security, relatedness, and communication. Here, values ranged from r = .42 to r = .47 for mothers and from r = .43 to r = .48 for fathers. There were no notable differences between the rater consistencies in the dyads with mothers and fathers.

Across the four measurement occasions, there were almost consistently at least large effects for rater consistency. Correlations ranged from r = .281 to r = .392 for the indicators of dependability. Correlations were somewhat higher with values ranging from r = .390 to r = .456 for the indicators of acceptance and closeness. The values were similar throughout the study.

Theoretic Implications und Future Research. Overall, the studies revealed large to very large effect sizes for the rater consistency of mutual attachments in the dyads between parents and their emerging adult children. This high magnitude is surprising. The relationship between parents and emerging adults is not yet a symmetrical relationship (Buhl, 2009). However, this rater consistency indicates that those emerging adults who are more likely than other emerging adults to see their parents as a safe haven also have parents who are more likely than other parents to see their children as a safe haven. This pattern was similar for mothers and fathers.

Even though the rater consistencies were high, it is always important to consider the definition of attachment. Attachment is not a characteristic of the dyad. It is not the dyad that has a secure attachment, but the two individuals involved may have a secure attachment to each other (Ainsworth, 1989). Study 1 showed that both attachments in the emerging adult-parent dyad were related to the emerging adult's well-being. Such results indicate that Ainsworth's objection should not be interpreted too narrowly. In some cases, another person's attachment to me may be the more interesting variable in explaining my experience than my attachment to that person. This opens up exciting perspectives for future research.

This high rater consistency shows that it is very fruitful to consider attachment from a dyadic point of view. There already exist such studies on dyadic attachment using the Actor-Partner Interdependence Model (Cook & Kenny, 2005). Studies on attachment in couple relationships use dyadic considerations (Seiffge-Krenke & Burk, 2012; Schachner et al., 2003). This dyadic view of attachment should become more common in attachment research on dyads beyond romantic couples.

8.2.4 Figure Consistency

The figure consistency for trust, relatedness, and communication was examined in Study 3. In this Study, the attachment to the parents was chosen as a reference. Therefore, the consistency describes the association of the other attachments (with partners and friends) with the attachments to parents. In Study 3 the figure consistency was analyzed separately for singles and emerging adults in a romantic partnership.

The effect sizes for figure consistency were large to very large for the attachments to friends. The correlation between the attachments to friends and the attachment to parents ranged from r = .37 to r = .49 for emerging adults in a partnership. These correlations ranged from r = .31 to r = .41 for singles. The large to very large effect sizes in rater consistency between parent attachment and friend attachment were also evident at the later measurement occasions.

Figure consistency between parental attachment and attachment to romantic partner showed much more mixed results. For trust, small to very large effect sizes showed with correlations ranging from r = .12 to r = .42. For communication, very small to large effect sizes showed with correlations ranging from r = .09 to r = .34. Only for relatedness were the results more balanced. Effect sizes were medium to large with correlations ranging from r = .29 to r = .40. Figure consistency increased for the later measurement occasion and at the last measurement occasion all effect sizes were very large (with values ranging from .40 to .71).

Theoretic Implications und Future Research. The results showed clear similarities between attachments to different attachment figures. This is consistent with Bowlby's (1988) assumptions about the application of working models of attachment to other relationships. At first glance, one might be inclined to take these results as supporting the theory of a general working model of

attachment (e.g., Levy et al., 2011, Lopez & Gormley, 2002; Scharfe & Cole, 2006; Wei, Shaffer et al., 2005; Wei, Russell et al., 2005). Indeed, the assumption of cross-figure patterns of attachment is also very consistent with these data, but a deeper look at the results shows that the results cannot fully be explained by a general working model of attachment.

Although the correlations were very high, most of the measurement error-free variance was specific to the individual attachment. Thus, a general working model of attachment could never describe attachment as a whole. More important, however, is a second observation. Because the emerging adults described attachments to multiple friends, the common figure specificity coefficient could be used to calculate how much the attachments to friends are related beyond the reference attachment to the parents. This common figure specificity coefficient was almost always substantially higher than the consistency coefficient. Thus, the attachments to friends coincide to a very high degree, but this is not so much due to a general working model of attachment as to elements of a more specific working model of friendship attachments. Overall, then, the study is in agreement with those studies that emphasize the importance of specific working models of attachment (e.g., Caron et al., 2012; Doyle et al., 2009; Furmann et al. 2002; Fraley, Heffernan et al., 2011; La Guardia et al., 2000; Ross & Spinner, 2001).

These findings are in contrast to viewing attachment as a personality trait, as is common in clinical psychology (Bowlby, 1988; Meyer & Pilkonis, 2001). The specificity of attachments contradicts this idea. A person can combine attachments of quite different quality.

8.2.5 Time Consistency

Time consistency was examined in Study 2. Here, the attachment security (with the three indicators acceptance, dependability, and closeness) of the emerging adults to their parents was presented in a model over four measurement occasions. The same model was also run with for the attachments of parents to their children. To examine gender effects, the emerging adults' model was also run again separately for male and female emerging adults. For time consistency the square root of the consistency coefficient has no substantive meaning comparable to the other kinds of consistency. Therefore, the effect sizes are reported in terms of variance proportions of the second and later measurement occasions here.

For the emerging adults' attachment to their parent, the time consistency ranged from .597 to .672 for the indicators of acceptance and dependability. The time consistency for the indicators of closeness was higher and ranged from .853 to .863. There were no substantial differences between male and female emerging adults.

For the parents' attachment to their emerging adult children, the time consistency ranged from .697 to .748 for the indicators of acceptance and closeness. The time consistency for the indicators of dependability were a little higher and ranged from .799 to .838. The values of the time consistency coefficients had similar ranges for emerging adults and parents with small differences between the indicators.

The time consistency of attachment was very high. In all cases, more than half of the measurement error-free variance could be explained by data from earlier measurement occasions. There was great stability in the data. A closer look (see Study 2) showed that there are slight signs

of grinding change processes among the emerging adults, but these are minimal compared to the large degree of stability.

Theoretical Implications and Future Research. The results at first support Bowlby's (1969, 1988) assumptions about stable and trait-like working models of attachment. Building on Fraley's (2002) theory, the pattern within change over time is more consistent with the idea of a prototypically constructed working model. Certain core elements of the working models of attachment appear to change little within the parent-child dyad.

It should be noted that emerging adults are in an important transition period. They have just entered emerging adulthood with greater normative opportunity to reshape the relationship with parents (Arnett, 2000). Over half of the emerging adults moved out shortly after or during the study, which has been shown in other studies to be an important point in the process of change in the parent-child relationship (Golish, 2000). However, the stability of attachment in our study was very high.

In a study of change in the Big Five personality traits over the first few years of college, Lüdtke et al. (2011) found correlations of r = .72 and higher over a 2-year period. Kandler et al. (2014) described similar and higher measurement error-free correlations as lower bounds for personality traits. Study 2 of this dissertation also calculated a correlation between the first and the last measurement occasion with a 9-month interval (this correlation describes stability more restrictively than time consistency, as only the first measurement occasion is correlated with the last). In Study 2, these correlations reached values around r = .6 for the indicators of acceptance and dependence (the value for the indicators of closeness was near r = .8). Thus, despite the high stability, the attachment does not reach the stability values that would have been expected for

personality traits. This is a further argument not to consider attachment as trait-like. Regarding the stability of attachment, the results are in contradiction to Bowlby (1969, 1988).

8.3 Methodological Reflections

8.3.1 Reasons and Effects of the Selection of Mother or Father

In Study 1, there was a significant difference in the self-reported attachment facet communication between the emerging adults who described attachment to their mother and those who described attachment to their father. There were no differences in the other attachment facets. To be able to explain this difference, the selection of the parent came into focus in the discussion of Study 1 and also in the follow-up of the study.

The emerging adults who participated in this study chose a parent to whom they described their attachment and who was also invited to participate in the study. There were several conceivable reasons for choosing a parent (a better relationship, more free time of that parent, or the absence of the other parent). To better understand these reasons, the emerging adults were asked to indicate the reason in a free text comment at the last measurement occasion.

Qualitative Analyses. To interpret and categorize these reasons, a qualitative analysis was conducted after the completion of Study 1. The detailed description of this analysis can be found in Appendix D. Only the most important findings that are helpful to better interpret the results of Study 1 are described here.

The qualitative analysis showed that the most frequently cited reasons were those that could be assigned to the categories of *availability* or *attachment*. Availability describes a rather pragmatic choice of the parent, which was mostly based on the fact that the other parent was not available

(which, however, should mean a worse attachment to the non-chosen parent). In the attachment category, choosing the parent was explicitly based on better attachment and greater proximity to the chosen parent. Less frequently, but always to a significant extent, reasons were given that could be assigned to the categories of *motivation* and *barriers*. In the motivation category, reasons were gathered that emphasized a higher motivation of the chosen parent to participate. The category barriers gathered reasons, which were mostly technical obstacles, which would have made it more difficult for the non-elected parent to participate. This included both missing email addresses and language problems (for a more detailed description of the categories and how they arose, for the other three sparsely populated categories, and for exact frequencies, see Appendix D).

The frequencies of reasons to select mothers or fathers were different. For mothers, the primary reasons were availability and attachment, with barriers coming in (behind motivation) only in fourth place in the ranking of frequencies. For fathers, it was significantly different. Here the category of barriers was the most frequent reason, then attachment, and only then availability and motivation. Fathers were thus less likely to be selected for reasons that suggest they are also the parent with whom there is a better (in the sense of more secure) attachment.

Quantitative Analyses. This raised the question of whether the differences between mothers and fathers might be because more of the emerging adults who had selected the father for the study who actually had a better attachment to the other parent (in this case, the mother). Thus, it could be that these emerging adults were more likely to act out their need for attachment to communicate about problems with their mothers, which in turn would ensure a difference between fathers and mothers.

To investigate this further, only the attachments to those mothers and fathers who were selected on the basis of better attachment were compared. Thus, in this analysis, only the attachments to those parents known to have a closer attachment to the emerging adults are compared. However, this showed that communication to fathers was also lower in this comparison. Thus, the qualitative analysis followed by quantitative analysis could not find evidence that the differences in communication could be explained by different selection processes for the study.

Interpretation. The additional analysis supports the assumption that the attachments to mothers and fathers differ in terms of communication, especially for parents with whom there is a good attachment. There are no results indicating a difference for other facets of attachment quality.

There is a speculative interpretation of the results that takes the more mother-centered focus of classical attachment theory as a basis. Under this view, it could be assumed that emerging adults who choose their father because of the better attachment are in many cases making a statement about an insecure attachment to the mother and a possibly existing strained relationship with the mother. This difficult relationship with the mother could also reduce the attachment aspect of communication in other attachments. Since this study only examined attachment to either the mother or the father, these speculations cannot be further substantiated on the data. However, this speculation should be explored in future studies, using the idea of hierarchies of attachment figures (Fraley, 2019).

8.3.2 Benefits of the CTC(M-1) Models

The use of the statistical models from the CTC(M-1) tradition made it possible to control for measurement error in the studies in this dissertation. This made it possible to describe the parameters more clearly than with other methods. This also had a direct impact on the substantive interpretation of the results.

In Study 3, large correlations were found between attachments to different figures. Without the full model, these correlations alone would have suggested an interpretation in terms of a general working model of attachment. Only the complete model made the specific proportions visible. In particular, the correlations of attachments within a domain beyond the reference attachment would never have become clear in a simpler model, although this is one of the most exciting results within this dissertation.

While Study 3 applied an existing model to a new data situation and Study 1 modified an existing Model in manageable details, in new model was created in Study 2 by combining several set pieces. This model was created for the specific questions about attachment addressed in this dissertation, but its application is not limited to those questions.

8.3.3 Applicability of the MR-LST-AR Model

The MR-LST-AR model can be used for different kinds of data, with the requirement that there are at least two kinds of raters or methods and at least three measurement occasions. The raters or methods must be structurally different. For dyads of raters, this means that the two raters must have a defining characteristic that allows choosing one of them as a reference. Possible dyads may be heterosexual couples, therapist and patient, ex-convict and parole officer, writer and lector,

first-born and second-born child, and many more. The MR-LST-AR model can used to explore the cross-method consistency, rater consistency, and figure consistency of time consistency. If it is applied to different methods (in a narrow sense), it can be used to estimate whether paper-pencil tests of intelligence show the same change over time as computer-based tests, for example. Likewise, it allows assessing whether self- and peer raters have a similar development in their ratings over time. Other possible use cases for the MR-LST-AR model are different specific factors. Here, it is possible to assess whether different symptoms of depression have a consistent or inconsistent change throughout an intervention. Further research questions may call for different coefficients as the primary outcome (see a complete list of all coefficients of the multi-rater LST model with autoregressive effects in the Appendix at the end of Study 2).

The MR-LST-AR model is not limited to data situations with two methods. It can be used for cases with three or even more methods with multiple ratings over time. An example is a self-rating and two observer ratings (one parent rating and one partner rating) of well-being over multiple measurement occasions. At each measurement occasion, the target rates its well-being and both observers rate their evaluation of the target's well-being. The MR-LST-AR model allows to compare the (in this example cross-method) consistency between the self-rating and the parent rating with the consistency between the self-rating and the partner rating. It also allows to see whether the rater specific factors correlate, which would indicate a common view of the observers beyond the self-rating. So, the MR-LST-AR model is suited for dyadic data, but it can also be used for several overlapping dyads.

The different factors in the MR-LST-AR model can also be used to predict other variables. The trait attachment as well as the situational deviation can both be important predictors for the

current mood or the current satisfaction with family life. It is also possible to correlate the factors with others to assess, for example, whether different characteristics have similar change processes. Adhering to recommendations by Koch et al. (2018), other variables can also predict the factors of the model. It may be possible that some life events, such as leaving the parental home, could predict state residuals.

8.3.4 Limitations of the Studies

The studies in this dissertation share important limitations already discussed in the studies in Chapters 5 through 7. Therefore, only the most important limitations are summarized here. The study examined emerging adults with a very narrow age range, who are also preselected by the selection criterion of the German Abitur. On the one hand, this makes the results easier to interpret because of the high degree of homogeneity, but on the other hand the results should not be transferred lightly to other age groups, cultures or social groups.

The second limitation concerns the selection of the parent. Even though we can reproduce parts of the effects of parental choice (see Chapter 8.3.1 and Appendix D), our results are not suited to compare mothers and fathers in general. Besides, parents may not always be interchangeable with each other. However, we had to combine the two parents in Studies 2 and 3, which may have masked existing differences.

The reason why some of the differences between mothers and fathers could not be tested is due to the sample size, the third important limitation. This is a large study with many raters involved and an acceptable dropout rate. However, as soon as subgroups were to be examined,

the models quickly ran into problems (see, for example, Appendix C in the analysis of gender effects among parents).

8.4 Therapeutic Implications

The results of this dissertation show that many of the assumptions of attachment theory have stood the test of time. Attachment to parents is very stable in emerging adults and it has large correlations with well-being. However, in some respects there are also new findings from this dissertation that can be usefully applied in therapeutic use, especially in work with patients of late adolescence and emerging adulthood.

In clinical psychology, attachment styles are sometimes described as trait-like and as if this trait shapes relationship formation in many contexts (Bowlby, 1988; Levy et al., 2011; Meyer & Pilkonis, 2001). The results of this dissertation show that this needs to be considered in a more nuanced way. Although the attachment was very stable, accumulative effects were also evident, especially in the emerging adults. Repeated experiences can change working models of attachment to some extent. Such experiences can also occur in therapy.

The high concordance of mutual dyadic attachments and the fact that parental attachment had an impact on the emerging adults' well-being beyond the emerging adults' own attachment show how important parental involvement can be even in this phase of life. The high rater consistency, particularly in the time-consistent portions of the attachment, suggest that the two attachments in the dyad are mutually stabilizing. A change in attachment patterns may therefore occur more easily if parents and emerging adult make a change at the same time.

The inclusion of important attachment figures in therapy is also useful because of another result. Although high figure consistency shows that attachment quality to quite different attachment figures is highly correlated, it cannot be reduced to a general working model of attachment. A patient who is avoidant toward the therapist might be securely attached in a romantic relationship or in his relationship with his mother. Attachment-oriented therapy should not focus too much on a general style of attachment, but rather focus on the patient's different experiences of attachment as part of the therapy.

8.5 Conclusion

This dissertation has shown that although attachments are quite stable over time and attachments to different attachment figures are very similar, the attachment quality of a person should still not be interpreted in the same way as a personality trait. Attachments are based on specific working models of attachment and there is a high degree of correspondence between the mutual attachments of emerging adults and their parents. This attachment to parents remains an important element for well-being even in emerging adulthood.

References for Chapters 1, 2, 3, 4, and 8

Ahnert, L., Pinquart, M., & Lamb, M. E. (2006). Security of children's relationship with nonparental care providers: A meta-analysis. *Child Development, 74*(3), 664-679. https://doi.org/10.1111/j.1467-8624.2006.00896.x

Ainsworth, M. D. (1964). Patterns of attachment behaior shown by the infant in interactions with his mother. *Merrill-Palmer Quarterly of Behavior and Development, 10*(1), 51-54.

Ainsworth, M. D. (1969). Object relations, dependency, and attachment: A theoretical review of the infant-mother relationship. *Child Development, 40*, 969-1025.

Ainsworth, M. D. (1989). Attachments beyond infancy. *American Psychologist, 44*(4), 709-716.

Ainsworth, M. D., Blehar, M. C., Waters, E., & Wall, S. N. (2015). *Patterns of attachment: A psychological study of the strange situation.* New York: Psychology Press. (Original work published 1978).

Armsden, G. C., & Greenberg, M. (1987). The Inventory of Parent and Peer Attachment: Individual differences and their relationship to psychological well-being in adolescence. *Journal of Youth and Adolescence, 16*(5), 427-454.

Arnett, J. J. (1998). Learning to stand alone: The contemporary american transition to adulthood in cultural and historical context. *Human Development, 41*(4), 295-315.

Arnett, J. J. (2000). Emerging adulthood. A theory of development from the late teens through the twenties. *American Psychologist, 55*(5), 469-480. https://doi.org/10.1037/0003-066X.55.5.469

Arnett, J. J., Kloep, M., Hendry, L. B., & Tanner, J. L. (2011). *Debating emerging adulthood. Stage or process?* New York: Oxford University Press.

Asendorpf, J. B., & Wilpers, S. (2000). Attachment security and available support: Closely linked relationship qualities. *Journal of Social and Personal Relationships, 17*(1), 115-138.

Asendorpf, J. B., Banse, R., Wilpers, S., & Neyer, F. J. (1997). Beziehungsspezifische Bindungsskalen für Erwachsene und ihre Validierung durch Netzwerk- und Tagebuchverfahren [Relationship-specific attachment scales for adults and their validation with network and diary procedures]. *Diagnostica, 43*(4), 289-313.

Bartholomew, K., & Horowitz, L. M. (1991). Attachment styles among young adults: A test of a four-category model. *Journal of Personality and Social Psychology, 61*(2), 226-244.

Baumel, A., & Berant, E. (2015). The role of attachment styles in malicious envy. *Journal of Research in Personality, 55*, 1-9. https://doi.org/10.1016/j.jrp.2014.11.001

Bernardon, S., Babb, K. A., Hakim-Larson, J., & Gragg, M. (2011). Loneliness, attachment, and the perception and use of social support in university students. *Canadian Journal of Behavioural Science, 43*(1), 40-51. https://doi.org/10.1037/a0021199

Bischof, N. (2009). *Psychologie. Ein Grundkurs für Anspruchsvolle.* Stuttgart: Kohlhammer.

Bowlby, J. (1953). *Child care and the growth of love* (2. ed.). London: Penguin Books.

Bowlby, J. (1958). The nature of the child's tie to his mother. *International Journal of Psycho-Analysis, 39*, 350-373.

Bowlby, J. (1969). *Attachment and loss: Vol. 1. Attachment.* New York: Basic.

Bowlby, J. (1973). *Attachment and loss: Vol. 2. Separation: Anxiety and anger.* New York: Basic.

Bowlby, J. (1980). *Attachment and loss: Vol. 3. Loss: Sadness and depression.* New York: Basic.

Bowlby, J. (1980). By ethology out of psycho-analysis: An experiment in interbreeding. *Animal Behaviour, 28*, 649-656.

Bowlby, J. (1988). *A secure base: Clinical applications of attachment theory.* London: Routledge.

Buhl, H. M. (2009). My mother: My best friend? Adults' relationships with significant others across the lifespan. *Journal of Adult Developement, 16*, 239-249. https://doi.org/10.1007/s10804-009-9070-2

Buhl, H. M., Wittmann, S., & Noack, P. (2003). Eltern-Kind-Beziehungen studierender und berufstätiger junger Erwachsener [Child-parent relationships of university students and working young adults]. *Zeitschrift für Entwicklungspsychologie und Pädagogische Psychologie, 35*, 144-152.

Burlingham, D., & Freud, A. (1942). *Young children in war-time.* London: George Allen & Unwin Limited for the New era.

Burlingham, D., & Freud, A. (1944). *Infants without families.* London: George Allen & Unwin Ltd.

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin, 56*(2), 81-105.

Caron, A., Lafontaine, M.-F., Bureau, J.-F., Levesque, C., & Johnson, S. M. (2012). Comparisions of close relationships: An evaluation of relationship quality and patterns of attachment to parents, friends, and romantic partners in young adults. *Canadian Journal of Behavioral Science, 44*(4), 245-256. https://doi.org/10.1037/a0028013

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2. ed.). New York: Taylor & Francis Group.

Cook, S. H., Heinze, J. E., Miller, A. L., & Zimmerman, M. (2016). Transitions in friendship attachment during adolescence are associated with developmental trajectories of

depression through adulthood. *Journal of Adolescent Health, 58*, 260-266. https://doi.org/10.1016/j.jadohealth.2015.10.252

Cook, W. L., & Kenny, D. A. (2005). The actor-partner interdependence model: A model of bidirectional effects in developmental studies. *International Journal of Behavioral Development, 29*(2), 101-109. https://doi.org/10.1080/01650250444000405

Cook, W. L., & Kenny, D. A. (2005). The Actor-Partner Interdependence Model: A model of bidirectional effects in developmental studies. *International Journal of Behavioral Development, 29*(2), 101-109. https://doi.org/10.1080/01650250444000405

De Wolff, M. S., & Van Ijzendoorn, M. H. (1997). Sensitivity and attachment: A meta-analysis on parental antecedents of infant attachment. *Child Development, 68*(4), 571-591. https://doi.org/10.2307/1132107

Doyle, A. B., Lawford, H., & Markiewicz, D. (2009). Attachment style with mother, father, best friend, and romantic partner during adolescence. *Journal of Research on Adolescence, 19*(4), 690-714. https://doi.org/10.1111/j.1532-7795.2009.00617.x

Eid, M. (2000). A multitrait-multimethod model with minimal assumptions. *Psychometrika, 65*(2), 241-261.

Eid, M. (2010). Multitrait-multimethod matrix. In N. Salkind, *Encyclopedia of Research Design* (pp. 850-855). Thousand Oaks: Sage Publications.

Eid, M., & Kutscher, T. (2014). Statistical models for analyzing stability and change in happiness. In K. M. Sheldon, & R. E. Lucas, *Stability of happiness. Theories and evidence on whether happiness can change* (pp. 263-297). Amsterdam: Elsevier.

Eid, M., & Nussbeck, F. W. (2009). The Multitrait-Multimethod Matrix at 50! *Methodology, 5*(3), 71. doi:10.1027/1614-2241.5.3.71

Eid, M., & Nussbeck, F. W. (2012). Modelle der Multitrait-Multimethod-Analyse für Variablen mit geordneten Antwortkategorien. In W. Kempf, & R. Langeheine, *Item-Response-Modelle in der sozialwissenschaftlichen Forschung* (pp. 127-149). Berlin: Verlag Irina Regener.

Eid, M., Courvoisier, D. S., & Lischetzke, T. (2012). Structural equation modeling of ambulatory assessment data. In M. R. Mehl, & T. S. Conner, *Handbook of research methods for studying daily life* (pp. 384-406). New York: Guilford Press.

Eid, M., Geiser, C., Koch, T., & Heene, M. (2017). Anomalous results in g-factor models: Explanations and alternatives. *Psychological Methods*, 541-562. https://doi.org/10.1037/met0000083

Eid, M., Holtmann, J., Santangelo, P., & Ebner-Priemer, U. (2017). On the definition of latent state-trait models with autoregressive effects: Insights from LST-R theory. *European*

Journal of Psychological Assessment, 33(4), 285-295. https://doi.org/10.1027/1015-5759/a000435

Eid, M., Lischetzke, T., Nussbeck, F., & Trierweiler, L. (2003). Separating trait effects from trait-specific method effects in multitrait-multimethod models: A multiple-indicator CT-C(M-1) model. *Psychological Methods, 8*(1), 38-60. https://doi.org/10.1037/1082-989X.8.1.38

Eid, M., Nussbeck, F. W., Geiser, C., Cole, D. A., Gollwitzer, M., & Lischetzke, T. (2008). Structural equation modeling of multitrait-multimethod data: Different models for different types of methods. *Psychological Methods, 13*(3), 230-253. https://doi.org/10.1037/a0013219

Fahrenberg, J. (2015). *Thoretische Psychologie. Eine Systematik der Kontroversen.* Lengerich: Pabst Science Publishers.

Forslund, T., Granqvist, P., van IJzendoorn, M. H., Sagi-Schwartz, A., Glaser, D., Steele, M., . . . Duschinsky, R. (2021). Attachment goes to court: Child protection and custody issues. *Attachment & Human Development*. https://doi.org/10.1080/14616734.2020.1840762

Fox, N. A., Kimmerly, N. L., & Schafer, W. D. (1991). Attachment to mother/Attachment to father: A meta-analysis. *Child Developement, 62*, 210-225.

Fraley, R. C. (2002). Attachment stability from infancy to adulthood: Meta-analysis and dynamic modeling of developmental mechanisms. *Personality and Social Psychology Review, 6*(2), 123-151.

Fraley, R. C. (2019). Attachment in adulthood: Recent developments, emerging debates, and future directions. *Annual Review of Psychology, 70*, 401-422. https://doi.org/10.1146/annurev-psych-010418-102813

Fraley, R. C., & Dugan, K. A. (2021). The consistency of attachment security across time and relationships. In R. A. Thompson, J. A. Simpson, & L. J. Berlin, *Attachment. The fundamental questions* (pp. 147-153). New York: The Guilford Press.

Fraley, R. C., Heffernan, M. E., Vicary, A. M., & Brumbaugh, C. C. (2011). The Experiences in Close Relationships - Relationship Structures Questionnaire: A method for assessing attachment orientations across relationships. *Psychological Assessment, 23*(3), 615-625. https://doi.org/10.1037/a0022898

Fraley, R. C., Vicary, A. M., Brumbaugh, C. C., & Roisman, G. I. (2011). Patterns of stability in adult attachment: An empirical test of two models of continuity and change. *Journal of Personality and Social Psychology, 101*(5), 974-992. https://doi.org/10.1037/a0024150

Freud, A. (1993). *The ego and the mechanisms of defense.* London: Karnac Books (Original work published 1936).

Freud, S. (1924). Der Untergang des Ödipuskomplexes. *Internationale Zeitschrift für Psychoanalyse, 10*(3), 245-252.

Freud, S. (1940). An outline of psychoanalysis. *International Journal of Psycho-Analysis, 21*, 27-84.

Funder, D. C. (1995). On the accuracy of personality judgment: A realistic approach. *Psychological Review, 102*(4), 652-670.

Furman, W., Simon, V. A., Shaffer, L., & Bouchey, H. A. (2002). Adolescents' working model and styles for relationsships with parents, friends, and romantic partners. *Child Developement, 73*(1), 241-255.

Geiser, C. (2008). *Structural equation modeling of multitrait-multimethod-multioccasion data (doctoral dissertation).* Retrieved from http://www.diss.fu-berlin.de/diss/receive/FUDISS_thesis_000000004986

Golish, T. D. (2000). Changes in closeness between adult children and their parents: A turning point analysis. *Communication Reports, 13*(2), 79-97.

Grossmann, K. E., Bretherton, I., Waters, E., & Grossmann, K. (2013). Maternal sensitivity: Observational studies honoring Mary Ainsworth's 100th year. *Attachment & Human Development, 15*(5-6), 443-447. https://doi.org/10.1080/14616734.2013.841058

Harlow, H. F., & Zimmermann, R. R. (1959). Affectional responses in the infant monkey. *Science, 130*(3373), 421-432. Retrieved from http://www.jstor.org/stable/1758036

Hazan, C., & Shaver, P. (1987). Romantic love conceptualized as an attachment process. *Journal of Personality and Social Psychology, 52*(3), 511-524.

Heinrich, M., Geiser, C., Zagorscak, P., Burns, G. L., Bohn, J., Becker, S. P., . . . Knaevelsrud, C. (2020). *On the meaning of the general factor of psychopathology ("P-Factor") in symmetrical bifactor models (preprint).* https://doi.org/10.31234/osf.io/syj9k

Heinrich, M., Zagorscak, P., Eid, M., & Knaevelsrud, C. (2018). Giving g a meaning: An application of the bifactor-(s-1) approach to realize a more symptom-oriented modeling of the Beck Depression Incentory-II. *Assessment*, 1-19. https://doi.org/10.1177/1073191118803738

Hendry, L. B., & Kloep, M. (2007a). Conzeptualizing emerging adulthood: Inspecting the emperor's new clothes? *Child Development Perspectives, 1*(2), 74-79.

Hendry, L. B., & Kloep, M. (2007b). Redressing the emperor! - A rejoinder to Arnett. *Child Development Perspective, 1*(2), 83-85.

Hiester, M., Nordstrom, A., & Swenson, L. M. (2009). Stability and change in parental attachment and adjusment outcomes during the first semester transition to college life. *Journal of College Student Development, 50*(5), 521-538.

Holtmann, J. (2017). *Multilevel graded response models for analyzing longitudinal multitrait-multimethod data (doctoral dissertation).* Retrieved from https://refubium.fu-berlin.de/bitstream/handle/fub188/6457/Holtmann_Jana_Dissertation.pdf?sequence=1&isAllowed=y

Holtmann, J., Koch, T., Bohn, J., & Eid, M. (2017). Bayesian analysis of longitudinal multitrait-multimethod data with ordinal response variables. *British Journal of Mathematical and Statistical Psychology, 70*, 42-80.

Holtmann, J., Koch, T., Bohn, J., & Eid, M. (2020). Multimethod assessment of time-stable and time-variable interindividual differences: Introduction of a new multitrait-multimethod latent state-trait IRT model. *European Journal of Psychological Assessment*, 1-20. https://doi.org/10.1027/1015-5759/a000577

Hudson, N. W., Fraley, R. C., Chopik, W. J., & Heffernan, M. E. (2015). Not all attachment relationships develop alike: Normative cross-sectional age trajectories in attachment to romantic partners, best friends, and parents. *Journal of Research in Personality, 59*, 44-55. https://doi.org/10.1016/j.jrp.2015.10.001

Jonkmann, K., Thoemmes, F., Lüdtke, O., & Trautwein, U. (2014). Personality traits and living arrangements in young adulthood: Selection and socialization. *Developmental Psychology, 50*(3), 683-698.

Kafetsios, K., & Sideridis, G. D. (2006). Attachment, social support and well-being in young and older adults. *Journal of Health Psychology, 11*(6), 863-876. https://doi.org/10.1177/1359105306069084

Kandler, C., Zimmermann, J., & McAdams, D. P. (2014). Core and surface characteristics for the description and theory of personality differences and development. *European Journal of Personality, 28*, 231-243. doi:10.1002/per.1952

Karreman, A., & Vingerhoets, A. J. (2012). Attachment and well-being: The mediating role of emotion regulation and resilience. *Personality and Individual Differences, 53*, 821-826. https://doi.org/10.1016/j.paid.2012.06.014

Kins, E., & Beyers, W. (2010). Failure to launch, failure to achieve criteria for adulthood? *Journal of Adolescent Research, 25*(3), 743-777. https://doi.org/10.1177/0743558410371126

Klein, M. (1952). Some theoretical conclusions regarding the emotional life of the infant. In M. Klein, P. Heimann, S. Isaacs, & J. Riviere, *Developments in Psychoanalysis* (pp. 198-236). London: The Hogarth Press.

Koch, T. (2013). *Multilevel structural equation modeling of mulitrait-multimethod-multioccasion data (doctoral dissertation).* Freie Universität Berlin. Retrieved from http://www.diss.fu-berlin.de/diss/servlets/MCRFileNodeServlet/FUDISS_derivate_000000013668/Thesis_Koch_gedreht.pdf?hosts=

Koch, T., Eid, M., & Lochner, K. (2018). Multitrait-multimethod analysis: The psychometric foundation of CFA-MTMM models. In P. Irwing, T. Booth, & D. J. Hughes, *The Wiley handbook of psychometric testing: A multidisciplinary reference on survey, scale and test development* (pp. 781-846). West Sussex, UK: John Wiley & Sons.

Koch, T., Holtmann, J., Bohn, J., & Eid, M. (2018). Explaining general and specific factors in longitudinal, multimethod, and bifactor models: Some caveats and recommendations. *Psychological Methods, 23*(5), 505-523. https://doi.org/10.1037/met0000146

Koch, T., Holtmann, J., Bohn, J., & Eid, M. (2020). Multitrait-multimethod analysis. In V. Zeigler-Hill, & T. Shackelford, *Encyclopedia of Personality and Individual Differences.* Cham: Springer. https://doi.org/10.1007/978-3-319-28099-8_1331-1

Kreppner, J. M., Rutter, M., Beckett, C., Castle, J., Colvert, E., Groothues, C., . . . Sounga-Barke, E. J. (2007). Normality and impairment following profund early institutional deprivation: A longitudianl follow-up into early adolescence. *Developmental Psychology, 43*(4), 931-946. https://doi.org/0.1037/0012-1649.43.4.931

La Guardia, J. G., Ryan, R. M., Couchman, C. E., & Deci, E. L. (2000). Within-person variantion in security of attachment: A self-determination theory perspective on attachment, need fulfillment, and well-being. *Journal of Personality and Social Psychology, 79*(3), 367-384. https://doi.org/10.1037//0022-3514.79.3.367

Lefkowitz, E. S. (2005). Things have gotten better: Developmental changes among emerging adults after the transition to university. *Journal of Adolescent Research, 20*(1), 40-63.

Lehnart, J., & Neyer, F. J. (2006). Should I stay or should I go? Attachment and personality in stable and instable romantic relationships. *European Journal of Personality, 20*, 475-495. https://doi.org/10.1002/per.606

Levy, K. N., Ellison, W. D., Scott, L. N., & Bernecker, S. L. (2011). Attachment style. *Journal of Clinical Psychology: In Session, 67*(2), 193-203. https://doi.org/10.1002/jclp.20756

Lopez, F. G., & Gormley, B. (2002). Stability and change in adult attachment style over the first-year college transition: Relations to self-confidence, coping, and distress patterns. *Journal of Counseling Psychology, 49*(2), 355-364.

Lucassen, N., Tharner, A., Van Ijzendoorn, M. H., Bakermans-Kranenburg, M. J., Volling, B. L., Verhulst, F. C., . . . Tiemeier, H. (2011). The association between paternal sensitivity and infant-father attachment security: A meta-analysis of three decades of research. *Journal of Family Psychology, 25*(6), 986-92. https://doi.org/10.1037/a0025855

Lüdtke, O., Roberts, B. W., Trautwein, U., & Nagy, G. (2011). A random walk down university avenue: Life paths, life events, and personality trait change at the transition to university life. *Journal of Personality and Social Psychology, 101*(3), 620-637. https://doi.org/10.1037/a0023743

Luhmann, M., & Kalitzki, A. (2016). How animals contribute to subjective well-being: A comprehensive model of protective and risk factors. *The Journal of Positive Psychology, 13*(2), 200-214. https://doi.org/10.1080/17439760.2016.1257054

Luhmann, M., Bohn, J., Holtmann, J., Koch, T., & Eid, M. (2016). I'm lonely, can't you tell? Convergent validity of self- and informant ratings of loneliness. *Journal of Research in Personality, 61*, 50-60.

Main, M. (1990). Cross-cultural studies of attachment organization: Recent studien, changing methodologies, and the concept of conditional strategies. *Human Development, 33*, 48-61.

Main, M. (2000). The organized categories of infant, child, and adult attachment: Flexible vs. inflexible attention unter attachment-related stress. *Journal of the American Psychoanalytic Association, 48*(4), 1055-1096. https://doi.org/10.1177/00030651000480041801

Main, M., & Solomon, J. (1986). Discovery of a new, insecure-disorganized/disoriented attachment pattern. In T. B. Brazelton, & M. Yogman, *Affective development in infancy* (pp. 95-124). Norwood, New Jersey: Ablex.

Main, M., Kaplan, N., & Cassidy, J. (1985). Security in infancy, childhood, and adulthood: A move to the level of representation. *Monographs of the Society for Research in Child Development, 50*(1), 66-104. https://doi.org/10.2307/3333827

Meyer, B., & Pilkonis, P. A. (2001). Attachment style. *Psychotherapy, 38*(4), 466-472. https://doi.org/10.1037/0033-3204.38.4.466

Mikulincer, M., & Shaver, P. R. (2016). *Attachment in adulthood* (2. ed.). New York: Guilford Press.

Nelson III, C. A., Zeanah, C. H., Fox, N. A., Marshall, P. J., Smyke, A. T., & Guthrie, D. (2007). Cognitive recovery in socially deprived young children: The Bucharest Early Intervention Project. *Science, 318*, 1937-1940. https://doi.org/10.1126/science.1143921

Neyer, F. J., & Lehnart, J. (2007). Relationships matter in personality development: Evidence from an 8-year longitudinal study across young adulthood. *Journal of Personality, 75*(3), 535-568. https://doi.org/10.1111/j.1467-6494.2007.00448.x

Nussbeck, F., Eid, M., Geiser, C., Courvosier, D., & Lischetzke, T. (2009). A CTC(M-1) model for different types of raters. *Methodology European Journal of Research Methods for the Behavioral and Social Sciences, 5*(3), 88-98. https://doi.org/10.1027/1614-2241.5.3.88

Pinquart, M., Feußner, C., & Ahnert, L. (2013). Meta-analytic evidence for stability in attachments from infancy to early adulthood. *Attachment & Human Development, 15*(2), 189-218. https://doi.org/10.1080/14616734.2013.746257

Reyer, W. (1956). *Pädagogische Psychologie. Allgemeine Darstellung auf der Grundlage einer psychischen Anthropologie.* Frankenberg: Aulis Verlag.

Ross, L. R., & Spinner, B. (2001). General and specific attachment representations in adulthood: Is there a relationship? *Journal of Social and Personal Relationships, 18*(6), 747-766.

Rutter, M., & O'Connor, T. G. (2004). Are there biological programming effects for psychological development? Findings from a study of romanian adoptees. *Developmental Psychology, 40*(1), 81-94. https://doi.org/10.1037/0012-1649.40.1.81

Schachner, D. A., Shaver, P. R., & Mirkulincer, M. (2003). Adult attachment theory, psychodynamics, and couple relationships. In S. M. Johnson, & V. E. Whiffen, *Attachment processes in couple and family therapy* (pp. 18-42). New York: The Guilford Press.

Scharfe, E., & Cole, V. (2006). Stability and change of attachment representations during emerging adulthood: An examination of mediators and moderators of change. *Personal Relationships, 13*, 363-374.

Schneider, L., & Schimmack, U. (2009). Self-informant agreement in well-being ratings: A meta-analysis. *Social Indicators Research, 94*, 363-376. https://doi.org/10.1007/s11205-009-9440-y

Seiffge-Krenke, I. (2006). Leaving home or still in the nest? Parent-child relationships and psychological health as predictors of different leaving home patterns. *Developmental Psychology, 42*(5), 864-876. https://doi.org/10.1037/0012-1649.42.5.864

Seiffge-Krenke, I., & Burk, W. J. (2012). Friends or lovers? Person- and variable-oriented perspectives on dyadic similarity in adolescent romantic relationships. *Journal of Social and Personal Relationships, 30*(6), 711-733. https://doi.org/10.1177/0265407512467562

Sroufe, L. A. (2021). Attachment as a relationship construct. In R. A. Thompson, J. A. Simpson, & L. J. Berlin, *Attachment. The fundamental questions* (pp. 17-23). New York: The Guilford Press.

Steyer, R., Mayer, A., Geiser, C., & Cole, D. A. (2015). A theory of states and traits - revised. *Annual Review of Clinical Psychology, 11*, 71-98. https://doi.org/10.1146/annurev-clinpsy-032813-153719

Thompson, R. A., Simpson, J. A., & Berlin, L. J. (2021). Attachment theory in the 21st century. In R. A. Thompson, J. A. Simpson, & L. J. Berlin, *Attachment: The fundamental questions* (pp. 3-13). New York, NY: The Guilford Press.

Van Ijzendoorn, M. H., & Kroonenberg, P. M. (1988). Cross-cultural patterns of attachment: A meta-analysis of the strange situation. *Child Development, 59*, 147-156.

Van Ijzendoorn, M. H., Schuengel, C., & Bakermans-Kranenburg, M. J. (1999). Disorganized attachment in early childhood: Meta-analysis of precursors, concomitants, and sequelae. *Development and Psychopathology, 11*, 225-249.

Vazire, S. (2006). Informant reports: A cheap, fast, and easy method for personality assessment. *Journal of Research in Personality, 40*, 472-481. https://doi.org/10.1016/j.jrp.2005.03.003

Waters, E., Bretherton, I., & Vaughn, B. E. (2015). Preface 2015. In M. D. Ainsworth, M. C. Blehar, E. Waters, & S. N. Wall, *Patterns of attachment. A psychological study of the strange situation. Classic Edition* (pp. x-xxxvi). New York: Psychology Press.

Wei, M., Russell, D. W., & Zakalik, R. A. (2005). Adult attachment, social self-efficacy, self-disclosure, loneliness, and subsequent depression for freshman college students: A longitudinal study. *Journal of Counseling Psychology, 52*(4), 602-614. https://doi.org/10.1037/0022-0167.52.4.602

Wei, M., Shaffer, P. A., Young, S. K., & Zakalik, R. A. (2005). Adult attachment, shame, depression, and loneliness: The mediation role of basic psychological needs satisfaction. *Journal of Counseling Psychology, 52*(4), 591-601. https://doi.org/10.1037/0022-0167.52.4.591

Wilkinson, R. B. (2004). The role of parental and peer attachment in the psychological health and self-esteem of adolescents. *Journal of Youth and Adolescence, 33*(6), 479-493.

Appendices

Contents **Page**

Appendix A:

The Different Versions of the Relationship-Specific Attachment Scales

Table A1

Different Versions of the Relationship-Specific Attachment Scale

Construct and item number	German Version of the Item	English Translation
	Target's attachment to mother	
Instruction	Beschreiben Sie Ihre Beziehung zu Ihrer Mutter. Wie sehr treffen diese Aussagen zu?	Describe your relationship with your mother. How accurate are these statements?
Security 1	Ich fühle mich von meiner Mutter akzeptiert.	I feel accepted by my mother.
Security 2	Ich habe das Gefühl, mich auf meine Mutter verlassen zu können.	I feel I can rely on my mother.
Security 3	Ich finde es einfach, meiner Mutter gefühlsmäßig nahe zu kommen.	I find it easy to get close to my mother emotionally.
Security 4*	Ich habe Schwierigkeiten, mich auf meine Mutter ganz zu verlassen.	I have difficulty relying on my mother completely.
Security 5*	Ich fühle mich unwohl, wenn ich meiner Mutter zu nah komme.	I feel uncomfortable getting too close to my mother.
Security 6*	Ich mach mir Sorgen, von meiner Mutter nicht akzeptiert zu werden.	I am worried about not being accepted by my mother.
Dependency 1	Damit ich etwas richtig genießen kann, muss meine Mutter immer dabei sein.	For me to really enjoy something, my mother always has to be there.
Dependency 2	Wenn ich Probleme habe, muss meine Mutter für mich da sein.	When I have problems, my mother has to be there for me.
Dependency 3	Ich kann Probleme nur mit meiner Mutter lösen.	I can solve problems only with my mother.
Dependency 4	Ich habe das Bedürfnis, meiner Mutter immer so nahe wie möglich zu sein.	I feel the need to always be as close to my mother as possible.
	Target's attachment to romantic partner And Romantic partner's attachment to target	
Instruction	Beschreiben Sie die Beziehung zu Ihrem Beziehungspartner. Wie sehr treffen diese Aussagen zu?	Describe your relationship with your relationship partner. How accurate are these statements?
Security 1	Ich fühle mich von meinem Partner akzeptiert.	I feel accepted by my partner.

Table A1 (continued)

Construct and item number	Construct and item number	Construct and item number
Security 2	Ich kann mich gut auf meinen Partner verlassen.	I can rely on my partner well.
Security 3	Ich finde es einfach, meinem Partner gefühlsmäßig nahe zu kommen	I find it easy to get close to my partner emotionally.
Security 4*	Ich habe Schwierigkeiten, mich auf meinen Partner ganz zu verlassen.	I have difficulty relying on my partner completely.
Security 5*	Ich fühle mich unwohl, wenn ich meinem Partner zu nah komme.	I feel uncomfortable getting too close to my partner.
Security 6*	Ich mach mir Sorgen, von meinem Partner nicht akzeptiert zu werden.	I am worried about not being accepted by my partner.
Dependency 1	Damit ich etwas richtig genießen kann, muss mein Partner immer dabei sein.	For me to really enjoy something, my partner always has to be there.
Dependency 2	Wenn ich Probleme habe, muss mein Partner für mich da sein.	When I have problems, my partner has to be there for me.
Dependency 3	Ich kann Probleme nur mit meinem Partner lösen.	I can solve problems only with my partner.
Dependency 4	Ich kann meinem Partner nie nah genug sein.	I can never be close enough to my partner.
	Target's attachment to friend	
Instruction	Hier geht es um Ihre Beziehung zu [Name]. Wie sehr treffen diese Aussagen zu?	This is about your relationship with [name]. How true are these statements?
Security 1	Ich fühle mich von [Name] akzeptiert.	I feel accepted by [name].
Security 2	Ich kann mich gut auf [Name] verlassen.	I can rely on [name] well.
Security 3	Ich finde es einfach, [Name] gefühlsmäßig nahe zu kommen.	I find it easy to get close to [name] emotionally.
Security 4*	Ich habe Schwierigkeiten, mich auf [Name] ganz zu verlassen.	I have difficulty relying on [name] completely.
Security 5*	Ich fühle mich unwohl, wenn ich [Name] zu nah komme.	I feel uncomfortable getting too close to [name].
Security 6*	Ich mache mir Sorgen, von [Name] nicht akzeptiert zu werden.	I am worried about not being accepted by [name].

Table A1 (continued)

Construct and item number	Construct and item number	Construct and item number
Dependency 1	Damit ich etwas richtig genießen kann, muss [Name] immer dabei sein.	For me to really enjoy something, [name] has to be there all the time.
Dependency 2	Wenn ich Probleme habe, muss [Name] für mich da sein.	When I have problems, [name] has to be there for me.
Dependency 3	Ich kann Probleme nur mit [Name] lösen.	I can solve problems only with [name].
Dependency 4	Ich habe das Bedürfnis [Name] immer so nahe wie möglich zu sein.	I feel the need to always be as close to [name] as possible.
	Parent's attachment to target	
Instruction	Hier geht es um eine Selbsteinschätzung. Geben Sie hier an, wie sehr diese Aussagen auf Sie zutreffen.	This is a self-assessment. Indicate here how much these statements apply to you.
Security 1	Ich fühle mich von meinem Kind akzeptiert.	I feel accepted by my child.
Security 2	Ich kann mich gut auf mein Kind verlassen.	I can rely on my child well.
Security 3	Ich finde es einfach, meinem Kind gefühlsmäßig nahe zu kommen.	I find it easy to get close to my child emotionally.
Security 4*	Ich habe Schwierigkeiten, mich auf mein Kind ganz zu verlassen.	I have difficulty relying on my child completely.
Security 5*	Ich fühle mich unwohl, wenn ich meinem Kind zu nah komme.	I feel uncomfortable getting too close to my child.
Security 6*	Ich mach mir Sorgen, von meinem Kind nicht akzeptiert zu werden.	I worry about not being accepted by my child.
Dependency 1	Damit ich etwas richtig genießen kann, muss mein Kind immer dabei sein.	For me to really enjoy something, my child has to be there all the time.
Dependency 2	Wenn ich Probleme habe, muss mein Kind für mich da sein.	When I have problems, my child has to be there for me.
Dependency 3	Ich kann Probleme nur mit meinem Kind lösen.	I can solve problems only with my child.
Dependency 4	Ich habe das Gefühl, meinem Kind nie nah genug sein zu können.	I feel like I can never be close enough to my child.

Table A1 (continued)

Construct and item number	Construct and item number	Construct and item number
	Parent's rating on target's attachment	
Instruction	Hier sollen Sie einschätzen, wie Ihr Kind sich einschätzt**.** Geben Sie also an, wie sehr diese Aussagen auf Ihr Kind zutreffen.	Here you are to assess how your child views him/herself. So indicate how much these statements apply to your child.
Security 1	Mein Kind fühlt sich von mir akzeptiert.	My child feels accepted by me.
Security 2	Mein Kind hat das Gefühl, sich gut auf mich verlassen zu können.	My child feels that he can rely on me well.
Security 3	Mein Kind findet es einfach, mir gefühlsmäßig nah zu kommen.	My child finds it easy to get close to me emotionally.
Security 4*	Mein Kind hat Schwierigkeiten, sich auf mich ganz zu verlassen.	My child has difficulty relying on me completely.
Security 5*	Mein Kind fühlt sich unwohl, wenn es mir zu nah kommt.	My child feels uncomfortable when he gets too close to me.
Security 6*	Mein Kind macht sich Sorgen, nicht von mir akzeptiert zu werden.	My child is worried about not being accepted by me.
Dependency 1	Damit mein Kind etwas richtig genießen kann, muss ich immer dabei sein.	For my child to really enjoy something, I have to be there all the time.
Dependency 2	Wenn mein Kind Probleme hat, muss ich für es da sein.	When my child has problems, I have to be there for him.
Dependency 3	Mein Kind kann Probleme nur mit mir lösen.	My child can solve problems only with me.
Dependency 4	Mein Kind hat das Bedürfnis, mir immer so nahe wie möglich zu sein.	My child has the need to always be as close to me as possible.
	Romantic partner's attachment to target	
Instruction	Hier geht es um die Einschätzung Ihrer Partnerin. Wie sehr treffen diese Aussagen auf diese zu?	This is about your partner's assessment. How much do these statements apply to her?
Security 1	Meine Partnerin fühlt sich von mir akzeptiert.	My partner feels accepted by me.
Security 2	Meine Partnerin kann sich gut auf mich verlassen.	My partner can rely on me very well.
Security 3	Meine Partnerin findet es einfach mir gefühlsmäßig nah zu kommen.	My partner finds it easy to get close to me emotionally.

Table A1 (continued)

Construct and item number	Construct and item number	Construct and item number
Security 4*	Meine Partnerin hat Schwierigkeiten sich auf mich ganz zu verlassen.	My partner has difficulty relying on me completely.
Security 5*	Meine Partnerin fühlt sich unwohl, wenn sie mir zu nah kommt.	My partner feels uncomfortable when she gets too close to me.
Security 6*	Meine Partnerin macht sich Sorgen, nicht von mir akzeptiert zu werden.	My partner is worried about not being accepted by me.
Dependency 1	Damit meine Partnerin etwas richtig genießen kann, muss ich immer dabei sein.	For my partner to really enjoy something, I always have to be there.
Dependency 2	Wenn meine Partnerin Probleme hat muss ich für ihn da sein.	When my partner has problems, I have to be there for him.
Dependency 3	Meine Partnerin kann Probleme nur mit mir lösen.	My partner can solve problems only with me.
Dependency 4	Meine Partnerin kann mir nie nah genug sein.	My partner can never be close enough for me.
	Friend's attachments to target	
Instruction	Hier geht es um eine Selbsteinschätzung. Wie sehr treffen diese Aussagen auf Sie zu?	This is a self-assessment. How much do these statements apply to you?
Security 1	Ich fühle mich von meinem Freund akzeptiert.	I feel accepted by my friend.
Security 2	Ich kann mich gut auf meinen Freund verlassen.	I can rely on my friend very well.
Security 3	Ich finde es einfach, meinem Freund gefühlsmäßig nah zu kommen.	I find it easy to get close to my boyfriend emotionally.
Security 4*	Ich habe Schwierigkeiten mich auf meinen Freund ganz zu verlassen.	I have trouble relying on my friend completely.
Security 5*	Ich fühle mich unwohl, wenn ich meinem Freund zu nah komme.	I feel uncomfortable getting too close to my friend.
Security 6*	Ich mach mir Sorgen, von meinem Freund nicht akzeptiert zu werden.	I am worried about not being accepted by my boyfriend.
Dependency 1	Damit ich etwas richtig genießen kann, muss mein Freund immer dabei sein.	For me to really enjoy something, my boyfriend always has to be there.
Dependency 2	Wenn ich Probleme habe, muss mein Freund für mich da sein.	When I have problems, my friend has to be there for me.

Table A1 (continued)

Construct and item number	Construct and item number	Construct and item number
Dependency 3	Ich kann Probleme nur mit meinem Freund lösen.	I can solve problems only with my friend.
Dependency 4	Ich kann meinem Freund nie nah genug sein.	I can never be close enough to my friend.
	Friend's rating of the target's attachment	
Instruction	Hier geht es um die Einschätzung Ihrer Freundin. Wie sehr treffen diese Aussagen auf diese zu?	This is about your girlfriend's assessment. How much do these statements apply to her?
Security 1	Meine Freundin fühlt sich von mir akzeptiert.	My girlfriend feels accepted by me.
Security 2	Meine Freundin kann sich gut auf mich verlassen.	My girlfriend is good at relying on me.
Security 3	Meine Freundin findet es einfach mir gefühlsmäßig nahe zu kommen.	My girlfriend finds it easy to get close to me emotionally.
Security 4*	Meine Freundin hat Schwierigkeiten sich auf mich ganz zu verlassen.	My girlfriend has difficulty relying on me completely.
Security 5*	Meine Freundin fühlt sich unwohl, wenn er mir zu nah kommt.	My girlfriend feels uncomfortable when he gets too close.
Security 6*	Meine Freundin macht sich Sorgen nicht von mir akzeptiert zu werden.	My girlfriend is worried about not being accepted by me.
Dependency 1	Damit meine Freundin etwas richtig genießen kann, muss ich immer dabei sein.	For my girlfriend to really enjoy something, I always have to be there.
Dependency 2	Wenn meine Freundin Probleme hat, muss ich für ihn da sein.	When my girlfriend has problems, I have to be there for him.
Dependency 3	Meine Freundin kann Probleme nur mit mir lösen.	My girlfriend can solve problems only with me.
Dependency 4	Meine Freundin kann mir nie nah genug sein.	My girlfriend can never be close enough for me.

Note. For the mothers' items, there was also a corresponding variant for fathers. For partners and friends, there were variants for both sexes. *These items are inverted for analysis.

Appendix B:

Supplementary Material for Study 1: 'Attachments to Parents after High School Graduation: A Study Using Self- and Parent Ratings'

Table B1

Items of the Attachment Scales

English items	German items
Relationship-Specific Scales: Attachment Security	
1. I feel accepted by my mother.	1. Ich fühle mich von meiner Mutter akzeptiert.
2. I feel like I can rely on my mother.	2. Ich habe das Gefühl, mich auf meine Mutter verlassen zu können.
3. I find it easy to get emotionally close to my mother.	3. Ich finde es einfach, meiner Mutter gefühlsmäßig nahe zu kommen.
4. I'm having trouble completely relying on my mother.*	4. Ich habe Schwierigkeiten, mich auf meine Mutter ganz zu verlassen.*
5. I feel uncomfortable getting too close to my mother.*	5. Ich fühle mich unwohl, wenn ich meiner Mutter zu nahe komme.*
6. I'm worried about not being accepted by my mother.*	6. Ich mach mir Sorgen, von meiner Mutter nicht akzeptiert zu werden.*
Relationship-Specific Scales: Dependency	
1. For me to really enjoy something, my mother always has to be there.	1. Damit ich etwas richtig genießen kann, muss meine Mutter immer dabei sein.
2. If I have problems, my mother must be there for me.	2. Wenn ich Probleme habe, muss meine Mutter für mich da sein.
3. I can only solve problems with my mother.	3. Ich kann Probleme nur mit meiner Mutter lösen.
4. I feel the need to always be as close as possible to my mother.	4. Ich habe das Bedürfnis, meiner Mutter immer so nahe wie möglich zu sein.
IPPA: trust	
1. My mother respects my feelings.	1. Meine Mutter respektiert meine Gefühle.
2. My mother accepts me as I am.	2. Meine Mutter akzeptiert mich, wie ich bin.
3. When I am angry about something, my mother tries to be understanding.	3. Wenn ich mich über etwas ärgere, versucht meine Mutter verständnisvoll zu sein.
IPPA: communication	
1. If my mother knows something is bothering me, she asks me about it.	1. Wenn meine Mutter merkt, dass mich etwas beschäftigt, fragt sie mich danach.
2. I tell my mother about my problems and troubles.	2. Ich erzähle meiner Mutter von meinen Problemen und Sorgen.
3. My mother encourages me to talk about my difficulties.	3. Meine Mutter ermutigt mich, über meine Probleme zu sprechen.
IPPA: relatedness	
1. I feel safe with my mother.	1. Ich fühle mich bei meiner Mutter gut aufgehoben.
2. I have the impression that my mother understands me.	2. Ich habe den Eindruck, dass meine Mutter mich versteht.
3. If I have difficulties, my mother helps me.	3. Wenn ich Probleme habe, ist mir meine Mutter eine Hilfe.

Note. For other attachment figures 'my mother' was replaced with 'my father' or 'my child'; *inverted item.

Table B2

Correlations between the Manifest Scales in the Mother Group

	Self-ratings of well-being			Self-ratings of attachment to parents					Parent ratings of well-being			Attachment of the parent					Parent ratings of the targets attachment			
	Swls	Flourishing	Happiness	Security	Relatedness	Communication	Trust	Dependency	Swls	Flourishing	Happiness	Security	Relatedness	Communication	Trust	Dependency	Security	Relatedness	Communication	Trust
Self-ratings of well-being																				
Flourishing	.64	1																		
Happiness	.56	.60	1																	
Self-ratings of attachment to parents																				
Security	.38	.32	.31	1																
Relatedness	.40	.39	.34	.73	1															
Communication	.32	.38	.32	.56	.70	1														
Trust	.37	.38	.26	.69	.72	.60	1													
Dependency	.02	.03	.11	.21	.32	.40	.17	1												
Parent ratings of well-being																				
Swls	.41	.31	.35	.25	.26	.27	.24	.00	1											
Flourishing	.28	.46	.34	.18	.15	.21	.21	-.04	.52	1										
Happiness	.33	.40	.51	.22	.21	.19	.21	-.03	.59	.62	1									
Attachment of the parent																				
Security	.22	.25	.17	.34	.37	.26	.38	.10	.40	.50	.40	1								
Relatedness	.11	.22	.15	.23	.26	.29	.28	.14	.29	.40	.27	.45	1							
Communication	.12	.21	.12	.18	.21	.30	.22	.15	.28	.36	.26	.37	.64	1						
Trust	.14	.27	.17	.27	.28	.25	.35	.13	.37	.43	.34	.55	.61	.49	1					
Dependency	-.25	-.16	.00	-.11	-.16	-.12	-.12	.13	-.10	-.12	-.03	-.23	.04	.11	.00	1				
Parent ratings of the targets attachment																				
Security	.15	.20	.15	.32	.36	.32	.36	.17	.41	.40	.37	.62	.49	.36	.58	-.12	1			
Relatedness	.15	.23	.19	.30	.36	.27	.32	.20	.43	.42	.40	.52	.54	.40	.53	-.02	.62	1		
Communication	.18	.21	.22	.27	.35	.40	.35	.20	.30	.34	.32	.42	.38	.46	.38	-.10	.45	.56	1	
Trust	.19	.25	.17	.31	.32	.25	.42	.12	.30	.43	.37	.51	.41	.31	.55	-.13	.56	.58	.42	1
Dependency	-.12	-.07	.03	.01	.05	.04	-.04	.38	.02	.00	-.03	-.05	.10	.20	.01	.51	-.02	.11	.08	-.03

Note. Swls = Satisfaction With Life Scale. This table contains the correlations of 435 dyads of emerging adults and their mothers.

Table B3

Correlations between the Manifest Scales in the Father Group

	Self-ratings of well-being			Self-ratings of attachment to parents					Parent ratings of well-being			Attachment of the parent					Parent ratings of the targets attachment			
	Swls	Flourishing	Happiness	Security	Relatedness	Communicatio	Trust	Dependency	Swls	Flourishing	Happiness	Security	Relatedness	Communicatio	Trust	Dependency	Security	Relatedness	Communicatio	Trust
Self-ratings of well-being																				
Flourishing	.61	1																		
Happiness	.54	.67	1																	
Self-ratings of attachment to parents																				
Security	.34	.38	.32	1																
Relatedness	.44	.38	.33	.81	1															
Communication	.25	.30	.31	.46	.56	1														
Trust	.34	.31	.28	.80	.86	.50	1													
Dependency	.21	.16	.15	.29	.31	.39	.19	1												
Parent ratings of well-being																				
Swls	.46	.29	.21	.34	.30	.09	.30	.03	1											
Flourishing	.20	.21	.18	.11	.06	.03	.06	-.13	.53	1										
Happiness	.39	.42	.33	.36	.26	.17	.24	.16	.66	.49	1									
Attachment of the parent																				
Security	.29	.23	.18	.43	.24	.22	.35	.21	.30	.30	.45	1								
Relatedness	.23	.29	.17	.27	.22	.12	.24	.14	.34	.40	.37	.46	1							
Communication	.18	.28	.21	.33	.20	.31	.19	.20	.28	.44	.45	.38	.46	1						
Trust	.27	.19	.15	.39	.30	.31	.40	.14	.37	.39	.42	.67	.48	.39	1					
Dependency	-.22	-.21	-.04	-.09	-.08	-.01	-.07	.09	-.24	-.21	-.13	-.06	.14	.00	-.13	1				
Parent ratings of the targets attachment																				
Security	.36	.41	.31	.55	.44	.43	.49	.36	.39	.30	.50	.69	.55	.48	.61	-.09	1			
Relatedness	.16	.15	.06	.31	.34	.39	.34	.26	.44	.34	.36	.44	.51	.45	.57	-.09	.54	1		
Communication	.34	.28	.14	.29	.26	.44	.28	.12	.29	.28	.27	.35	.40	.54	.40	-.12	.43	.61	1	
Trust	.12	.07	.14	.11	.03	.25	.25	.07	.24	.41	.26	.38	.47	.37	.49	-.03	.48	.44	.45	1
Dependency	-.09	-.17	-.04	-.08	-.02	-.09	-.06	.12	-.11	-.16	-.09	-.10	.01	.02	-.13	.44	-.12	.04	-.05	-.14

Note. Swls = Satisfaction With Life Scale. This table contains the correlations of 123 dyads of emerging adults and their fathers.

Table B4

Model Fit Indices of Confirmatory Factor Analyses of Each Scale with Single-Item Indicators

Scale	χ^2	*df*	*p*	RMSEA	CFI
Security*	161.88	35	<.001	.114	.945
Relatedness	12.89	8	.116	.047	.998
Communication	8.13	8	.421	.007	1
Trust	8.68	8	.371	.017	1
Dependency	16.39	15	.357	.018	.999
Flourishing**	147.33	55	<.001	.078	.954
Happiness	23.21	15	.080	.044	.997
Life Satisfaction	7.32	7	.396	.013	1

Note. All models were estimated using WLSMV. All models are multi group models for the mother and the father group.

*The model fit for security was bad. We conducted exploratory factor analyses for the mother group and the father group separately to examine the factor structure. In the mother group, the Eigenvalues were 3.664 / 0.770 / 0.637 / 0.546 / 0.213 / 0.170 and in the father group, the Eigenvalues were 3.845 / 0.727 / 0.577 / 0.514 / 0.229 / 0.107. Therefore, both factor analyses indicate that there is only one factor of attachment security. There are, however, strong correlations between the error terms of some items.

**For the model of flourishing, the two lowest categories were collapsed, because of empty cells in the father group. This model showed only an acceptable model fit.

Table B5

Tests of Measurement Invariance and Convergent Validity

Tested stage of measurement invariance and convergent validity	χ^2 of the difference test	*df*	*p*
Facets of attachment with five possible stages of measurement invariance and convergent validity			
Security			
II	13.88	8	.085
III	8.14	9	.520
IV	7.38	6	.287
V	**2.59**	**2**	**.274**
Relatedness			
II	16.11	17	.516
III	13.96	15	.528
IV	17.77	12	.123
V	**0.92**	**2**	**.630**
Communication			
II	**24.34**	**17**	**.110**
III	29.99	18	.038
Trust			
II	20.10	17	.269
III	20.15	14	.126
IV	14.83	11	.191
V	**2.06**	**2**	**.358**
Dependency			
II	29.27	24	.210
III	32.53	22	.069
IV	23.20	20	.279
V	**1.98**	**2**	**.381**
Facets of well-being with two possible stages of measurement invariance			
Flourishing			
II	**13.96**	**12**	**.303**
Happiness			
II	**43.50**	**32**	**.085**
Life Satisfaction			
II	37.73	22	.020
II with restrictions only on the self-rating	27.22	12	.007
II with restrictions only on the parent rating	**10.67**	**10**	**.384**

Note. The χ^2-value of Stage II is based on the comparison to Level I. The selected stages of measurement invariance and convergent validity are printed in boldface type.

Table B6

Unstandardized Regression Coefficients in the Mother Group

		Facet of well-being					
		Flourishing		Happiness		Life Satisfaction	
Factors of attachment		Self-rated	Parent rated	Self-rated	Parent rated	Self-rated	Parent rated
Security	*T*	**0.32***	**0.21***	**0.87***	**0.63***	**1.14***	**0.76***
		(0.05)	(0.06)	(0.15)	(0.15)	(0.19)	(0.18)
	D	**0.21***	**0.72***	0.13	**1.10***	0.31	**1.27***
		(0.08)	(0.10)	(0.21)	(0.23)	(0.23)	(0.27)
	M	-0.07	0.00	0.12	0.52	-0.70	**0.85***
		(0.15)	(0.16)	(0.43)	(0.43)	(0.42)	(0.43)
Relatedness	*T*	**0.13***	**0.05***	**0.31***	**0.19***	**0.37***	**0.24***
		(0.02)	(0.02)	(0.05)	(0.05)	(0.07)	(0.06)
	D	**0.06***	**0.20***	0.09	**0.29***	-0.01	**0.32***
		(0.03)	(0.03)	(0.07)	(0.08)	(0.07)	(0.08)
	M	0.00	**0.10***	0.09	**0.44***	-0.04	**0.44***
		(0.04)	(0.04)	(0.09)	(0.12)	(0.10)	(0.13)
Communication	*T*	**0.17***	**0.11***	**0.40***	**0.26***	**0.47***	**0.36***
		(0.02)	(0.03)	(0.06)	(0.07)	(0.09)	(0.08)
	D	0.03	**0.17***	0.01	**0.26***	-0.04	**0.25***
		(0.02)	(0.03)	(0.06)	(0.08)	(0.08)	(0.08)
	M	0	0	0.05	**0.20***	0.01	0.10
		(fixed)	(fixed)	(0.07)	(0.10)	(0.05)	(0.08)
Trust	*T*	**0.10***	**0.06***	**0.19***	**0.14***	**0.29***	**0.19***
		(0.02)	(0.02)	(0.04)	(0.04)	(0.06)	(0.05)
	D	**0.06***	**0.19***	0.11	**0.37***	-0.02	**0.45***
		(0.03)	(0.04)	(0.07)	(0.08)	(0.08)	(0.10)
	M	0.02	0.08	0.04	0.17	0.05	0.06
		(0.04)	(0.05)	(0.09)	(0.11)	(0.08)	(0.09)
Dependency	*T*	0.02	0.00	**0.15***	-0.02	0.04	0.03
		(0.03)	(0.03)	(0.06)	(0.07)	(0.08)	(0.08)
	D	**-0.13***	**-0.08***	-0.50	-0.38	**-0.51***	**-0.24***
		(0.04)	(0.04)	(0.33)	(0.28)	(0.14)	(0.12)
	M	0	0	-0.01	-0.07	0.00	0.50
		(fixed)	(fixed)	(0.09)	(0.08)	(0.33)	(0.33)

Note. *T* = attachment factor, *D* = discrepancy factor, *M* = method factor. Significant regression coefficients and correlations of the well-being residuals are printed in boldface type. The standard errors are in parenthesis. * $p <$ .05.

Table B7

Unstandardized Regression Coefficients in the Father Group

		Facet of well-being					
		Flourishing		Happiness		Life Satisfaction	
Factors of attachment		Self-rated	Parent rated	Self-rated	Parent rated	Self-rated	Parent rated
Security	*T*	**0.31***	0.08	**0.91***	**0.82***	**0.65***	**0.82***
		(0.08)	(0.09)	**(0.25)**	**(0.22)**	(0.21)	(0.25)
	D	0.05	**0.49***	0.14	**1.15***	0.46	0.51
		(0.17)	(0.17)	(0.48)	**(0.43)**	(0.37)	(0.39)
	M	**0.80***	0.26	1.71	1.71	0.55	1.40
		(0.35)	(0.33)	(0.99)	(0.97)	(0.66)	(0.82)
Relatedness	*T*	**0.11***	0.01	**0.36***	**0.21***	**0.31***	**0.23***
		(0.02)	(0.03)	(0.09)	(0.09)	(0.07)	(0.08)
	D	0.09	**0.21***	0.08	**0.49***	0.11	**0.42***
		(0.05)	(0.06)	(0.13)	(0.16)	(0.12)	(0.16)
	M	-0.10	0.09	-0.30	0.18	-0.24	**0.39***
		(0.06)	(0.07)	(0.23)	(0.19)	(0.16)	(0.19)
Communication	*T*	**0.15***	0.01	**0.46***	0.26	**0.29***	0.16
		(0.04)	(0.05)	(0.12)	(0.16)	(0.12)	(0.16)
	D	**0.13***	**0.31***	0.22	**0.79***	0.11	**0.52***
		(0.06)	(0.08)	(0.17)	(0.24)	(0.12)	(0.24)
	M	0	0	-0.32	-0.15	0.19	0.15
		(fixed)	(fixed)	(0.24)	(0.22)	(0.14)	(0.15)
Trust	*T*	**0.09***	0.02	**0.29***	**0.18***	**0.21***	**0.21***
		(0.03)	(0.03)	(0.07)	(0.08)	(0.07)	(0.08)
	D	0.03	**0.18***	0.03	**0.45***	0.14	**0.42***
		(0.05)	(0.06)	(0.15)	(0.15)	(0.12)	(0.16)
	M	-0.12	0.14	-0.09	-0.01	-0.20	0.06
		(0.08)	(0.09)	(0.20)	(0.17)	(0.17	(0.16)
Dependency	*T*	0.10	-0.09	**0.31***	**0.40***	**0.34***	0.10
		(0.06)	(0.06)	(0.16)	(0.18)	(0.16)	(0.21)
	D	**-0.20***	**-0.15***	-1.54	-0.39	**-0.46***	**-0.65***
		(0.06)	(0.07)	(0.83)	(0.70)	(0.19)	(0.21)
	M	0	0	-0.05	**-0.41***	-0.28	0.41
		(fixed)	(fixed)	(0.19)	(0.18)	(0.55)	(0.72)

Note. *T* = attachment factor, *D* = discrepancy factor, *M* = method factor. Significant regression coefficients and correlations of the well-being residuals are printed in boldface type. The standard errors are in parenthesis. * $p <$ .05.

Appendix C:

Supplementary Material for Study 2: 'Analyzing Stability and Change in Dyadic Attachment: The Multi-Rater Latent State-Trait Model with Autoregressive Effects'

Coefficients of the MR-LST-AR Model

Table A1

Mathematical definitions of the coefficients of the MR-LST-AR model.

Coefficient	*Definition*
	Target ratings ($k = 1$)
Reliability (*Rel*)	$\mathrm{Rel}(Y_{i1l}) = 1 - \frac{\mathrm{Var}(E_{i1l})}{\mathrm{Var}(Y_{i1l})}$
Occasion specificity (*OS*)	$\mathrm{OS}(Y_{i1l}) = \frac{\lambda_{Oj1l}^2 \mathrm{Var}(SR_l)}{\mathrm{Var}(Y_{i1l}) - \mathrm{Var}(E_{i1l})}$
Time consistency (*TCon*) [for $l > 1$]	$\mathrm{TCon}(Y_{i1l}) = \frac{\lambda_{Ti1l}^2 \mathrm{Var}(T_{i11}) + \lambda_{Oj1l}^2 \beta_{Ol}^2 \mathrm{Var}(O_{l-1})}{\mathrm{Var}(Y_{i1l}) - \mathrm{Var}(E_{i1l})}$
Predictability by trait$_1$ ($Pred_{\mathrm{trait1}}$)	$\mathrm{Pred}_{\mathrm{trait1}}(Y_{i1l}) = \frac{\lambda_{\mathrm{T}i1l}^2 \mathrm{Var}(T_{i11})}{\mathrm{Var}(Y_{i1l}) - \mathrm{Var}(E_{i1l})}$
Unpredictability by trait$_1$ ($UPred_{\mathrm{trait1}}$) [for $l > 1$]	$\mathrm{UPred}_{\mathrm{trait1}}(Y_{i1l}) = \frac{\lambda_{\mathrm{O}j1l}^2 \beta_{Ol}^2 \mathrm{Var}(O_{l-1})}{\mathrm{Var}(Y_{i1l}) - \mathrm{Var}(E_{i1l})}$
	Parent ratings ($k = 2$)
Reliability (*Rel*)	$\mathrm{Rel}(Y_{i2l}) = 1 - \frac{\mathrm{Var}(E_{i2l})}{\mathrm{Var}(Y_{i2l})}$
Occasion specificity (*OS*)	$\mathrm{OS}(Y_{i2l}) = \frac{\lambda_{\mathrm{O}i2l}^2 \mathrm{Var}(SR_l) + \lambda_{\mathrm{OPS}i2l}^2 \mathrm{Var}(SRPS_l)}{\mathrm{Var}(Y_{i2l}) - \mathrm{Var}(E_{i2l})}$
Time consistency (*TCon*) [for $l > 1$]	$\mathrm{TCon}(Y_{i2l}) = \frac{\lambda_{\mathrm{T}i2l}^2 \mathrm{Var}(T_{i11}) + \lambda_{\mathrm{TPS}i2l}^2 \mathrm{Var}(TPS_{i21}) + \lambda_{\mathrm{O}j2l}^2 \beta_{\mathrm{O}l}^2 \mathrm{Var}(O_{l-1}) + \lambda_{\mathrm{OPS}j2l}^2 \beta_{\mathrm{OPS}l}^2 \mathrm{Var}(OPS_{l-1})}{\mathrm{Var}(Y_{i2l}) - \mathrm{Var}(E_{i2l})}$

Predictability by trait$_1$ ($Pred_{\text{trait1}}$)

$$\text{Pred}_{\text{trait1}}(Y_{i2l}) = \frac{\lambda^2_{Ti2l}\text{Var}(T_{i11}) + \lambda^2_{\text{TPS}i2l}\text{Var}(TPS_{i21})}{\text{Var}(Y_{i2l}) - \text{Var}(E_{i2l})}$$

Unpredictability by trait$_1$ ($UPred_{\text{trait1}}$) [for $l > 1$]

$$\text{UPred}_{\text{trait1}}(Y_{i2l}) = \frac{\lambda^2_{\text{O}j2l}\beta^2_{\text{O}l}\text{Var}(O_{l-1}) + \lambda^2_{\text{OPS}j2l}\beta^2_{\text{OPS}l}\text{Var}(OPS_{l-1})}{\text{Var}(Y_{i2l}) - \text{Var}(E_{i2l})}$$

Rater consistency ($RCon$)

$$\text{RCon}(Y_{i2l}) = \frac{\lambda^2_{\text{T}i2l}\text{Var}(T_{i11}) + \lambda^2_{\text{O}i2l}\text{Var}(O_l)}{\text{Var}(Y_{i2l}) - \text{Var}(E_{i2l})}$$

Rater specificity (RS)

$$\text{RS}(Y_{i2l}) = \frac{\lambda^2_{\text{TPS}i2l}\text{Var}(TPS_{i21}) + \lambda^2_{\text{OPS}i2l}\text{Var}(OPS_l)}{\text{Var}(Y_{i2l}) - \text{Var}(E_{i2l})}$$

Rater-consistent predictability by trait$_1$ ($RConPred_{\text{trait1}}$)

$$\text{RConPred}_{\text{trait1}}(Y_{i2l}) = \frac{\lambda^2_{\text{T}i2l}\text{Var}(T_{i11})}{\lambda^2_{\text{T}i2l}\text{Var}(T_{i11}) + \lambda^2_{\text{TPS}i2l}\text{Var}(TPS_{i21})}$$

Rater-specific predictability by trait$_1$ ($RSPred_{\text{trait1}}$)

$$\text{RSPred}_{\text{trait1}}(Y_{i1l}) = \frac{\lambda^2_{\text{TPS}i2l}\text{Var}(TPS_{i21})}{\lambda^2_{\text{T}i2l}\text{Var}(T_{i11}) + \lambda^2_{\text{TPS}i2l}\text{Var}(TPS_{i21})}$$

Rater-consistent time consistency ($RConTCon$) [for $l > 1$]

$$\text{RConTCon}(Y_{i1l}) = \frac{\lambda^2_{\text{T}i2l}\text{Var}(T_{i11}) + \lambda^2_{\text{O}i2l}\beta^2_{\text{O}l}\text{Var}(O_{l-1})}{\lambda^2_{\text{T}i2l}\text{Var}(T_{i11}) + \lambda^2_{\text{TPS}i2l}\text{Var}(TPS_{i21}) + \lambda^2_{\text{O}i2l}\beta^2_{\text{O}l}\text{Var}(O_{l-1}) + \lambda^2_{\text{OPS}i2l}\beta^2_{\text{OPS}l}\text{Var}(OPS_{l-1})}$$

Rater-specific time consistency ($RSTCon$) [for $l > 1$]

$$\text{RSTCon}(Y_{i1l}) = \frac{\lambda^2_{\text{TPS}i2l}\text{Var}(TPS_{i21}) + \lambda^2_{\text{OPS}i2l}\beta^2_{\text{OPS}l}\text{Var}(OPS_{l-1})}{\lambda^2_{\text{T}i2l}\text{Var}(T_{i11}) + \lambda^2_{\text{TPS}i2l}\text{Var}(TPS_{i21}) + \lambda^2_{\text{O}i2l}\beta^2_{\text{O}l}\text{Var}(O_{l-1}) + \lambda^2_{\text{OPS}i2l}\beta^2_{\text{OPS}l}\text{Var}(OPS_{l-1})}$$

Rater-consistent occasion specificity ($RConOS$)

$$\text{RConOS}(Y_{i2l}) = \frac{\lambda^2_{\text{O}j2l}\text{Var}(SR_l)}{\lambda^2_{\text{O}j2l}\text{Var}(SR_l) + \lambda^2_{\text{OPS}j2l}\text{Var}(SRPS_l)}$$

Rater-specific occasion

$$\text{RSOS}(Y_{i2l}) = \frac{\lambda^2_{\text{OPS}j2l}\text{Var}(SRPS_l)}{\lambda^2_{\text{O}j2l}\text{Var}(SR_l) + \lambda^2_{\text{OPS}j2l}\text{Var}(SRPS_l)}$$

specificity (*RSOS*)	
Rater-consistent unpredictability by trait$_1$ (*RConUPred*$_{\text{trait1}}$) [for $l > 1$]	$\text{RConUPred}_{\text{trait1}}(Y_{i2l}) = \frac{\lambda^2_{\text{O}j2l}\beta^2_{\text{O}l}\text{Var}(O_{l-1})}{\lambda^2_{\text{O}j2l}\beta^2_{\text{O}l}\text{Var}(O_{l-1}) + \lambda^2_{\text{OPS}j2l}\beta^2_{\text{OPS}l}\text{Var}(OPS_{l-1})}$
Rater-specific unpredictability by trait$_1$ (*RSUPred*$_{\text{trait1}}$) [for $l > 1$]	$\text{RSUPred}_{\text{trait1}}(Y_{i2l}) = \frac{\lambda^2_{OPSj2l}\beta^2_{OPSl}\text{Var}(OPS_{l-1})}{\lambda^2_{\text{O}j2l}\beta^2_{\text{O}l}\text{Var}(O_{l-1}) + \lambda^2_{\text{OPS}j2l}\beta^2_{\text{OPS}l}\text{Var}(OPS_{l-1})}$

Note. Y_{ikl} with i: indicator (1: acceptance; 2: dependability; 3: closeness); k: rater (1: target; 2: parent); l: measurement occasion;

The coefficients for the target ratings are based on the variance decomposition in Equation 10 to 12. The coefficients for the parent ratings are based on the variance decomposition in Equation 24 These Equations are described in the article. The model can be applied to different sets of indicators and raters and for different numbers of occasions of measurement.

Gender Differences

Emerging Adults

To examine gender differences, the LST-AR models were calculated for male and female targets separately. The 574 targets comprise of 379 females and 196 males. The model for the female targets had a good model fit (χ^2 = 86.142 with df = 47; RMSEA = .047; CFI = .984). The results are displayed in Table C1. The model for the male targets had an acceptable model fit (χ^2 = 73.441 with df = 47; RMSEA = .054; CFI = .971). The results are displayed in Table C2.

There were no global differences between the results for male and female sample. For one aspect there is a small trend for a higher time consistency in the male sample, for one other items the trend is the other way around. For dependability, the time consistency and the predictability were slightly higher in the female sample. For acceptance, the time consistency and the predictability were slightly higher in the male sample.

Table C1

Results of the LST-AR Model of Female Targets' Attachment

	a_{ij}	Rel	OS	TCon	Pred	Unpred	$r(S_{i1}, S_{il})$
Y_{11}	4.51	.765	.415	.585	.585		
		[.64;.89]	[.27;.64]	[.36;.73]	[.36;.73]		
Y_{21}	4.49	.644	.348	.652	.652		
		[.50;.77]	[.20;.59]	[.41;.80]	[.41;.80]		
Y_{31}	4.13	.707	.169	.831	.831		
		[.62;.78]	[.08;.31]	[.69;.92]	[.69;.92]		
Y_{12}	4.47	.850	.372	.628	.556	.071	.742
		[.76;.95]	[.23;.53]	[.47;.77]	[.27;.74]	[.01;.24]	[.61;.85]
Y_{22}	4.47	.663	.325	.675	.613	.062	.779
		[.55;.78]	[.18;.49]	[.51;.82]	[.34;.80]	[.01;.22]	[.65;.88]
Y_{32}	4.06	.808	.137	.863	.837	.026	.901
		[.73;.88]	[.06;.49]	[.75;.94]	[.64;.94]	[.00;.12]	[.83;.95]
Y_{13}	4.38	.831	.347	.653	.574	.079	.652
		[.72;.93]	[.21;.51]	[.49;.79]	[.18;.76]	[.01;.36]	[.50;.77]
Y_{23}	4.42	.779	.313	.687	.615	.071	.696
		[.67;.87]	[.17;.48]	[.52;.83]	[.25;.82]	[.00;.33]	[.53;.82]
Y_{33}	4.00	.808	.143	.857	.824	.033	.858
		[.72;.88]	[,06;.26]	[.74;.94]	[.58;.93]	[.00;.18]	[.75;.93]
Y_{14}	4.14	.725	.461	.539	.431	.108	.539
		[.61;.88]	[.29;.60]	[.40;.71]	[.06;.67]	[.01;.46]	[.33;.70]
Y_{24}	4.42	.712	.319	.681	.606	.075	.656
		[.59;.84]	[.17;.49]	[.52;.83]	[.21;.82]	[.01;.38]	[.45;.81]
Y_{34}	4.06	.817	.148	.852	.817	.035	.837
		[.74;.89]	[.07;.25]	[.75;.93]	[.57;.93]	[.00;.22]	[.71;.93]

Note. a_{ij}: intercept; Rel: reliability coefficient; OS: occasion specificity coefficient; TCon: time consistency coefficient; Pred: predictability by trait$_1$ coefficient; Unpred: unpredictability by trait$_1$ coefficient; $r(S_1, S_l)$: measurement error-free correlation between this measurement occasion and the first measurement occasion.

Y_{ij} with *i*: indicator (1: acceptance; 2: dependability; 3: closeness); *l*: measurement occasion; the bootstrapped 95%-confidence intervals in parenthesis.

Table C2

Results of the LST-AR Model of Male Targets' Attachment

	a_{ij}	Rel	OS	TCon	Pred	Unpred	$r(S_{i1}, S_{il})$
Y_{11}	4.54	.614	.348	.652	.652		
		[.41;.84]	[.14;.80]	[.20;.86]	[.20;.86]		
Y_{21}	4.45	.767	.596	.404	.404		
		[.51;1.0]	[.35;.99]	[.01;.65]	[.01;.65]		
Y_{31}	3.95	.547	.225	.775	.775		
		[.39;.67]	[.11;.69]	[.31;.89]	[.31;.89]		
Y_{12}	4.52	.698	.260	.740	.704	.035	.789
		[.53;.90]	[.09;.55]	[.45;.91]	[.33;.88]	[.00;.18]	[.55;.93]
Y_{22}	4.41	.730	.569	.431	.354	.077	.592
		[.53;.95]	[.32;.80]	[.20;.68]	[.00;.63]	[.01;.36]	[.37;.77]
Y_{32}	3.90	.765	.158	.842	.820	.021	.867
		[.64;.91]	[.08;.36]	[.64;.92]	[.49;.91]	[.00;.18]	[.71;.93]
Y_{13}	4.50	.639	.323	.677	.627	.050	.685
		[.46;.83]	[.15;.58]	[.42;.85]	[.13;.81]	[.01;.37]	[.39;.86]
Y_{23}	4.44	.872	.468	.532	.459	.072	.502
		[.70;1.0]	[.24;.73]	[.27;.76]	[.00;.72]	[.01;.44]	[.24;.71]
Y_{33}	3.80	.774	.136	.864	.843	.021	.832
		[.65;.90]	[.07;.30]	[.70;.93]	[.51;.92]	[.00;.22]	[.60;.91]
Y_{14}	4.46	.759	.311	.689	.640	.049	.663
		[.60;.95]	[.12;.58]	[.42;.88]	[.16;.86]	[.00;.38]	[.34;.86]
Y_{24}	4.35	.798	.504	.496	.417	.079	.438
		[.60;1.0]	[.25;.73]	[.26;.75]	[.00;.71]	[.01;.49]	[.12;.66]
Y_{34}	3.81	.761	.157	.843	.819	.025	.806
		[.61;.89]	[.08;.43]	[.57;.92]	[.26;.91]	[.00;.37]	[.46;.90]

Note. a_{ij}: intercept; Rel: reliability coefficient; OS: occasion specificity coefficient; TCon: time consistency coefficient; Pred: predictability by trait$_1$ coefficient; Unpred: unpredictability by trait$_1$ coefficient; $r(S_1, S_l)$: measurement error-free correlation between this measurement occasion and the first measurement occasion.

Y_{ij} with *i*: indicator (1: acceptance; 2: dependability; 3: closeness); *l*: measurement occasion; the bootstrapped 95%-confidence intervals in parenthesis.

Parents

The LST-AR model for the 368 mothers had a good model fit (χ^2 = 72.507 with df = 47; RMSEA = .038; CFI = .980). The results are displayed in Table S3. The 94 fathers were a too small sample for such a complex model. The model fit was poor (χ^2 = 93.846 with df = 47; RMSEA = .103; CFI = .884). Additionally, the model had theta problems, meaning that the residual variance of one item (Y_{31}) was negative. Due to these estimation problems, the results of this model are not trustworthy and are therefore not displayed here.

The results in the sample of mothers do not differ significantly at any point from those in the overall sample of parents. The missing effects may be due to the small number of fathers in the study relative to mothers. However, it should also be noted that the targets in this study self-selected their participating parent, which may mean that the fathers are not average fathers. Fathers who have no contact with their children or whose relationship was strained were not selected.

Table C3

Results of the LST-AR Model of Mothers' Attachment

	a_{ij}	Rel	OS	TCon	Pred	Unpred	$r(S_{i1}, S_{il})$
Y_{11}	4.54	.741	.234	.766	.766		
		[.60;1.0]	[.11;.37]	[.63;.89]	[.63;.89]		
Y_{21}	4.42	.575	.127	.873	.873		
		[.43;.74]	[.06;.24]	[.76;.94]	[.76;.94]		
Y_{31}	4.32	.636	.261	.739	.739		
		[.48;.94]	[.14;.41]	[.59;.86]	[.59;.86]		
Y_{12}	4.54	.690	.298	.702	.693	.009	.775
		[.50;.84]	[.17;.47]	[.53;.84]	[.30;.83]	[.00;.26]	[.64;.88]
Y_{22}	4.52	.499	.215	.785	.778	.007	.853
		[.35;.66]	[.10;.44]	[.56;.90]	[.35;.90]	[.00;.24]	[.72;.92]
Y_{32}	4.34	.675	.300	.700	.691	.009	.763
		[.52;.82]	[.15;.52]	[.48;.85]	[.21;.84]	[.00;.31]	[.64;.85]
Y_{13}	4.56	.612	.338	.662	.652	.011	.715
		[.45;.77]	[.18;.50]	[.50;.82]	[.20;.81]	[.00;.39]	[.54;.84]
Y_{23}	4.54	.617	.156	.844	.839	.005	.860
		[.46;.77]	[.07;.32]	[.68;.93]	[.44;.93]	[.00;.27]	[.72;.93]
Y_{33}	4.32	.717	.268	.732	.724	.008	.739
		[.58;.86]	[.14;.44]	[.55;.86]	[.21;.86]	[.00;.39]	[.57;.85]
Y_{14}	4.60	.656	.342	.658	.647	.011	.705
		[.51;.81]	[.19;.48]	[.52;.81]	[.20;.80]	[.00;.45]	[.51;.82]
Y_{24}	4.54	.627	.160	.840	.835	.005	.854
		[.45;.82]	[.08;.28]	[,73;.92]	[.50;.92]	[.00;.29]	[.71;.92]
Y_{34}	4.37	.703	.285	.715	.706	.009	.723
		[.55;.86]	[.15;.44]	[.56;.85]	[.17;.85]	[.00;.48]	[.49;.84]

Note. a_{ij}: intercept; Rel: reliability coefficient; OS: occasion specificity coefficient; TCon: time consistency coefficient; Pred: predictability by trait$_1$ coefficient; Unpred: unpredictability by trait$_1$ coefficient; $r(S_1, S_l)$: measurement error-free correlation between this measurement occasion and the first measurement occasion.

Y_{ij} with *i*: indicator (1: acceptance; 2: dependability; 3: closeness); *l*: measurement occasion; the bootstrapped 95%-confidence intervals in parenthesis.

Appendix D:

The Choice of the Participating Parent and the Effect on Attachment Ratings.

Each target had to choose one parent in this study. Each target described their attachment to this parent. This parent was invited to the study to describe their attachment to their child (i.e., the target). This parent also provided parental ratings on the target's attachment, well-being, personality, and loneliness. This selection may have had an impact on the results on parent differences, as the two parents were not randomly selected. In the Bohn et al. (2020; as Study 1 also a part of this dissertation) study, there were differences between parents that remained unclear in the article as to whether they were due to differential selection effects. To further investigate the reasons for the selection of the parent, a further analysis was conducted.

If mothers and fathers were invited into the study by the targets for different reasons, this may have caused differences between attachments to mothers and fathers. If the reasons are known, it can be investigated whether the differences also exist between mothers and fathers who were included in the study for the same reasons.

The purpose of this excursus is to examine the reasons that targets gave for choosing a parent. Furthermore, it will be examined in which way the possible different reasons for the choice of mothers and fathers might have affected differences in attachment ratings. Specifically, the question is whether the differences in communication with mothers and fathers that became apparent in Study 1 are also apparent when looking only at parents who were selected because of particularly good attachment.

Method

At the fourth and final measurement point, targets were asked to describe in a free-text comment why they had invited that parent into the study. A total of 432 targets indicated why they had invited the parent in question. Of these, 342 targets had previously involved their mother and 90 targets had previously involved their father in the study. Those targets who invited their mothers to the study and who described their attachment to their mother form the *mother group*. Those targets who invited their fathers form the *father group*. The total group of targets consisted of 301 daughters and 131 sons.

To answer the research question of this excursus, a mixed methods approach was chosen. Qualitative analysis was used to examine the reasons targets gave for this selection[1]. Inductive category formation according to Mayring (2010) was used. The analyses were performed by two raters. In this process, targets' comments regarding the reasons given were grouped into categories. The categories were created based on a random sample of 80 free-text comments. After these categories were created, all free-text comments were sorted into the categories. In some cases, multiple reasons were given, allowing free-text comments to be assigned to two categories. To check for interrater reliability, 100 of the free-text comments were categorized by both raters and Cohens κ was calculated. The other free-text comments were each categorized by one rater.

[1] Important parts of this analysis were conducted as part of a research workshop under my supervision. These analyses themselves were carried out by Dilara Kurt and Lara-Annabel Weill, who did an outstandingly good job. As part of the research workshop, the two conducted the qualitative analyses and some of the quantitative analyses presented here. They were not involved in the creation of this excursus.

Based on the categories of the qualitative analysis, quantitative analyses were conducted. Here, χ^2-tests were used to examine whether the categories were mentioned with different frequency in the mother and father groups.

Qualitative Analyses

The Categories Found

The qualitative analyses reveled seven categories of reasons to choose a parent. The different categories are displayed in Table D1. Since the free text comments were written in German, the table also includes the original German formulations.

Table D1

The Categories of Reasons to Choose a Parent

Category (*Kategorie*)	Description (*Beschreibung*)	Sample comments (*Beispielkommentare*)
Attachment (*Bindung*)	Describes the selection of the chosen parent based on a better or closer attachment with that parent. Or also describes why a parent is liked better and that parent knows one better. Also describes the selection of the chosen parent based on commonalities, emotional closeness, similarities. (*Beschreibt die Auswahl des gewählten Elternteils auf Basis einer besseren bzw. engeren Bindung zu diesem Elternteil. Bzw. auch Beschreibungen, warum ein Elternteil lieber gemocht wird und dieser einen besser kennt.* *Beschreibt auch die Auswahl des gewählten Elternteils aufgrund von Gemeinsamkeiten, emotionaler Nähe, Ähnlichkeiten*)	"I have chosen my mother because I think that I have a closer attachment with her and she knows me better than my father." (*Ich habe mich für meine Mutter entschieden weil ich denke, dass ich eine engere Bindung zu ihr habe und sie mich besser kennt als mein Vater*)
Availability (*Verfügbarkeit*)	Describes the selection of the particular parent based on the lack of availability of the other parent or the sufficient availability of the selected parent: Parent is deceased, there is little or no contact with the parent, parent is separated/divorced, was local at the time, or generally has more time. (*Beschreibt die Auswahl des jeweiligen Elternteils auf Basis der mangelnden Verfügbarkeit des anderen Elternteils bzw. der ausreichenden Verfügbarkeit des gewählten Elternteils: Elternteil ist verstorben, es besteht kaum oder kein Kontakt zum Elternteil, Eltern sind getrennt/geschieden, waren zum Zeitpunkt vor Ort oder haben generell mehr Zeit*)	"My other parent is deceased." (*Mein anderes Elternteil ist verstorben)* "Because I know that he has time to fill out the questionnaires." (*Weil ich bei diesem weiß, dass er Zeit hat die Fragebögen auszufüllen*)

Table D1 (continued)

Category (*Kategorie*)	Description (*Beschreibung*)	Sample comments (*Beispielkommentare*)
Barriers (*Barrieren*)	Describes the selection of the respective parent on the basis of the parent's technical access or technical knowledge (e.g.: e-mail) or on the basis of one parent's (low, lack of) knowledge of German. Also: extent of use of technology/Internet (*Beschreibt die Auswahl des jeweiligen Elternteils auf Basis vom technischen Zugang bzw. technischen Kenntnissen der Elternteile (z.B.: E-Mail) oder auf Basis von (geringen, fehlenden) Deutschkenntnissen eines Elternteils. Auch: Ausmaß der Nutzung von Technik/Internet*)	"My mother reads her emails more often." (*Meine Mutter liest öfter ihre E-Mails*) "I chose my father because his German is better than my mother's." (*Ich habe meinen Vater gewählt weil sein Deutsch besser ist als das meiner Mutter*)
Motivation	Describes the selection of the chosen parent based on willingness, (enjoyment of) support, desire to participate, decision of the parent(s). (*Beschreibt die Auswahl des gewählten Elternteils aufgrund von Bereitschaft, (Freude an) Unterstützung, Lust an Teilnahme, Entscheidung der Eltern/des Elternteils*)	"My mother has directly agreed to participate in the survey." (*Meine Mutter hat sich direkt dazu bereit erklärt bei der Umfrage mit zu machen*)
Reliability (*Zuverlässigkeit*)	Describes the selection of the chosen parent both in terms of reliability in filling out the questionnaire or to participate and in terms of reliability as a trait. (*Beschreibt die Auswahl des gewählten Elternteils sowohl in Hinblick auf die Zuverlässigkeit beim Ausfüllen des Fragebogens bzw. zur Teilnahme als auch in Hinblick auf Zuverlässigkeit als Eigenschaft)*	"My mother fills out questionnaires reliably while my father would have probably a) forgotten and b) done so rather unreliably." (*Meine Mutter füllt Fragebogen zuverlässig aus während mein Vater dies wohl a) vergessen und b) eher unzuverlässig getan hätte*)

Table D1 (continued)

Category (*Kategorie*)	Description (*Beschreibung*)	Sample comments (*Beispielkommentare*)
No Preference (*Keine Präferenz*)	No specific reason is given, selection is random, was a spontaneous decision. (*Es wird kein bestimmter Grund angegeben, Auswahl ist zufällig erfolgt, war eine spontane Entscheidung*)	"It has no particular reason I could have also given my mother." (*Es hat keinen bestimmten Grund ich hätte auch meine Mutter angeben können*)
Other (*Sonstige*)	Meaning of answer unclear, ambiguous answer; Also: statements that do not fit into any other category. (*Bedeutung der Antwort unklar, uneindeutige Antwort; Auch: Aussagen, die in keine andere Kategorie passen*)	"Because she is my mother." (*Weil sie meine Mutter ist*)

Note. The original German wording is shown in brackets and italics. To support the translation, the website www.deepl.com was used.

Interpretation of the categories

Only the category *Attachment* is a clear self-revelation of the target. When attachment is given as a reason, the targets made a conscious decision based on their attachment to their parent. The category *Availability* can be purely pragmatic, for example if only one parent is still alive. However, it is also possible that it conceals an attachment-related motive, for example, if the other parent was unavailable due to alienation. The belief that a parent is available in times of need is part of a secure attachment. Participation in a study is not, of course, a time of need, but a fundamental availability of the parent may also be expressed in this category. However, unlike

the category *Attachment*, the category *Availability* cannot be used to safely infer an attachment motive.

The category *Motivation* can also conceal a willingness on the part of the parent to do something for his or her own child that is relevant for attachment. But it can also be that the motivation arises from other characteristics of the parent, such as a greater interest in science or a greater conscientiousness. The category *Reliability* describes a character trait of the parent that may be related to the parent's parenting skills. The supportiveness of an attachment figure supports the emergence of a secure attachment (Mikulincer & Shaver, 2016). The concepts of reliability and supportiveness have similarities. However, this is only indirectly related to the target's attachment, so attachment cannot be directly inferred from this category either.

The category *Barriers* refers to the technical or linguistic abilities of the chosen or non-chosen parent. These skills are not related to attachment. The category *No preference* is not related to attachment, but should represent a random choice of the parent, according to the targets. The category *Other* eludes deeper analysis because the free-text comments in these cases were not interpretable.

Quantitative Analyses

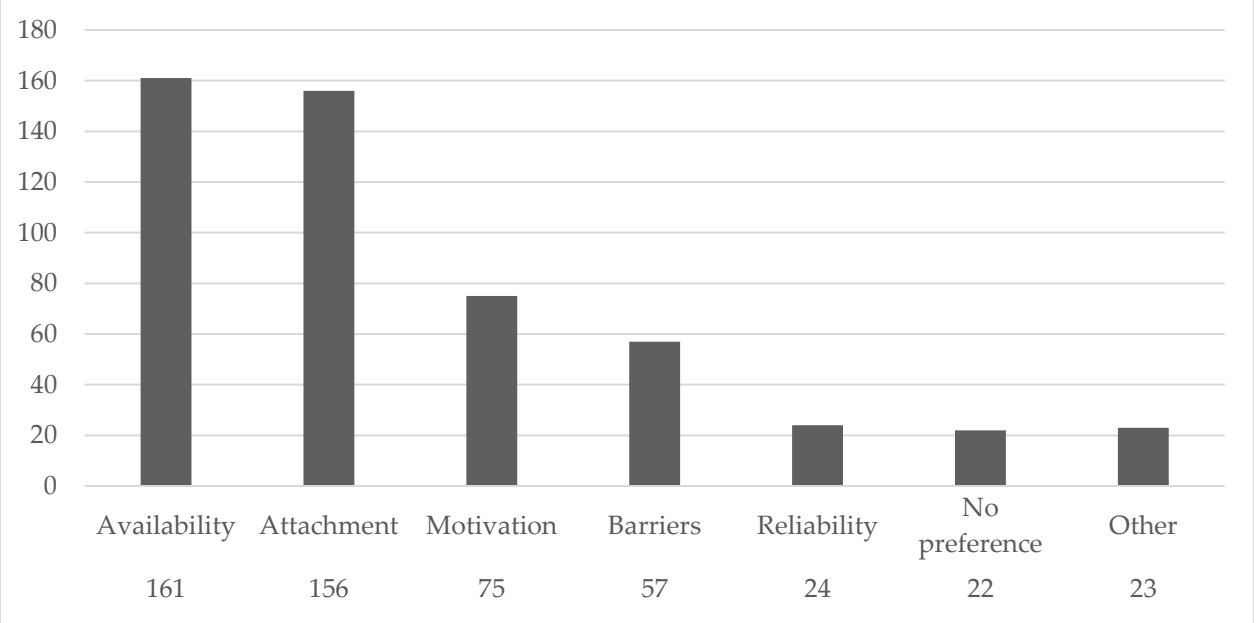
Distribution of Categories

The two raters assigned the categories very similarly. The interrater reliability was at a high level with $\kappa = .88$. The number of free-text comments that were assigned to the corresponding categories are shown in Figure D1. *Availability* and *attachment* were named most frequently as reasons. *Motivation* and *barriers* formed a middle group in naming. The categories *reliability*, *no preference* and *other* were given least frequently. In several cases, free-text comments were assigned

to two categories. In 32 cases, this was the combination of *availability* and *attachment*. In 12 cases it was *motivation* and *availability* and in 11 cases *motivation* and *attachment*. Other combinations were assigned less than 10 times each.

Figure D1

Number of Categorizations



Note. The 432 free text comments could also be assigned to two categories if reasons from different categories were mentioned.

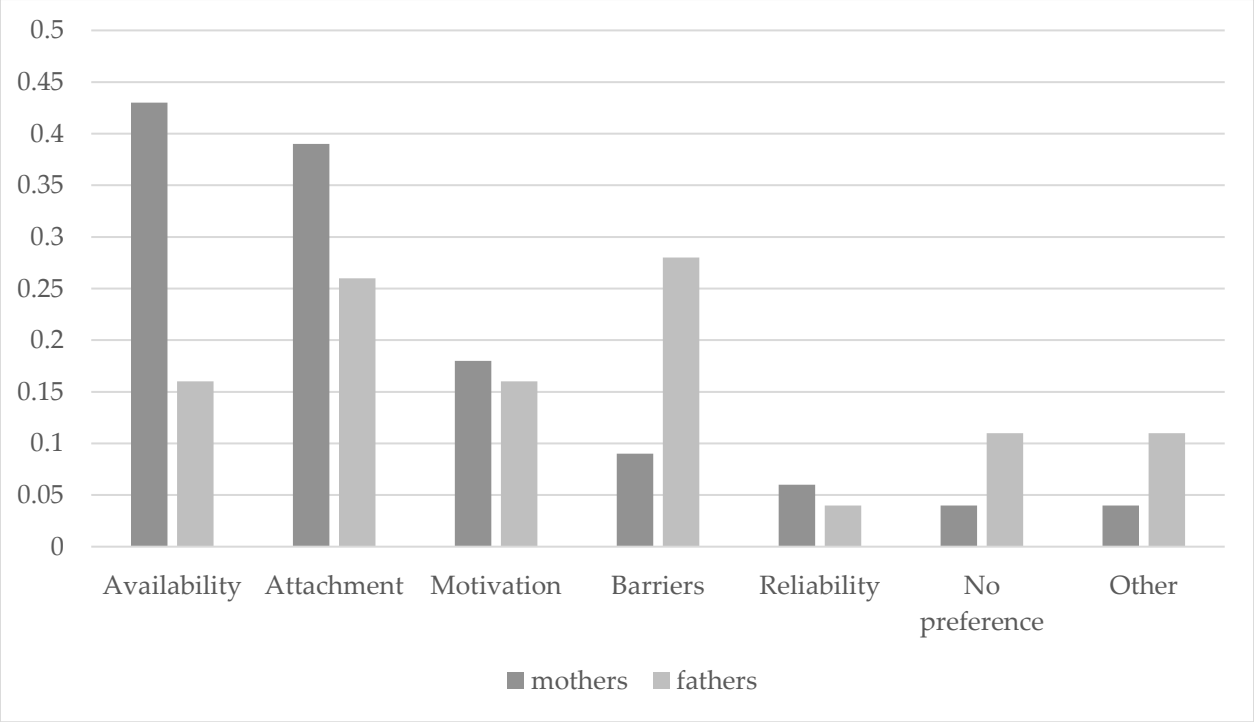
The reasons to invite a mother to the study differed from the reasons to invite a father. Of the female targets, 83% invited their mother to the study. Among the male targets, this proportion was 71%. The difference between these two proportions in just not significant ($\chi^2 = 3.81$; $p = .051$). This result differs from the first measurement point of the study, where the gender of the targets

and the parents invited showed an association (see Bohn et al., 2020; also included as Study 1 in this dissertation).

In the occupation of the categories, there were clear differences between the mother group and the father group. Figure D2 shows the relative frequencies of the categories of reasons for mothers and fathers separately.

Figure D2

Relative Frequencies of the Categories for Mothers and Fathers



Note. Relative frequencies of categorizations separately for invited 342 mothers and 90 fathers.

Within each category, a four-field χ^2-test was used to examine whether the relative frequencies differed between the mother and the father group. The categories *Availability* ($\chi^2 = 22.93$; $p < .001$) and *Attachment* ($\chi^2 = 4.48$; $p = .034$) were chosen more often in the mother group. The categories

Barriers ($\chi^2 = 21.11$; $p < .001$), *No preference* ($\chi^2 = 22.93$; $p = .004$), and *Other* ($\chi^2 = 22.93$; $p = .001$) were more prevalent in the father group. There were no differences between the mother and father group regarding the categories *Motivation* ($\chi^2 = 0.26$; $p = .610$) or *Reliability* ($\chi^2 = 0.27$; $p = .603$).

Investigating the Influence on Attachment Ratings

To examine whether differences were evident between mothers and fathers who were both selected for having particularly good attachment, the mean scores of attachment security and the three facets from the Inventory of Parent and Peer Attachment (trust, communication, and relatedness; Armsden & Greenberg, 1987; for the short version see Bohn et al., 2020) were compared. All values refer to response scales from 1 to 5. The items of the corresponding scale were averaged for each person.

Independent *t*-tests were performed to answer the research question. The results of the difference between those parents selected on the basis of better attachment are shown in Table D2.

Table D2

Differences Between Attachments to Mothers and Fathers Selected Based on Attachment

Attachment Scale	mean mother group (SD)	mean father group (SD)	*t* (*df*)	*p*	difference [95%-C.I.]
Security	4.36	4.25	0.721	.472	0.10
	(0.67)	(0.47)	(154)		[-0.18; 0.39]
Trust	4.25	4.38	-0.785	.433	-0.13
	(0.76)	(0.57)	(154)		[-0.46; 0.20]
Communication	3.88	3.43	2.28	.024	0.44
	(0.87)	(0.81)	(154)		[0.06; 0.83]
Relatedness	4.21	4.28	-0.43	.670	-0.07
	(0.74)	(0.65)	(154)		[-0.39; 0.25]

Note. Results of independent *t*-tests. difference = mean difference; 95%-C.I. = 95% confidence interval of the mean difference.

The results in Table 2 show that only in the case of communication does a significant difference exist between attachment to mothers and attachment to fathers. Those targets who invited their mother to the study because of attachment reported better communication with the parent than those targets who invited their father for the study because of attachment. No significant difference was found for security, trust, and relatedness.

A post hoc analysis also examined whether there were other differences between the mother group and the father group when parents were invited to the study for other reasons. The results are shown in Table D3.

Table D3

Differences between Attachments to Mothers and Fathers Selected Based on Other Reasons

Attachment Scale	mean mother group (SD)	mean father group (SD)	*t* (*df*)	*p*	difference [95%-C.I.]
		Availability			
Security	4.27	4.05	1.078	.283	0.22
	(0.73)	(0.82)	(159)		[-0.19; 0.62]
Trust	4.22	4.14	0.332	.741	0.08
	(0.87)	(0.95)	(159)		[-0.40; 0.57]
Communication	3.79	3.74	0.204	.839	0.05
	(0.89)	(0.93)	(159)		[-0.44; 0.54]
Relatedness	4.17	3.74	1.906	.058	0.43
	(0.79)	(1.02)	(159)		[-0.02; 0.88]
		Motivation			
Security	4.33	4.36	-0.128	.898	-0.02
	(0.63)	(0.62)	(73)		[-0.39; 0.35]
Trust	4.42	4.48	-0.293	.770	-0.05
	(0.62)	(0.64)	(73)		[-0.43; 0.31]
Communication	3.77	4.02	-1.19	.238	-0.26
	(0.77)	(0.55)	(73)		[-0.69; 0.17]
Relatedness	4.24	4.14	0.459	.647	0.10
	(0.72)	(0.70)	(73)		[-0.33; 0.52]
		Barriers			
Security	4.39	4.15	1.426	.160	0.24
	(0.66)	(0.58)	(55)		[-0.10; 0.57]
Trust	4.05	4.13	-0.345	.731	-0.08
	(0.91)	(0.84)	(55)		[-0.55; 0.39]
Communication	3.65	3.23	1.667	.101	0.42
	(1.00)	(0.86)	(55)		[-0.08; 0.92]
Relatedness	4.10	4.11	-0.011	.991	0.00
	(0.86)	(0.79)	(55)		[-0.45; 0.44]

Table 3 (continued)

Attachment Scale	Attachment Scale	Attachment Scale	Attachment Scale	Attachment Scale	Attachment Scale
			Reliability		
Security	4.41	4.21	0.606	.551	.20
	(0.59)	(0.70)	(22)		[-0.48; 0.88]
Trust	4.27	3.75	1.503	.147	.52
	(0.66)	(0.32)	(22)		[-0.20; 1.23]
Communication	4.05	2.83	2.859	.009	1.22
	(0.79)	(0.69)	(22)		[0.33; 2.10]
Relatedness	4.17	4.00	0.410	.686	0.17
	(0.78)	(0.47)	(22)		[-0.68; 1.01]
			No preference		
Security	4.12	4.35	-0.717	.482	-0.23
	(0.86)	(0.55)	(19)		[-0.90; 0.44]
Trust	4.25	4.37	-0.475	.640	-0.12
	(0.62)	(0.51)	(20)		[-0.63; 0.40]
Communication	3.33	3.33	0.000	1.00	0.00
	(1.07)	(0.79)	(19)		[-0.87; 0.87]
Relatedness	4.06	4.33	-1.03	.316	-0.28
	(0.69)	(0.54)	(20)		[-0.84; 0.29]
			Other		
Security	4.28	4.20	0.241	.812	.08
	(0.85)	(0.75)	(21)		[-0.62; 0.78]
Trust	4.22	4.39	-0.499	.623	-0.17
	(0.84)	(0.80)	(21)		[-0.89; 0.54]
Communication	3.89	3.91	-0.052	.959	-0.02
	(0.91)	(0.97)	(21)		[0.84; 0.80]
Relatedness	4.03	4.39	-1.02	.321	-0.37
	(0.95)	(0.76)	(21)		[-1.11; 0.38]

Note. Results of independent *t*-Tests. difference = mean difference; 95%-C.I. = 95% confidence interval of the mean difference. Due to a Bonferroni correction, only *p*-values smaller than .002 can be considered significant.

Because of the large number of tests and the exploratory nature of the post-hoc analyses, a Bonferroni correction was applied. No significant differences were found between the mother and father groups.

Discussion

The analyses of the digression clearly show that, on average, the mothers and fathers were selected for the study for other reasons. For the mothers, more attachment-related reasons are given, while the fathers were selected more for pragmatic reasons. The most common category for fathers is barriers, which mainly involve Internet access or language problems of the other parent. These results, in addition to the sheer numbers, could be an indication that the relationships to mothers are closer on average, as various other studies (e.g. Margolese, Markiewicz, & Doyle, 2005) have already shown.

The groups of mothers and fathers selected based on attachment are two groups that targets can be assumed to have more secure attachments with than with other parents. In terms of fathers, here we have a group that targets particularly value because of attachment and were not invited to the study simply out of pragmatism. Interestingly, those targets with such fathers nevertheless report poorer communication with them than those targets who chose their mothers because of closer ties.

In the post-hoc analyses, there are no comparable differences between the mother and father groups. Only for the individuals who chose the parent because of reliability (a very close attachment reason) the difference in communication might be replicated. Overall, it appears that contrary to expectations, the poorer communication with fathers cannot be explained by the fact that fathers participated in the study more often because of nonattachment-related reasons. While

communication with fathers appears to be more difficult than with mothers, there is no evidence for differences in other facets of attachment security.

References for Appendix D

Armsden, G. C., & Greenberg, M. (1987). The Inventory of Parent and Peer Attachment: Individual differences and their relationship to psychological well-being in adolescence. *Journal of Youth and Adolescence, 16*(5), 427-454.

Bohn, J., Holtmann, J., Luhmann, M., Koch, T., & Eid, M. (2020). Attachment to parents and well-being after high-school graduation: A study using self- and parents ratings. *Journal of Happiness Studies, 21*(7), 2493-2525. doi:10.1007/s10902-019-00190-y

Margolese, S. K., Markiewicz, D., & Doyle, A. B. (2005). Attachment to parents, best friend, and romantic partner: Predicting different pathways to depression in adolescence. *Journal of Youth and Adolescence, 34*(6), 637-650. doi:10.1007/s10964-005-8952-2

Mayring, P. (2010). *Qualitative Inhaltsanalyse. Grundlagen und Techniken* (11. ed.). Weinheim: Beltz.

Mikulincer, M., & Shaver, P. R. (2016). *Attachment in adulthood* (2. ed.). New York: Guilford Press.

Curriculum Vitae

Curriculum vitae is not included for privacy reasons. Therefore, pages 285 to 288 are not included in the online version of the dissertation.

Eigenständigkeitserklärung

Hiermit versichere ich, dass ich die vorgelegte Arbeit selbstständig verfasst und keine andere als die anderen angegeben Hilfsmittel verwendet habe. Die Arbeit ist in keinem früheren Promotionsverfahren angenommen oder abgelehnt worden.

Berlin, März 2021

Johannes Bohn