

1 Introduction

Few mammals show paternal care, and humans are among those that do. The fewer the number of offspring over the lifetime, the more important the paternal care, including many specific kinds of behavior. So far, a wide range of research has been conducted on the transition to parenthood. Research has focused mainly on parents and the influence on the development of the child during pregnancy (i.e. course of pregnancy, age of mother, and drug abuse during pregnancy) or after the birth (i.e. attachment of mother and child, personality factors of mother) (for an overview: Bleich, 1996).

A psychobiological marker of paternal behavior is testosterone. Recent research found that testosterone in fathers-to-be decreases from the time before the birth of their first child to the time after the birth. Storey, Walsh, Quinton and Wynne-Edwards (2000) found 33% lower T levels three weeks after compared with three weeks before the birth of their child. Moreover, Gray, Kahlenberg, Barrett, Lipson and Ellison (2002) found a significant decrease in T levels one week after as compared to one week before birth. No psychosocial variables were included in these analyses.

In animal research, there is clear evidence that differences in specific reproductive strategies are strongly associated with either monogamous or non-monogamous living species (Wynne-Edwards & Reburn, 2000). Basically, a distinction is made between the reproductive strategies of species with few offspring (qualitative reproductive strategy) and of species with many offspring (quantitative reproductive strategy). Especially from the male perspective, there are large differences in the specific behavior depending on reproductive strategy. For example, in mammals, which have few offspring, paternal investment sometimes is very intense in order to enhance the survival rate of the offspring. Some specific hormones are assumed to affect pair bonding and paternal investment. In males, this refers primarily to androgens and especially testosterone.

Humans pursue a qualitative reproductive strategy, since they can only have a small number of offspring in their life. Therefore, high paternal investment makes sense and is of absolute importance in order to support the survival of the offspring. Although cultural and social aspects play an important role in human behavior, there are also interindividual differences in the amount of paternal investment in the same culture. Beside cultural aspects and social circumstances, hormones such as T affect specific reproductive behavior in men. An interaction between hormones and behavior is suggested. On the one hand, hormones do not affect behavior directly, but constitute a disposition that makes different specific behaviors possible depending on situational and psychosocial context, and on the other hand, specific behavior affects hormones.

Pair bonding and relationship status are important psychosocial variables, with previous research finding an association between relationship status and T. Different studies demonstrated lower T levels in men living in a committed romantic relationship compared with single men (Burnham, Flynn, Chapman, Gray, McIntyre, Lipson and Ellison, 2003; Gray, Campbell, Marlowe, Lipson & Elliot, 2004; Mazur & Michalek, 1998; van Anders & Watson, 2006b). However, there is no evidence for a direct influence of a romantic relationship on T, since recent research found inconsistent results about cause and effect of T levels and relationship status. For example, Van Anders and Watson (2006) conducted a longitudinal study and verified the hypothesis that T level acts as a trait rather than as a state. They found that men with lower T levels at a first measurement point ended up to be more likely to live in a committed romantic relationship about one year later, compared with men with higher T levels at the first time of study assessment. In addition, Burnham et al. (2003) found even lower T levels in fathers compared with men in a committed romantic relationship without children.

The aforementioned association of decreasing T levels in males across the transition to fatherhood has been intensively examined in animals, and most studies corroborate this association. Early on, Wingfield, Hegner, Dufty and Ball (1990) developed the challenge hypothesis, and this effect was also found in humans. Several studies were able to verify the decreasing T levels in fathers-to-be (e.g. Storey, Walsch, Quinton & Wynne-Edwards, 2000; Gray, Kahlenberg, Barrett, Lipson & Ellison, 2002).

The purpose of this work was to explore the interaction of T and paternal investment by taking into account interpersonal differences in personality traits and relationship quality. The focus of the study refers to the transition to fatherhood, because this sensitive phase represents an important challenge and demands adaptation processes in the context of paternal investment. As there are cultural differences concerning pair bonding and paternal care, we focus on the culture in Middle Europe, i.e. the subjects of the studies all live in Switzerland and most are Swiss-born citizens.

Following this, we compared a sample of fathers-to-be with a sample of men (controls) living in a committed romantic relationship without children and in which the female partner is not pregnant. In our first study, we explored the effect of the transition to fatherhood on T levels, relationship quality, and the association between T levels and relationship quality in men over the period of transition to fatherhood. These effects are analyzed in a longitudinally designed study, by assessing data on two days, one before and one after the birth of their first child, respectively, and analogously for controls with three months in-between.

In a second study, we were interested in different effects of transition to fatherhood depending on the personality trait of SS, as SS is assumed to reflect mating effort and to be related to T level. As there is evidence that providing paternal care is associated with a reduced likelihood of engaging in competitive or mating behavior and with a reduction in T levels, we hypothesized that the transition to fatherhood has a different impact on T level

depending on the SS score of fathers. Again, these assumed effects were analyzed in a group of fathers-to-be and new fathers, respectively, in contrast to a control group with men in a committed romantic relationship without any children.

This work is structured in three parts. The first part provides a theoretical background containing definitions and discussions about current theories as well as a review of the state of research in this field. The second part will describe the two empirical studies; the first study is about T and relationship quality, and the second study refers to SS and T, both in relation to the transition to fatherhood. The final part of this work provides a summary of the key findings, which are further discussed. To finish, an outlook for prospective studies will be provided.

2 Theoretical Background

The aim of this chapter is to provide a theoretical background of the psychological factors and constructs as well as the endocrinological processes that are important in relation to the transition to parenthood and in particular to fatherhood. Moreover, this chapter provides a review of the state of research in this field, upon which the two empirical studies in the second part of this work are based. This chapter is structured according to psychological factors concerning romantic relationship, relationship quality, transition to parenthood, and the personality trait of sensation seeking and biological factors mainly concerning T and associations of psychological and endocrinological factors.

2.1 Romantic Relationship

2.1.1 Definition

The evolutionary function of romantic relationships in humans can be seen in sharing support in raising the offspring. Up to the late nineteen sixties, partnership and marriage were often 'partnerships of convenience', with the aim of shared duties of production and nurturing, including sexuality and reproduction. While reasons for romantic relationships have changed a great deal over the last few decades, they are still deemed as the most important social relationships. Mostly, romantic relationships are ranked as the most important value.

In a survey by Bodenmann (2003) with 300 young Swiss students, ninety-seven percent rated close friendship and romantic relationships as the most important issue, followed by health (89%), education and vocational career (81%), and money combined with prestige (35%). In the same survey, expectations of romantic relationships were explored. In this respect, participants rated fidelity and intimacy as the most important issues of a romantic relationship. Also important were issues such as compassion, appreciation, satisfying

sexuality and emotional security. Financial security and family were only rated as very important issues by fewer than 40% of the participants.

In this regard, Shaver, Hazan, and Bradshaw (1988) therefore described three systems: the attachment system, the care system, and the sexual system. Sexual attraction is important for the constitution of a relationship, and attachment and nurture are needed for stabilization of the relationship. Nowadays, if one of these three systems is lacking, or if the aforementioned expectations are not satisfied, partners feel unhappy, estimate their relationship as unsatisfactory and even break up. Therefore, research on romantic relationship quality is very important and is described in the next section.

2.1.2 Relationship Quality

The term relationship or partnership quality is based on marriage quality, as most research on romantic relationships has dealt with married couples. The first empirical studies on marital quality emerged in the 1930s. They explored the impact of several factors, such as role compatibility, age differences, education, socioeconomic status, personality, and expectations and attitudes towards marriage. Mostly, the focus was on the question of whether similarity or complementarity was best for marital quality (e.g. Posavac, 1971; Klohnen & Mendelsohn, 1998; Dryer & Horowitz, 1997; Markey, 2007). However, most results revealed that these factors did not significantly predict marital quality. Eysenck and Wakefield (1981) used questionnaires to explore 566 married couples with regard to their similarity in several factors. They found the following ranking for the factors influencing variability in marital quality: Most important was sexual behavior (58% of variability), followed by sexual attitudes (41%), data of individual life history (25%), personality (18%), and social attitudes (3%).

According to Spanier and Lewis (1980), high quality of marriage is defined by a high adjustment, an adequate communication, a strong commitment, and an intensive satisfaction

with the relationship. Bierhoff and Grau (1997, 1999) considered the duration of the partnership as another important issue for the quality of partnership. After all, there is evidence that the duration of the partnership is a better predictor of the stability and continuation of the relationship than relationship satisfaction or other psychological variables.

Taken together, there are three different, but highly related, approaches to relationship quality. First, relationship *satisfaction* is a subjective estimation of their relationship by both partners. Second, relationship *quality* is related to more structural issues of the couple, and to a more objective estimation by indicating issues on a continuum from good to bad (Spanier, 1976). The third approach focuses on the duration of the partnership and is named relationship *stability* (Dinkel, 2006).

Recent literature and research suggest the term of relationship *quality* as a subordinate concept concluding relationship *satisfaction* and relationship *stability*. For this reason, the term of relationship quality is used in the same way in this work.

So far, the explanation and predictability of relationship satisfaction and relationship stability have been the main focuses of research on romantic relationships (Gottman, 1998). Therefore, interpersonal conflicts and conflict behavior of couples have been well explored (Cahn, 1994; Spitzberg & Cupach, 1998). In addition, the quality and satisfaction of romantic relationships show variations over time. Mostly, a decline in the quality of romantic relationships over time, and especially during the first year, were reported in many studies (Glenn, 1990; Rollins & Feldman, 1970, Tucker & Aron, 1993).

2.1.3 Measurement of Relationship Quality

In this work, relationship quality is assessed using the validated German version of the Partnership Questionnaire (Partnerschaftsfragebogen: PFB, Hahlweg, 1996). This questionnaire contains 30 items and reflects three aspects of relationship quality: *Quarrelling*, which means a destructive way of coping with conflicts, *Togetherness/Communication*, including different aspects of bonding aspects such as shared activities, verbal exchange and openness and interest in the opinion of the partner, and *Tenderness*, encompassing positive sexuality, both physically and verbally.