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**Relationship Processes in Understudied Samples:  
Implications for Relationship Functioning and Sexuality  
in Romantic Relationships**

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## **Dedication**

I dedicate this thesis to my partner and my great love Daniel Bojar! Thank you for being patient, for challenging me in every possible way, for helping me be a better researcher and to grow as a scientist.

You deserve the Best-Partner Award.<sup>∞</sup>

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## **Abstract**

Relationship functioning can be investigated from different angles; next to investigating dyadic outcomes between couples we can also zoom into processes within subjects. Adopting a cultural lens adds another layer, as the cultural context influences norms around intimate relationships, and can be inspected using the framework of Bronfenbrenner's (1977) ecological systems theory. In more collectivistic societies, for instance, the extended family is much more involved in decisions regarding the couple relationship, accompanied by more obligations and duties towards family members, and maintaining harmony within the community is much more important than the relationship satisfaction between spouses. It is therefore highly relevant to replicate existing evidence and extend these results beyond Western, Educated, Industrialized, Rich and Democratic (WEIRD) samples. This thesis aims at investigating predictors, correlates and processes in a non-Western sample and in intercultural couples, drawing on several relevant theories, in two empirical studies and a quantitative review. The empirical studies are based on a sample of 180 Iranian couples of which both partners provided weekly reports on their relational experiences during the past seven days, over the course of six consecutive weeks. In study 1, we tested a concurrent mediation model and demonstrated that drops in sexual satisfaction can explain variance of within-subject associations of conflict frequency with relationship satisfaction. In study 2, we found that both the absence or occurrence of sex, as well as cumulative sex frequency, predicted intimacy and relationship satisfaction in later weeks. The lagged model showed that sexual intercourse predicted prospective residualized change in women's perception of emotional intimacy one week later, which in turn predicted prospective residualized change in the partners' relationship satisfaction two weeks later. These two studies provide further evidence for the tight interconnection of distressed interactions and sexual life in non-Western intimate relationships. The data also suggest these associations found in Western couples

extend to non-Western couples in predominantly Muslim societies. Moving away from a single culture, in study 3 we considered couples with different socio-cultural backgrounds. Previous research found that couples with different socio-cultural backgrounds are less stable and less satisfied in their relationships than culturally homogeneous couples, due to additional stressors these couples face. We computed effect sizes comparing couples with different socio-cultural backgrounds and culturally homogeneous couples based on the studies included in this review. Our results suggest that controlling for socio-demographic variables that are specific to socio-culturally different couples decreases the gap in relationship functioning between the two groups. Besides the confirmation of several exchange theory components, we complement the underlying theory with our results in non-Western samples. Additionally, within-subject analysis showed considerable within-person variation implying complex relationship processes. All three studies underline that associations between indicators of relationship functioning in non-Western couples are similar to Western relationships. This supports the assumption that many intimacy-related aspects represent basic human needs. This dissertation further provides a comprehensive view on several indicators of relationship functioning by shedding light on predictors, processes and relationship outcomes within- and between-subjects.

*Love is the pinnacle of evolution, the most compelling survival mechanism of the human species because it induces us to bond with a few precious and irreplaceable others who offer us a safe haven and emotional protection from the storms of life.*

*Sue Johnson*

## **1. Introduction**

Across cultures, human beings are wired for connection (Lieberman, 2013) and the need for sexual intimacy, emotional bonding and a romantic relationship is part of our survival code (Fishbane, 2007). Being in a healthy, well-functioning relationship constitutes a major resource providing support and resilience for the ups and downs of life (Braithwaite, Delevi, & Fincham, 2010; Coombs, 1991). A satisfying and stable relationship is associated with many positive outcomes for physical health and mental well-being, whereas high levels of relationship distress are not only a source of unhappiness but also affect physical and psychological health (Kiecolt-Glaser & Newton, 2001).

Past research has intensively investigated variables associated with relationship satisfaction and stability in couples (for an overview see e.g., Karney & Bradbury, 1995), but there is little research regarding relationship outcomes for spouses with different cultural backgrounds (Shibazaki & Brennan, 1998) or non-Western relationships, such as Iranian couples, which is why this is one major focus of this thesis. Relationship stability is usually a consequence of high relationship satisfaction (Karney & Bradbury, 1995) and several meta-analyses have identified the most important predictors of relationship satisfaction that can be summarized in broader categories: (conflict) communication of couples (Blanchard et al., 2009), partner's personality, particularly the trait neuroticism (Malouff et al., 2010) and

related to that adult attachment (Hadden et al., 2014), as well as commitment between spouses and social support from the social network (Le et al., 2010).

The majority of sexual experiences are happening in the context of a romantic relationship (Willettts, Sprecher, & Beck, 2004). Thus, sexuality in the context of relationships is another major focus of this work and is also considered a key factor shaping relationship quality in intimate relationships (Impett, Muise, & Peragine, 2014), as a fulfilling sexuality is considered by most people (70%) to be one of the central ingredients of a happy romantic relationship (Taylor et al., 2007). High sexual satisfaction is positively associated with relationship quality (Sprecher, 2002) and negative relationship experiences, such as frequent conflict, are related to lower sexual satisfaction (Haning et al., 2007). The most sexually satisfied couples are usually also the most satisfied with their relationships (Byers, 2005; McNulty et al., 2016). The relevance of sexuality for relationship satisfaction seems to extend beyond non-Western samples, as this association was for example also found among Chinese couples living in China (Renaud et al., 1997). However, as most of the studies are based on samples recruited in Western and more individualistic countries, investigating these associations between sexuality and relationship quality in countries where sexual intercourse is considered the wife`s duty (Shirpak et al., 2007) or in countries where very little sex education is available, can lead to different outcomes (Renaud et al., 1997), providing a rationale for the work presented here.

Further aspects relevant for relationship functioning include characteristics of the person itself, the couple and the culture an individual or couple lives in. Based on Bronfenbrenner`s (1977) *ecological system theory* and the *Vulnerability-Stress-Adaptation Model* (VSA Model) by Karney and Bradbury (1995), with the latter model being developed to take predictors for relationship functioning for the individual, the dyad and external stressors into account, the multifarious influences on relationship functioning will be

examined. Bronfenbrenner's model in particular can facilitate a disentanglement of the constituents of relationship satisfaction, such as within-person processes or comparisons between couples and will allow to group predictors of relationship outcomes relevant for the three articles of this dissertation. In Bronfenbrenner's model, these different levels are named microsystem, the individual itself, mesosystem, the individual in relation to others, exosystem, the external environment of a close other and macrosystem, the cultural context a person lives in. For this work, the different systems were adapted for the context of intimate relationships. To distinguish between the different levels is highly relevant for this thesis containing two empirical studies investigating couples in a non-Western country (studies one and two) and a quantitative review looking at diverse samples of individuals with a partner from a different socio-cultural background (article three). First, the different levels of Bronfenbrenner's model and its implications for relationships will be described within each system and combined with a literature review of predictors for relationship functioning that represent or are related to variables relevant for the included articles. The focus will be on sexuality and the influence of culture for relationship functioning as these topics are relevant for the three articles included in this thesis.

## **1.1. Bronfenbrenner ecological system theory in relation to romantic relationships**

### **1.1.1. Microsystem**

The microsystem of the model represents the individual with their demographic characteristics such as age or health status (see Figure 1). Within this system every individual takes on different roles throughout their life (Bronfenbrenner, 1977). Cowan and Cowan (2003) conceptualize the change of roles during life transitions by addition, for instance in the case of becoming parents and adopting the parental role, by subtraction, for instance when becoming a widow, and by revision, for example when changing the career. Here, the focus will be mainly on the role as a partner and how an individual is creating the relationship to

their attachment figure, which in adulthood is usually the spouse or partner (Hazan & Shaver, 1987).

How a person relates to others is influenced by a number of factors. As established by the VSA model (Karney & Bradbury, 1995), enduring vulnerabilities consist of personal demographic and experiential factors throughout life which are associated with lower relationship satisfaction. They include for instance, 1) maladaptive personality characteristics such as high neuroticism (Karney & Bradbury, 1997), 2) an insecure attachment style (Hazan & Shaver, 1987) which is linked to maladaptive conflict behavior (Simpson et al., 1996) and difficulties with intimacy (Bartholomew, 1990) or 3) traumatic experiences in the past (Spasojević et al., 2000), which are particularly likely among immigrant groups that arrived as refugees (Spasojević et al., 2000). Other demographic variables that are relevant for this thesis and linked to lower relationship functioning and stability are younger age at marriage and a lower level of education (Feng et al., 2012).

The next component of the VSA model, stressful events, includes a range of incidents such as becoming unemployed (Vinokur et al., 1996), getting a serious illness (Reich et al., 2006) or experiencing discrimination (Leslie & Letiecq, 2004) which are associated with relationship dissatisfaction. Some of these variables are more likely to accumulate among certain groups of individuals depending on the cultural context or on the constellation of spouses (Hohmann-Marriott & Amato, 2008). Other important stressors relating to a foreign cultural background of an individual are immigration stress (Falconier et al., 2013) and minority stress (Gamarel et al., 2014), with both types of strains predicting lower relationship quality as well. Enduring vulnerabilities and stressful events both affect adaptive processes, as for instance an individual successfully coping with relationship conflict is related to higher relationship quality (Bodenmann & Shantinath, 2004). The evidence in this paragraph demonstrates that the unit of the microsystem is already complex and a lot of additional

demographic correlates and other characteristics, such as dispositions and behavioral tendencies, influence an individual's behavior within a romantic relationship. This complexity is exacerbated by the interaction of some of these personal features, such as experiencing discrimination as an immigrant, which can make certain experiences and conditions more likely than others.

### 1.1.2. Mesosystem

The mesosystem specifies interactions between different microsystems, in other words between individuals and how they influence each other (Bronfenbrenner, 1977). The focus here will be again on the interaction with the partner but the family as well as the broader social network are also relevant (see Figure 1).

Also, the mesosystem couple is characterized by dyadic demographic factors that are related to relationship quality. First of all, married couples tend to be more committed and more stable than their unmarried counterparts (Osborne et al., 2007). Relationship duration is another relevant variable, as with increasing duration divorce first becomes more likely, peaks around five years and afterwards starts declining in likelihood (Kulu, 2014). Additionally, the greater the age gap between spouses the higher the risk of divorce (Francis-Tan & Mialon, 2015), suggesting lower marital satisfaction. This is especially relevant for couples in Iran, where the average age difference between husbands and wives (4.3 years, Statistical Center of Iran, 2016) tends to be higher than in the US (2.3 years, Current Population Survey, 2014). Furthermore, a couple's low socio-economic status is related to lower relationship satisfaction and marital stability (Archuleta et al., 2011).

There is also broad evidence that becoming parents is a major stressor for the relationship and relationship satisfaction decreases as a consequence (Twenge et al., 2003). On the other hand, couples with younger children are less likely to divorce, suggesting that children can also be protective for the relationship (Waite & Lillard, 1991). A similar pattern,

with younger children reducing the divorce risk more than older ones, has been replicated in China, a more collectivistic society (Xu et al., 2015). The relationship with the parents in law also affects the couple relationship, with high levels of discord with the in-laws predicting less marital satisfaction as well as lower stability (Bryant et al., 2001). However, in-laws, the extended family and friends can also be important sources of social support which is highly relevant for relationship functioning (Schoebi et al., 2010). Schoebi and colleagues (2010) showed in their study that social support is fundamental across cultures and in more collectivistic societies with rather interdependent values couples tend to rely more heavily on social support by their social network. Receiving social support is also particularly important for well-being in dual-earner couples with children (Parasuraman et al., 1992).

The best way to study interactions between spouses, or how two microsystems affect each other, is by looking at how relationship processes unfold and change over time using dyadic longitudinal or daily diary data (Laurenceau & Bolger, 2005). This underlines the importance to consider the mesosystem or the interaction between microsystems and their personal backgrounds. Features that characterize the dyad or originate from interactions among different microsystems, most importantly the partner but also family and friends, are relevant for relationship outcomes.

#### 1.1.1. Exosystem

The exosystem is an extension of the mesosystem, involving the environment the individual itself is not part of, for instance the workplace of the partner (Bronfenbrenner, 1977). Although the individual is not part of this environment, they can be greatly influenced by the exosystem (see Figure 1). For instance, the partner might come home exhausted and in a bad mood as a consequence of tremendous stress at work (Barling & Macintyre, 1993). These tensed situations can easily trigger conflict and evidence indeed suggests that external stressors go along with a higher incidence of relationship problems (Randall & Bodenmann,

2017). Research on the so-called spill-over process shows that stress in one domain can spill over into another, such as experiencing stress at work that is brought home, spills over to the other partner and impairs the relationship (Schulz et al., 2004). More specifically, the Stress-Divorce model postulates that daily stressors outside of the relationship spill into the relationship and evoke marital distress (Bodenmann, 1995; Bodenmann, 2000; Bodenmann, 2007). The role of external stress is also postulated to affect marital satisfaction and stability in the VSA model (Karney & Bradbury, 1995). Although the exosystem is another relevant research angle of relationship research and certainly plays an important role in romantic relationships, it is not the focus of this thesis as this work is concentrating on demographic factors characterizing the individual and relationship processes between spouses.

#### 1.1.2. Macrosystem

The macrosystem contains all other systems and describes the society or country the individual or couple lives in (see Figure 1). This incorporates values, traditions, norms but also includes the economic, legal and political system of the cultural context (Bronfenbrenner, 1977). Mechanism how individuals internalize these values and norms could be through the process of socialization. Socialization can be defined as a process of social interaction by which individuals learn skills, knowledge, values, attitudes, beliefs, motives and norms of the group they are a member of, thereby helping them to adapt to the culture they live in (Longmore, 1998). The next couple of paragraphs will describe the cultural context and its role within the three articles in this thesis in more detail.

#### 1.1.3. Cultural Differences in Iran Compared to Western Countries

Using Iran as an example for cultural differences affecting romantic relationships, it would be appropriate to apply Hofstede's (2011) cultural dimension of individualism and collectivism. This is especially relevant as Iran has a more collectivistic orientation than Western countries and more collectivistic countries are less focused on the individual or

couple in favor of maintaining harmony within the community (Hofstede, 2011). This means for instance that the extended family is much more involved in decisions regarding the couple relationship, accompanied by more obligations and duties towards family members (Sabour Esmaeili & Schoebi, 2017). In more individualistic countries on the other hand, the stability of a relationship mainly depends on the satisfaction of both partners (Karney & Bradbury, 1995).

Culture might even be a part of the variables within the VSA model by Karney and Bradbury (1995), explaining relationship satisfaction and stability. Experiences in the family of origin might be for instance shaped by individualistic and collectivistic values such as higher family involvement. Similarly, more obligations towards the family (Sabour Esmaeili & Schoebi, 2017) may represent a larger source of stressors compared to Western societies. However, a tight family network also constitutes a resource, with couples in more collectivistic countries receiving more social support (Schoebi et al., 2010). Additionally, barriers to separate might be higher in more collectivistic countries, in which marriage is a union of two families, as indicated by lower divorce rates of 14.3% in Iran (BBC Persian, 2018) compared to 42% in the United States (National Marriage and Divorce Rate Trends, 2017).

Adaptive processes potentially involve culturally based learning processes as well, as displaying and sharing emotions is a rather Western strategy of emotion regulation (Matsumoto, Yoo, & Nakagawa, 2008). Furthermore, the meaning that we give sexuality tends to be transmitted within a culture and might be affected by cultural learning (Kimmel & Fracher, 1992), for instance religiosity conveys moral beliefs around sexuality (Laumann et al., 1994). In that sense, sexuality can be viewed as a socially constructed reality that differs from person to person and within-person over time (Blumer, 1969). Cultural backgrounds, the

community, friends and family not only influence sexual attitudes but also sexual behavior, partly as a result of different sources of socialization in a society (Longmore, 1998).

#### 1.1.4. Legal Differences

Another difference arises due to legal differences regarding marriage (Laluddin et al., 2014). First of all, some marriages in Iran are arranged (Abbasi-Shavazi & McDonald, 2008). As a consequence, women are typically younger when they get married and usually do not have dating experiences or prior romantic partners (Abbasi-Shavazi & McDonald, 2008). Generally speaking, being in an arranged marriage seems to be associated with lower marital satisfaction (Madathil & Benshoff, 2008; Yasan & Gürgen, 2009). However, study results are mixed and one study comparing arranged marriages with marriages of choice did not find significant differences regarding satisfaction (Myers et al., 2005). A further aspect of the legal system is the divorce law which favors men in Iran, making it difficult for a women to leave an unsatisfying marriage (Sabour Esmaeili & Schoebi, 2017). Lastly, the country a couple lives in also matters in cases when one partner has a different nationality, as for instance in the US there is a number of legal barriers for immigrating partners (Chacón, 2007).

#### 1.1.5. Relationship Functioning in Iranian Couples

Analogous to Western couples, several studies indicate communication and conflict resolution being similarly strong predictors of marital satisfaction and stability in Iranian relationships (Askari, Noah, Hassan, & Baba, 2012; Habibi, Hajiheydari, & Darharaj, 2015). In a recent review investigating correlates of relationship quality in Iranian couples, many variables, such as individual and interpersonal psychological functioning (e.g., personality, communication and attachment style) as well as some sociodemographic characteristics such as age at marriage, appeared to be relevant for the couples' satisfaction in a similar manner as we know from Western samples (Sabour Esmaeili & Schoebi, 2017). Nevertheless,

differences between Iran and the Western world exist, for instance regarding the level of religiosity, potentially having an impact on relationship satisfaction.

#### 1.1.6. Religiosity

Religion is an important part of culture, especially in more religious societies. While religiosity is important for several areas, the focus within this thesis (see empirical studies 1 and 2) will be on religion and its associations with sexuality. Religion shapes sexual attitudes, moral beliefs and behaviors (Laumann et al., 1994) by promoting certain values and norms (Wilcox, Chaves, & Franz, 2004). But religion has also regulated sexual behavior throughout history by defining the boundaries of what is acceptable (Woo et al., 2012) and, unsurprisingly, intrinsic religiosity as well as spirituality are related to more conservative sexual attitudes (Ahrold et al., 2011). Social stigmas towards sexuality and less liberal sexual attitudes of religious people are additionally linked to more feelings of shame and guilt around the topic (Woo et al., 2012). In general, growing up in a less religious household is associated with higher sexual satisfaction later (Haavio-Mannila & Kontula, 1997) and higher religiosity is associated with sexually restrictive behavior and the willingness to follow religious sexual scripts (Mcfarland et al., 2011). Being more religious is also associated with less sexual activity and intercourse frequency in general (Mcfarland et al., 2011). What is considered as appropriate sexual behavior varies between cultures and their religious traditions, thereby affecting sexuality differently (Woo et al., 2012). For instance, the official religion in Iran is Islam and 99.6% of Iranians identify as Muslims (International Crisis Group, 2005). Iranians also tend to report high levels of religiosity (Tezcür & Azadarmaki, 2008), while in many Western countries the proportion of individuals identifying as Christians keeps dropping since many years (European Social Survey, 2015). This suggests that Muslim religion plays an important role in the daily life of Iranian couples and affects the whole concept of marriage by shaping moral beliefs about duties and expectations as well as social roles within a marriage (Abbasi-Shavazi & McDonald, 2008).

#### 1.1.7. Gender Role Attitudes

Individuals high in religiosity also endorse more traditional gender roles (Ahrold et al., 2011) while evidence demonstrates that particularly husbands holding more egalitarian views is associated with higher relationship satisfaction (Amato & Booth, 1995). This finding has also been replicated in Japan, a more collectivistic society (Taniguchi & Kaufman, 2014), while individuals tend to have more conservative attitudes regarding women working outside of the home in more collectivistic countries such as China (Chang, 1999). This is in line with most Iranian women being housewives (83% in 2014, Statistical Center of Iran 2015), whereas in the US many women pursue a career (57.1%, Current Population Survey, 2019). Furthermore, confirming to gender roles is associated with sexual passivity in women which, in turn, predicts lower sexual satisfaction in husbands and wives (Kiefer & Sanchez, 2007). Thus, research suggests that gender role attitudes are related to relationship outcomes and these attitudes differ across cultures, with non-Western countries exhibiting more traditional attitudes.

Adopting a cultural lens when conducting research on relationship outcomes in couples has many implications for the micro-, meso-, exosystem and is an important focus of this thesis. Furthermore, the macrosystem, as another major focus, contains important aspects such as cultural traditions, legal boundaries and economic conditions that seem to be often overlooked in relationship research.

#### 1.1.8. Chronosystem

Finally, Bronfenbrenner further describes the chronosystem which encompasses environmental events and transition spanning large swaths of a life such as getting married or retiring. This system also takes unexpected events into account, for instance economic pressures or getting a divorce (Bronfenbrenner, 1977). Major life transitions disrupt the status quo and involve the reorganization of the self, social roles and close relationships (Cowan, 1991). This transitional process tends to go along with an imbalance within one's close

relationships and psychological stress (Cowan & Cowan, 2003). Distinguishing between major and minor stressors is crucial, as research shows that chronic minor stressors such as daily hassles tend to be the ones eroding the relationship over time (Randall & Bodenmann, 2017) whereas major stressors, such as fundamental life transitions, may even promote cohesion as couples stick together in the face of adversity. For instance, conceptualizing an illness as a common problem affecting both partners (we-disease) and supporting each other is related to better relationship functioning and higher stability (Traa et al., 2015). Yet other impactful stressors such as financial problems, which immigrating individuals and couples are especially prone to (Martin Dribe & Lundh, 2008), can predict lower marital satisfaction (Helms, Supple, Su, Rodriguez, & Cavanaugh, Hengstebeck, 2014). This difference in outcomes can be explained by the observation that adjustment and adaptation during transition periods and how stressors are experienced depends on personal characteristics such as resilience, resources within the family or social network and on coping skills and strategies of the couple (McCubbin, & Patterson, 1982). Different sources of stressors, their severity as well as their duration (Randall & Bodenmann, 2017) are relevant for experiences in intimate relationships, which is why several stressors or stressful experiences will be also be examined throughout this thesis.

Taken together, predictors for relationship outcomes can be found within all systems of Bronfenbrenner`s model and have important links with relationship functioning and ultimately for the stability of a relationship. The next sections will look at other important theories in the context of intimate relationships, covering aspects of relationship functioning not discussed so far and with a focus on the family of exchange theories which are relevant for the included articles.

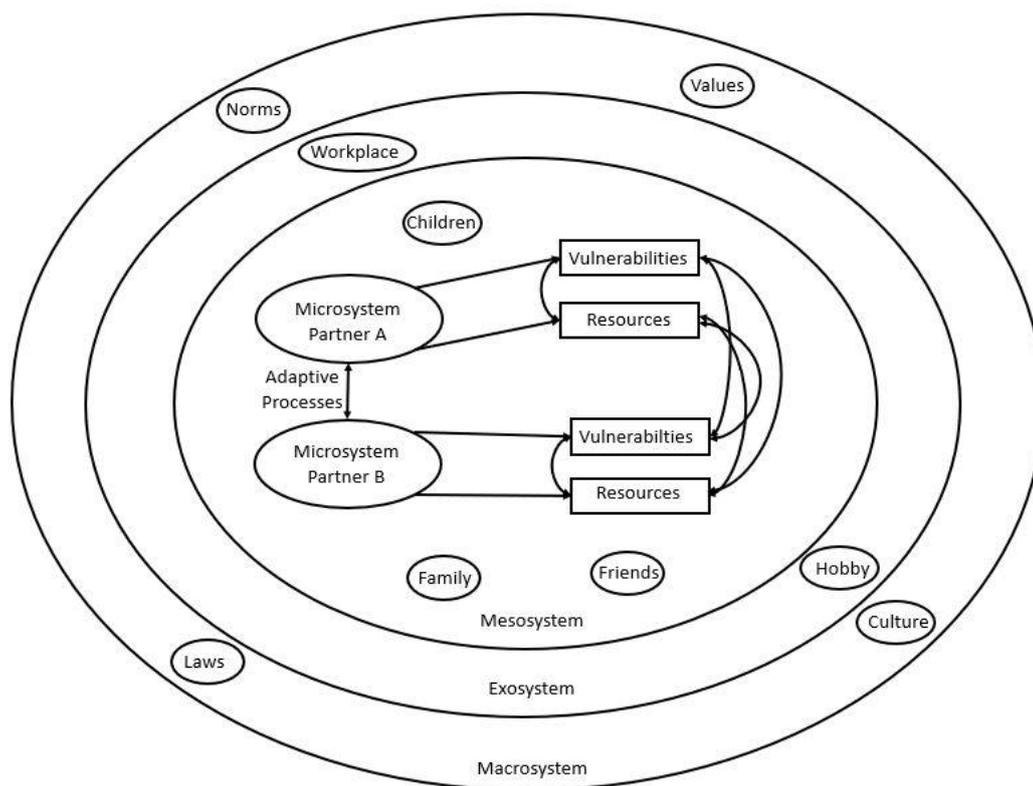


Figure 1. An adapted version of Bronfenbrenner ecological system theory illustrating different layers of relationships<sup>1</sup>.

## 1.2. Theories of Relationship Functioning in Conjunction with Sexuality

One major theoretical framework for understanding relationship functioning in general, and sexuality in intimate relationships specifically, are *social exchange theories* (Blau, 1964; Homans, 1958; Thibaut & Kelley, 1959). As relationship functioning and sexuality are the main topics of this thesis and social exchange theories are relevant for article one and three, the theories will be illustrated in more detail. In general, exchange theories are widely tested and provide solid evidence in relationship research (see for a review: Sprecher, 1998). To understand sexuality in the context of relationships, the *interpersonal exchange model of sexual satisfaction* (Lawrance & Byers, 1995), *sexual strategy theory* (Buss, 1998)

<sup>1</sup> The temporal component of the chronosystem is not graphically displayed as it tends to represent transient phenomena.

and *social learning theories* (Hogben & Byrne, 1998) are helpful theoretical approaches to cover different aspects of sexuality in intimate relationships.

### 1.1.3. Social Exchange Theories (Blau, 1964; Homans, 1958; Thibaut & Kelley, 1959)

First, the focus will be on social exchange theories which are relevant for many aspects of romantic relationships such as mate selection, relationship formation and relationship dissolution (Hatfield, Traupmann, Sprecher, Utne, & Hay, 1985). The general idea of this theoretical framework is that social behavior in humans is defined by exchanges of resources between individuals. This exchange of resources is characterized by minimizing costs, such as loss of resources, and maximizing gains, such as gratification (Sprecher, 1998). Being the recipient of a reward, such as receiving a pleasurable resource, usually leads an individual to reciprocate by returning a reward. Thus, the exchange is influenced by the perception of fairness (relative costs and rewards) for both parties involved (Sprecher, 1998). Besides costs and rewards, a person's level of satisfaction is also influenced by the comparison level and the comparison level for alternatives (Thibaut, & Kelley, 1959). More specifically, the comparison level can be understood as the subjective standard that a person is using to evaluate the attractiveness of the rewards and costs while the comparison level for alternatives represents the expectation of what to gain in an alternative relationship (Kelley, & Thibaut, 1978). For instance, people higher in sexual narcissism, a trait that is characterized by low sexual empathy, sexual exploitation, believing in possessing grandiose sexual skill and feeling entitled to sex, report lower sexual and relationship satisfaction because they tend to compare their sex lives, especially sex frequency, with others in their social network (Muise, Maxwell, & Impett, 2018).

### 1.2.1. Interpersonal Exchange Model of Sexual Satisfaction

Based on social exchange theory (Blau, 1964; Homans, 1958; Thibaut & Kelley, 1959), the *interpersonal exchange model of sexual satisfaction* (IEMSS; Lawrance & Byers, 1995) represents a framework specifically for interpreting results regarding sexual satisfaction. More specifically, the interpersonal exchange model of sexual satisfaction looks not only at exchange processes with respect to general relationship satisfaction but focuses on exchanges within the sexual relationship and the consequences for relationship satisfaction (Sprecher, 1998). For instance, one study reports evidence for sexual satisfaction mediating the association between sexual exchanges and relationship satisfaction (Kisler & Christopher, 2008). Originally, Lawrance and Byers (1995) proposed relationship quality to be a predictor for sexual satisfaction rather than vice versa. Later this assumption was revised, as a causal link for either direction of sexual and relationship satisfaction could not be found, concluding that both constructs are mutually influencing each other (Byers, 2005). Bidirectional models for change also have been introduced in other areas of basic research (Crisp & Hewstone, 2007). Evidence supports a reciprocal influence of sexual and relationship satisfaction, as initial satisfaction in either domain predicts prospective changes in the other (McNulty, Wenner, & Fisher, 2016; Yeh, Lorenz, Wickrama, Conger, & Elder, 2006), suggesting that initial levels of satisfaction are important (Kisler & Christopher, 2008).

The associations between the different model components are conceptualized similarly as in the original exchange theories. The IEMSS model states that sexual satisfaction is affected by rewards (e.g., pleasurable sensation or feelings of intimacy) and costs (e.g., experiences leading to pain or embarrassment) that are exchanged by the partners within the sexual relationship (Lawrance & Byers, 1995). One example for costs in the sexual relationship of a couple is the condition of sexual dysfunction, which, in line with the IEMSS, is associated with sexual dissatisfaction (Stephenson & Meston, 2011). As in the original social exchange theories, Lawrance and Byers (1995) include the component of perceived

equality between one's own and the partner's level of rewards and costs with respect to sexuality. Thus, over time, sexual satisfaction is high if levels of rewards exceed levels of costs (relative rewards are high and relative costs are low) and the levels of rewards and costs are perceived to be equal between partners in the sexual relationship (Lawrance & Byers, 1995). Important for this work, the IEMSS model has also been tested cross-culturally, finding evidence for the different model components in a more collectivistic society (Renaud et al., 1997).

### 1.2.2. Equity Theory

Another theory within the family of social exchange theories that is frequently being applied to romantic relationships is *equity theory* (Hatfield, Utne, & Traupmann, 1979). Similar to exchange theory, equity theory focuses on the perception of the balance between inputs and outcomes for both partners in their relationship (Sprecher & Schwartz, 1994). Hatfield, Utne and Traupmann (1979) postulate that equity depends on how much importance each member of the dyad attaches to the inputs, representing positive and negative contributions during an exchange and depending on the outcome this results in a potential reward or punishment. Subtracting rewards from punishments equals the total outcomes and in the case of inequity a person is either over- or underbenefitted, leading to relationship distress in both cases. Hence, the experience of inequity in rewards or punishments can result in sexual dissatisfaction which is accompanied by an increased motivation to restore equity (Hatfield, Utne, & Traupmann, 1979). In several studies, couples experiencing overall equity in their relationship reported higher sexual satisfaction compared to under- and overbenefitted couples (Hatfield, Greenberger, Traupmann, & Lambert, 1982; Traupmann, Hatfield, & Wexler, 1983). Conversely, being exposed to this aversive experience is frequently perceived as costs and relationship dissolution is often considered a result of a failed attempt to restore equity after distress (Hatfield, Utne, & Traupmann, 1979). Reducing equity distress can be

achieved by a cognitive or behavioral restoration process, for instance by offering or denying sexual interactions (Sprecher, 1998).

### 1.2.3. Investment Model

An extension of interdependence theory (Thibaut & Kelley, 1959) is the *investment model* (Rusbult, 1983). Adding the components of investment and relationship maintenance helps to understand commitment between partners and relationship stability (Rusbult, 1983; Rusbult, Drigotas, & Verette, 1994). Indirectly, the model also explains sexual satisfaction, as potential alternative partners are being cognitively derogated in highly committed relationships as a result of a rewarding current relationship in which both partners are invested (Johnson & Rusbult, 1989; Simpson, Gangestad, & Lerma, 1990). This process is facilitated by a fulfilling sexuality, increasing the likelihood of maintaining the current relationship and leading to the perception that alternative partners are perceived as worse (Sprecher, 1998). Furthermore, in line with research on *positive illusions*, the tendency to idealize the partner (e.g. Murray, Holmes, & Griffin, 1996), people higher in commitment tend to perceive their partners as excellent sexual partners, have positive expectations about their future sexuality and consider their sex lives as superior in comparison to others (De Jong & Reis, 2014).

### 1.2.4. (Dis-) Advantages of Social Exchange Theories

Exchange theories provide a great framework to explain how relationship variables are related to sexual and relationship satisfaction and due to numerous studies testing the IEMSS it represents an evidence-based theory for sexuality in close relationships (e.g. Byers & Wang, 2004; Kisler & Christopher, 2008). Nevertheless, there are also aspects of the theory that can be viewed critically, and more recent theoretical approaches may deepen our understanding of sexuality in the context of romantic relationships. It is for instance difficult to measure rewards, costs and equity, especially as they may differ for different individuals and may change over time or as a consequence of comparison (Sprecher, 1998). On the other hand,

scholars are pointing out that individuals may in fact rather act need-based instead of evaluating equity (Clark & Chrisman, 1994). A recent approach, *sexual communal strength*, proposes that being highly motivated to meet the partner's sexual needs predicts sexual desire over time and higher relationship quality (Muisse & Impett, 2014). Having a partner that is willing to accommodate own sexual desires for their loved one is associated with higher relationship satisfaction (Burke & Young, 2012) and being generous towards the sexual needs of the partner is also associated with commitment on the part of the partner (Muisse & Impett, 2015). Interdependence is high in the area of sexuality, especially when conflicting sexual needs and interests come together within a monogamous relationship. One way of dealing with this interdependence and thereby maintaining relationship and sexual satisfaction is the ability to focus more on the benefits for the partner and less on one's own associated costs (Day, & Impett, 2015).

In summary, having a surplus of rewards and mutuality serve a satisfying sexual relationship but paying too much attention to the balance between partners can also have costly implications (Muisse et al., 2018). These two perspectives, the exchange and the communal approach are not necessarily mutually exclusive and may even complement each other. For instance, one orientation can be beneficial for one person but not for another and both aspects of the two approaches can be important for sexual satisfaction: rewards and to some degree their equity as well as wanting to satisfy the partner's needs without expecting (immediate) reciprocation.

#### 1.2.5. Social Learning Theory and Sexuality (Hogben & Byrne, 1998)

Turning to social learning theories in the context of sexuality, research shows that sexual pleasure, and its expectation, are among the most powerful reinforcers and rewards for social behavior (Hovell et al., 1994). Anticipation of being rewarded for a certain behavior can initiate that behavior and also motivates the maintenance of displaying a certain behavior (Rotter, 1954). A sexual context within a romantic relationship contains various possibilities

of being rewarded. Examples of this include experiencing sexual arousal and stimulating physical sensations (e.g., orgasm) which is usually perceived as pleasurable (Hogben & Byrne, 1998) or expecting feelings of love and closeness as well as receiving affection from the partner, as another pathway of being reinforced (Rotter, 1954).

Sexual experiences may be exceptionally rewarding for couples reporting high sexual satisfaction and emotional intimacy. At the same time negative experiences, such as frequent conflict in a relationship, may decrease the likelihood of subsequent positive behavior towards the partner. In general, receiving punishment in the form of adverse stimuli decreases the likelihood of this behavior in the future (Skinner, 1953). More specifically, unpleasant experiences are being paired with the situation where they emerged (Pawlow, 1972). For instance, negative emotions such as fear or anxiety that are felt during a conflict or after being rejected in a sexual context can trigger these unpleasant feelings as a consequence of the same context in the future. Due to this pairing, a conflict or potentially a sexual situation itself can trigger negative emotional reactions (Bodenmann, 2012). Frequent conflicts may also undermine feelings of efficacy and competence (Bandura, 1977), to the extent that when couples are repeatedly not being able to resolve the conflict it might decrease the attempt to resolve a conflict. Frequent conflicts are associated with higher levels of depression and poorer health (Beach et al., 1998) and therefore have important implications for the sexual life of a couple, as for instance research showed that conflicts are associated with lower sexual satisfaction (Haning et al., 2007).

#### 1.2.6. Sexual Strategy Theory (Buss, 1998)

From an evolutionary perspective it made sense for women and men to adopt different mating strategies to increase their reproductive or genetic fitness (Gangestad & Simpson, 2000). According to sexual strategy theory, human reproduction is influenced by different adaptive problems in the environment (e.g., survival) for men and women (Buss, 1989). More specifically, men tend to choose a more short-term orientation to increase the number of

offspring while women potentially benefit more from adopting a long-term strategy, thereby receiving support in raising a child in case of a pregnancy which is very energy- and time-costly for women (Buss & Schmitt, 1993). Developing a preference for long-term mating usually includes forming a bond with one's partner, thereby obtaining a co-parent when being pregnant. Increasing the number of offspring on the other hand is achieved by mating with a variety of different partners, hence a short-term mating strategy also involves immediate sexual gratification (Buss & Schmitt, 1993). Conflict can arise due to these differences in sexual strategies, leading to interferences between partners while pursuing them and thereby impacting sexual satisfaction (Buss, 1989). Buss (1989) found in his study that the source of sexual dissatisfaction for women is often stemming from male sexual assertiveness and aggression, with men tending to initiate sexual intercourse more frequently and more consistently than women desire. For men on the other hand, sexual dissatisfaction arises when women are withholding in a sexual context, thus desiring sex less frequently than men.

Viewed from the perspective of exchange theories, sexual behavior can be considered a resource that is exchanged between partners for other sexual or more general relationship rewards (Sprecher, 1998). This might hold true particularly in cases with a higher discrepancy in sexual desire (Regan & Atkins, 2006) between partners, when sexual acts are traded for other relational benefits (Sprecher, 1998). In a relationship context, the consequences of different sexual strategies, such as a discrepancy in sex frequency, is one reason for sexual dissatisfaction and conflict (Buss, 1989) and may also decrease relationship satisfaction. When feeling underbenefitted or experiencing inequity, distress may even be exacerbated by comparisons (Sprecher, 1998), such as comparing the current sex frequency to the frequency of early stages of the relationship as sex frequency tends to decline over time (Call et al., 1995).

### 1.2.7. Biopsychosocial Model (Engel, 1977)

Belsky, Steinberg and Draper (1991) extended previous work by combining social learning theory, behavior that is for instance learned throughout childhood depending on the environment a person grew up in, with biological processes rooted in evolution, especially in the context of human mating behavior. Taking into account social aspects and biological factors (e.g., genetic or biochemical) that predispose a person, for instance for certain behaviors makes sense and is in line with the biopsychosocial model (Engel, 1977). This holistic model further acknowledges psychological factors, such as mood or mental health, as well as social factors including cultural or socioeconomic conditions as relevant aspects for the overall health of an individual, which is not only the absence of illness (Engel, 1977). An important biological pathway involved in couples intimate experiences is oxytocin which supports bonding between partners (Feldman, 2012). Physical intimacy is associated with higher levels of oxytocin which is released during sexual behavior, for instance during orgasm (Carter, 1992; 1998) but also when touching and stroking each other (Holt-Lunstad et al., 2008). Interestingly, the hormonal effects, for instance on mood, seem to depend more on whether people engage in sexual intercourse or not, instead of the satisfaction with sexual activity (Brody, 2002). This may underline the importance of biological mechanisms during sexuality. These biological and hormonal effects are potentially underlying mechanisms partially explaining the findings regarding conflicts, intimacy and sexuality of the articles included in this thesis. Analogous to the health of an individual, a healthy relationship is also multifaceted and constitutes a complex interaction between biological, psychological and social variables.

## **1.2. Goals of this Dissertation**

With this thesis, I aim to identify relationship processes and indicators of relationship functioning in often-neglected samples. As has been illustrated with the adaptation of

Bronfenbrenner's ecological systems theory (1977), different layers of relationships in different cultures will be studied. The first goal is to zoom in into one non-Western culture to investigate how relationship events and experiences are associated with sexuality and relationship satisfaction within-person using dyadic data. Tracking relationship dynamics in Iranian couples is important to provide empirical evidence for sexuality in the context of Iranian marriages. Furthermore, studies one and two will examine if findings regarding the sexual relationship in couples from Western studies can be replicated with a non-Western sample. Successful replications will increase the generalizability and robustness of these results to non-Western samples. At least just as interesting, findings that do not replicate would challenge results from Western studies and potentially reveal cultural differences in relationship processes. Results of studies one and two will also provide a theoretical contribution by improving the understanding of relationship dynamics between Iranian spouses. This will be achieved by analyzing associations between predictors and outcomes, simultaneously measured over the course of six weeks (study one). Secondly, prospective change will be estimated with the exogenous variables in previous weeks, predicting outcomes in subsequent weeks (study two). Important differences between cultural contexts will be identified and cultural implications derived.

With the quantitative review I will zoom out, adopting a broader macro perspective, no longer considering one but multiple cultures, numerous predictors and between-subject outcomes in diverse samples. The first goal here is to summarize the current state of the literature regarding general relationship functioning of couples with different socio-cultural backgrounds. It is highly important to confirm whether the widely held assumption of lower relationship stability in intercultural couples holds across multiple studies. To this end, effect sizes will be computed and their interpretation regarding relationship functioning for couples with different socio-cultural backgrounds will be addressed. Further, demographic correlates characterizing and accumulating in couples with different socio-cultural backgrounds will be

identified. Differences in relationship outcomes that are dependent on the specific cultural combination could imply interactions between cultural groups. Based on this and the review, standards and recommendations for future research investigating couples with different socio-cultural backgrounds will be developed.

#### 1.2.8. Overview of Included Studies

Based on the literature review in the previous chapters, the complexity of romantic relationships, compounded by cultural influences, was demonstrated, underlining the necessity to adopt different angles when investigating couples to capture different facets of intimate relationships. There are biological, social and psychological factors predicting relationship outcomes that can be found on the levels of individuals, couples and societies. As outlined, these factors and levels are captured by different theoretical models. Since the three included articles differ in terms of study design, analysis strategy and investigated effects, an overview over the studies and their corresponding features can be found in Table 1. Researching culturally diverse samples is highly relevant in our globalized world. The three studies will be shortly introduced in the following sections the complete articles will be presented.

#### 1.2.9. Study I

The first article is an empirical study and the first study investigating whether low sexual satisfaction explains the negative association between conflict frequency and relationship satisfaction in an Iranian sample using an intensive repeated measures design. This is particularly crucial, as scholars have frequently pointed out the necessity to conduct longitudinal research in order to investigate relationship processes (Bradbury, Fincham, & Beach, 2000). This article demonstrates that sexual satisfaction is indeed a mediator within-person and between couples for husbands and wives, based on a final sample of 179 couples across six consecutive weeks.

#### 1.2.10. Study II

The second study shows that one reason why frequent sexual intercourse (measured at  $t_2$ ) is important for relationship satisfaction (measured at  $t_0$ ), is because it enables the couple to experience moments of intimacy (measured at  $t_1$ ). In this study, we found actor and partner effects and detected within-person residualized prospective change based on a final sample of 168 Iranian couples over a six-week period. Furthermore, we included a binary intercourse variable indicating the absence or presence of sex in any given week as well as a cumulative sex frequency variable capturing the total number of sexual activity incidents to address different facets of sexuality in romantic relationships.

#### 1.2.11. Study III

The third article is a quantitative review investigating indicators of relationship functioning in couples with different socio-cultural backgrounds. So far, most reviews considering predictors of relationship functioning have been focusing on studies investigating couples with the same cultural background or studies that do not specifically pay attention to the cultural combinations of spouses in their sample (e.g., Christopher & Sprecher, 2000; Bradbury, Fincham, & Beach, 2000; Karney & Bradbury, 1995). An important takeaway of the review presented here is that several demographic correlates should be taken into account when comparing relationship stability of culturally homogeneous couples and couples with different socio-cultural backgrounds. This has important implications for studies investigating this growing subpopulation.

Table 1. Summary of the articles included in this dissertation

	Study	Design	Sample	Statistical Framework	Analysis Strategy	Predictors	Outcomes	Culture
Study I	Uhlich, M., Nouri, N., Jensen, R., Meuwly, N., & Schoebi, D. (in prep). Conflict frequency and relationship satisfaction in Iranian couples: Testing the mediating role of sexual satisfaction.	Empirical study	$N = 179$ couples	Multilevel modeling: within- and between subjects	Concurrent model	Conflict frequency, sexual satisfaction	Sexual satisfaction, relationship satisfaction	Iran
Study II	Uhlich, M., Nouri, N., & Schoebi, D. (in prep). Predicting Emotional Intimacy with Sexual Activity: Evidence from a Dyadic Longitudinal Study with Iranian Couples.	Empirical Study	$N = 168$ couples	Multilevel modeling: within-subjects	Prospective change model	Sex frequency, intimacy	Intimacy, relationship satisfaction	Iran
Study III	Uhlich, M., Ackert, M., Luginbuehl, T., & Schoebi D., (in prep). Indicators of relationship functioning in couples with different socio-cultural backgrounds: A narrative review.	Quantitative review	$N = 18$ studies	Comparing Effect sizes: between-subjects	Cohen's $d$ , Hedge's $g$ , $f^2$	Demographic correlates (e.g., social support)	Relationship functioning (e.g., divorce rate)	Multicultural

## **2. Study I:**

### **Conflict Frequency and Relationship Satisfaction in Iranian Couples: Testing the Mediating Role of Sexual Satisfaction**

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## Abstract

Distressed couples report more conflicts and lower relationship quality. Furthermore, frequent conflict is related to lower sexual satisfaction, and sexual satisfaction is positively related to relationship quality. However, little is known about these associations in non-Western samples. Based on these findings, we hypothesized a mediation model and examined whether the association of conflict frequency with relationship satisfaction can be explained by declines in sexual satisfaction. We tested this assumption based on a sample of 180 Iranian couples with both partners providing weekly reports on their relational experiences for six weeks. The results suggested that individuals who reported conflicts more frequently also reported decreased sexual satisfaction, which in turn was associated with lower relationship satisfaction. Mediation paths were significant for both partners. Within subject analysis revealed that individuals with higher conflict frequency in one week were having lower relationship satisfaction than in weeks with lower conflict frequency, mediated by sexual satisfaction. These findings provide further evidence for the tight interconnection of distressed interactions and sexual life in non-Western intimate relationships. The data also suggest these associations found in Western couples extend to non-Western couples in predominantly Muslim societies.

## Conflict frequency and Relationship Satisfaction in Iranian Couples: Testing the Mediating Role of Sexual Satisfaction

Intimate relationships can be a source of positive as well as negative experiences. Frequent conflicts with the partner can cause a lot of pain for many (Gottman, 1994) and individuals who report more conflicts in their relationship also report lower relationship satisfaction than individuals who have conflicts infrequently (Bradbury et al., 2000). Satisfactory sexual interactions, on the other hand, are rewarding and represent a resource of relationships (Sprecher, 2002) with individuals who report a satisfying sexuality also reporting higher relationship satisfaction (Yabiku, Gager, & Johnson, 2009). In a nutshell, both types of experiences are linked to relationship satisfaction: frequent conflicts predicting lower relationship satisfaction (Bradbury et al., 2000) and high sexual satisfaction being associated with higher relationship satisfaction (McNulty, Wenner, & Fisher, 2016; Debrot, Meuwly, Muise, Emily, & Schoebi, 2017). Finally, frequent conflict is also related to lower sexual satisfaction (Haning et al., 2007). However, so far, no study investigated if sexual satisfaction could be the mediator for the negative association between conflict frequency and relationship satisfaction.

Based on social exchange theory (Blau, 1964; Homans, 1958; Thibaut & Kelley, 1959), we understand conflicts as costs and satisfying sexual encounters as rewards. The theory suggests that rewards and costs influence the perception of a relationship and the level of satisfaction. In this framework, human social behavior is conceptualized as an exchange of resources between individuals. During this exchange, people tend to minimize costs and maximize rewards, and a favorable reward-cost balance will lead to satisfaction with the relationship (Sprecher, 1998). In romantic relationships, sexual rewards and costs are often traded for other relational resources such as intimacy, affection or closeness. More specifically, highly rewarding sexual interactions with few associated costs, and an equal

exchange of sexual behavior, are likely to go along with higher relationship satisfaction (Sprecher, 1998). Experiencing a lot of conflicts is linked to decreased sexual satisfaction (Haning et al., 2007), thereby negatively affecting the overall balance between costs and rewards. This imbalance is likely to be related to lower relationship satisfaction (Sprecher, 1998).

### **Interpersonal Exchange Model of Sexual Satisfaction**

Sexual satisfaction can be defined as “an affective response arising from one’s subjective evaluation of the positive and negative dimension associated with one’s sexual relationship” (Lawrance & Byers, 1995) as well as experiencing physical pleasure and emotional satisfaction from sexual intercourse (Mcfarland et al., 2011). The interpersonal exchange model of sexual satisfaction (IEMSS: Lawrance & Byers, 1995) considers exchange processes specifically with respect to the sexual relationship, and their consequences for relationship satisfaction (Sprecher, 1998). A favorable balance of rewards (pleasurable encounters or emotional qualities) and costs (mental/physical effort or couple conflicts) from sexual and other couple interactions are expected to predict higher sexual satisfaction, as well as relationship satisfaction. For instance, sexual dysfunction was conceptualized as costs in one study, thereby accounting for the negative association between sexual costs and sexual satisfaction (Stephenson & Meston, 2011). Several studies found evidence supporting this model (Lawrance & Byers, 1995; Byers & Demmons, 1999), and all components of the model (levels of rewards and costs, relative levels of costs and rewards, equality between levels of rewards and costs) were significantly related to sexual satisfaction (e.g. Byers, 2005; Renaud et al., 1997) in Western samples and in a non-Western sample (e.g. Renaud et al., 1997). In cases in which the evaluation of rewards and costs exceeds personal expectations regarding the level of sexual satisfaction, individuals are sexually more satisfied (Byers, Wang, Harvey et al. 2004). Sexual self-disclosure is one way of positively influencing the balance between costs and rewards and is associated with higher sexual satisfaction, as knowing the likes and

dislikes of the partner leads to a greater understanding how to sexually satisfy them and thereby increases their rewards (MacNeil & Byers, 2005).

### **Conflict and Relationship Satisfaction**

Marital conflict is an important predictor of relationship satisfaction and, ultimately, relationship stability (Karney & Bradbury, 1995). Higher frequency of conflicts was linearly associated with relationship dissolution (McGonagle, Kessler, & Gotlib, 1993), leading to a 1.5 times higher likelihood of divorce with increased levels of conflict (Orbuch et al., 2002).

However, some evidence suggests that problem-solving behaviors when facing conflict, rather than conflict alone, is the crucial element. Engaging in destructive conflict behavior is harmful for a relationship, and distressed couples display considerably more negative conflict styles than non-distressed couples (e.g. Gottman, 1993). One form of destructive conflict behavior would be avoiding rather than resolving a conflict, which can be even more detrimental to the relationship (Cramer, 2000). Resolving a conflict constructively is an important factor that enhances relationship satisfaction (Gottman, 1994), as successful conflict resolution is associated with higher relationship satisfaction (Fincham et al., 2004) and more positive expectations about the future of the relationship (Vanzetti et al., 1992). In other words, both frequent conflicts and attempts to resolve them in a destructive manner are associated with relationship distress and instability (e.g., Murray, Holmes, & Griffin, 1996).

### **Conflict as a Predictor of Sexual Satisfaction**

Unresolved conflicts and tensions between partners are negatively associated with sexual satisfaction (Haning et al., 2007; O'Farrell, Choquette, Cutter, & Birchler, 1997) and lower levels of sexual satisfaction are related to more sexual conflict (Long et al., 1996). One way how conflict impairs sexual satisfaction could be due to the experience of rejection. A recent study found that sexual advances by the partner in the aftermath of a conflict are often followed by rejection (Kim, Muise, & Impett, 2018). The experience of rejection predicts lower sexual satisfaction (Byers & Heinlein, 1989), but declining a partner's attempt to

engage in sexual exchanges in a sensitive way, preventing feelings of rejection and presumably conflict, is associated with higher levels of both sexual and relationship satisfaction (Kim et al., 2018). On the other hand, unresponsive behavior, especially within the context of sexual interactions, can contribute to conflict (Metz & Epstein, 2002).

Moreover, relationship distress not only undermines sexual satisfaction but also predicts sexual problems and dysfunction (Burri et al., 2013). More specifically, negative communication, unresolved conflicts and a lack of intimacy, contribute to the occurrence and persistence of sexual problems (Apt, Hurlbert, Pierce, & White, 1996; Metz & Epstein, 2002b), underlining the impact of conflicts on the sexual relationship. Low sexual satisfaction in men even predicts relationship dissolution (Sprecher, 2002), while individuals experiencing high intimacy with their partner report higher sexual satisfaction (Haning et al., 2007). However, conflicts are associated with lower intimacy and less feelings of closeness in general (Haning et al., 2007), potentially inhibiting a satisfying sexual encounter. Thus, low sexual satisfaction might explain the negative association of conflict frequency and relationship satisfaction.

### **Evidence of sexual satisfaction predicting relationship quality**

A large body of research has demonstrated the strong positive association between sexual satisfaction and relationship quality (e.g. Haavio-Mannila & Kontula, 1997; Purnine & Carey, 2008). In this sense, high sexual satisfaction may also have a protective function for relationships, as reflected by the tight connection between sexual and general relationship satisfaction (Meltzer & McNulty, 2016). Changes in sexual satisfaction are associated with changes in relationship quality (Sprecher, 2002), exemplified by the observation that sexual satisfaction significantly predicts subsequent relationship satisfaction (Fallis et al., 2016; Yeh, Lorenz, Wickrama, Conger, & Elder, 2006). Even 48 hours after sexual intercourse, levels of sexual satisfaction remained elevated (Meltzer et al., 2017). On days on which individuals reported feeling more sexually satisfied, they also perceived their partner as more responsive,

which in turn predicted increases in relationship satisfaction the next day (Gadassi et al., 2016). Besides high relationship satisfaction, being sexually satisfied is associated with frequent intercourse and frequent orgasm (Haavio-Mannila & Kontula, 1997). Behaviors that promote intimacy and closeness, such as frequently engaging in sex, are associated with both higher sexual and relationship satisfaction (Muise, Impett, & Desmarais, 2013).

Evidence, from a longitudinal study following couples for about 4-5 years, supports a reciprocal influence of sexual and relationship satisfaction, as initial satisfaction in either domain predicts prospective changes in the other (McNulty, Wenner, & Fisher, 2016; Yeh, Lorenz, Wickrama, Conger, & Elder, 2006), suggesting that initial levels of satisfaction are crucial (Kisler & Christopher, 2008). More specifically, the authors found that higher levels of sexual satisfaction at one assessment positively influenced changes in relationship satisfaction at subsequent assessments and vice versa (McNulty et al., 2016). McNulty and colleagues (2016) concluded that sexual and relationship satisfaction were causally linked in a bidirectional manner. Yet although sexual and relationship satisfaction are mutually influencing each other (McNulty et al., 2016), the question remains whether this is equally true for all individuals, as Byers (2005) found low sexual satisfaction to be associated with a greater decrease in relationship satisfaction over time only for those individuals whose relationship satisfaction was already decreasing. In the same study, the author also found that higher relationship satisfaction was associated with an increase in sexual satisfaction, though again only for individuals whose sexual satisfaction was already increasing. Moreover, in another study, some intimate relationships benefitted more from sexual intercourse than others: couples experiencing stronger sexual afterglow after intercourse had higher relationship satisfaction at baseline as well as over time (Meltzer et al., 2017).

Since in this work the studied couples are characterized by long-term marriages, it is important to mention that with the passing of time sexual satisfaction becomes less strongly

associated with relationship quality in general, compared to relationships in early stages (Byers, 1999). Furthermore, sexual and relationship satisfaction both decline over the course of a relationship (McNulty, O'Mara, & Karney, 2008; McNulty & Widman, 2013). However, sexual satisfaction seems to decline more rapidly, starting after one year of relationship duration (Schmiedeberg & Schröder, 2016), whereas relationship satisfaction only starts declining after 2.5 years (Lorber et al., 2015) or even later (Anderson, Van Ryzin, & Doherty, 2010).

### **Sexual satisfaction in Iranian couples**

Analogous to Western samples, sexual satisfaction in Iranian couples is reliably associated with higher relationship satisfaction and marital stability (Aliakbari Dehkordi, 2010; Fatehizadeh & Ahmadi, 2006; Rahmani, Merghati Khoei, & Alah Gholi, 2009; Zarra Nezhad & Moazami Goodarzi, 2011; Ziaee, Jannati, Mobasheri, Taghavi, & Abdollahi, Madanloo, Behnampour, 2014). Although social and demographic variables such as race or social status tend to be unrelated to sexual satisfaction (e.g. Davidson, Darling, & Norton, 1995; Henderson-King & Veroff, 1994; Laumann, Gagnon, Michael, & Michaels, 1994), there are cultural differences between Western societies and Iran that should be considered. Generally speaking, Iranian women are expected to be virgins when entering marriage, with only 2% of women reporting to have had sexual intercourse before marriage. This means they are usually sexually inexperienced, although women probably underreport due to social stigma. In contrast, 36% of Iranian men reported having experienced premarital sex (Hashemi, Seddigh, Tehrani, & Khansari, Khodakarami, 2013). As a consequence, as well as due to a comparatively low divorce rate (15% in 2011, Aghajanian & Thompson, 2013), a woman's lifetime number of sexual partners is considerably lower than for Western women, who have approximately seven sexual partners in their lifetime (Mitchell et al., 2018). Nevertheless, sexuality plays an important role in Iranian couples and, under certain circumstances, especially for women. For women, low sexual satisfaction is a legitimate

reason for divorce, even though the divorce law in Muslim marriages is more favorable for men in general (Sabour Esmaeili & Schoebi, 2017). Thus, reporting that her husband is incapable of sexually satisfying her (e.g., because of impotence) is one legal way for a woman in Iran to end an unsatisfying marriage (Sabour Esmaeili & Schoebi, 2017). Not surprisingly, several studies demonstrated that sexual problems are among the major reasons for divorce indicated by Iranian couples (Barikani & Sarichlow, Mohammadi, 2012; Bolhary et al., 2012; Shakerian, Nazari, Masoomi, Ebrahimi, & Danai, 2014).

### **The mediating role of sexual satisfaction**

Sexual satisfaction was traditionally proposed to be a predictor for relationship satisfaction (Edwards & Booth, 1994), although other authors proposed the inverse causal direction (Lawrance & Byers, 1995). The causal link between sexual satisfaction and relationship satisfaction is still unresolved and both constructs are currently discussed in the literature as mutually influencing each other (McNulty et al., 2016). Additionally, prior work has repeatedly shown the mediating role of sexual satisfaction in a relationship context: in one study, evidence suggests sexual satisfaction to be a mediator between individuals' judgments about their sexually-related exchanges and their relationship satisfaction (Kisler & Christopher, 2008). In another study, wives' perceptions of their sexual attractiveness was positively associated with relationship satisfaction and these associations were mediated by increased sexual frequency as well as higher sexual satisfaction (Meltzer & McNulty, 2010). An important limitation of previous literature however is that, to the best of our knowledge, no study has investigated these mechanisms specifically in non-Western samples. Building on the existing literature we propose sexual satisfaction as a key mechanism linking conflict frequency and relationship satisfaction.

## **The current study**

The current study seeks to extend prior research by studying the weekly associations between conflict, sexual and relationship satisfaction in Iranian couples. Our general aim is to investigate the consequences of conflict for sexual and relationship satisfaction in a non-Western sample. For a long time, scholars pointed out the importance to investigate within-person processes to better understand how a person's thoughts, feelings and behaviors are shaped by context and change over time (Gable & Reis, 1999). We examine this question using an experience sampling method allowing us to assess the couple's relational thoughts, feelings and behavior over a six-week period. In the present study we hypothesized a mediation model and examined whether the association of conflict frequency with relationship satisfaction is mediated by drops in sexual satisfaction (see Figure 1). Further, we predicted that conflict will be negatively associated with sexual and relationship satisfaction for husbands and wives. Sexual and relationship satisfaction, on the other hand, were predicted to be positively associated for both members of the dyad.

## **Method**

### **Participants**

The couples' average relationship duration was 10.6 years ( $SD=8.9$ ), while the mean age was 34.8 years ( $SD=7.7$ ) for women and 39.2 years ( $SD=8.4$ ) for men. Most participants, 80% of women and 71% of men, reported at least a bachelor's degree or higher. Almost all participants were Muslim (99.4%), 62% had a Persian background, 21% were Turkish and the rest was Arab or indicated the "other" category. The majority of participants (84%) reported a low to average income and 64% of couples had children.

### **Procedure**

Couples were recruited at the Islamic Azad University in Tehran and they completed a paper and pencil study. Participants first completed a more detailed baseline questionnaire and then participated in a second part of the study. This part was a longitudinal repeated measures

design and couples were asked to provide weekly reports on their relational experiences during the past seven days, over the course of six consecutive weeks. A total of 180 married and heterosexual couples (360 individuals) participated in the study and all couples shared a home. Our final sample consisted of 179 with 8.2% of missing data including one couple only participating in the baseline questionnaire and not in the longitudinal part. There is no indication to assume that these couples are not missing completely at random (Bolger & Laurenceau, 2013).

### **Measures**

The study included questionnaires about respondents' relationship satisfaction, sexual satisfaction and conflict frequency. As this survey was part of a larger study, that included questions on topics such as relationship functioning, family life and religiosity, only the variables relevant for this article will be presented. Descriptive statistics and intercorrelations of the study variables are presented in Table 1.

We used the following adapted item from the Couples' Satisfaction Index (CSI) by Funk and Rogge (2007) "Please indicate the degree of happiness, of your relationship, during the last 7 days", to measure weekly relationship satisfaction on a scale from 0 (Extremely Unhappy) to 6 (Perfect).

To measure weekly sexual satisfaction, we asked participants to indicate their degree of happiness on a scale from 1 (very dissatisfactory) to 4 (very satisfactory), using the following item: "If you think about the last 7 days, how satisfying was the sexuality with your partner?".

In order to measure how often couples had been fighting in the past week, we asked participants to rate how often they were having conflicts on a scale from 0 to 7 days, using the following item: "During the last 7 days how often did you have conflicts with your partner?".

## Data Analytic strategy

We relied on two-level multilevel models for dyadic data to account for the statistical non-independence in the data, due to the dyadic structure and the repeated measures design using the software Mplus 6.1 (Muthén & Muthén, 2010). At level-1, the predictors conflict frequency and sexual satisfaction were centered at the individual mean to capture within-person variation and at level-2 they were centered at the grand mean. The dependent variables relationship satisfaction and the mediator sexual satisfaction were not centered. The mediator sexual satisfaction was uncentered as outcome variable and centered as predictor variable. The weekly reports (level 1) were nested within couples (level 2) using an adaptation of the actor-partner interdependence mediation model (APIMeM; Ledermann & Bodenmann, 2006, an extensions of the actor-partner interdependence model (APIM); Kashy & Kenny, 1999). Actor- and partner effects were included in a concurrent mediation model.

The level-1 model for the prediction of relationship satisfaction by conflict frequency mediated by sexual satisfaction for the female partner of the couple is shown in equation (1) and (2).

Level-1 equations:

$$(1) RS_{ijf} = d_{RSif} + b_{jff}Sex_{ijf} + c'_{jff}Con_{ijf} + b_{jmf}Sex_{ijm} + c'_{jmf}Con_{ijm} + e_{RSijf}$$

Mediator level-1:

$$(2) Sex_{ijf} = d_{Sexif} + a_{jff}Con_{ijf} + a_{jmf}Con_{ijm} + e_{Sexijf}$$

Female relationship satisfaction<sub>ijf</sub> is predicted by actor and partner effects. The estimate for  $d_{RSif}$  is the intercept and represents the wife's relationship satisfaction. The estimate for  $b_{jff}$  captures the association of the actor's sexual satisfaction on her relationship satisfaction. The estimate for  $b_{jmf}$  reflects the partner effect of male sexual satisfaction on female relationship satisfaction. The estimate for  $c'_{jff}$  captures the association of the actor's conflict frequency on her relationship satisfaction. The estimate for  $c'_{jmf}$  reflects the partner effect of male conflict frequency on female relationship satisfaction. Finally,  $e_{RSijf}$  is the level-

1 error term for female relationship satisfaction. Equation (2) represents the level-1 equation for the mediator with  $d_{Sexif}$  being the intercept for sexual satisfaction and  $a_{iff}$  capturing the association of the actor effect between the female conflict frequency and her sexual satisfaction. The estimate for  $a_{jmf}$  represents the partner effect of male conflict frequency and female sexual satisfaction. Finally,  $e_{Sexif}$  is the level-1 error term for female sexual satisfaction.

Similarly, to level 1, the equations (3) and (4) on level-2 specify the different pathways of the mediation for the between subject variables. Equations (5) to (12) represent the random intercepts and slopes for all predictors in the model. Random slopes were only included for the a and c' pathways of the actor effects.

Level-2 equations:

$$(3) RS_{if} = d^*_{RSif} + b^*_{iff}Sex_{if} + c'^*_{iff}Con_{if} + b^*_{jmf}Sex_{jm} + c'^*_{jmf}Con_{jm} + e^*_{RSif}$$

$$(4) Sex_{if} = d^*_{Sexif} + a^*_{iff}Con_{if} + a^*_{jmf}Con_{jm} + e^*_{Sexif}$$

$$(5) d_{RSif} = \gamma_{00} + \mu_{0j}$$

$$(6) b_{iff} = \gamma_{10}$$

$$(7) b_{jmf} = \gamma_{20}$$

$$(8) c'_{iff} = \gamma_{30} + \mu_{1j}$$

$$(9) c'_{jmf} = \gamma_{40}$$

$$(10) d_{sexif} = \gamma_{50} + \mu_{2j}$$

$$(11) a_{iff} = \gamma_{60} + \mu_{3j}$$

$$(12) a_{jmf} = \gamma_{70}$$

## Results

The intraclass correlation coefficient (ICC), indicating the ratio of between-variance to total variance, was 0.568 for female relationship satisfaction and 0.544 for male relationship satisfaction. In other words, 56.8% for women and 54.4% for men of the total variance of relationship satisfaction was between couples. The estimated means between couples for relationship satisfaction for husbands was  $M_h = 3.41$  ( $SE = 0.087$ ,  $p < .001$ ) and  $M_w = 3.25$  ( $SE = 0.085$ ,  $p < .001$ ) for wives.<sup>1</sup>

In line with our predictions, we found significant within-subject actor effects for the following pathways: conflict frequency significantly predicted lower sexual satisfaction for husbands ( $b = -.077$ ,  $SE = .034$ ) and wives ( $b = -.129$ ,  $SE = .031$ ). Furthermore, higher sexual satisfaction significantly predicted higher relationship satisfaction for husbands ( $b = .772$ ,  $SE = .208$ ) and wives ( $b = .888$ ,  $SE = .213$ ). Finally, higher conflict frequency significantly predicted lower relationship satisfaction for men ( $b = -.155$ ,  $SE = .046$ ) and women ( $b = -.199$ ,  $SE = .045$ ). There was also one significant partner effect with male sexual satisfaction predicting female relationship satisfaction ( $b = .378$ ,  $SE = .144$ ). All parameter estimates are displayed in Table 2.

Next, we tested the mediation model and indeed found significant mediational paths for both partners as hypothesized (see Table 3). For this, we tested all eight possible mediational pathways and included random slopes for both genders in the final model. The within-subject results indicated that individuals with higher conflict frequency in one week were having lower relationship satisfaction compared to weeks with lower conflict, mediated

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<sup>1</sup> A random intercept model with a fixed slope at level-1 included the predictors conflict frequency and sexual satisfaction only at the within-level and no predictors at the between-level. The intercepts for this model were for wives 1.18 ( $SE=0.28$ ) and for husbands 1.39 ( $SE=0.27$ ). After that we tested if there is a randomly varying slope regarding predictors and outcome. When including a random slope at level-1, the variance for the random slope was significant for all predictors and both genders but only for actor effects. In the final mediation model, despite the significant variance, there was no random slope for the pathway sexual satisfaction and relationship satisfaction as the model failed to estimate this parameter, presumably because the effect was too small.

by sexual satisfaction. The indirect pathways were significant as actor-effects, more specifically via own sexual satisfaction for husbands ( $b = 0.17, SE = 0.07$ ) and wives ( $b = 0.12, SE = 0.06$ ). The total within-subject effects for women  $b = -0.36 (SE = 0.05)$  and for men  $b = -0.25 (SE = 0.05)$  were also highly significant. The results showed a usual pattern in relationship research with predominantly significant actor effects and weak or insignificant partner effects. Similar significant associations and mediational pathways have been found between couples (see Table 1 in Appendix).

### **Discussion**

The main aim of this study was to investigate whether the effects of conflict frequency on relationship satisfaction can be explained by sexual satisfaction across weeks. We used weekly reports by both partners of married Iranian couples to test the assumption that low sexual satisfaction, as a result of high conflict frequency, is one mechanism explaining lower relationship satisfaction. This was supported by our study results, indicating that the association between conflict frequency and relationship satisfaction is established through an indirect pathway. In other words, husbands' and wives' sexual satisfaction was found to play an intervening role for the association of conflict frequency and relationship satisfaction. Additionally, these mediating associations were confirmed for men as well as women, indicating that sexual aspects of the relationship are important for both genders. This challenges the assumption that sexuality is more important for men than for women (Talmadge & Dabbs, 1990). However, we found one partner effect only for men, with male sexual satisfaction predicting female relationship satisfaction. This could be a result specific to an Iranian sample, in which women with sexually unsatisfied husbands feel like they fail in their marital duty (Shirpak et al., 2007), thereby predicting lower female relationship satisfaction. In general, the mediational pathways were only significant as actor effects, suggesting that only own sexual satisfaction (and not the partner's sexual satisfaction) explains the negative association between conflict frequency and own relationship

satisfaction. This may indicate that individuals tend to focus on their own sexuality when evaluating own relationship outcomes while the partner's level of sexual satisfaction is less important for explaining the association of conflict frequency and relationship satisfaction.

With our study design we were able to see the immediate effects of conflict and its negative associations with sexual and relationship satisfaction on a weekly basis. This contains information about the daily life of a couple and how relationship events and experiences shape weekly relationship outcomes within both members of the couple. We identified a mediational mechanism, indicating the association of conflict frequency and relationship satisfaction can be explained by drops in sexual satisfaction. We were able to see that couples' evaluation of their sexual and relationship satisfaction differed from week to week depending on what happened between them during the week. In weeks of higher conflict frequency, individuals reported lower sexual and relationship satisfaction compared to weeks with less conflict. Comparisons between couples revealed that, in general, couples who reported more conflicts also reported lower sexual and relationship satisfaction across weeks compared to couples having conflicts less often (see Appendix, Table 1). Hence, lower sexual satisfaction was one reason for experiencing lower relationship satisfaction after couples had an argument, indicating that conflicts have negative consequences for sexual and relationship satisfaction in Iranian couples. This is in line with studies conducted in Western countries, similarly demonstrating that a higher conflict frequency is linked to lower sexual (Haning et al., 2007) and relationship satisfaction (McGonagle et al., 1993). We also replicated the finding from Western couples that high sexual satisfaction predicts high relationship satisfaction (McNulty et al., 2016) with Iranian couples.

To the best of our knowledge, these results are the first to demonstrate that the associations of conflict frequency, sexual satisfaction and relationship satisfaction found in Western couples extend to non-Western couples in predominantly Muslim societies. Furthermore, we are not aware of any study investigating mediational pathways, with the

variables investigated here, using a multilevel design with longitudinal dyadic data. By using a repeated-measures-design measuring the couples' experiences multiple times across different contexts, we were able to reduce bias and improve the representativeness and generalizability of the results (Reis, Gable, & Maniaci, 2014).

### **Sexual satisfaction as a basic need across cultures in romantic relationships**

Our findings provide additional evidence for the tight interconnection of distressed interactions and sexual life in non-Western intimate relationships. Despite the similarity to Western couples, regarding the importance of conflict and sexuality for relationship functioning, there are important differences. In Iran, most individuals have their first sexual encounters in the context of marriage (Hashemi et al., 2013). In contrast, in the US, sexual activity is mostly experienced in dating relationships (Laumann et al., 1994) and around 87% of women reported engaging in sex before being married (Wu, Martin, & England, 2018). Given these differences, it is interesting to replicate associations that we already know from studies based on Western samples with an Iranian sample. Overall, sexual satisfaction seems to be a basic need across cultures in romantic relationships and we found similar associations despite cultural differences. Extending prior knowledge, we found a mediational pattern within and between Iranian dyads that could also be expected in an individualistic society. Even in a quite conservative and patriarchal society such as Iran, compared to Western standards, the results of this study suggest that couples experience the same impairing effects of conflict on their sexuality and relationship functioning. Although sexuality is more stigmatized and less discussed publicly in Muslim countries (Shirpak et al., 2007), our data suggests that both Iranian women and men experience their sexuality as quite important for their relationship, despite the fact that more conservative attitudes are related to restricting sexuality to mostly reproductive purposes (Lefkowitzs, Gillen, Shearer, & Boone, 2004). The primary source of regulation of sexuality within marriage is introduced by Muslim writings such as the Koran and the value system of the religious community (Shirpak et al., 2007). In

summary, Iranian couples seem to consider sexual satisfaction an important component for the overall evaluation of their relationship. The importance of sexual satisfaction in Iranian couples is especially interesting regarding the wife's sexual satisfaction, as the sexuality of Iranian women is supposed to be subordinate to their husbands and it is considered their marital duty to fulfill their husband's desires (Shirpak et al., 2007). This duty aspect in combination with sexual dissatisfaction constituting a frequent reason to divorce a husband (Barikani & Sarichlow, Mohammadi, 2012) may indicate that interpreting sexual satisfaction in an Iranian sample is not the same as in an Western sample.

### **Gender differences**

Although many evolutionary theories suggest gender differences (Buss, 1998) in sexuality, we found similar effects for both genders, with sexual satisfaction explaining the association between conflict frequency and relationship satisfaction equally for husbands and wives. Another recent study testing specifically for gender differences in two independent samples regarding the association of sexual and relationship satisfaction did not find significant differences (McNulty et al., 2016). Our mediation model indicates that being temporarily in a negative context, such as a conflict, decreases sexual and relationship satisfaction significantly for women as well as men. However, the effect of conflict frequency on sexual satisfaction was stronger for women, which could imply that context is more important for wives than for husbands. The literature suggests that sexual satisfaction depends more on the context for women and on the frequency of sexual intercourse for men (Impett & Peplau, 2003).

### **Clinical implications**

Our results suggest that to maintain high sexual and relationship satisfaction across weeks in Iranian couples, reducing conflicts with detrimental consequences for sexual and relationship satisfaction can be one important starting point. In a clinical setting, Iranian couples could be for instance helped by participating in a communication skills training to

improve conflict resolution skills. This is in line with previous intervention studies in Western countries demonstrating that reducing conflict in couples is associated with positive relationship outcomes (e.g. Bodenmann, 2016; Halford, Rahimullah, Wilson, Occhipinti, Busby, & Larson, 2017), as well as one study with Iranian couples which showed that participants reported higher relationship satisfaction after completing a conflict resolution skills training (Askari et al., 2012). Miscommunication that leads to conflict may occur easily around a sensitive topic such as sexuality. Indeed, communication skills have been found to account for changes in sexual satisfaction and relationship satisfaction (Byers, 2005) and intimate forms of communication, such as self-disclosure, are related to higher sexual satisfaction (MacNeil & Byers, 2005). Being able to communicate well, particularly about sexuality, is therefore an important predictor for sexual satisfaction and is associated with a fulfilling sex life (Sprecher & McKinney, 1993). Poor communication, in contrast, is associated with decreases in sexual and relationship satisfaction (Byers & Demmons, 1999; Cupach & Comstock, 1990). Conflict management and sexual satisfaction are important aspects for relationship functioning and are often reasons for couples to seek couple or sexual therapy (Doss et al., 2004).

Even in the absence of open conflict couples may still experience lower sexual and relationship satisfaction as implied by approach-avoidance social motivation theory (Elliot et al., 2006). The motivations and goals people pursue when engaging in sex influence sexual and relationship outcomes and, when engaging in sex to avoid conflict, this was associated with more negative emotions and even conflict itself, which predicted decreased sexual satisfaction as well as lower relationship quality (Impett, Peplau, & Gable, 2005). These detrimental effects of pursuing sex for avoidance goals can even be measured months later (Muisse et al., 2013). While avoiding a conflict can be more comfortable in the moment itself, it can have negative consequences for many aspects of the relationship over time (McNulty & Fincham, 2012).

The impact a conflict has on both sexual and relationship satisfaction can also depend on personal sexual growth beliefs. Based on implicit theories of relationships (Knee & Petty, 2013), higher expectations regarding for instance need fulfillment within the relationship are longitudinally associated with relationship satisfaction and expecting a satisfying sexuality led to increases in sexual satisfaction later on (McNulty & Karney, 2004). However, as the good-enough sex model suggests, these expectations should be realistic (Metz & McCarthy, 2007). Nevertheless, individuals with an orientation towards sexual growth beliefs think that sexual satisfaction can be actively shaped by work and effort. In contrast, people with sexual destiny beliefs are more passive because they view dealing with difficulties as outside of their control (Maxwell et al., 2016). Sexual growth belief is associated with one's own sexual and relationship satisfaction as well as the partner's and suggests more constructive coping with conflicts (Maxwell et al., 2016). Promoting growth beliefs without creating unrealistic expectations and teaching couples how to actively shape sexual satisfaction in couple or sex therapy could thus be another promising way to enhance relationship satisfaction and stability.

Taken together, sexual and relationship satisfaction are bidirectionally influencing each other (Muise et al., 2018) and interventions to treat and prevent relationship distress may benefit by also targeting the sexual relationship during therapy. These interventions are likely to benefit general relationship functioning (McNulty et al., 2016).

### **Limitations**

There are some limitations of the current study. First, this study was based on self-report data. However, for the evaluation of satisfaction the subjective perspective is relevant. Additionally, recruiting participants in a major Iranian city may not be representative for people living in rural areas our sample is highly educated and included many dual earner couples (95% of working husbands, 51% of working wives) as participants were recruited at the university. In general, more educated couples with a higher socio-economic status are

happier in their relationship (Conger et al., 2010). The rate of employed women in Iran is much lower in the general population (17% in 2014, Statistical Center of Iran 2015) than in our study. Women in our sample were more educated than men on average and Iranian women holding university degrees are usually not represented in the workforce (Shavarini, 2005). This might be relevant for the relationship, as in one study more educated women and men reported higher sexual satisfaction (Haavio-Mannila & Kontula, 1997) while the level of education for women and men was not predictive for sexual satisfaction in another study (Haning et al., 2007). Lastly, although participants reported rather high sexual satisfaction on average, despite being in a relationship for at least a couple of years, we cannot rule out that some sexual intercourse might have been unpleasant, unwanted or coerced (Meltzer et al., 2017), especially considering that in Iran sexual intercourse is seen as the wife's duty (Shirpak et al., 2007).

### **Future directions**

When investigating the maintenance of sexual and relationship satisfaction in non-Western samples across weeks there are several factors to consider in future research. Conflict around sexuality uniquely predicts relationship dissatisfaction beyond general conflict frequency (Long et al., 1996). This indicates that besides conflict frequency, the conflict topic is also relevant for relationship quality. For instance, in a pilot study, displayed emotions of couples during a discussion about a sexual argument were more predictive for relationship satisfaction than emotions that were expressed when talking about a non-sexual conflict topic (Rehman et al., 2011). Although the negative association between conflict frequency and sexual satisfaction was true for most individuals, as the average random slope across participants for conflict frequency and sexual satisfaction was negative, there was great individual variability (see Appendix Figure 1 & 2). The graph is only descriptive, but for some participants the slope was neutral and for others it was even positive as can be seen in the spaghetti plot. Therefore, it might be worthwhile to test if the conflict topic moderates the

association between conflict frequency and lower sexual satisfaction. Less threatening conflict topics or couples who manage to express their vulnerability during the fight could experience more closeness after arguing. Previous research showed that self-disclosure, such as revealing vulnerabilities, predicts higher intimacy (Laurenceau, Feldman Barrett, & Pietromonaco, 1998). The variability in the sample may further indicate that the context the couples live in also matters, such as having young children at home and thereby being less satisfied with the relationship in general (Twenge et al., 2003). The positive slope may also imply that some couples use sex as a coping mechanism to reconcile after conflicts. This might be particularly true for volatile couples, whose relationships are characterized by intense emotions and passion in positive and negative aspects (Gottman, 1994). This would make sense, as passion is an essential ingredient of sexual satisfaction (Rubin & Campbell, 2012).

Second, in line with systems theory, future research should consider the family network of the couple (Jurish & Myers-Bowman, 1998; Klein & White, 1996). This perspective might be particularly useful when studying couples in more collectivistic countries as the theory assumes interdependence of the couple-subsystem and the broader family-system (Jurish & Myers-Bowman, 1998) and in more collectivistic societies the self-concept is more interdependent (Triandis, 2001). Thus, when studying non-Western samples, relationships to family members, as well as their approval of the partner or their involvement in the couple relationship, are important contextual factors potentially influencing the relationship of the couple. This might be particularly interesting in comparison to a sample of couples in which dyads consist of a Western and a non-Western partner.

Lastly, results from a recent study indicate that implicit evaluations of relationship satisfaction in a sexual context is impacted by sexual frequency (Hicks et al., 2016). Furthermore, there is also evidence that intercourse frequency mediates the association of sexual and relationship satisfaction (Schmiedeberg & Schröder, 2016). Looking at sexual

frequency in conjunction with intimacy-related variables could be interesting for tracking important relationship processes relevant for relationship functioning and sexuality in Iranian couples.

### **Conclusion**

The sexual relationship and relationship functioning are intertwined and distress in one area is likely to affect the other. Our within-subject analysis demonstrated that in a sample of married Iranian couples living in Iran, the association of conflict frequency and relationship satisfaction can be explained by declines in sexual satisfaction across weeks. In weeks of higher conflict frequency individuals reported lower sexual satisfaction which in turn predicted lower relationship satisfaction for both partners compared to weeks with less conflict. This underlines once more the basic social need for sexuality and closeness (Maslow, 1943) across cultural contexts and the relevance of it for intimate relationships.

Table 1. *Intercorrelations, Means and Standard Deviations between Study Variables for Men and Women.*

	<i>M</i>	<i>SD</i>	1	2	3	4	5
Relationship Satisfaction W	3.26	1.43					
Relationship Satisfaction M	3.41	1.43	0.58**				
Sexual Satisfaction W	2.83	0.88	0.54**	0.40**			
Sexual Satisfaction M	2.84	0.88	0.37**	0.50**	0.54**		
Conflict Frequency W	1.39	1.64	-0.52**	-0.34**	-0.39**	-0.21**	
Conflict Frequency M	1.26	1.55	-0.28**	-0.44**	-0.22**	-0.29**	0.39**

*Note.* All Variables are uncentered.

Table 2. *Within-Subject Effects for Single Pathways*

		Women	Men
		<i>b(SE)</i>	<i>b(SE)</i>
	Conflict→Sex	-0.129(0.031)***	-0.077(0.034)*
Actor-Effects	Sex→RS	0.888(0.213)***	0.722(0.208)**
	Conflict→RS	-0.199(0.045)***	-0.155(0.046)**
	Conflict→Sex	-0.018(0.023)	0.017(0.027)
Partner-Effects	Sex→RS	0.292(0.202)	0.378(0.144)**
	Conflict→RS	0.025(0.035)	0.013(0.040)

*Note.* *N*=179 couples; \**p* > .05, \*\**p* > .01, \*\*\**p* > .001; This a random intercept and slope model displaying within-subject regression coefficients.

Table 3. *Within-Subject Effects of the Mediation Pathways*

	<i>b</i>	<i>SE</i>
Conflict <sub>w</sub> → Sex <sub>w</sub> → RS <sub>w</sub>	0.012*	0.006
Conflict <sub>m</sub> → Sex <sub>m</sub> → RS <sub>m</sub>	0.17*	0.007
Conflict <sub>m</sub> → Sex <sub>w</sub> → RS <sub>w</sub>	0.005	0.003
Conflict <sub>w</sub> → Sex <sub>m</sub> → RS <sub>m</sub>	0.003	0.002
Conflict <sub>w</sub> → Sex <sub>w</sub> → RS <sub>m</sub>	0.005	0.003
Conflict <sub>m</sub> → Sex <sub>m</sub> → RS <sub>w</sub>	0.005	0.004
Conflict <sub>m</sub> → Sex <sub>w</sub> → RS <sub>m</sub>	0.002	0.002
Conflict <sub>w</sub> → Sex <sub>m</sub> → RS <sub>w</sub>	0.001	0.001

Note. *N*=179 couples; \**p* > .05, \*\**p* > .01, \*\*\**p* > .001; This a random intercept and slope model displaying within-subject regression coefficients; Total effect for women was *b*=.048\*\*, *SE*=.018 and for men *b*=.85\*\*, *SE*=.029.

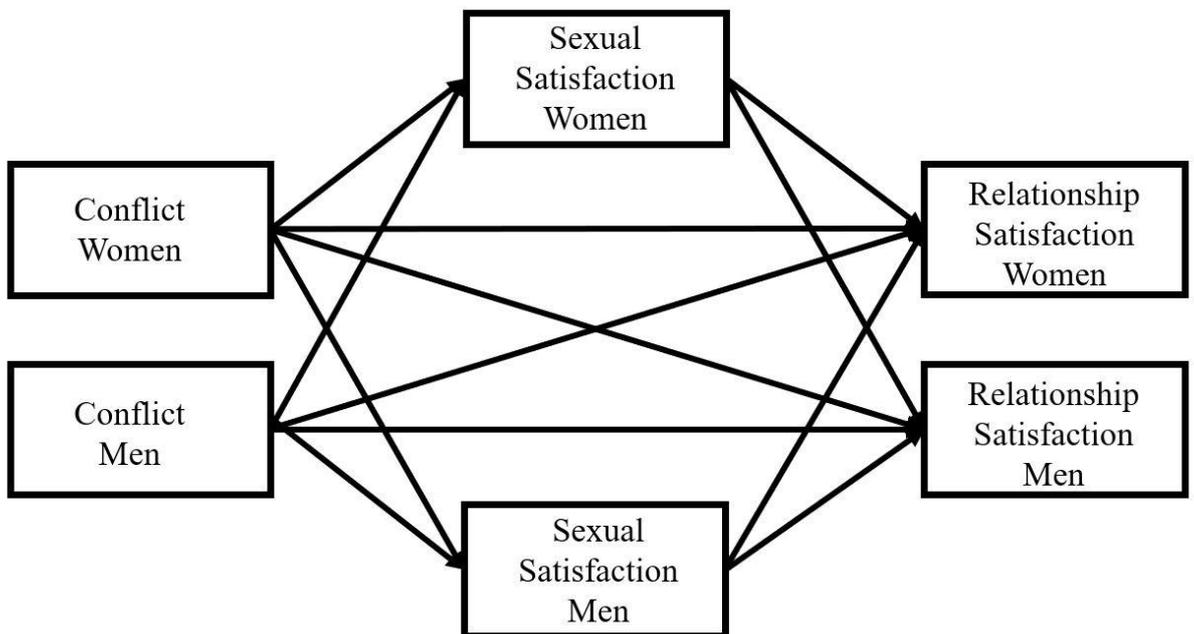


Figure 1. Conceptual model postulating the association between conflict frequency and relationship satisfaction mediated by sexual satisfaction for both partners.

## Appendix

Table 1. *Between-Subject Effects of the Mediation Model for Actor- and Partner-Effects*

		Between-Subject	
		<i>b</i>	<i>SE</i>
Actor-Effects	Conflict <sub>W</sub> → RS <sub>W</sub>	-0.372***	0.055
	Conflict <sub>M</sub> → RS <sub>M</sub>	-0.290***	0.067
	Conflict <sub>W</sub> → Sex <sub>W</sub> → RS <sub>W</sub>	-0.115*	-0.050
	Conflict <sub>M</sub> → Sex <sub>M</sub> → RS <sub>M</sub>	-0.129**	-0.049
Partner-Effects	Conflict <sub>W</sub> → RS <sub>M</sub>	-0.165*	0.070
	Conflict <sub>M</sub> → RS <sub>W</sub>	-0.027	0.062
	Conflict <sub>M</sub> → Sex <sub>W</sub> → RS <sub>M</sub>	0.001	0.014
	Conflict <sub>W</sub> → Sex <sub>M</sub> → RS <sub>W</sub>	-0.039	0.030
	Conflict <sub>M</sub> → Sex <sub>W</sub> → RS <sub>W</sub>	-0.053	0.039
	Conflict <sub>W</sub> → Sex <sub>W</sub> → RS <sub>M</sub>	0.002	0.042
	Conflict <sub>M</sub> → Sex <sub>M</sub> → RS <sub>W</sub>	-0.023	0.032
	Conflict <sub>W</sub> → Sex <sub>M</sub> → RS <sub>M</sub>	-0.010	0.015

Note.  $N=179$  couples; \* $p > .05$ , \*\* $p > .01$ , \*\*\* $p > .001$ .

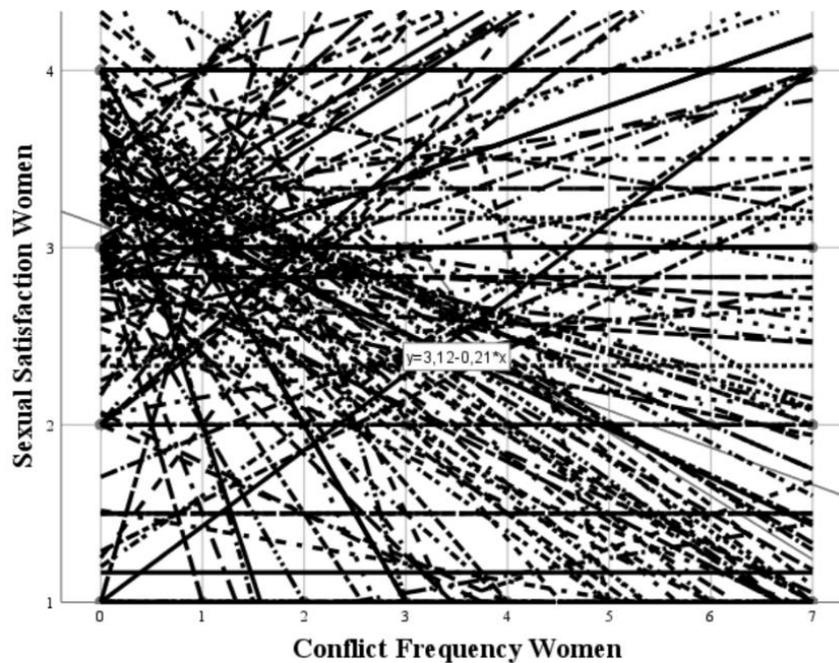
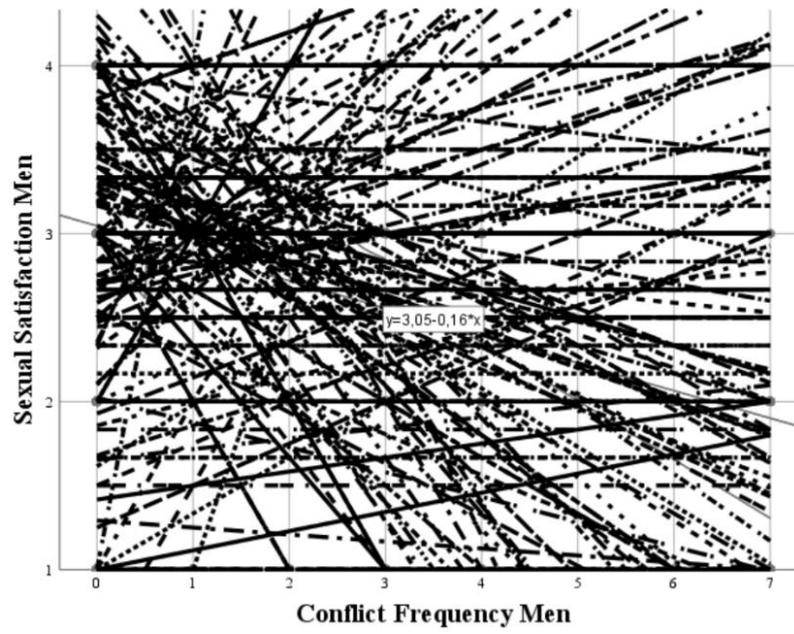


Figure 1. Spaghetti Plot representing the random effects for the association of female sexual satisfaction and female conflict frequency.



*Figure 2.* Spaghetti Plot representing the random effects for the association of male sexual satisfaction and male conflict frequency.

### **3. Study II**

## **Predicting Emotional Intimacy with Sexual Activity: Evidence from a Dyadic Longitudinal Study with Iranian Couples**

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## Abstract

Regular sexual intercourse can have many personal and relationship benefits such as pleasure, stress relief (Ulrich-Lai et al., 2010) as well as higher sexual and relationship satisfaction (Schmiedeberg & Schröder, 2016). Likewise, emotional intimacy has been found to promote well-being, relationship quality (Reis & Shaver, 1988) and sexual satisfaction (Muisse et al., 2013). Thus, sexual frequency and emotional intimacy are tightly linked in their importance for sexual and relationship functioning. However, little is known about how the frequency of sexual intercourse promotes feelings of closeness over time in non-Western samples. We hypothesized that more frequent sexual intercourse predicts increases of emotional intimacy across weeks. We tested this assumption based on a sample of 180 Iranian couples, of which both partners provided weekly reports on their relational experiences during the past seven days, over the course of six consecutive weeks. Our results suggested that in weeks in which sexual intercourse occurs couples reported higher intimacy. Sexual intercourse in previous weeks predicted intimacy in subsequent weeks and this was even extended to the prediction of relationship satisfaction in the week after that. These findings align with results from Western romantic relationships and emphasize the tight interconnection of sexual life and relationship functioning. Further, these results could have important implications for the treatment of distressed spouses seeking couples or sex therapy.

## Predicting Emotional Intimacy with Sexual Activity: Evidence from a Dyadic Longitudinal Study with Iranian Couples

Sexuality is a defining characteristic of intimate relationships (Meltzer et al., 2007), distinguishing it from other close relationships such as friendships or parent-child relationships. In the formation of romantic relationships, sexual attraction is noticed early on in a potential mate and contributes to it in important ways (Poulsen et al., 2013). Individuals have many reasons to engage in sexual intercourse. Besides reproduction, sex potentially promotes pair-bonding (Meston & Buss, 2007), and, with reliable birth control methods widely accessible to most people, sexual intercourse is not necessarily linked to reproductive goals. Indeed, the most common reasons people report for having sex are sexual attraction, physical pleasure, and emotional reasons (Meston & Buss, 2007). Specifically, women, and sometimes also men (Basson, 2000; Leigh, 1989), report emotional reasons, such as showing affection and feeling close, whereas men more often prioritize sexual arousal and physical pleasure (Meston & Buss, 2007).

Prior research has demonstrated that physical intimacy before (e.g., foreplay) and after intercourse, such as cuddling, are important for a satisfying sexual experience (Muise, Giang, & Impett, 2014). The range of positive effects of regular sexual intercourse is broad and involves both personal and relationship benefits, such as pleasure, stress relief (Ulrich-Lai et al., 2010), and sexual and relationship satisfaction (Schmiedeberg & Schröder, 2016). Studies demonstrating the link between sex frequency and general happiness (e.g. Blanchflower & Oswald, 2004; Laumann et al., 2006), as well as less negative mood and lower stress the day after intercourse, emphasize the rewarding quality of frequent sex (Burleson et al., 2007).

Sexual experiences in general and higher sex frequency are associated with increased relationship satisfaction (e.g. Call, Sprecher, & Schwartz, 1995; Muise, Schimmack, & Impett, 2016), potentially suggesting that couples need sexual experiences with some

regularity to have a satisfying relationship. Intercourse frequency also depends on relationship length though, as newlyweds tend to have sex on a higher regular basis than long-term couples (Meltzer & McNulty, 2016). In general, sex frequency and sexual satisfaction decline over time in long-term relationships (Call et al., 1995; McNulty, Wenner, & Fisher, 2016; McNulty & Widman, 2013). However, Muise and colleagues (2016) demonstrated that having sex more than once per week does not result in additional benefits for relationship satisfaction, even when controlling for relationship duration.

Being physically and sexually intimate with the partner also elicits a range of positive outcomes, such as emotional intimacy, positive affect, and relationship satisfaction (Debrot, Meuwly, Muise, Emily, & Schoebi, 2017). These feelings of closeness are an important predictor of sexual satisfaction and thereby contribute to the perceived quality of the sexual experience (Muise et al., 2013). Sexual satisfaction in turn also predicts higher emotional intimacy in both spouses (Yoo et al., 2014). Emotional intimacy with a romantic partner on the other hand promotes well-being, relationship quality (Reis & Shaver, 1988; Schaefer & Olson, 1981; Yoo et al., 2014), and sexual satisfaction (Muise et al., 2013), while failure to establish and maintain intimacy is associated with negative relationship outcomes (Waring, 2013). This indicates that intimacy represents an important ingredient for a satisfying relationship. Although intimacy and relationship satisfaction are related constructs, intimacy is usually referred to as feelings of closeness towards the partner and can include emotional and sexual facets which affect relationship outcomes differently (Yoo et al., 2014) whereas relationship satisfaction measures the cognitive overall evaluation of the state of the relationship. In this study, we were particularly interested in the emotional aspect of intimacy, focusing on dyadic interactions and the affective experience of the relationship.

A challenge associated with analyzing data regarding sex frequency is to obtain accurate frequency estimates. Studies on sexual behavior traditionally use retrospective self-report data to evaluate, for instance how often people engaged in sexual intercourse during the

past three months (Willis & Jozkowski, 2018). Yet research has demonstrated that retrospective data is often biased due to memory errors which are even more prevalent for sexual behaviors that tend to occur at higher frequency (MacCullum & Peterson, 2012). A recent study has shown that participants overreported sexual behaviors, such as intercourse or making out, in the retrospective survey compared to their daily diary reports (Willis & Jozkowski, 2018). This indicates that the study design affects frequency reports of sexual intercourse which is why we chose an intensive longitudinal repeated measures design in our study.

### **The current study**

Because sexuality and intimacy are crucial for relationship quality and stability (McNulty, Wenner, & Fisher, 2016; Reis & Shaver, 1988), it is important to better understand the mechanisms and pathways between the constructs of intercourse frequency, intimacy and relationship satisfaction. Studies that investigated intimacy as a global construct, involving both aspects of emotional intimacy and sexual relations, usually did not take into account the potential differential effects of emotional and sexual intimacy on relationship quality (Yoo et al., 2014). In the current study, we separately examined emotional intimacy and sex frequency to investigate and disentangle these distinct effects.

Sexuality might influence relationship satisfaction via various pathways as previous research has for instance found evidence that affection partly accounts for the link between sexual activity and well-being (Debrot et al., 2017). We propose here that sexual activity is an important predictor of relationship satisfaction as it affords people the experience of closeness and intimate moments with the partner in a sample of non-Western couples. We tested this assumption by examining Iranian couples' weekly reports on sexual activity, intimacy and relationship satisfaction during the past week, collected over the course of six consecutive weeks. This longitudinal design allowed us to track how processes and within-subject associations evolve over time while attenuating recall bias, potentially leading to

overreporting of sexual behavior (Willis & Jozkowski, 2018), and with a lower participant burden compared to a daily diary design. Accordingly, we tested whether sex frequency at time t0 predicted higher intimacy one week later, which in turn predicted higher relationship satisfaction at t2.

## **Method**

### **Participants**

Participants reported an average relationship duration of 10.6 years ( $SD = 8.9$ ). The mean age for women was 34.8 years ( $SD = 7.7$ ) and that for men was 39.2 years ( $SD = 8.4$ ). Most participants, 80% of women and 71% of men, reported at least a bachelor's degree or higher. Almost all participants identified as Muslim (99.4%), 62% had a Persian background, and 21% identified as Turkish, while the rest identified as Arab or indicated the "other" category. The majority of participants (84%) indicated a lower to average income and 64% of couples had children.

### **Procedure**

Iranian couples were recruited at the Islamic Azad University in Tehran. Participants first completed a baseline questionnaire package and then participated in a longitudinal study. Couples were asked to provide weekly reports on their relational experiences during the past seven days over the course of six consecutive weeks. A total number of 180 married and heterosexual couples (360 individuals) participated in the study, and all couples shared a home. Twelve couples did not participate in the longitudinal part of the study, and thus the final sample consisted of 168 couples. There were 7.4% missing data but there was no indication to assume that the missing data was not missing completely at random.

## Measures

The study included questionnaires about respondents' relationship satisfaction, sexual satisfaction, and conflict frequency. This survey was part of a larger study that included questions on topics such as relationship functioning, family life and religiosity.

*Relationship satisfaction.* We adapted three items from the Couples' Satisfaction Index (CSI) by Funk and Rogge (2007) to measure weekly relationship satisfaction, asking for the degree of happiness during the past seven days. Participants were instructed the following way: "Please indicate the degree of happiness, during the last 7 days, of your relationship", to which participants rated their happiness on a scale from 0 (= extremely unhappy) to 6 (= perfect); "During the last 7 days, did you have a warm and comfortable relationship with your partner?" and "During the last 7 days, how rewarding was your relationship with your partner?" to which participants rated their relationship on a scale from 0 (= not at all true) to 5 (= completely true). The three items were added to receive a sum score for relationship satisfaction for each week.

*Frequency of sexual intercourse.* We used a broader definition of sexuality that was not restricted to penile-vaginal intercourse but included physically erotic interactions to capture a broad range of sexual activity. Specifically, we asked participants "How often did you have sex with your partner during the past 7 days?" and "Besides sex, did you experience any other intimate erotic moment that included physical contact?". Both items were rated on a scale ranging from 0 to 7 days or more than once a day. These two variables were added to receive a sum score for frequency of sexual contact for each week. Moreover, we computed a second, binary variable indicating the presence or absence of sexual activity for the couple during that week, as previous research has found that sex more than once per week has no additional benefit for the relationship (Muise et al., 2016).

*Intimacy.* To measure intimacy the couples responded to the following four items: “During the last 7 days when I spent time with my partner, I felt that she/he showed how much she/he cares about me.”, “During the last 7 days when I spent time with my partner, I felt understood.”, “During the last 7 days when I spent time with my partner, I felt loved.” and “During the last 7 days, my partner and I experienced we-ness while we spent time together.” All items were rated on scale from 0 days to 7 days and a mean score based on the four items was computed for each week.

### **Data Analytic Strategy**

We ran multilevel models for dyadic data to account for the statistical dependence in the data due to the couples data and the repeated measurements within each participant using Mplus 6.1 (Muthén & Muthén, 2010). The clustering of the data between members of the dyad and the time series of the same individual imply that these data points are correlated (Bolger & Laurenceau, 2012). The participants weekly reports (level 1) were nested within couples (level 2), and we estimated separate parameters for women and men, using a two-level adaptation of the actor-partner interdependence model (APIM; Kashy & Kenny, 1999). We included two different sex frequency variables: one variable reflecting the number of sexual interactions for each of the participants since there were some discrepancies between the two partners’ reports ( $r = .74$ ). Discrepancies in sex frequency reports may affect partners’ perceptions of intimacy differently. In addition, we included a binary variable, indicating the presence or absence of sex for the couple during that week. To estimate if previous weeks predicted outcomes in subsequent weeks the variables were lagged, so that intimacy represented  $t + 1$  and relationship satisfaction was  $t + 2$ . Thus, we predicted that sex frequency at  $t_0$  predicted higher intimacy at time  $t + 1$ , which in turn predicted higher relationship satisfaction at time  $t + 2$ . To avoid artifacts, and to detect prospective residualized change, we controlled for time and for the previous time points in the lagged model specifications. As our hypotheses concerned within-subject associations at level 1, we centered the predictor

variables, cumulative sex frequency and intimacy, at the individual mean to capture within-person variation. We additionally included a common binary intercourse variable for the dyad to capture the absence or presence of intercourse in any given week. In cases of conflicting indication, wives' report regarding the presence of sexual intercourse occurred was used. At level 2 we estimated the correlation of the outcomes, intimacy and relationship satisfaction. Equation 1 summarizes the level 1 model describing the effects of sex frequency and intimacy on changes in relationship satisfaction.

$$(1) \text{ Relationship Satisfaction }_{t+2j} = b_{0j} + b_{1t+1j} (\text{previous relationship satisfaction}) + b_{2t+0j} (\text{own sex frequency}) + b_{3t+0j} (\text{partner sex frequency}) + b_{4t+0} (\text{presence of sex}) + b_{5t+1j} (\text{own intimacy}) + b_{6t+1j} (\text{partner intimacy}) + e_{t+2j}$$

Relationship Satisfaction  $_{t+2j}$  is the self-reported level of satisfaction of a partner from couple  $j$  at time  $t + 2$ . The estimate for  $b_{0j}$  is the average of the participant's relationship satisfaction. The estimate  $b_{1t+1j}$  reflects the actor's relationship satisfaction one week earlier at time  $t + 1$ . The estimate for  $b_{2t+0j}$  represents the effect of the actor's and  $b_{3t+0j}$  reflects the effect of the partner's reported sex frequency on relationship satisfaction two weeks later. The estimate  $b_{4t+0}$  captures presence or absence of intercourse and its effect on relationship satisfaction two weeks later. The estimate  $b_{5t+1j}$  captures the effect of the actor's and  $b_{6t+1j}$  represents the effect of the partner's intimacy perception on the change of relationship satisfaction one week later. The parameter for  $e_{t+2j}$  is the level 1 error term for relationship satisfaction at time  $t + 2$ . Equation 2 shows the level 1 model for the effects of sex frequency on changes in intimacy.

$$(2) \text{ Intimacy }_{t+1j} = b_{0j} + b_{1t+0j} (\text{previous intimacy}) + b_{2t+0j} (\text{own sex frequency}) + b_{3t+0j} (\text{partner sex frequency}) + b_{4t+0} (\text{presence of sex}) + e_{t+1j}$$

Intimacy  $_{t+1j}$  is the perception of closeness one partner of couple  $j$  felt toward their husband or wife at time  $t + 1$ . The estimate for  $b_{0j}$  is the average of the participant's level of intimacy. The estimate  $b_{1t+0j}$  reflects the actor's level of intimacy one week earlier at time  $t + 0$ . The estimate for  $b_{2t+0j}$  represents the effect of the actor's and  $b_{3t+0j}$  reflects the effect of the partner's reported sex frequency on intimacy one week later. The estimate  $b_{4t+0}$  captures presence or absence of intercourse and its effect on intimacy one week later. The parameter for  $e_{t+1j}$  is the Level 1 error term for intimacy at time  $t + 1$ .

## Results

The intercorrelations between both frequency variables (binary and cumulative score), the participants mean score on intimacy and the sum score representing relationship satisfaction for each week were significant and positive (Table 1).

Our final model revealed significant lagged effects, with male cumulative sex frequency significantly predicting female perceptions of intimacy ( $b = -0.096$ ) one week later (Figure 1). Also, the common binary sex frequency variable significantly predicted both female ( $b = 0.409$ ) and male intimacy ( $b = 0.355$ ) one week later. These effects emerged as significant above and beyond past perceptions of intimacy. By including both sex frequency variables (cumulative and binary) in the model at the same time, we demonstrated that both types of experiences matter, the occurrence of sex and the number of sexual encounters, independent of each other. Interestingly, contrary to our predictions, we found negative associations between cumulative sex frequency and intimacy: females' sex frequency was negatively associated with changes in intimacy in the lagged model. In contrast, the common binary intercourse variable was positively associated with female and male changes in intimacy perceptions one week later.

Despite the partner effect for male cumulative sex frequency on female intimacy, we found no significant effect of women's cumulative sex frequency on their own or their

husband's intimacy. However, wives' intimacy perceptions in week two significantly predicted their own ( $b = -3.342$ ) and their husbands' ( $b = -1.455$ ) residualized change in relationship satisfaction in week three, and the same was true for the husbands' intimacy perceptions predicting their own ( $b = -3.160$ ) and their wives' ( $b = -1.860$ ) change in relationship satisfaction in week three. Thus, intimacy in one week predicted changes in relationship satisfaction in the subsequent week. Similarly, the associations between intimacy and relationship satisfaction were also negative: female and male intimacy in week two were significantly negatively associated with both the husbands' and wives' change in relationship satisfaction in week three. However, the results also revealed a significant positive direct effect from the common binary intercourse variable in week one on both males' ( $b = 1.993$ ) and females' residualized change in relationship satisfaction ( $b = 2.211$ ) two weeks later. Also, male cumulative sex frequency in week one significantly predicted female ( $b = -0.444$ ) and male relationship satisfaction ( $b = -0.529$ ) in week three.

To further examine these unexpected negative effects, we followed up with an analysis of the effects in the same week by estimating a concurrent model (see Figure 2). This model yielded positive effects for female cumulative sex frequency ( $b = 0.064$ ) as well as the occurrence of intercourse ( $b = 0.274$ ) both significantly predicting higher female intimacy in the same week. However, female intimacy again significantly predicted lower male ( $b = -3.689$ ) female relationship satisfaction ( $b = -1.862$ ) in the same week. Similarly, higher male intimacy predicted lower male relationship satisfaction ( $b = -4.004$ ) in the same week. Furthermore, the occurrence of intercourse significantly predicted both higher male relationship satisfaction ( $b = 2.360$ ) as well as higher female relationship satisfaction ( $b = 2.590$ ) in the same week. Also, higher male cumulative sex frequency significantly predicted higher male relationship satisfaction ( $b = 0.524$ ). Likewise, higher female cumulative sex frequency significantly predicted higher female relationship satisfaction ( $b = 0.714$ ) in the same week.

## Discussion

Here, we demonstrated that both the number of sexual intercourse incidents couples reported in one week as well as whether couples engaged in sex or not, is predictive for future intimacy which in turn predicts own and the partner's future relationship satisfaction. This means that intimate experiences in one week tend to spill over into the next week. Previous research has found that sexual intercourse positively spilled over into the next day by reducing stress for couples in happy relationships (Ein-Dor & Hirschberger, 2012). Our research extends these findings by showing that cumulative sex frequency and intercourse occurrence also have prolonged effects predicting relationship outcomes even seven days later. Additionally, the occurrence of sexual intercourse predicted higher male and female intimacy one week later. Earlier research showed that intimacy is also carried over to the next day, predicting the partners' relationship satisfaction (Feldman Barrett & Rovine, 2005), and our study demonstrated this effect even on a weekly basis.

Somewhat unexpectedly, reports of more frequent sexual intercourse by husbands in one week predicted lower female intimacy one week later. Similarly, high intimacy perceptions of husbands and wives in one week predicted lower own and the partner's relationship satisfaction in the following week. Although this may not seem plausible at first, it makes sense on closer inspection: weeks with high sex frequency are typically followed by weeks with lower sex frequency and correspondingly lower levels of intimacy. The same is true for weeks in which couples experience high intimacy, and which are usually followed by weeks with lower intimacy and correspondingly lower relationship satisfaction. The actor and partner effects of intimacy on relationship satisfaction found here underscore the dyadic and interaction-based nature of intimacy, in which relationship satisfaction is not only influenced by the own perception of intimacy but also how close one partner feels towards the other. As our follow-up analysis showed, ceiling effects of high sex frequency, followed by lower levels of closeness and satisfaction, seem to be a natural cycle of intimate experiences in close

relationships when measuring dyadic interactions on a weekly basis. Furthermore, our results are in line with those of Muise and colleagues (2015), who showed that, even though individuals need frequent sexual intercourse to be satisfied, more sex does not lead to more benefits beyond a certain frequency. Even in an experimental intervention study, instructing couples to double their intercourse frequency, the authors did not find an effect on happiness and couples even reported lower sexual satisfaction (Loewenstein, Krishnamurti, Kopsic, & McDonald, 2015).

In the concurrent model we additionally found that wives felt increased emotional intimacy after the occurrence of intercourse and when they indicated higher cumulative sex frequency in the same week. However, there was no effect on male intimacy in the same week. This challenges the assumption that the sexual relationship is per se more important for men than for women and that men use sex as a means to create intimacy with their partner (Talmadge & Dabbs, 1990). Assuming that sexual arousal for women may originate from a need for intimacy rather than physical arousal, as postulated by Basson's model of female sexual response (2000), could explain why intimacy was more important for women than for men. Although the occurrence of sex also predicted male intimacy one week later, we interpret the effects of both sex frequency variables on female intimacy in the lagged and the concurrent model as a general tendency that emotional intimacy within the sexual relationship might be more important for women and this can be observed within the same week as well as longitudinally. Other scholars argue similarly that men tend to favor sexual behavior and physical closeness whereas women have a greater need for emotional closeness and affection than men (e.g. Hook, Gerstein, Detterich, & Gridley, 2003; Sprecher, 2002). This can be explained from an evolutionary perspective, in which bonding experiences are regarded as more relevant for women and frequent sexual encounters with less emotional investment tend to be more adaptive for men (Buss & Schmitt, 1993).

On another note, our longitudinal analysis suggests that sex affects the relationship beyond momentary changes. Despite earlier research finding no daily effects of sex on relationship satisfaction (Meltzer, Makhanova, Hicks, French, McNulty, & Bradbury, 2017), our lagged results showed that the occurrence of intercourse predicts higher relationship satisfaction in husbands and wives two weeks later. The concurrent model indicated that the occurrence of sex as well as female and male cumulative sex frequency predicts higher own relationship satisfaction in the same week. Meltzer and colleagues (2017) suggest that the association between sexual intercourse and relationship satisfaction might be a process evolving over time, which could be confirmed with our study results. Couples' sexuality constitutes one major mechanism to create connection and closeness with the partner (Baumeister & Leary, 1995) which makes sense in light of attachment theory highlighting the sexual relationship as part of the attachment system (Shaver et al., 1988).

### **Clinical Implications and Future Research**

Our study provides several implications for future research and clinicians. Sexuality is a major component of romantic relationships, as it predicts intimacy and relationship satisfaction. Debrot and colleagues (2017) found that couples who were experiencing more positive emotions after sexual intercourse were at lower risk of relationship distress over time. However many couples find it difficult to discuss the topic of sexuality (Frederick et al., 2017) and health professionals and therapists are also often hesitant to bring up couples' sex life in therapy (Haboubi & Lincoln, 2003). Dissatisfaction with the relationship may be a result of low intimacy, as many couples start couple therapy due to a lack of intimacy (Doss et al., 2004). Since a lack of intimacy is often related to other relationship problems, such as low sexual satisfaction (Muise et al., 2013), it makes sense to discuss the topic even when couples may not be aware of difficulties within the sexual relationship and do not present with this issue. Our results, showing that the partner's intimacy experience is particularly relevant for one's own relationship satisfaction, underline once more the interdependency and importance

of mutuality between intimates. Strengthening a sense of we-ness and cohesion might be very fruitful during therapy.

Some couples may not have a lot of sex but nevertheless perceive their sexuality as highly satisfying or feel an emotional connection even in the absence of sex, leading to an overall satisfaction with their relationship. Future research should investigate other factors promoting both the sexual relationship and emotional intimacy. One such factor could be sexual communication. Research has consistently demonstrated that communication is one of the most important predictors for relationship quality (Gottman & Krokoff, 1989), particularly self-disclosure, which is related to high levels of intimacy (Feldman Barrett & Rovine, 2005). Specifically, sexual communication is associated with a range of positive outcomes for sexuality such as higher sexual satisfaction or higher orgasm frequency (Frederick et al., 2017). One future avenue, extending this work, could therefore be to investigate if sexual communication improves couples' sexuality and increases emotional intimacy at the same time for Iranian couples. Since, compared to more individualistic societies, different preferences characterize interpersonal communication in more collectivistic countries such as Iran, it would be interesting to compare these results with a sample of couples in which one partner is Iranian and the other partner has a Western background.

### **Strength and Limitations**

There are several strengths of this study: first of all, our sample consisted of married couples from a non-Western country, increasing the generalizability of our findings as this was not a college student sample within a study conducted in a Western context. Secondly, we collected reports from both partners of the dyad which is important when assessing relationship processes. Third, in order to measure the everyday life of couples in their natural environment at home, we collected data in a weekly design across six weeks. Collecting data on a weekly basis instead of a daily diary design is a more economic and a less time-consuming approach for participants, potentially mitigating attrition loss and recall bias at the

same time. However, some scholars argue that daily diaries are most appropriate to conduct research on couples' sexuality (Muise et al., 2013). Due to our somewhat surprising negative effects in the lagged model, it would have been useful to further complement the analysis with daily diary data, additionally to the concurrent model, to improve the modeling of relationship processes. This may represent a limitation of the study. Moreover, this study was based only on self-report data and only heterosexual couples participated. Lastly, the sample in this study was highly educated including mostly dual-earner couples living in a major Iranian city which may not be very representative for the general population, especially for couples living in rural areas. The rate of employed women in Iran is much lower in the general population (17% in 2014, Statistical Center of Iran 2015) than in our study.

### **Conclusion**

Sex is a basic human need, also in a non-Western society, with both the occurrence and frequency of sex in one week predicting intimacy one week later, which in turn predicts relationship satisfaction for Iranian husbands and wives in the subsequent week. While the presence of intercourse in one week predicted increased intimacy in the subsequent week, a high frequency of intercourse in one week seemed to offer no additional benefit for intimacy the week after. This probably indicates that after a certain frequency, individuals are sexually satisfied. The present study underlines the importance of sexual intercourse regarding essential relationship outcomes such as intimacy and relationship satisfaction in Iranian men and women, although the effects on intimacy appeared to be more relevant for wives. Our lagged analysis and complementing concurrent results suggest that relationship satisfaction is characterized by complex dyadic relationship processes such as sexual and intimacy experiences during the week in non-Western couples.

**Table 1.** Intercorrelations, means and standard deviations between study variables for men and women.

	Mean	SD	1	2	3	4	5	6
Relationship Satisfaction W	10.14	3.77						
Relationship Satisfaction M	10.49	3.60	0.69**					
Sex Frequency W	2.11	2.08	.30**	.22**				
Sex Frequency M	2.17	2.06	.22**	.26**	.74**			
Intimacy W	3.18	1.84	.60*	.48**	.26**	.22**		
Intimacy M	3.20	1.77	.49**	.59**	.24**	.25**	.56**	
Common Binary Intercourse	-	-	.30**	.30**	.50**	.47**	.19**	.17**

*Note.* All Variables are uncentered.

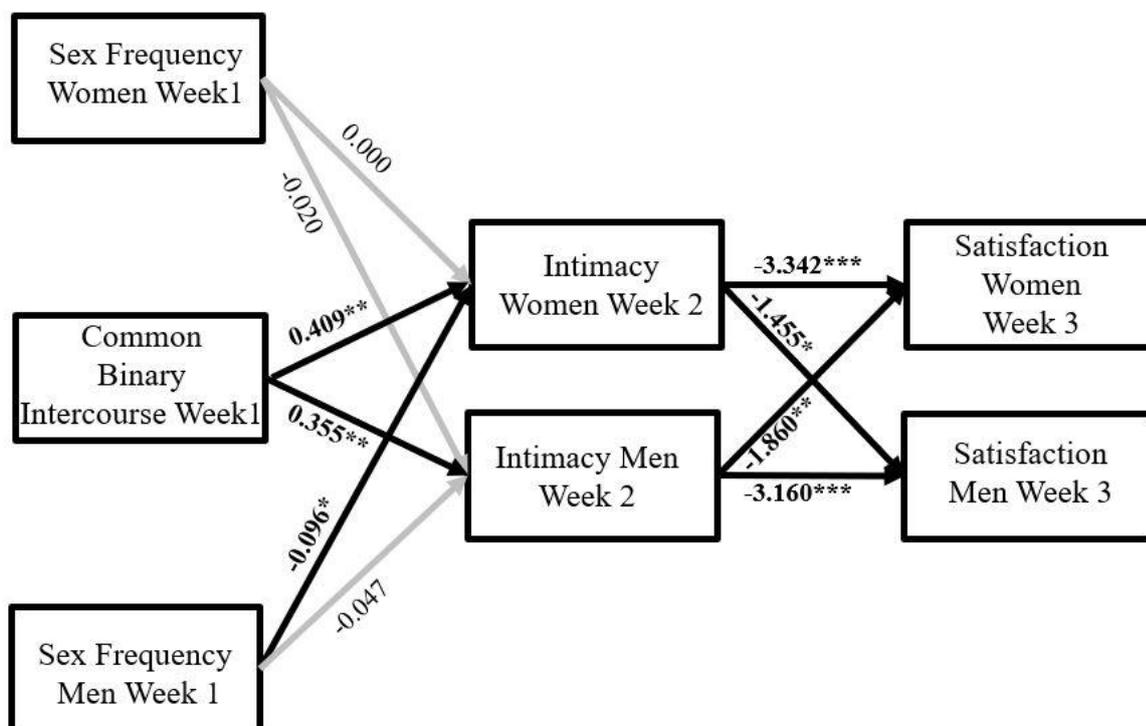


Figure 1. Lagged model controlling for previous time points with a common binary and an cumulative sex frequency variable predicting intimacy and relationship satisfaction for husbands and wives (N=168). The full model included predictions from all sex frequency variables to relationship satisfaction with the binary intercourse in week 1 significantly predicting both male relationship satisfaction in week 3 ( $b = 1.993$ ) as well as female relationship satisfaction in week 3 ( $b = 2.211$ ); Also, male cumulative sex frequency significantly predicted female ( $b = -0.444$ ) and male relationship satisfaction ( $b = -0.529$ ) in week 3;  $***p < .001$ ;  $**p < .01$ ;  $*p < .05$ .

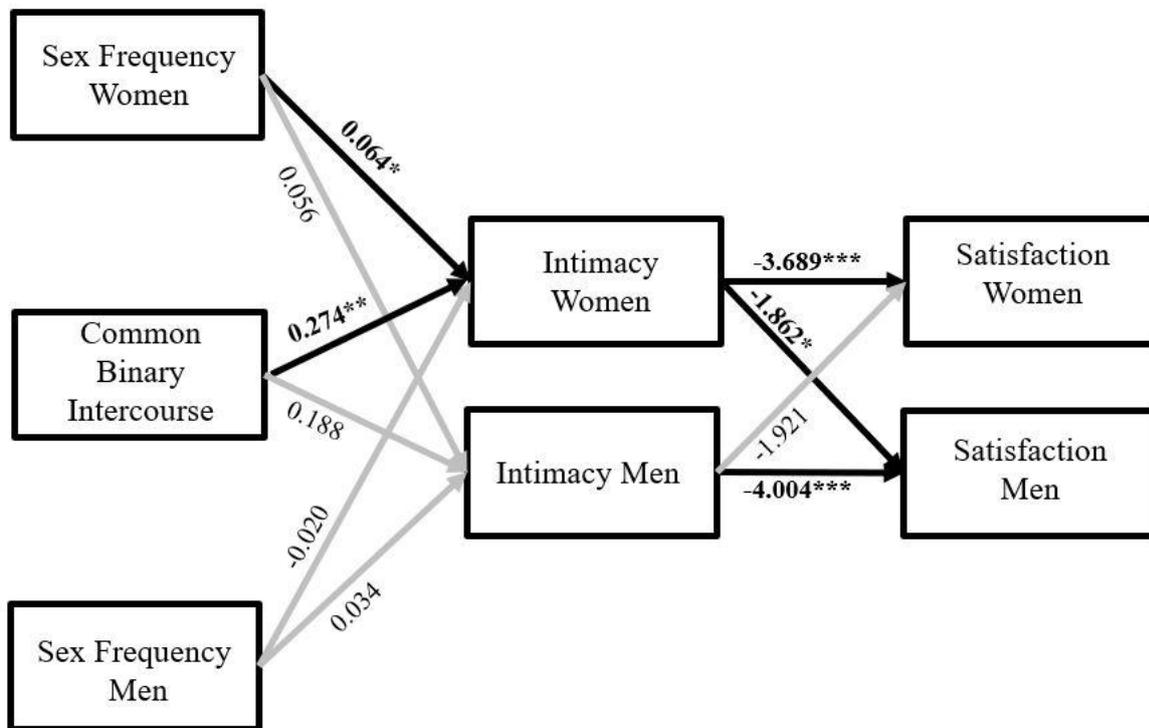


Figure 2. Concurrent model with a common binary and a cumulative sex frequency variable predicting intimacy and relationship satisfaction for husbands and wives (N=168). The full model included predictions from all sex frequency variables to relationship satisfaction with the binary intercourse significantly predicting both male relationship satisfaction ( $b = 2.360$ ) as well as female relationship satisfaction ( $b = 2.590$ ); Also, male cumulative sex frequency significantly predicted male relationship satisfaction ( $b = 0.524$ ) and female cumulative sex frequency significantly predicted female relationship satisfaction ( $b = 0.714$ );  $***p < .001$ ;  $**p < .01$ ;  $*p < .05$ .

#### **4. Study III**

### **Indicators of Relationship Functioning in Couples with Different Socio-Cultural Backgrounds: A Narrative Review**

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## Abstract

Previous research found that couples with different socio-cultural backgrounds are less stable and less satisfied in their relationships than culturally homogeneous couples, due to stressors these couples face, such as discrimination and a lack of social support (e.g. Baltas & Steptoe, 2000; Kalmijn et al., 2005). However, a review of the current literature suggests that correlates of different socio-demographic variables are important. We reviewed 41 studies that looked at relationship outcomes in both, couples with socio-culturally homogeneous and socio-culturally different backgrounds, so that comparisons between the two groups were possible and effect sizes could be computed. An overview over the study results suggests that socio-culturally different couples tend to be less satisfied and less stable in comparison to culturally homogeneous couples. However, studies controlling for socio-demographic variables that are mostly specific to socio-culturally different couples decrease the gap in relationship functioning between the two groups so that the relationship satisfaction of the two groups has a similar level, calling into question intrinsic differences in relationship functioning. Practical implications for clinicians working with socio-culturally different couples, for instance helping them to cope with discrimination, and avenues for future research regarding the necessity to control for demographic variables such as a lower SES are discussed. (195 words)

## Indicators of Relationship Functioning in Couples with Different Socio-Cultural Backgrounds: A Narrative Review

In many countries, couples with partners of different socio-cultural backgrounds are becoming more frequent since many years (e.g. Hiew, Halford, van de Vijver, & Liu, 2015a; Joyner, 2005). In the United States, for example, partners in 28% of all married couples are from different socio-cultural backgrounds, (U.S. Census Bureau, 2012). The overall number of such socio-culturally mixed couples within a society is likely to even be considerably higher when also taking into account unmarried couples (Lewis & Ford-Robertson, 2010).

Yet despite this growth, the current body of literature is predominantly based on studies investigating mostly culturally homogeneous couples or mixed samples containing some socio-culturally diverse couples without specifically examining this subgroup. Most of the study results have not been replicated using samples of socio-culturally diverse couples, raising the question if the findings from previous research apply to this population as well. In order to correspond to the development of the modern world with increasing globalization and mobility, it is necessary to investigate this growing population of couples with different socio-cultural backgrounds regarding relationship outcomes. A lack of research in couples with different socio-cultural backgrounds prevents an understanding of relationship functioning and underlying mechanisms or processes such as cultural differences in these couples, as we cannot assume that the findings from research about culturally homogeneous couples apply to couples with different socio-cultural backgrounds. It is especially important to know if culturally homogeneous relationships differ from relationships with different socio-cultural backgrounds in key predictors of relationship quality such as communication.

The current article reviews studies that compared the quality and stability of relationships with partners of different socio-cultural backgrounds to couples in which

partners have the same cultural background. That way it can be clarified if there is an effect of cultural heterogeneity on relationship outcomes within intimate relationships. Our goal is to identify relevant studies comparing both types of couples and estimate effect sizes for each included study to draw conclusions about relationship functioning of culturally heterogeneous relationships relative to culturally homogeneous couples. Implications of cultural heterogeneity in intimate relationships for relationship functioning will be discussed, as well as current limitations and promising avenues for future research. To this end, we will first clarify the use of terminology and describe the method for screening the literature and the selection of quantitative, peer-reviewed and published papers for this review. Next, we lay out the theoretical background of the studies based on exchange theory and review the major findings regarding stressors and demographic correlates identified in the body of research. We will complement this narrative review with an overview of effect sizes of major findings.

### **Terminology**

No consensus exists on how to label couples with different socio-cultural backgrounds. Some authors use the expression *interethnic* (e.g. Gaines, Clark, & Afful, 2015), others *intercultural* (e.g. Lainiala & Säävälä, 2013), *mixed marriage* (Skowroński, Othman, Siang, Han, Han, Yang, & Waszyńska, 2014), *intermarriage* (Obúćina, 2016), *binational* (Klein, 2001), *bi-ethnic* (Pereyra et al., 2015) or *interracial* relationships (e.g. Bratter & Eschbach, 2006). Most studies do not specifically define the terms culture, race and ethnicity, and often participants self-identify as belonging to a specific culture or race. Ethnicity usually incorporates several racial groups, such as Chinese, Korean, or Japanese identifying as Asian Americans (Craig-Henderson & Lewis, 2015), thus this term mainly refers to values and traditions (Martin & Nakayama, 2010) in a broader geographic region. The term race is mostly used as a social category based on apparent physical differences such as skin color and has a certain overlap with biological heritage as well (Gaines et al., 2015).

Culture can be defined as a collective programming of the mind differentiating members of one group from another group (Hofstede, 2011) that is passed on from generation to generation (Matsumoto, Hee Yoo, & Fontaine, 2008). It can also be understood as a learned orientation towards life, shared by a particular group of people. It shapes thoughts and expectations, feelings and behaviors related to all aspects of life, specifically in the social domain, including dating customs, gender roles, emotion expression, sexuality, social support, and other norms of social interaction (Fu, Tora, & Kendall, 2001; McGoldrick & Preta, 1984; Kalmijn & Tubergen, 2006).

For this work we define couples with different socio-cultural backgrounds (DISC) broadly as unions composed of partners who identify, or are identified, as having a cultural, racial or ethnical background that differs from the partner's cultural, racial or ethnic background. We contrast these couples with 'culturally homogeneous couples', defined as unions in which both partners share the same cultural, racial or ethnic background.

## **Method**

### **Selection Criteria**

We identified 41 studies to include in the current review (see Appendix). We searched in Google Scholar and Ovid for relevant studies, using the following keywords: *intercultural*, *interracial*, and *interethnic*, in combination with the terms *couples*, *relationships*, *marriage*, *relationship satisfaction*, or *relationship functioning*. This led to a total number of approximately 400 articles. In a first step, we excluded all qualitative publications, unpublished dissertations and book chapters, cross-cultural comparisons between couples as well as all studies which did not examine predictors of relationship functioning. We selected studies published after 1980 that included comparisons between a sample of culturally homogeneous couples and a sample of DISC-couples regarding relationship outcomes.

Effect sizes for each predictor measured in the sample of DISC-couples as well as in the culturally homogeneous sample regarding relationship functioning were calculated to test if cultural heterogeneity has a negative effect on relationship outcomes. More specifically, the effect of being either a DISC-couple or a culturally homogeneous couple on relationship functioning was assessed. A total number of 18 studies (44%) reporting significant differences between the two groups were included for group comparisons. These 18 studies that qualified for computing the effect sizes, are heterogeneous regarding sample size and country of origin of the partners. We report 37 effect sizes for different predictors based on the 18 included studies ranging from small to large, with some effect sizes being based on the same studies but regarding different outcomes and two different studies (Hiew et al., 2015a & Hiew, Halford, van de Vijver, & Liu, 2015b) using the same sample. Depending on the analytic design and the statistical requirements for the estimation of effect sizes, we report different types of effect sizes. When possible, we additionally examined gender differences for between group effects.

### **Theoretical and Empirical Background**

Historically, the first scientific studies on DISC-couples were published in the late 30s (e.g. Baber, 1937) and 40s (e.g. Davis, 1941; Merton, 1941), when sociologists in the US used census data to investigate motives and characteristics of married DISC-couples, which was a highly stigmatized form of relationship at the time. In the United States, interracial marriage was legalized with a supreme court decision in 1967 (Lombardo, 1988). Most of the studies conducted before or shortly after the supreme court decision aimed at preventing DISC-relationships or considered them as problematic (Gordon, 1964; Feng, Boyle, Ham, & Raab, 2012). In the course of the civil rights movement, the prevalence of DISC-couples increased and a cultural and social transformation began with increasing tolerance towards DISC-relationships (Lewis & Ford-Robertson, 2010). Studies started investigating divorce rates of DISC-couples in the US, and until today many scholars, mainly in the field of sociology, studied

this phenomenon using either qualitative or quantitative methods (Dainton, 2015). Research on DISC-couples in Europe, however, remained rare (Dribe & Lundh, 2012).

Research on DISC-relationships and relationship functioning drew from several theories to guide their hypotheses and to contextualize results. Three main theoretical focuses can be identified. The first focus, using the framework of assimilation theory (Gordon, 1964), lies on the process of integration of a cultural minority. The second focus centers on the formation and motivation for entering a DISC-relationship which will be addressed in the context of social exchange theories (Blau, 1964; Homans, 1958; Thibaut & Kelley, 1959). The third focus examines the role of similarity between partners and the implications in the context of DISC-relationships using heterogamy theory as well as in reference to the two cultural backgrounds, drawing on the convergence effect.

#### **Assimilation Theory (Gordon, 1964) and Acculturation**

Assimilation theory (Gordon, 1964) assumes that every cultural minority in a country becomes a part of the dominant society over time, and social differences vanish gradually. Gordon (1964) identified several stages, where at the beginning, the immigrant group learns about the local culture and is gradually accepted by it. After assimilating immigrants to some degree (Kalmijn, 1998), the formation of DISC-relationships represents the second stage, with children of those couples being increasingly accepted as part of the local population, decreasing prejudice and discrimination. Yet Lewis and Ford-Robertson (2010) argue that depending on the specific foreign culture, differential assimilation may occur: the ease and speed with which different minority groups are integrated may vary, and some foreign cultures may only achieve partial integration. Accordingly, the higher the acceptance and the lower social distance between minority and dominant cultural groups, the more likely the formation of a DISC-relationship becomes (Lewis & Ford-Robertson, 2010). Being already assimilated to some degree to the local culture, is often the point when DISC-relationships are starting to form (Kalmijn, 1998). For a minority member, perceiving the dominant culture as a

reference group is therefore more predictive for DISC-dating than identification with the own ethnicity (Kim et al., 2012). After formation, the degree of acculturation, for instance, how much a member of an immigrant minority adopts the dominant cultural standards through contact with the native population (Mok, 1999), is one of the predictors for successful DISC-relationships (Kim, Edwards, Sweeney, & Wetchler, 2012). Assimilation theory provides a good framework for the process of integration, with marrying someone from the local culture as an immigrant representing a key milestone of integration (Nee & Alba, 2012).

### **Social Exchange Theories (Blau, 1964; Homans, 1958; Thibaut & Kelley, 1959)**

Social exchange theory is one of the most prominent frameworks used to explain the reasons for which people enter and maintain DISC-relationships. The general idea of Social exchange theory is that human social behavior is defined by exchange of resources between individuals. This exchange is characterized by minimizing costs and maximizing rewards (Sprecher, 1998). In the context of relationships, the theory assumes that women for instance trade their attractiveness for a higher social status of their husband (Stevens et al., 1990). This concept can be applied to DISC-relationships, as belonging to the local culture can be seen as one form of status (racial prestige), leading to a status exchange for a DISC-partner with a higher social capital, e.g. a higher level of education (Kalmijn, 1993). However, most minorities have a lower education level in comparison to the native population (Hohmann-Marriott & Amato, 2008).

Similarly, interdependence theory (Thibaut & Kelley, 1959) and equity theory (Canary & Stafford, 1992) assume that relationship satisfaction varies as a function of perceived relationship outcomes (perceived costs and rewards). More specifically, the fairness of an exchange is based on the perceived balance of costs and rewards between partners, leading to distress and dissatisfaction within the relationship in case of an imbalance (Sprecher, 1998). This interdependence is increased in case of a high level of rewards and a low level of costs as well as the absence of an attractive alternative partner (Kelley, & Thibaut, 1978). We argue

that stressors affecting the relationship can be perceived as potential costs. Some of these potential costs, such as internal and external stressors due to legal, cultural, social and financial problems are increased for DISC-couples (Gagliardi et al., 2010) and affect their relationship. Therefore, partners who live in their own culture may perceive a relationship with a partner from a foreign culture as an increased investment, placing culturally foreign partners unfavorably compared to potential alternatives from the same cultural background. Furthermore, the investment model (Rusbult & Agnew, 2011) states that the availability of potential alternative partners and the anticipated costs of separation affect commitment towards the current relationship. In line with interdependence theory, recent research found that the partner's use of maintenance behavior as a form of rewards predicted commitment mediated by relationship satisfaction in DISC-couples (Dainton, 2015). As an overall result, social exchange theories would thus predict that DISC-couples are less stable (Troy et al., 2006).

On the other side, benefits of being in a DISC-relationship include developing new values, perspectives, identity and expanding one's self (e.g. Aron, & Aron, 1996), potentially outweighing its associated costs. Being in a DISC-relationship is also a unique possibility to experience another culture from the inside and to form new friendships and relationships (Perel, 2000).

### **Similarity between Partners**

Belief-similarity theory (Rokeach, 1961) and similarity-attraction theory (Byrne, 1969), both propose that, in general, people tend to choose partners who are similar to themselves. The homogamy perspective assumes additionally that all marriages are influenced by factors of homogamy such as religious, cultural or social similarities (e.g. common interests or experiences), similar level of attractiveness and socio-economic status (Lewis et al., 1997). In line with these theories, similarity of spouses in personality, attitudes, beliefs

and values were found to be linked to increased relationship satisfaction and –stability (Decuyper, De Bolle, & De Fruyt, 2012; Gonzaga, Campos, & Bradbury, 2007 ; Luo & Snider, 2009). Although similarity between spouses regarding personality and attitudes seems to be stable over time following couples for a period of 20 years (Caspi, Ozer, & Herbener, 1992), it is also a process as newlyweds become more similar regarding personality over the first year of marriage (Gonzaga et al., 2007). One study suggests that such assortative mating effects, the tendency to choose a partner with similar characteristics, tends to be quite robust as it exists cross-culturally, based on evidence in four countries (Kalmijn, 1998). Lewis and colleagues (1997) argue that all types of intimate relationships are influenced by homogamy in some area, such as a common hobby. Continuing this line of reasoning, heterogamy theory assumes that the divorce rate of DISC-couples is higher than that of culturally homogeneous couples, because of higher dissimilarity between spouses (Feng et al., 2012). Dissimilarity could also be appealing, as Yancey (2003) for instance argues that people could be attracted to what appears different or exotic. In cases of DISC-couples this is labeled as ‘jungle fever’, the assumption that the interest in a DISC-partner is driven by the desire to gain sexual experiences with someone from a different culture. However, this theory did not find much support as individuals in DISC-relationships preferred someone who had similar levels of relational sexual attitudes (Yancey, 2003), which is aligned with the finding that similar sexual attitudes are associated with higher relationship satisfaction (Cupach & Metts, 1995).

### **Culture and Different Socio-Cultural Dimensions Shaping Relationships**

Culture contains norms and values which influence human interactions and form social roles. Those norms and values help every person to interpret social situations and to choose and display the right behavior in social contexts (Triandis, 1989). One possibility how culture might influence individuals and their relationships that we want to describe is by considering the six Hofstede Dimensions (Hofstede, 2011). First, power distance indicates how equally power is distributed within an institution, for instance the family (Hofstede,

2011). In more patriarchal societies, power is unequally distributed with men holding most of the power (Gruber & Szoltysek, 2016) and higher power asymmetry within a relationship is associated with more conflicts and lower relationship satisfaction (Tang, 1999). Differences in expectations regarding the power distribution could be particularly pronounced in DISC-couples, especially if one partner was socialized in a more patriarchal society, thereby potentially elevating the risk for conflicts.

Uncertainty avoidance, where members of a society try to avoid ambiguous situations through many rules and behavioral codes, is accompanied with lower tolerance towards deviant behavior and appearing different is perceived as dangerous (Hofstede, 2011). Being in a DISC-relationship can be perceived as violating the social norm of endogamy, the tendency to be in relationship with someone from your own group (Davis, 1941; Merton, 1941). We suspect that DISC-couples living in communities or cultures with higher uncertainty avoidance may thus be more likely to experience negative reactions from others.

The dimension masculinity versus femininity contains different gender role expectations in a society with regard to how women and men should behave, their respective responsibilities in the household or within the family and what activities they should engage in (Hofstede, 2011). Previous research has demonstrated that couples in more equal relationships are happier and more stable (Rudman & Phelan, 2007) and more equal household chores division is associated with higher relationship satisfaction (Sutor, 1991). In turn, we assume that higher discrepancy on this dimension due to cultural differences may lead to more conflicts between DISC-partners.

Indulgence versus restraint represents how much gratification is accepted and when it is restricted. More restrained societies participate less in hedonistic activities and hobbies (Hofstede, 2011). This could become relevant for DISC-couples regarding the arrangements

of leisure time, as disagreements in this area can even be a reason for separation (Hawkins et al., 2012).

Finally, the dimension individualism and collectivism describes how much an individual is integrated into groups (Hofstede, 2011). In more individualistic cultures personal interests and own identity are influencing behavior, attitudes, and self-concept whereas in more collectivistic societies goals and interests of the group are regarded as more important (Schoebi, Wang, Ababkov & Perrez, 2010). In more individualistic societies the independent self reflects more individualistic attitudes and emphasizes the uniqueness of a person, whereas the interdependent self describes collectivistic attitudes, stressing the connectedness of an individual (Triandis, 2001). Having a more collectivistic orientation was associated with more engagement in positive interpersonal behaviors (Triandis, Bontempo, Villareal, Asai, & Lucca, 1988). This leads to a different emphasis on the importance of the family and in-laws, with the extended family constituting the most important source for social support (Goodwin & Cramer, 2000). How the family and especially the parents, perceive one's partner is very important for choosing a spouse, particularly in more collectivistic countries the parents' approval of the relationship is essential (Dion & Dion, 1993). Given its importance, conflicts regarding the closeness and interference of the family of origin is a frequent cause for divorce (Hawkins et al., 2012).

The literature suggests that different predictors are relevant for interpersonal relationships in different cultures (e.g. Gudykunst, & Matsumoto, 1996; Yelsma & Athapilly, 1988). Different cultural norms exist regarding social interactions which could potentially lead to difficulties in intimate relationships. For instance, in more collectivistic societies, individuals refrain from displaying their emotions publicly (Gudykunst, & Matsumoto, 1996). In general, positive and negative emotional behavior and expressiveness differs in couples from individualistic versus collectivistic countries. Group differences seem to be partially

mediated by collectivistic values and variance in emotional behavior between groups can be explained to some degree by cultural factors (Tsai, Levenson, et al., 2006). Although norms about displaying emotions differ between Western and collectivistic cultures, emotional experience itself seems similar across cultures, as indicated by a study about physiological arousal (Tsai, Knutson, et al., 2006). Relationship standards, which can be defined as personal beliefs about the features a romantic relationship should offer (Epstein, & Baucom, 2002), can also differ by culture. One possibility relationship standards can be operationalized is by measuring endorsement of relational harmony and family responsibility. Chinese participants endorsed family responsibility much more than Western couples, while relational harmony was rated as more important by Western participants than Chinese couples (Hiew, Halford, van de Vijver, & Liu 2015a). Cultural values and norms also influence interpersonal communication, as Gudykunst and Matsumoto (1996) found in their study that Westerners tend to favor direct and explicit communication (low-context communication) whereas individuals from more collectivistic countries prefer an implicit and indirect way of communicating (high-context communication). These differing preferences might also be experienced in DISC-relationships, thereby potentially leading to misunderstandings. From previous research we know that constructive communication is a strong predictor for relationship satisfaction in Western couples (e.g. Gottman & Krokoff, 1989). This may not be necessarily true for arranged marriages, as communication was not associated with relationship satisfaction for arranged marriages in India (Yelsma & Athapilly, 1988). In another study, Hiew and colleagues (2015b), the authors also did not find significant differences regarding positive communication in DISC-couples in comparison to Western couples overall. However, Chinese women in particular showed less positive and more negative communication in comparison to couples with Western wives.

## **Predictors of Relationship Satisfaction and Stability in DISC-Couples**

Different cultural groups have different norms and standards around marriage and divorce (Fu, 2006), also reflected in differing divorce rates (Fu & Wolfinger, 2011). More specifically, studies comparing couples cross-culturally indicate that some cultures report lower relationship satisfaction on average, demonstrating culture-dependent differences (Celenk, van de Vijver, & Goodwin, 2011; Goodwin, & Gaines, 2004). While there is evidence that spouses with different cultural backgrounds have a higher risk of divorce (Kalmijn et al., 2005), DISC-couples in Finland, consisting of Finish-Swedish or Finish-Sami couples, did not think more frequently about getting a divorce than culturally homogeneous couples (Lainiala & Säävälä, 2013). Lower relationship stability was also found in younger couples: DISC-relationships in adolescents were less stable in comparison to culturally homogeneous relationships of adolescents, even after controlling for some demographic variables (Wang, Kao & Joyner, 2006).

Furthermore, DISC-couples also report lower relationship satisfaction (Fu, Tora & Kendall, 2001). This might be particularly true for DISC-couples with children as these couples are even less satisfied compared to culturally homogeneous couples or DISC-couples without children. The authors discuss this finding in terms of DISC-couples differing more in their views about how to raise their children (Van Mol & de Valk, 2016). This does not necessarily mean that DISC-couples are less satisfied in their relationship in general. DISC-couples do not necessarily exhibit increased rates of dysfunctional traits: similar to culturally homogeneous couples (Hazan, & Shaver, 1987), DISC-couples exhibit higher rates of securely attached than insecurely attached DISC-couples. This may indicate that in relevant relationship aspects, such as inner working models, DISC- and culturally homogeneous couples function similarly (Gaines, Granrose, et al., 1999).

However, there is conflicting evidence regarding differences in relationship satisfaction between DISC-couples and culturally homogeneous couples. While Negy and Snyder (2000) found DISC-couples to indicate even higher relationship satisfaction than Latin couples, MacNeil and Adamsons (2014) found no differences between DISC- and culturally homogeneous couples regarding relationship satisfaction and social support, though the study relied on a small sample size. Troy and colleagues (2006) conducted two studies and found no significant differences in relationship satisfaction, attachment style, conflict style and coping between DISC-couples and culturally homogeneous couples in the first study, whereas DISC-couples reported even higher relationship satisfaction than culturally homogeneous couples in their second study. Conflict topics are one aspect in which DISC-couples seem to differ from culturally homogeneous couples, although their problem-solving behavior appears to be only slightly different (Henderson, 2000). In particular, although problem-solving strategies of DISC-couples are similar to those found in culturally homogeneous couples (e.g. no significant differences regarding observed indirect nice behavior or observed direct nasty behavior), some differences were identified. DISC-couples reported significantly more direct nice behaviors and less indirect nasty behaviors during conflict, in comparison to culturally homogeneous couples (MacNeil & Adamsons, 2014).

### **Socio-Demographic Correlates Characterizing DISC-Couples**

Several studies controlling for demographic correlates found no difference or even higher relationship satisfaction among DISC-couples compared to culturally homogeneous couples (Feng et al., 2012; Hohmann-marriott & Amato, 2008; Van Mol & De Valk, 2016; Weller & Rofé, 1988; Zhang & Van Hook, 2009). This implies that the different study outcomes also depend on several demographic variables that only some studies control for and that potentially confound differences in outcomes. More specifically, one important explanation may be that belonging to a minority in general involves several risk factors. Personal demographic and experiential factors as well as the way couples cope with stressful

events and differences are highly relevant for relationship outcomes (Karney & Bradbury 1995). In a study by Hohmann-Marriott and Amato (2008), factors such as lacking social support by family and friends and complex relationship histories with former partners accounted for differences in relationship satisfaction. Individuals in DISC-relationships tended to have more past relationships as well as a higher probability of remarriage, known to be associated with relationship instability (e.g. Amato & DeBoer, 2001), and to have children from a prior relationship. Furthermore, spouses of DISC-couples experienced parental divorce more often (Hohmann-Marriott & Amato, 2008). Identification of characteristics that differentiate DISC-couples from culturally homogeneous couples revealed that DISC-couples have, on average, a lower level of education, a lower income and higher unemployment rates (Dribe & Lundh, 2008). In turn, a lower SES was found to be associated with lower relationship satisfaction in DISC-couples (Weller et al. 1988).

Another variable that is often ignored but predicts lower relationship satisfaction in DISC-couples, is a higher prevalence rate of psychopathology in immigrants. Turkish partners in a DISC-relationship with British spouses for instance had higher depression scores when they experienced more cultural differences in their relationship (Baltas & Steptoe, 2000). Furthermore, DISC-couples tend to marry at an earlier stage of their relationship, sometimes to receive a permanent residence for the partner. Among other factors this results in DISC-marriages having higher divorce rates in comparison to the general population, especially during the first years of marriage (Kalmijn et al., 2005). When younger age at marriage is controlled for, differences between DISC-couples and the general population regarding relationship stability diminish (Feng et al., 2012). These findings demonstrate once more the complexity that research on DISC-relationships contains.

### **Convergence Effect**

Outcomes for DISC-couples tend to lie between the equivalent outcomes of the culturally homogeneous couples from their cultures of origin. This effect is called

convergence effect and was reported for constructs such as relationship satisfaction or stability (Feng et al., 2012; Hiew et al., 2015a; Jones, 1996; Zhang & Van Hook, 2009). In other words, the relationship satisfaction or stability in DISC-couples reflects a mix of the satisfaction levels or divorce rates found in the two countries of origin of both partners. This effect is also attributed to attitudes towards divorce held in different countries, which are transmitted through socialization (Smith et al., 2012). Thus, the partner of a DISC-couple coming from a culture with higher tolerance towards divorce is more likely to initiate divorce (Feng et al., 2012). Studies reviewed here also provide evidence for a convergence effect with DISC-couples reporting intermediate relationship satisfaction as well as relationship standards in comparison to the two culturally homogeneous groups (Hiew et al., 2015a). This suggests that DISC-couples are influenced by each other's cultural norms which may affect other relationship aspects as well. However, it should be noted that migrating individuals tend to be less conservative than their cultural average (Smith et al., 2012), potentially leading to a more tolerant attitudes in comparison to the general norms of their country of origin.

### **Minority Stress Theory: Discrimination and the Role of Social Support in DISC-Couples**

As minority stress theory suggests, belonging to a minority and thus experiencing additional stressors is associated with worse mental and physical health outcomes (Meyer, 2003), potentially explaining health disparities between DISC-individuals and the Caucasian population (Williams & Mohammed, 2009). As DISC-couples depart from social norms of ethnic or cultural homogeneity (Triandis, 1989) in a relationship, they experience negative reactions from society such as rejection and increased negative attitudes (Herman & Campbell, 2012). Indeed, several studies found that DISC-couples experience prejudice, discrimination and racism (Solsberry, 1994). Although acceptance levels in a society are rising with an increasing number of DISC-couples, as indicated by an increasing approval of these couples over the last decades (Joyner, 2005), negative attitudes towards DISC-couples

still persist (Qian, 2005), particularly in older and more conservative people (Todd et al., 1992). In the year 2000, 22% of Caucasian-Americans reported to disapprove of African-American and Caucasian-American DISC-relationships (Johnson & Jacobson, 2005). Although the evidence is mixed regarding social support (Leslie & Letiecq, 2004), disapproval and receiving less social support from friends, family and the public is associated with lower relationship satisfaction in DISC-couples (Shibazaki & Brennan, 1998) and constitute a risk factor for DISC-relationships.

Studies comparing DISC-couples from numerous cultural backgrounds often find African-American DISC-couples being the least satisfied couples, behind both Latin-American DISC-couples and American couples (Bratter & King, 2008; Kroeger & Williams, 2011). African-American culturally homogeneous couples tend to have the highest divorce rate and the lowest relationship satisfaction level when compared to Caucasian and Hispanic couples (Bulanda, & Brown, 2007), with DISC-relationships including an African-American partner being among the least stable in comparison to other DISC-combinations (Zhang & Van Hook, 2009). Accordingly, African-Americans are also the minority group least likely to be in a DISC-relationship in the US (Qian, 2005). There is evidence that African-Americans in DISC-relationships, although being raised and socialized like Caucasian Americans, seem to feel more ambivalence towards their relationships (Forry, Leslie, & Letiecq, 2007). Even in societies such as those in Hawaii, with more tolerant attitudes towards DISC-couples and a high percentage of DISC-couples compared to other areas (Fu, 2006), DISC-couples still have a lower relationship stability (Fu, Tora, & Kendall, 2001). Lower stability and satisfaction could be a result of low acceptance and high discrimination (Solsberry, 1994) due to the racial combination. One explanation for this might be the phenomenon of black exceptionalism (Kroeger & Williams, 2011), the observation that African-Americans tend to be more segregated from mainstream society than other minorities and face the highest social and

structural barriers in comparison to other cultural backgrounds (Lewis & Ford-Robertson, 2010).

### **Heterogamy Effect: Religion and Values**

Many differences regarding values, lifestyle, norms, expectations about romantic relationships and gender roles could potentially be related to religion in DISC-relationships as religion constitutes a part of culture. Abu-Rayya (2007), investigating western or eastern European wives married to Muslim Arab husbands, found Christian religiosity of the wife to be associated with less own relationship satisfaction and less intimacy in women with DISC-partners living in Israel. But even when belonging to the same religion, and thus sharing some values and customs, DISC-couples report lower relationship satisfaction (Fu, Tora, & Kendall, 2001). This phenomenon could be rooted in the observation that belonging to the same cultural background probably facilitates understanding each other's expectations (Fu et al., 2001) and assists in finding consensus regarding decisions (Kalmijn et al., 2005).

In light of that, it makes sense that people tend to choose partners who are similar to themselves regarding many aspects such as personality (McCrae & Terracciano, 2005), values, interests, religion, cultural background and education (Kalmijn, 1998). Comparing immigrant couples, in which both partners have the same cultural background, with DISC-couples reveals differences in terms of relationship outcomes in these two groups. For example, when comparing Mexican-American DISC-couples with Caucasian and Mexican culturally homogeneous couples, DISC-couples were found to be more similar to Caucasian couples than to Mexican couples (Negy & Snyder, 2000). This underlines that immigrants start adopting cultural norms, becoming more acculturated, and in line with assimilation theory (Gordon, 1964) a certain degree of acculturation might be necessary before individuals enter DISC-relationships. Analogously, the similarity between the values in the host country and the values endorsed in the partner's country of origin were found to be associated with higher relationship satisfaction (Lainiala et al., 2013). DISC-couples also report more conflict

due to dissimilar values in comparison to culturally homogeneous couples (Hohmann-Marriott & Amato, 2008). All this points to a heterogamy effect (Glenn, Hoppe, & Weiner, 1974): the higher the discrepancy between spouses' values, the higher the risk for separation or divorce (Dribe & Lundh, 2012; Kalmijn, de Graaf, & Janssen, 2005) and the lower the relationship satisfaction (Acitelli, Kenny, & Weiner, 2001). In line with this, Kalmijn and colleagues (2005) found the heterogamy effect to be stronger (higher divorce rate among these DISC-couples) for nationalities that were less similar to Western countries.

### **Gender Differences**

Another variable that needs to be addressed relates to the gender constellation in DISC-couples. Women usually report lower relationship satisfaction (Hendrick, Dicke, & Hendrick, 1998) and tend to initiate relationship dissolution more often than men (Pettit & Bloom, 2012), also in DISC-couples (Dribe & Lundh, 2012). In fact, women in DISC-relationships are even significantly less happy than women in culturally homogeneous relationships. Male relationship satisfaction in DISC-relationships, on the other hand, was quite similar to male satisfaction in culturally homogeneous relationships (Fu et al., 2001). One underlying variable driving this effect could be the degree of acculturation, as highly acculturated women in DISC-relationships show higher relationship satisfaction in comparison to less acculturated women (Abu-Rayya, 2007). This may make sense in light of the finding that acculturation is also associated with gender role attitudes, implying less conservative attitudes (Negy & Snyder, 2000).

Immigrants and refugees are usually male, which makes DISC-relationships with a foreign husband more frequent (Neyrand & M'Sili, 1998). For instance, in Islamic cultures traditional gender roles are highly endorsed (Wing, 2008) and as men benefit more from being the head of the family, with their wives taking care of the household and the children, they may be less willing to adapt to Western standards, subsequently potentially leading to more conflicts in a DISC-relationship with a more emancipated partner. This result indicates that it

may make a difference if the wife or the husband in a DISC-couple has a foreign background, as Western values tend to be more liberal with less conservative gender roles. Additionally, women also adapt more easily to a new culture as they show higher acculturation levels than men (Kim et al., 2012). Both Chinese couples as well as DISC-couples living in Australia were less satisfied when the husband was Chinese (Hiew et al., 2015a). This result is not surprising since traditional gender roles are highly valued in Chinese culture (Marshall, 2008). Thus, Craig-Henderson and Lewis (2015) emphasize to take the sex of the foreign partner into account when conducting research on DISC-couples. Several studies show that when the husband is the foreign spouse, marital instability is much higher than when the wife is foreign (Bratter & King, 2008; Neyrand & M'Sili, 1998; Zhang & Van Hook, 2009) and relationship satisfaction is also lower when the husband is foreign (Dribe & Lundh, 2012). Although one study did not find different divorce rates depending on the gender of the spouse in DISC-couples (Feng et al., 2012), overall the gender of the DISC-partner seems to be an important factor with regard to relationship satisfaction and stability and the evidence suggests that having a male versus female DISC-partner does not result in the same outcome.

### **Analysis of Effect Sizes for the Current Review**

Based on the literature reviewed here we computed effect sizes, comparing DISC- and culturally homogeneous couples regarding variables associated with relationship functioning. The goal was to get a clearer picture about the magnitude and the direction of the effect and to draw more accurate conclusions based on several studies about relationship outcomes when comparing the two groups. Despite the methodological heterogeneity and different relationship outcomes we were able to estimate several effect sizes. Depending on the statistical information provided in the respective papers we used Cohen's  $d$  (Cohen, 1988) to estimate the effect size whenever possible. However, in studies with unequal sample sizes we used Hedges  $g$  (Hedges, 1988) and when only regression results were reported, we used  $f^2$

(Cohen, 1988) as the effect size measure. We only estimated an effect size when significant group differences were reported in the corresponding paper.

### **Hypothesis**

Based on the evidence in the literature, we first hypothesized that being in a DISC-relationship is associated with lower relationship functioning such as relationship satisfaction or stability. Second, we predicted that this effect is less pronounced for studies taking demographic correlates into account. Lastly, we hypothesized that DISC-couples in which the husband has a foreign background have lower relationship functioning than when the wife is the DISC-partner. The study by Hiew and colleagues (2015) is the only study included here that allowed for testing differences between DISC-couples depending on the specific gender constellation. To gain further insight into the effects of gender we also compared DISC-husbands and DISC-wives with culturally homogeneous individuals.

### **Results**

The effect sizes based on these studies are not completely conclusive. Overall and in line with our hypothesis, the majority of the effect sizes (see Table 1) indicate lower relationship functioning for DISC-couples based on a number of different relationship outcomes (see indices 1-4, 7-11, 17, 19, 22-26, 29, 30, 34, 35), including DISC-couples mostly reporting more dissatisfaction and exhibiting a higher divorce risk. Some of the effect sizes were even in favor of DISC-relationship functioning, with DISC-couples outperforming culturally homogeneous couples (see indices 12, 14, 18, 20, 27, 28, 31-33, 36). While most of the effect sizes are small (see indices 1, 7-12, 14, 18-20, 22, 29-31, 33-36), some are medium (see indices 2-4, 17, 26, 32) and few have a large effect (see indices 23-25, 27, 28) or have no effect (see indices 5, 6, 13, 15, 16, 21, 37). Controlling for demographic correlates decreased effect sizes (see index 5, 6), confirming our hypothesis, and in the study by Fu and colleagues (2001) there was even no effect on relationship satisfaction. Other reviewed studies (Feng et al., 2012; Hohmann-marriott & Amato, 2008; Weller & Rofé, 1988; Zhang & Van Hook,

2009) were not included for estimating an effect size as there were no significant differences between DISC- couples and culturally homogeneous couples after controlling for demographic characteristics. Our hypothesis that a foreign husband is associated with poorer relationship functioning in comparison to culturally homogeneous couples was not confirmed (see indices 15, 16). While there were significant differences between DISC-husbands and culturally homogeneous individuals (see indices 3, 17, 25), the same was true for DISC-wives. This indicates poorer relationship functioning than culturally homogeneous individuals (see indices 4, 19, 24) and in line with convergence theory, this was only true in comparison to Western individuals (see indices 18, 20). Overall, based on the estimated effect sizes across studies, there is a tendency in favor of culturally homogeneous couples compared to DISC-couples, showing a small disadvantage for DISC-relationship functioning.

### **Discussion**

The aim of this review was to identify and summarize the current state of research regarding relationship outcomes of DISC-couples. As culture influences all aspects of human behavior (Matsumoto & Yoo, 2006), it also affects relationships and interactions between spouses. The fact that the prevalence of DISC-couples is increasing (Fu, 2006) may indicate a social change in our globalized world where exposure to many cultures is increasingly leading to meeting potential DISC-partners. To draw conclusions about relationship stability of DISC-couples, sociologists traditionally chose descriptive approaches (Kalmijn, 1998) such as identifying and comparing percentages of divorce rates for DISC- and culturally homogeneous couples. This research found that DISC-couples had less stable and less satisfying relationships (Kalmijn et al., 2005; Kroeger et al., 2011) and was explained as the result of different values, ideologies, attitudes (Hohmann-Marriott & Amato, 2008; Lainiala et al., 2013, Negy et al., 2000) or customs, as well as negative experiences such as discrimination and disapproval by the social environment from both cultural backgrounds (Smith et al., 2012). Additionally, depending on the country of origin, those couples are

confronted with a number of legal issues (Gagliardi et al., 2010). In some cases, DISC-marriages are entered mostly due to economic reasons, security or to achieve a permanent residence permit, which could partly explain why DISC-relationships are less stable (Kalmijn et al., 2005; Klein, 2001). However, the number of those cases is probably low (Smith et al., 2012) and most of the time this is rather a stereotype that DISC-couples are confronted with.

There are several major contributions of this review to the current state of research. By reviewing suitable studies, we summarized important theoretical approaches shedding light into relationship functioning of DISC-couples. We also identified demographic correlates that have a higher prevalence in DISC-couples and computed effect sizes allowing for some clarity regarding DISC-relationship functioning. Theoretical approaches such as social exchange theory (Thibaut & Kelley, 1959) help in understanding the motivation to enter a DISC-relationship despite higher costs by having to deal with discrimination. Based on the overall effect sizes, we also found DISC-couples to be less stable, less satisfied and having lower relationship functioning than culturally homogeneous couples, in line with the heterogamy effect (Glenn et al., 1974). Furthermore, in the studies reviewed here we also found evidence for a convergence effect with DISC-couples' level of relationship satisfaction being in-between their respective cultures (e.g. Hiew, et al., 2015a). Unfortunately, not many studies compared the divorce rates of both involved cultures. Instead, they usually compared relationship stability of DISC-couples with culturally homogeneous couples exclusively from the culture where the study was conducted as a reference.

The inconsistencies in the magnitude and direction of the effect sizes might be attributable to higher or lower cultural similarity, with couples exhibiting more similar cultural backgrounds being at lower risk for relationship dysfunction (Dribe & Lundh, 2012). This underlines that DISC-couples are also likely to be influenced by factors of homogamy (Lewis et al., 1997). Due to a lower similarity DISC-couples may experience lower

relationship functioning, yet, as argued in similarity-attraction theory (Byrne, 1969), DISC-couples are probably in a relationship because they share things. Although DISC-couples may be different regarding apparent physical characteristics, they may also be similar on an individual level, e.g. having common interests, which can be quite relevant for couples (Hawkins et al., 2012). Some studies did not find significant differences between DISC-couples and culturally homogeneous couples regarding characteristics such as education (Hiew et al., 2015b), potentially implying that DISC-relationships can be quite homogeneous in important aspects. This is in line with the finding that higher education of a minority member raises their likelihood of being romantically involved with a native, as the couple has a similar level of education this way (Kalmijn & Van Tubergen, 2006).

The higher separation or divorce rate of DISC-relationships might be evidence for higher social distance of the DISC-partner (Zhang & Van Hook, 2009). If social distance is one important factor explaining variance regarding differences between DISC-and culturally homogeneous couples, a DISC-couple consisting of two similar cultures should report higher relationship functioning in comparison to DISC-couples facing more social distance (Smith et al., 2012). Cultural distance regarding values in DISC-couples tends to rise with different religions, so even if religion does not play a major role for the society or for the individual, it may explain a substantial part of cultural variance. Accordingly, Smith and colleagues (2012) found DISC-relationships in which partners belonged to different religions to be less stable than DISC-couples with the same religion, although the specific combination of faiths matters (Bahr, 1981; Petts, 2016), while couples belonging to the same religion tend to have higher relationship satisfaction (Heaton, 1984).

More differences between spouses is likely to lead to a higher prevalence of conflicts and the necessity to solve them, which may result in higher levels of tolerance towards each other and foster the development of more adaptive conflict management strategies (MacNeil

& Adamsons, 2014). This could explain the positive effect sizes we found for the studies by Hiew and colleagues (2015b), with DISC-couples showing more validating communication behavior, as well as the study by MacNeil and colleagues (2018) indicating that DISC-couples engage in less direct nasty and more direct nice communication behavior. Besides cultural baseline similarity of DISC-partners, another mechanism helping DISC-relationships to succeed is the degree of acculturation (Kim et al., 2012) and the speed of assimilation (Gordon, 1964). Being able to adapt and adjust easily to a foreign culture may decrease cultural barriers and dissimilarities. Furthermore, individuals who quickly acculturate are more open to experience, more extraverted, more agreeable, and lower in neuroticism (Swagler & Jome, 2005) and these personality characteristics are associated with higher relationship satisfaction (Malouff et al., 2010). It should be also noted that some minorities are more likely to be in a DISC-relationship than others, which is driven by the process of assimilation and the relative size of the minority group, making the prevalence of DISC-couples for certain cultural combinations more likely (Wu, Schimmele, & Hou, 2015). Larger minorities are better in preserving their values and traditions (Smith et al., 2012) and it is also easier to build and maintain necessary institutions such as schools and churches where the community teaches and passes on their life style and values (Breton, 1964). This way, the minority keeps more social distance to the native population and retains more options to marry within their culture (Smith et al., 2012). Larger and more encapsulated immigrant groups are also more likely to be perceived as threatening by the society they live in (Smith et al., 2012), thus potentially increasing discrimination.

Other relationship-affecting factors that have a higher probability to accumulate in DISC-relationships include for example the DISC-partner not being accepted by friends and family, thus decreasing social support or even facing discrimination (Baltas & Steptoe, 2000), and having more complex relationship histories (Hohmann-Marriott & Amato, 2008). In

many cases, DISC-couples have to additionally deal with language barriers (Troy et al., 2006) or the DISC-partner receiving a residence permit (Lainiala & Säävälä, 2013). Other demographic variables which are more prevalent among DISC-couples are bigger age differences between spouses (Lainiala & Säävälä, 2013) and marrying at a younger age. A higher age-gap between DISC-spouses may be a result of the general tendency of the individuals to cross social boundaries, not only regarding culture (Hohmann-Marriott & Amato, 2008). Another factor is lower education, and hence fewer career opportunities (Feng et al., 2012), which is often related to fewer financial resources (Hohmann-Marriott & Amato, 2008). Different levels of education between DISC-and culturally homogeneous couples may however not be true for all cultural groups, as Hiew and colleagues (2015b) did not find significant differences in education between Western and Asian couples. This probably depends on the country of origin, as immigrating Asians are for instance usually highly educated in comparison to other immigrant groups (Hiew et al., 2015b). As minorities tend to have lower socio-economic status (Cherlin, 1998), DISC-couples with one partner belonging to a minority probably have a lower income, resulting in a lower SES in comparison to majority couples on average. All these factors are likely to decrease relationship functioning in DISC-couples.

Nevertheless, DISC-couples often have a higher socio-economic status than immigrant culturally homogeneous couples (Gullickson, 2006). Only recently scholars started focusing on confounding variables that need to be controlled for when investigating relationship functioning in DISC-couples (e.g. Fu, 2006; Hohmann-marriott & Amato, 2008). The statement that DISC-relationships have lower relationship functioning and satisfaction, and are therefore less stable, may be correct on a descriptive level. However, differences become smaller when factors such as a lower household income are taken into account. Depending on if these factors are taken into account, it may also explain some of the variance across studies

reviewed here, with one study showing opposite evidence for relationship outcomes such as higher relationship satisfaction in DISC-couples (Troy et al., 2006), and studies controlling for the confounding variables finding no significant differences between DISC- and culturally homogeneous couples regarding relationship satisfaction or stability (e.g. Hohmann-marriott & Amato, 2008). Many of these demographic variables characterize couples with different cultural backgrounds and may influence relationships negatively. This implies that a number of aspects related to the involved cultures are not a direct cause of impaired relationship functioning, but rather many challenges are associated with being part of a DISC-couple.

### **The Specific Cultural Combination of DISC-Partners Matters for Relationship Outcomes**

As different cultures vary considerably regarding many psychological outcomes (Matsumoto & Yoo, 2006) it may be possible to uncover separate effects for different cultural backgrounds. The likelihood of entering a DISC-relationship already depends on the specific culture (Kalmijn & Van Tubergen, 2006). Furthermore, Asian-White DISC-couples have a lower risk of divorce than Western couples, which is an indicator how much the risk of relationship dissolution differs by culture (Feng et al., 2012). Different cultural origins in combination with a Western person may produce different outcomes, given that for example the social distance between a Western and a non-Western culture depend on the specific country involved. Merging DISC-relationships into one general category for research purposes probably hides important differences between several DISC-couple constellations as they may for instance cancel each other out. In line with this and as argued above, the six Hofstede dimensions (2011) potentially affect DISC-relationships differently depending on the country of origin of the DISC-partner. A variable that appears to be relevant for relationship satisfaction in the majority of DISC-couples may not be relevant in some cultural combinations, as we have seen with education in Asian DISC-couples (Hiew et al., 2015b).

One possibility to meet these challenges is to investigate a sample of DISC-couples based on their cultural backgrounds and not merge several cultural combinations into one participant pool. Additionally, an outcome in DISC-couples should always be compared with culturally homogeneous couples from both cultures to check for a convergence effect. This is necessary to attribute the outcome to this specific combination of two cultural backgrounds. Until now, there is no way of knowing if differences between DISC- and culturally homogeneous couples arise due to unspecific culture effects or because of the interaction of two specific cultures. To understand relationship functioning as the interaction of two cultures a corresponding baseline value of both cultures is thus necessary. This underlines the usefulness of considering the specific involved cultures and studies investigating DISC-couples should assess each cultural combination with different samples as a gold standard, as done by Hiew and colleagues (2015a; 2015b).

Taken together, the evidence suggests that DISC-couples are different from culturally homogeneous couples in several aspects as their relationship functioning involves different risk factors, such as the experience of societal rejection (Herman & Campbell, 2012) and fewer financial resources, impairing relationship satisfaction (Weller & Rofé, 1988). The multi-dimensionality of culture (Hofstede, 2011), culture in relation to an individual such as the degree of acculturation (Mok, 1999) and all the additional characteristics that DISC-partners bring into the relationship (Hohmann-Marriott & Amato, 2008) may lead to interaction effects and underlines the complexity of conducting research with DISC-couples. This calls for methodological considerations how to deal with this complexity.

### **Methodological considerations**

Inconsistencies in the definition and use of these terms are among the main challenges in research on couples with different socio-cultural backgrounds. Furthermore, many methodological problems in cross-cultural research also apply to research on DISC-

relationships. As pointed out by Harzing (2006), differences in response style due to cultures are leading to biased results. As a result, outcomes may therefore represent differences in response style rather than real differences between spouses, which makes this relevant for DISC-couples with two involved cultures. This problem is very stable across time, different questions, cultures and even different ethnic backgrounds within the same country (Harzing, 2006). Using the English language rather than the native language in the questionnaire also produces bias. In general, if scales and questionnaires are translated the accuracy must be checked carefully (Van de Vijver & Tanzer, 2004). This problem becomes relevant when investigating DISC-couples in which the DISC-partner has a different native language.

Furthermore, some scales and constructs seem to be more susceptible to response bias than others due to different norms within cultures (Harzing, 2006). Researchers distinguish three different kind of biases (Van de Vijver & Leung, 1997a,b; (Van De Vijver & Poortinga, 1997): construct bias occurs when the measured variable is not the same in different cultures. Method bias, encompassing sample, administration and instrument bias, appears when there are systematic differences between samples due to cultural conditions, when there are communication problems while administering the test material or when there are differences between cultural groups regarding the familiarity with the content of the instrument. Finally, item bias arises when the item content means different things across cultures. These biases are especially present when the DISC-partner was raised in a different culture. There are numerous sources for those biases and several strategies how to meet these challenges are proposed in the literature but cannot be discussed in detail here (for an overview see: Van de Vijver & Tanzer, 2004). The geographic area of the neighborhood where research is conducted should be considered as well, as residential areas and workplaces are segregated by culture and ethnicity (Ellis et al., 2004). A minority that is highly concentrated in one area, and therefore less diverse, influences the occurrence of (certain combinations of) DISC-relationships (Wu et al., 2015).

## **Strengths and Limitations**

There are several limitations to this review. One of the main challenges was the highly heterogeneous studies regarding method (e.g. instruments assessing the constructs), sample structure and size, included cultures, statistical analysis, different outcomes and control variables. For instance, some studies used the Marital Satisfaction Inventory (MSI; Snyder, 1981) to measure relationship satisfaction which may not be an appropriate instrument when couples originate from different cultures (Durodoye, 1997). The same argument may also apply to other instruments. The heterogeneity regarding the different measures of relationship outcomes result in a less consistent pattern of effects sizes. At the same time, this increases the generalizability to different aspects of relationship functioning and matches the complexity of romantic relationships. Only some studies did control for demographic variables and this review indicates taking them into account probably changes the magnitude and direction of the effect sizes. Some of the studies did rely on small sample sizes and most studies did not compare outcomes with both (control) groups of culturally homogeneous couples representing the two cultural backgrounds. Moreover, study samples consisting of DISC-couples usually include a melting pot of multiple cultures. This sampling strategy is probably applied due to recruiting difficulties of DISC-couples involving the same set of cultures. Additionally, it is not specified in most of these studies where the DISC-partner has been born and since when the person was living in the host country. It may be useful, depending on what specifically will be investigated, to have a researcher (dis-) confirm the self-referred classification for the country of origin (Craig-Henderson & Lewis, 2015). Being African American and growing up in the United States is not the same as a first or second-generation immigrant (Feng et al., 2012). Even though African Americans face a lot of discrimination (Lewis & Ford-Robertson, 2010) they are socialized in the US, which is different from being an immigrant. For instance, first generation Mexican Americans have a higher marital stability than following generations (Bean, Berg & Van Hook) and the longer a

person already lives in a foreign country, the higher the probability to marry a native (Kalmijn & Van Tubergen, 2006). Additionally, most of the included studies were conducted in the United States (Bratter & King, 2008).

None of the included studies investigated DISC-couples longitudinally regarding psychological variables and some constructs are only based on single items. Since many studies relied on census data from decades ago, some results may not be the same if measured nowadays as society becomes more liberal over time (Lewis & Ford-Robertson, 2010). Another issue arising when looking at divorce rates in DISC-couples using census data is that relationship duration is negatively associated with relationship satisfaction and stability, with most divorces occurring within the first ten years (Clarke, 1995). Thus, the time frame or time point chosen from census data to study relationship stability of DISC-couples affects the conclusion drawn from the outcomes as the divorce rate is time dependent (Smith et al., 2012). Furthermore, research analyzing census data usually only takes failed marriages into account (Bulanda & Brown, 2007) while failing to acknowledge functional DISC-marriages. Finally, many studies included here are based on the measurements of only one person of the dyad which makes it more difficult to draw conclusions about the DISC-couple, as data about both individuals of a dyad are required to make assumptions about DISC-relationship functioning.

The inclusion of diverse samples by some studies relying on census data, student samples and including married or cohabiting couples representing several cultural backgrounds constitutes a methodological strength. This reflects a variability that is much more representative of society than the widely used WEIRD (Western, educated, industrialized, rich, and democratic) samples most studies rely on (Rad, Martingano, & Ginges, 2018). Although married and cohabiting DISC-couples did not differ with regard to satisfaction outcomes (Hohmann-Marriott & Amato, 2008), in general dating college students

are usually not as serious and stable as older cohabiting and married couples. One example of this would be the observation that the relationship duration increases with increasing age in adolescence (Wang et al., 2006).

### **Future Research and Practical Implications**

Based on this review we propose three important avenues for future research. First, to disentangle the interaction effects and general effects of culture, it is crucial to study DISC-couples by comparing DISC-relationships with the two involved reference samples of culturally homogeneous couples. Based on the literature reviewed here we would expect less cultural variance, and therefore smaller effect sizes, between two European countries in comparison to a Western with a non-Western country. Future studies should take cultural distance between spouses based on their country of origin into account. Furthermore, it would be interesting to look at DISC-couples from two different non-Western countries. Due to a lack of research, to the best of our knowledge there are no such studies yet. In the United States, discrimination tends to increase with the skin color intensity of an individual (Smith et al., 2012), and DISC-relationships based on status exchange seem to occur less often in Europe than in the US (Kalmijn & Van Tubergen, 2006). Both observations should be replicated with other Western societies.

Second, to be able to accurately compare DISC-relationships with culturally homogeneous couples regarding relationship outcomes, it is useful to control for a number of demographic variables (Feng et al., 2012) discussed in this review. Additionally, future studies should also control for how long the DISC-partner already lives in the host country and where he/she has been born, as it makes a difference whether a person immigrated as a child, as an adult or is a second generation immigrant who was born in the host country (Feng et al., 2012) and has been socialized there (Smith et al., 2012). Despite the age of immigration, individual differences of acculturation exist, as the process of acculturation is for instance slower if they spend a lot of time in their subculture (Abu-Rayya, 2007).

Third, future research should further investigate the effect of the gender combination to assess the impact on marital (un-)happiness of a culturally different male spouse. As gender (role) is primed by culture (McHugh, & Hanson Frieze, 1997), it may not be the same type of DISC-relationship when the DISC-partner is the husband.

Another issue that should be considered in future research about DISC-couples is the measurement of personality traits, as people entering DISC-relationships may be systematically more tolerant than culturally homogeneous couples. Shibazaki and Brennan (1998) for example found individuals in DISC-relationships to report lower self-esteem, which is negatively related to relationship satisfaction (Sciangula & Morry, 2009). This might constitute some form of selection bias, as people engaging in DISC-relationships may already be more adventurous and their values potentially differ from their country of origin to begin with (Lainiala & Säävälä, 2013).

An important shift in DISC-couple research would be to understand their unique resources and advantages instead of focusing on negative effects. This could include aspects such as new experiences or adventures, perceiving and experiencing oneself through different eyes, self-discovery in new contexts, inspiration for different behaviors or thinking-styles and critically questioning norms, customs and assumptions (Perel, 2000). Another resource of these relationships could be that DISC-partners are forced to communicate intensely with each other due to a language barrier and different cultural connotations of words. This may lead to a deeper understanding of each other in the long run, especially in comparison to culturally homogeneous couples for whom many things are perceived as self-evident. Furthermore, because of a higher potential for conflicts resulting from more misunderstandings, DISC-couples that stay together may develop positive conflict-coping strategies and strong communications skills.

This review has shown that DISC- and culturally homogeneous couples are not substantially different after taking certain demographic features and risk factors of DISC-relationships into account. This awareness should be considered in counseling and couples' therapy by finding a balance between the sameness and the uniqueness of those couples (Leslie & Young, 2015). One imbalance between spouses in DISC-relationships comes from a power difference related to racial privileges, as Caucasian individuals are culturally more privileged while they are in a relationship with someone less advantaged (Leslie & Young, 2015). Furthermore, even the Caucasian partner may experience discrimination by virtue of their DISC-relationship (Herman & Campbell, 2012). It might be useful to educate DISC-couples how to be more resilient towards discrimination, thereby reducing a risk factor undermining their relationship satisfaction. DISC- and culturally homogeneous couples share a range of problems, such as conflicts, that all couples face. The underlying sources for these shared problems may also be the same as in culturally homogeneous couples, such as having different expectations, opinions or needs. This may mostly be a quantitative difference in terms of a higher discrepancy between the baselines of spouses. Besides the implications for couples' therapy and counseling, research results about DISC-couples can also have implications for social policies (Craig-Henderson & Lewis, 2015). On the other hand, DISC-children can become important links between two cultures, making them an important resource on a societal level and possibly promoting peace because they connect easily with both cultures.

### **Conclusion**

Legal barriers for DISC-couples to get married do no longer exist but it appears that cultural and social barriers still remain, albeit becoming weaker over time (Kalmijn, 1998; Lewis & Ford-Robertson, 2010). Based on the literature reviewed here, DISC-relationships tend to be less stable and less satisfied in comparison to culturally homogeneous couples (e.g. Dribe & Lundh, 2012; Pereyra, 2012). However, when taking demographic characteristics

specific to DISC-relationships into account, the difference regarding relationship outcomes becomes smaller or disappears. Investigating DISC-couples involves controlling for individual-, couple- and group-level characteristics (Zhang & Van Hook, 2009) as the constellation of those variables within couples is relevant. In general, this encompasses demographic variables such as the socio-economic status, education, age and years spent in the country, as more than half of the elevated divorce risk of DISC-couples can be explained by demographic variables (Feng et al., 2012). On an individual level, gender role attitudes, relationship history of the partners (e.g. if the individuals already had DISC-relationships before or had children with an ex-partner (Hohmann-Marriott & Amato, 2008), any experience of trauma and degree or speed of acculturation are relevant concepts (Abu-Rayya, 2007). On a couple level, concepts such as the age difference between partners, value distance between partners (Dribe & Lundh, 2012), and potentially the gender of the DISC-partner are important. Furthermore, relationship factors such as demonstrating commitment towards the DISC-partner in public should also be taken into account (Wang et al., 2006). On a group level, the specific country of origin is vital and, associated with that, the divorce rate in that country (Fu & Wolfinger, 2011) as well as the location on cultural dimensions (Hofstede, 2011). Additional stressors that DISC-couples face are less social support, discrimination (Baltas & Steptoe, 2000; Shibasaki & Brennan, 1998) and in some cases difficulties with receiving a permanent residence permit, which, as a consequence, can lead to a quicker marriage (Kalmijn et al., 2005). DISC-couples represent numerous types of relationships and the many factors examined in this review contribute to the fascinating complexity of relationship functioning in DISC-couples. A lot of research remains to be done, especially regarding resources innate to DISC-relationships.

Table 1. *Effect Sizes for Comparisons between DISC- and Culturally Homogeneous Couples regarding Relationship Outcomes*

Index	Author	Variable	Sample	Comparison	Measure	Effect	Quantity	Interpretation
1	<i>Dribe &amp; Lundh, 2012</i>	<i>Divorce Risk</i>	<i>c</i>	<i>DISC : Non DISC</i>	<i>g</i>	<i>-0.24</i>	<i>Small</i>	<i>DISC have a higher risk for divorce</i>
2	<i>Durodoye, 1997</i>	<i>Global Dissatisfaction</i>	<i>c</i>	<i>DISC : Non DISC</i>	<i>d</i>	<i>-0.57</i>	<i>Medium</i>	<i>DISC have more dissatisfaction</i>
3	<i>Durodoye, 1997</i>	<i>Global Dissatisfaction</i>	<i>i</i>	<i>DISC-M, Non DISC-M</i>	<i>d</i>	<i>-0.61</i>	<i>Medium</i>	<i>DISC-M husbands have a higher dissatisfaction</i>
4	<i>Durodoye, 1997</i>	<i>Global Dissatisfaction</i>	<i>i</i>	<i>DISC-W, Non DISC-W</i>	<i>d</i>	<i>-0.52</i>	<i>Medium</i>	<i>DISC-W wives have a higher dissatisfaction</i>
5	<i>Fu et al., 2001</i>	<i>Relationship Satisfaction</i>	<i>c</i>	<i>DISC : Non DISC</i>	<i>g*</i>	<i>0.00</i>	<i>-</i>	<i>No Effect</i>
6	<i>Fu et al., 2011</i>	<i>Intact Marriages (10 years)</i>	<i>c</i>	<i>DISC : Non DISC</i>	<i>g</i>	<i>0.12</i>	<i>-</i>	<i>No Effect</i>
7	<i>Gagliardi et al., 2010</i>	<i>Denial</i>	<i>cd</i>	<i>DISC : Non DISC</i>	<i>g*</i>	<i>-0.24</i>	<i>Small</i>	<i>DISC show more denial</i>
8	<i>Gagliardi et al., 2010</i>	<i>Stress Communication (own view)</i>	<i>cd</i>	<i>DISC : Non DISC</i>	<i>g*</i>	<i>0.26</i>	<i>Small</i>	<i>DISC have less stress communication (own view)</i>
9	<i>Gagliardi et al., 2010</i>	<i>Stress Communication (partner's view)</i>	<i>cd</i>	<i>DISC : Non DISC</i>	<i>g*</i>	<i>0.27</i>	<i>Small</i>	<i>DISC have less stress communication (partner's view)</i>

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10	Gagliardi et al., 2010	Support	cd	DISC : Non DISC	g*	0.22	Small	DISC show less support
11	Gagliardi et al., 2010	Total Negative Dyadic Coping	cd	DISC : Non DISC	g*	-0.34	Small	DISC have more negative dyadic coping
12	Henderson, 2000	Disagreement	c	DISC : Non DISC	d	0.43	Small	DISC have less disagreement
13	Hiew et al., 2015a	Relationship Satisfaction	cd	DISC : Non DISC	g*	0.02	-	No Effect
14	Hiew et al., 2015b	Validation	c	DISC : Non DISC	g*	-0.41	Small	DISC show more validating behavior (agreement, acceptance)
15	Hiew et al., 2015a	Relationship Satisfaction	cd	DISC gender : DISC gender	g*	0.01	-	No effect for Western-male & Chinese female DISC-couple vs. Chinese-male & Western female DISC-couples
16	Hiew et al., 2015a	Relationship Satisfaction	cd	DISC gender : Non DISC	g*	-0.04	-	No effect for Chinese-male & western-female DISC-couple vs. western Non DISC & Chinese Non DISC
17	Hiew et al., 2015a	Relationship Satisfaction	cd	DISC-M : Non DISC	g*	0.51	Medium	DISC-M have less relationship satisfaction than western Non DISC

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18	Hiew et al., 2015a	Relationship Satisfaction	cd	DISC-M : Non DISC	g*	-0.49	Small	DISC-M have more relationship satisfaction than Chinese Non DISC
19	Hiew et al., 2015a	<i>Relationship Satisfaction</i>	<i>cd</i>	<i>DISC-W : Non DISC</i>	<i>g*</i>	<i>0.31</i>	<i>Small</i>	<i>DISC-W have less relationship satisfaction than western Non DISC</i>
20	Hiew et al., 2015a	Relationship Satisfaction	cd	DISC-W : Non DISC	g*	-0.39	Small	DISC-W have more relationship satisfaction than Chinese Non DISC
21	Johns et al., 2007	Relationship Satisfaction	c	DISC : Non DISC	g*	-0.01	-	No Effect
22	Jones, 1994	<i>Divorce Rate</i>	<i>c</i>	<i>DISC : Non DISC</i>	<i>g</i>	<i>-0.31</i>	<i>Small</i>	<i>DISC have a higher risk to divorce</i>
23	Kalmijn et al., 2005	<i>Divorce Risk (10 years)</i>	<i>c</i>	<i>DISC : Non DISC</i>	<i>g</i>	<i>-1.00</i>	<i>Large</i>	<i>DISC have a higher risk to divorce</i>
24	Kalmijn et al., 2005	<i>Divorce Risk (10 years)</i>	<i>c</i>	<i>DISC-W : Non DISC</i>	<i>g</i>	<i>-1.00</i>	<i>Large</i>	<i>DISC-W have a higher risk of divorce</i>
25	Kalmijn et al., 2005	<i>Divorce Risk (10 years)</i>	<i>c</i>	<i>DISC-M : Non DISC</i>	<i>g</i>	<i>-0.99</i>	<i>Large</i>	<i>DISC-M have a higher risk of divorce</i>
26	Leadley et al., 2000	<i>Risk of Alcohol related Partnership Problems</i>	<i>c</i>	<i>DISC : Non DISC</i>	<i>g</i>	<i>-0.61</i>	<i>Medium</i>	<i>DISC have more alcohol related partnership problems</i>

27	MacNeil & Adamson, 2014	Direct Nice (reported)	c	DISC : Non DISC	d	-1.03	Large	DISC report more direct nice
28	MacNeil & Adamson, 2014	Indirect Nasty (observed)	c	DISC : Non DISC	d	1.32	Large	DISC show less direct nasty
29	Negy & Snyder, 2000	<i>Dissatisfaction in Affective Communication</i>	c	<i>DISC : Non DISC</i>	<i>g*</i>	<i>0.39</i>	<i>Small</i>	<i>DISC have a higher dissatisfaction in affective communication</i>
30	Negy & Snyder, 2000	<i>Dissatisfaction with Children</i>	c	<i>DISC : Non DISC</i>	<i>g*</i>	<i>-0.41</i>	<i>Small</i>	<i>DISC have more dissatisfaction with children</i>
31	Negy & Snyder, 2000	Global Distress	c	DISC : Non DISC	<i>g*</i>	0.35	Small	DISC have lower global distress
32	Negy & Snyder, 2000	Role Orientation	i	DISC-M : Non DISC	<i>g*</i>	-0.38	Medium	DISC-M husbands have a less traditional role orientation
33	Negy & Snyder, 2000	Inconsistency	i	DISC-W : Non DISC	<i>g*</i>	0.23	Small	DISC-W wives show more consistence
34	Pereyra et al., 2015	<i>Relationship Satisfaction</i>	cd	<i>DISC : Non DISC</i>	<i>f<sup>2</sup></i>	<i>-0.13</i>	<i>Small</i>	<i>DISC have less relationship satisfaction</i>
35	Smith et al., 2012	<i>Divorce Risk</i>	c	<i>DISC : Non DISC</i>	<i>g</i>	<i>-0.24</i>	<i>Small</i>	<i>DISC have a higher risk to divorce</i>
36	Troy et al., 2006	Relationship Satisfaction	c	DISC : Non DISC	<i>g*</i>	-0.45	Small	DISC have more relationship satisfaction

37	Van Mol & de Valk, 2016	Relationship Satisfaction	i	DISC : Non DISC	g*	-0.03	-	No Effect
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*Note.* Gagliardi (2010), Hiew et al. (2015a ;2015b), MacNeil & Adams (2014), Negy & Snyder (2000): each reported effect stems from the same sample. Some studies used individual and other dyadic data. d = effect size estimator according to Cohen (1988); g = effect size estimator according to Hedges (1981); g\* = effect size estimator with corrected variance according to Hedge (1981); f<sup>2</sup> = effect size estimator for regressions according to Cohen (1988); DISC = couples with different socio-cultural backgrounds; Non DISC = couples with similar/same socio-cultural backgrounds; DISC-M = within dyad the husband is from a different socio-cultural background; DISC-W = within the dyad the wife is from a different socio-cultural background i = data from one person of the dyad; c = couples with independent measures; cd = couples with dependent measures; Effects in italics are negative for relationship functioning in DISC.

## Appendix

Table 1. *Summary of all 41 Studies Included and Reviewed for this Work*

Author (Year)	Study Design	Sample Size & Participants	Included Nationalities	Indicators of Relationship Functioning	Key Findings	Analysis
Abu-Rayya (2007)	Cross-sectional	156 individuals (women married to Israeli Arabs)	Eastern European (89) & Western European women (67) both married to Israeli Arabs	RS (DAS), marital intimacy (PAIR)	Women with highest acculturation had higher RS & intimacy, Christian religiosity was negatively correlated with RS & intimacy	Correlation, MANCOVA
Baltas & Steptoe (2000)	Cross-sectional	66 individuals (33 DISC-married couples)	British, Turk (10 Turkish women)	Marital difficulties, conflict topics due to cultural differences	British spouses had significant higher scores on marital cultural difficulties in comparison to their spouse; partners depression was associated with marital cultural difficulties	Correlation, t-test, chi <sup>2</sup> , interviews

Bratter & King (2008)	Time series ca. 1980-2000	Census data: ca. 5 676 individuals	African-American, native American, American, Latin American, Asian, Hawaiian (1606 males, 4070 females)	Divorce rate over the years	Divorce rate is higher for DISC-couples	Multivariate analysis
Contreras et al. (1996)	Cross- sectional	186 individuals (172 married couples)	American (32 couples), Mexican & DISC- couples → was classified by ARSMA (54 couples), 14 singles	love attitudes (LAS), sexual attitudes (sexual attitudes Scale), marital adjustment (DAS), RS (RAS), Couples similarity	Hispanics were more pragmatic about love and less idealistic about sex; passionate love was correlated with RS	ANOVA, MANOVA
Dainton (2015)	Cross- sectional	90 individuals (53 male, 36 female)	African American (60), American (12), Mixed (10), Latin American (6)	Maintenance activity (-infidelity, - avoidance, +conflict management, +social networks) predicted 52% of variance in RS; Maintenance behavior (-infidelity, -giving advice, +social network) predicted commitment; RS fully mediated maintenance activity & commitment	RS (QMI), Commitment (Commitment Scale), Maintenance (prosocial maintenance enactment & negative maintenance)	Correlation, Regression

Dribe & Lundh, (2012)	Time series 1942-1989 & 1990-2005	Census data: 403 294 couples (DISC- and non DISC- couples)	Immigrant countries (N=139) not specified but foreign-born person	Marital dissolution, value dissimilarity between spouses (Inglehart index)	DISC-couples have higher dissolution rates, greater value dissimilarity is associated with higher dissolution risk, the effects are stronger for native women married to non-native men	Multivariate log-log regression
Durodoye (1997)	Cross- sectional	76 individuals (38 couples: 19 DISC- couples)	African-American, Nigerian	RS (MSI)	DISC-couples have lower RS & higher disagreement regarding conflict topics	ANOVA
Feng et al. (2012)	Time series 1991-2001	Census data: 344 946 individuals (172 473 married couples)	European (British)/American, African, south Asian, other Asian	Divorce risk is higher for DISC- couples but when controlling for younger age the effect diminishes	Divorce rate	Logistic regression
Forry et al. (2007)	Cross- sectional	152 individuals (76 DISC-married couples)	American, African- American	Marital quality (Personal relationships questionnaire) relationship unfairness	DISC-couples are similar to intracultural, sex role ideology moderates RS	ANOVA, MANOVA

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				(unfairness questions)		
Fu et al. (2001)	Cross-sectional	282 individuals (122 couples)	Hawaiian, Asian, Pacific Islanders, American, DISC-married vs. non DISC-married	Marital happiness (3 items)	DISC-couples are less happy	Linear regression, MANOVA
Fu (2006)	Time series 1983-1996	Census data: 159 000 individuals (79 500 married couples)	American, Hawaiian/Filipino, Japanese	DISC-couples have higher divorce rates	Divorce rate	Logistic regression
Fu & Wolfinger, (2011)	Time series 1995-2002	Census data: 17 194 individuals (8597 married couples)	Asian, Latin-American (510), African-American (107)	Higher divorce risk for DISC-Latin-American couples but not for African-American couples	Divorce rate	Sickle model
Gagliardi et al. (2010)	Cross-sectional	918 individuals (459 couples)	Swiss (225 couples), DISC-Thai (234 couples)	Dyadic coping (COPE&DCI), Relationship satisfaction (PFB)	DISC-couples show less negative dyadic coping & stress communication	MANCOVA, ANCOVA: post-hoc t-Test
Gaines et al. (1999a)	Cross-sectional	206 individuals (103 DISC-couples)	American, Latin American, Africa-American, Asian	Attachment style (categorical Attachment style),	Securely attached individuals display	ANOVA

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				Accommodative tendencies (relationship enhancing vs. relationship threatening behavior)	sig. fewer destructive behaviors	
Gaines et al. (1999b)	Cross-sectional	182 individuals (91 DISC-couples)	American, Latin American, African American, Asian	Romanticism, giving interpersonal resources (RBT)	DISC-couples exchanged affection & interpersonal resources	t-test, correlation, multivariate F-test
Henderson (2000)	Cross-sectional	132 individuals (66 couples)	African-Americans, American, Latin American (33 DISC-, 33 non DISC-couples)	Conflict topics, problem solving behavior (discussion on video)	Conflict topics & interaction styles of DISC-couples were different from non DISC-couples	t-Test, videos
Hiew et al. (2015b)	Longitudinal: 2 Sessions in 2 weeks	246 individuals (123 committed couples)	Australian (33 couples), Chinese (36 couples), 54 DISC-couples	Relationship satisfaction (CSI), relationship standards (CWICSS)	Western couples rated couple bond as more important; high couple bond, high agreement & low family responsibility predicted RS; RS was highest for western couples and intermediate for DISC	ANOVA, intraclass correlation, MLM

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Hiew et al. (2015a)	Longitudinal: 2 Sessions in 2 weeks	246 individuals (123 committed couples)	Australian (33 couples), Chinese (36 couples), 54 DISC-couples	Relationship satisfaction (CSI), communication (10 min video recorded discussion→KPI)	Couples with Chinese female partner showed more negative behavior; RS was associated with high positive behavior	ANOVA, Correlation, MLM
Hohmann- Marriott & Amato (2008)	Time series survey1 1987- 1988  survey2 1998- 2000	Census data:  N1: 11 880 individuals (5 940 married couples);  N2: 4840 individuals (2480 married couples)	N1=305 DISC-couples: Latin American (181), African American (54), other (70)  N2=362 DISC-couples: Latin American (129), Latin American & African-American (78), African American (47), other (108)	RS (3 items: satisfaction, conflict, separation consideration)	DISC-couples report lower RS than intraculturals: differences were accounted for by more complex relationship histories, fewer shared values, less support from parents, more heterogamy (age education etc.)	t-test, chi <sup>2</sup> test, regression analysis, Clogg test/OLS regression, ANOVA
Johns et al. (2007)	Cross- sectional	260 individuals (130 couples)	American (89 American couples), Latin American (13 couples; 28 DISC- American/Latin couples)	Marital satisfaction (MAT)	Higher anger predicts lower RS	Correlation, Regression, ANOVA

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Jones (1994)	Time series data between 1976-79	Census data: sample size of marriages depends on ethnicity	Australian, English-speaking countries overseas, Polish, German, Yugoslav, Greek, Italian, Netherlands	Divorce risk	DISC-couples have a higher divorce risk	Logistic regression
Kalmijn et al. (2005)	Time series data between 1974-1984 and 1974-1994	Census data: Sample size not specified	European (western & southern), Turk, Moroccan	Divorce risk	DISC-couples have a higher risk of divorce the higher the cultural difference	Multivariate logistic regression
Kim et al. (2012)	Cross-sectional	87 individuals in DISC-relationships	Chinese (19), South Korean (63), Japanese (5)	attachment style (AAQ), RS (CSI)	Acculturation & differentiation are related to RS	Regression, t-Test
Kroeger & Williams (2011)	Time series Data 2007-2008	Census data: 7466 students in committed DISC-relationship	American, Latin American, Asian, African-American	RS (relationship satisfaction scale)	Less RS & more depressive symptoms	OLS regression
Leadley et al. (2000)	Cross-sectional 1997	Census data: 3 270 individuals (1 635 married/cohabiting couples)	American (34%), African American (22%), Latin American (33%), DISC-couples (7%) other (4%)	Alcohol related relationship problems	Ethnicity status predicts relational distress	Logistic regression

Leslie & Letiecq (2004)	Cross-sectional	152 individuals (76 DISC-couples)	American, African-American	RS (PRS)	Racial identity was strongest predictor for RS; pride of race was associated with higher RS	ANOVA, regression
Lewis et al. (1997)	Cross-sectional	292 individuals	American (53%), African-American (47%)	Factors influencing mate selection (Non-racial index, racial index)	Nonracial factors like common interests, occupations are more important than racial ones; sexual attraction and the ease of talking to someone from another race play a role during mate selection	Correlation, regression, Chi <sup>2</sup>
MacNeil & Adams (2014)	Cross-sectional	20 individuals (10 student couples)	American, Asian, Latin American, African-American (5 DISC-, 5 non DISC-couples)	RS (RAS), conflict management (CMSS: DINN video coding)	No differences regarding RS & social support, some differences for conflict management	ANOVA, correlation
Negy & Snyder (2000)	Cross-sectional	426 individuals (213 couples)	American (66 couples), Mexican (75 couples), (72 DISC-couples)	Marital & parental role orientation (scales of MSI-R), marital distress (MSI-R)	DISC-couples were more similar to American ones regarding satisfaction etc., acculturation in DISC-couples related	MANOVA, MANCOVA, ANCOVA

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					to role-orientation & distress	
Neyrand & M`Silli (1998)	Time series cohort 1975, 1982, 1990	Census data: 2000 individuals (1000 couples)	French, African (315), Asian (77), southern European (324), middle eastern (75), other (191)	Applications for naturalization (divorce rate)	When the husband is foreign the divorce rate is higher than when the wife is foreign	Percentage distribution
Pereyra et al. (2015)	Cross-sectional	2176 individuals (1088 couples)	American (300), Latin American (611), Latin (177)	Negative communication, RS	Negative communication influenced RS in all groups; spirituality influenced own RS positively except for Latino males in non DISC-relationships	SEM (regression)
Phillips & Sweeney (2006)	Cross-sectional 1995	Census data: 4 444 individuals (married women)	American (3 222), African American (751), Latin American (471)	If exposure to risk factors (education, age etc.) would be reduced for DISC-couples, the divorce risk would be lower	Effect of risk factors on divorce rate	Logistic regression
Shibazaki & Brennan (1998)	Cross-sectional	100 individuals	44 Students in DISC-relationships; 56% American, 25% Latin	RS (DAS), relationship	RS is associated with approval of one's relationship by social	Chi <sup>2</sup> , cross-tabulation, t-test

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			American, 11% Asian, 4% African-American, 3% Indian, 1% Arabic	initiation motives (open question)	environment for DISC-and non DISC-couples	
Sinning & Worner (2010)	Time series I data 2001-2007	Census data: ca. 20 000 (DISC-individuals, 2 groups intracultural)	Sample size not specified	RS (1 item)	DISC-couples have lower RS	Modified random effects ordered probit model
Smith et al. (2012)	Time series 1995-2008	Census data: 233 490 Individuals (116 745 married couples)	Non DISC-Dutch couples (ca. 41%), 59% DISC-couples: Indonesian, Antillean, Turkish, Moroccan, North/South American, other European, other African, other Asian	Divorce risk is higher for DISC-couples especially when cultures are very distant; it is smaller for 2 <sup>nd</sup> generation immigrants; the higher the divorce propensity of wife's country the higher the risk	Divorce rate	Multiway clustering
Troy et al. (2006)	Cross-sectional	Study 1) 236 individuals (118 couples: students exclusively dating)  Study 2) 218 individuals (109 couples)	American, Asian/Pacific Islander, Latin American, African-American Study 1: 32 DISC-couples, 86 non DISC-couples; Study 2: 34 DISC-couples, 75 non DISC-couples	RS (Relationship satisfaction scale/perceived relationship quality components scale) conflict pattern (CPQSF, relationship efficacy scale, coping style:	DISC-couples have higher RS, no differences for conflict & attachment	ANOVA

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				COPE) attachment style (MAQ)		
Van Mol & De Valk (2016)	Cross-sectional	Census data: 898 individuals in DISC-or non DISC-relationship	European (German, British, French, Belgian, Spanish, Italian) & Dutch	RS (Single item RS)	DISC-couples have higher RS, having children is negatively associated with RS	OLS regression with bootstrap
Wang et al. (2006)	Time series Data 1994-1995	Census data: 10 095 individuals who are dating	American, Latin American, African-American, Asian (12% of sample are DISC-couples)	Relationship stability	DISC-relationship is less stable	Cox regression model
Weller & Rofé (1988)	Cross-sectional	292 (50 DISC-couples, 109 non DISC -western, 139 non DISC -eastern couples)	Israeli, African, Asian	RS (Satisfaction & tension scale, marital happiness scale) scale for husbands' household activities	No differences of RS between DISC- & non DISC -couples; Education affected RS	ANOVA, multiple Regression
Yancey (2003)	Cross-sectional	Census data: sample size not specified	American (818), African-American (274), other	Sexual attitudes (single Item about premarital sex)	Individuals who had sex with someone from a different race have similar traditional/relational sexual attitudes as others	t-test, regression analysis

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Zhang & Van Hook (2009)	Time series 1990-2001	Census data: 23 139 married couples	American, African-American, Asian, Latin American, Others	Marital stability (single item)	DISC-couples are less stable but after controlling for couple characteristics it's not an elevated risk for dissolution	Cox proportional hazard models
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*Note.* RS = relationship satisfaction.

## **5. General Discussion**

The main goals of this doctoral thesis were first to investigate relationship processes within sexuality to predict relationship satisfaction in Iranian couples, second to identify demographic correlates as well as indicators of relationship functioning in DISC-couples and third to study samples of couples that tend to be not only neglected in relationship research but also in psychology in general (Henrich et al., 2010). Bronfenbrenner`s (1977) ecological system theory proved to be a useful framework for the different angles that have been adopted here for the three articles. The theory (Bronfenbrenner, 1977) assisted by putting the different studies and their outcomes into context. While studies one and two focused on the mesosystem via relationship processes between spouses, study three identified demographic correlates characterizing the microsystem or the individual and taking the macrosystem, representing the socio-cultural background, into account.

In the following, the consequences of primarily focusing on Western, educated, industrialized, rich and democratic samples for (relationship) research will be discussed. Further, another perspective for understanding culture, based on looseness or tightness of social norms, as well as avenues for future research and clinical implications for (couple) therapy will be considered.

### **5.1. Common Topics across Included Studies**

All three studies included in this thesis underline the importance to conduct research on currently understudied samples. Comparing relationship outcomes from non-Western samples with Western samples is important in order to assess whether certain aspects of a relationship are specific to a Western context or if findings generalize across cultures. Studies one and two indicate that sexuality is a crucial ingredient in romantic relationships across non-Western contexts, underlining the importance of the sexual relationship for overall

relationship satisfaction and potentially pointing to a universal effect which makes sense from an evolutionary perspective (Dewitte, 2012).

Also, investigating DISC-couples comprising several cultural backgrounds, a potentially growing population (Ortega & Hergovich, 2018), is important for understanding the influence of specific cultural combinations on relationship functioning, as it has for instance implications for the cultural distance (e.g. Dribe & Lundh, 2012) between spouses. Continuing both lines of research, investigating relationship outcomes in other non-Western couples and understanding relationship functioning in DISC-couples, are important areas for future relationship research.

In the next section, evidence regarding the generalizability of samples from Western, educated, industrialized, rich and democratic countries, and the arising problems when relying mostly on these samples, will be reviewed.

## **5.2. Conducting Research in WEIRD Samples**

In psychology, 96% of all research is based on Western, Educated, Industrialized, Rich and Democratic (WEIRD) samples, mostly from the US, Europe, Australia and Israel, although they only represent 12% of the world's population (Arnett, 2008). Even within Western studies most research is based on a very specific subpopulation (Rozin, 2001). Arnett (2008) found in his analysis that 67% of participants are consisting of American undergraduate college students and scholars are (implicitly) assuming that these results are universal for human nature (Henrich et al., 2010). This assumption is typically inspired by evolutionary reasoning, however sometimes there are several, mutually exclusive, hypotheses that this reasoning is rooted in (Henrich et al., 2010).

Further, 73% of the first authors on these studies were American (Arnett, 2008) and 70% of all citations within psychology are from American studies which represents the highest proportion in comparison to any other scientific discipline (May, 1997). Henrich and

colleagues (2010) demonstrated across many subfields and domains within psychology that there is considerable variation across different populations, with Westerners tending to be at the extreme ends of behavioral distributions as well as being outliers in several disciplines and across different methods. However, some of these differences might also be due to methodological artifacts when comparing WEIRD samples with less WEIRD ones (Henrich et al., 2010) as there are many challenges associated for example with cross-cultural research, as discussed in the included quantitative review (see Study 3). For instance, there are differences between WEIRD and less WEIRD samples regarding values (Hofstede, 2001), levels of happiness (Diener et al., 2009) and psychopathology (Tseng, 2001) which limits the external validity of most studies. However, there also some scholars who are making a great effort to test findings in different populations (e.g., Conroy-Beam, Buss, Pham, & Shackelford, 2015; Tracy & Matsumoto, 2008).

A current review (Feldman Barrett et al., 2019) concluded that the expression and perception of emotions is not that universal after all and the authors found the generalizability to be especially inconclusive in remote and small-scale cultures. Despite similarities regarding emotion expression, the social message that it transmits seems to depend on the cultural context (Martin et al., 2017). More specifically, the variation in emotion expression may depend on cultural learning such as display rules (Ekman, 2016). Furthermore, some non-English-speaking cultures list emotions that do not exist in our Western cultures such as *gigil* (the urge to squeeze something cute) or *liget* (a form of collective aggression; Mesquita & Frijda, 1992). Consequently, identifying expressed emotions correctly is much more accurate when displayed by individuals from the own cultural background (Elfenbein & Ambady, 2002). However, underlying cognitive processes seem to be similar across different populations, for instance when mixing up people or mistaking a person within the same social category (Fiske, 1993).

The expression and perception of emotions is particularly relevant in relationship research, since emotions are a widely studied topic in this area. Usually, affect in couples is measured using a coding system to categorize expressed emotions of couples interacting on video tapes (Coan & Gottman, 2007) and in a recent study couples relationship state was identified by an artificial intelligence algorithm relying, among other cues, on facial configurations (Uhlich & Bojar, 2019). These cultural differences in emotion expression and perception may be especially important for DISC-relationships, as intense emotions are much more prevalent in a relationship context than in less close relationships (Feldman Barrett et al., 1998).

There are a number of reasons that may underlie these differences in populations, for instance cultural aspects such as differences in languages affecting the perception of the location of objects in relation to oneself (egocentric) or to other objects (allocentric: Majid, Bowerman, Kita, Haun, & Levinson, 2004). Environmental conditions may also be underlying causes (Gangestad, Haselton, & Buss, 2009), such as living in a rural rather than urban environment or an industrialized versus agricultural society as well as the occurrence of cultural developments (e.g., Enlightenment). Of course genetic variations as well as epigenetic effects, stemming from the genetic distribution across different populations and the ability or differential pressures to adapt to different environments, probably also play a role (Beja-Pereira, Luikart, England, Bradley, Jann, Bertorelle,... & Erhardt, 2003; Henrich et al., 2010).

However, a recent study intending to replicate famous psychology studies using samples from 36 countries did find little evidence for failure of replication due to variability between WEIRD and less WEIRD samples (Klein et al., 2018). This potentially suggests that the replication crisis may not be rooted in cultural differences as hypothesized but rather in *p*-hacking, publication bias (Klein et al., 2018), misinterpretation of the *p*-value and its magnitude regarding expected reproducibility (Colquhoun, 2017), to name a few potential

causes. Similarly, the association of higher religiosity with religion being a part of culture, is associated with women having more children. This association is usually explained in terms of religious institutions officially stating to only engage in sexual intercourse for procreational reasons and to abstain from contraception (Woodcock Tentler, 2018). Yet when controlling for socio-economic status, effects of religiosity on birth rates disappeared, independent of the specific religious affiliation, indicating that the driving effect of having fewer children is higher income (Rosling et al., 2018). This suggests that it is not the (cultural) difference between Christian or Muslim religion or the degree of religiosity per se that might be driving the effect but probably the level of education of women as well as women having access to the work force, thereby increasing the family income and probably investing less in reproduction. Additionally, a certain level of wealth is presumably necessary in order to make cultural revolutions, such as the age of Enlightenment, possible since investing in philosophical, humanistic or intellectual ideas, that tend to make societies more liberal and educated, could be viewed as a luxury when dealing with more life-threatening needs. These findings suggest that some effects that are explained in terms of cultural differences might be confounded with or correlates of other variables such as socio-economic status, reminding scholars to interpret results carefully.

The fact that socio-economic status is a powerful predictor in explaining cultural differences is also in line with our findings in study three. Based on the quantitative review, when controlling for certain demographic correlates the gap in relationship functioning between culturally homogeneous couples and DISC-couples decreased. It could be expected that this is similarly true when comparing Iranian couples with Western couples regarding for instance differences in relationship functioning.

In summary, in addition to differences in socio-economic status between WEIRD and non-WEIRD samples, there is a lot of evidence demonstrating that WEIRD samples are not

very representative for many phenomena studied in the field of psychology which is probably also true for relationship research.

### 5.2.1. American Participants Compared to other Western Samples

Although almost all studies rely on WEIRD samples, the majority of these samples consist of American college students. This already brings a range of challenges in generalizing findings to other Western samples with it, since Americans tend to occupy the most extreme ends of a normal distribution regarding numerous characteristics (Henrich et al., 2010). For instance, Americans are the most individualistic population of all, strongly valuing freedom and autonomy (Lipset, 1996). Lipset (1996) moreover found, among other features, Americans to be the most patriotic, populist, fundamentalist regarding Christian religiosity, have the highest income inequality, the highest crime rate as well as the highest divorce rate among Western countries. As discussed before, many of these characteristics such as the divorce rate have implications for relationships, especially considering minority couples (e.g., DISC-couples) living in the US and being more likely to be affected by poverty (Cherlin, 1998).

In line with individualism, Americans also prefer the biggest variety of choices across several contexts (Rozin, Fischler, & Masson, 2006; Savani, Markus, & Conner, 2008). From research regarding the paradox of choice, we know that too many options are not beneficial for the decision process (Iyengar & Lepper, 2000). Thus, American dating behavior, with a preference for more options, is potentially different from other Western and non-Western countries. The paradox of choice may especially unfold in online dating contexts with a seemingly endless number of alternative partners. This is becoming more and more relevant as we are living in an era in which the number of couples meeting online still increases (Rosenfeld & Thomas, 2012), with currently 39% of heterosexual and 65% of homosexual couples having met online and online dating replacing the matchmaking role of friends and family (Rosenfeld & Thomas, 2019). Muslim dating apps such as “muzmatch” probably also

change the relationship formation process in non-Western societies, where family members used to be heavily involved in the partner selection (Sabour Esmaeili & Schoebi, 2017). At the same time, online dating potentially leads to more unusual couples such as DISC-couples that probably would not have met otherwise because their social environments do not overlap, as we tend to be connected with people who are similar to us (Ortega & Hergovich, 2018).

### 5.2.2. Age and Generation Effects: the Problem with Student Samples

The mentioned issue of extreme individualism is even intensified among college students compared to people without college education (Snibbe & Markus, 2005). This is also reflected in tighter social networks (Lamont, 2000) and higher interdependence (Grossmann et al., 2009) in less educated Americans than in college students. Adherence to social norms also tends to vary within the US between more educated and rural areas (Harrington & Gelfand, 2014). Additionally, students appear to be less trusting in laboratory studies which tends to change towards more trust as people age (Sutter & Kocher, 2007). Another point that is relevant for DISC-couples experiencing discrimination is the finding that college students tend to be less prejudiced (Henry, 2008) and younger people are more liberal in general (Cornelis, Van Hiel, Roets, & Kossowska, 2009). Thus, as most studies regarding prejudice are based on student samples, we might even underestimate the discrimination minorities such as DISC-couples are confronted with. All this questions how representative student samples are regarding relationship formation and dissolution (Adams, 2005).

Additionally, discoveries such as the Flynn effect (Flynn, 1987), the finding that IQ scores are increasing over time, or evidence demonstrating increasing individualism over time (Putnam, 2000) further question how comparable studies on WEIRD samples nowadays are to studies based on similar samples from couples of decades ago (Henrich et al., 2010).

Henrich and colleagues (2010) conclude that the generalizability of findings from WEIRD samples regarding the existence of an effect, as well as its magnitude or direction, is limited or cannot be extended to other populations. Already, WEIRD samples from different

decades, young students versus the average adult population or different levels of education may differ within the US or between different Western countries and limit external validity. Relying on potentially unrepresentative samples thus probably leads to a false and an incomplete understanding of human nature (Henrich et al., 2010).

Taken together and put into the context of relationship research, which is also mostly based on individualistic American couples (Lipset, 1996), it would make sense to compare these typical samples with couples from different Western and non-Western countries. With around one third of the American adult population completing a Bachelor's degree or higher (Ryan & Bauman, 2016), including the full range of levels of education among couples represents the average couple better as more educated couples tend to be more individualistic. Furthermore, relationship research should focus less on convenience samples such as college students and for instance include diverse age groups of couples as younger couples tend to have more liberal attitudes (Cornelis et al., 2009). This is underlined by findings that a relationship for instance changes when couples are having children (Twenge et al., 2003), which most couples have at some point (85% of women become mothers throughout their reproductive life; OECD Family Database, 2014), or a couple's sexuality changes as they grow older (McNulty et al., 2016).

### 5.2.3. Population Differences in Collectivism and Individualism

As pointed out before, individualism and collectivism are dimensions that affect social and intimate relationships. Because this dimension is highly relevant for the work presented here, this section will review the evidence of emerging differences based on individualism and collectivism, again questioning the representativeness when focusing mostly on individualistic samples. To recap Westerners from more individualistic cultures believe they can make life choices freely (Hofstede, 2001) without considering and including the broader family. They also feel less obligated to conform to societal expectations and social norms than individuals from more collectivistic societies (Bond & Smith, 1996). Research demonstrated

that individuals with a more independent self, referring to the self in terms of personal psychological characteristics such as personality or attitudes instead of social roles and relationships, are more likely to exhibit self-serving bias, the tendency to inflate one's self-view (Heine & Hamamura, 2007). However, on closer inspection it appeared that individuals with more interdependent selves also engaged in self-enhancement but in communal traits such as cooperation or generosity (instead of egocentric traits such as intelligence) that are considered desirable in more collectivistic societies (Kurman, 2001). As the same five factor structures emerged cross-culturally for general personality characteristics (Hofstede & McCrae, 2004), self-enhancement seems to indeed happen in both more individualistic as well as more collectivistic societies (Brown, 2003) but regarding different traits.

Another aspect that is related to the self-concept is the reasoning style an individual engages in (Oyserman & Lee, 2008). People from more individualistic societies and with independent self-concepts tend to employ analytical reasoning, which is characterized by paying attention to an object's features and not to the context of an object. In contrast a person with a more interdependent self-concept exhibits a holistic approach, the tendency to consider the context of an object and using this relationship to make predictions about events and behavior (Nisbett et al., 2001). This has important implications for how people explain and attribute social behavior. A person from a more individualistic society focuses on personal dispositions when explaining behavior and tends to ignore external circumstances that might have also led to the behavior (Gilbert & Malone, 1995). In contrast, a more collectivistic background prompts an individual to take situational factors into account, assuming that these factors heavily influence the displayed behavior (Miyamoto & Kitayama, 2002). This might have important consequences during couple conflicts, as partners who attribute behavior externally and view it as temporarily dependent on the situation is associated with better relationship outcomes (Bradbury & Fincham, 1990). Non-Western individuals are also less

egocentric in taking the perspective of another person when they are being empathetic (Cohen & Hoshine-Browne, 2007), which might be beneficial for intimate relationships.

Being from a more collectivistic society is not only associated with more social support and bigger social networks but also with less dynamic networks. More specifically, non-Westerners tend to keep the same people in their social network, for instance by avoiding negative interactions (Adams, 2005). Focusing more on avoiding negative outcomes rather than pursuing positive ones seems to be a general strategy in non-Western contexts (Elliot et al., 2001) and might be connected to a preference for lower arousal during positive affective states in more collective societies compared to more individualistic countries (Tsai, 2007). An orientation towards maintaining group harmony also affects group dynamics, for instance when working collectively on a task non-Western individuals show less social loafing. In other words, they are less likely to reduce effort when individual contributions are not visible (Earley, 1993).

Individuals from more collectivistic countries also attribute less value to physical attractiveness of a person (Anderson, Adams, & Plaut, 2008), which potentially has implications for relationship formation. However, Conroy-Beam and colleagues (2015) demonstrated that, cross-culturally, men prioritize attractiveness and youth whereas women value status and (financial) resources more than men. This is also reflected in the finding that men across Western and non-Western societies show a very similar preference for waist to hip ratio in women (Singh & Luis, 1995).

All these differences between more collectivistic and individualistic societies underline differences in social behavior and implications thereof for intimate relationships, demonstrating the importance to take this dimension into account and to include samples from more collectivistic societies in relationship research as has been done in this work.

#### 5.2.4. Tight and Loose Cultures

A different perspective explaining cultural differences arises by considering ecological and historical factors affecting psychological characteristics of citizens, societal institutions and state outcomes (Harrington & Gelfand, 2014). Gelfand and colleagues (2011) describe the tightness and looseness dimension in terms of how much a society or people living in a certain area comply with social norms. This dimension differs from the collectivism and individualism spectrum (Triandis, 1989) which is traditionally used to describe cultures. More specifically, the concept specifies the strength of social norms, with societies that exhibit higher tightness enforcing norms more strongly and being less tolerant toward deviating behavior. More loose societies on the other hand show a higher tolerance toward deviant behavior and weaker social norms. The general idea of this tightness-looseness concept is that external threats of local environments, such as population density, resource scarcity, disease prevalence, environmental disasters and a history of warfare, increase the necessity for strong norms (Gelfand et al., 2011). Adherence to strong social norms can be measured on several levels, with tight countries being more likely to have authoritarian governments, more restrictions on their media, fewer civil and political rights, stricter legal punishments as well as endorsement of stricter law enforcement and, as a consequence, lower crime rates (Gelfand, 2012).

Related to tightness-looseness is also the strength of social situations, with strong situations being defined by increased predictability of social behavior as only a limited range of behavior is considered appropriate. Weak social situations on the other hand are characterized by much more freedom regarding displayed behavior (Mischel, 1977) and more loose societies also have weaker social ties (Harrington & Gelfand, 2014). Being exposed to more strong situations compared to weak situations is associated with a certain psychological profile as well as different psychological processes (Gelfand et al., 2011). More specifically, being able to only display a certain repertoire of behavior in strong situations, with others

more closely evaluating and monitoring any social behavior as well as potentially punishing misbehaving, results in better self-monitoring abilities (Snyder & Gangestad, 1986) and self-regulation such as impulse control (Baumeister & Heatherton, 1996). Moreover, people living in tight societies also exhibit a need for more structure (Neuberg, 1993), order and norms. They are also more cautious as well as self-disciplined, which is probably functional in a tight context and reflects external demands (Harrington & Gelfand, 2014). Additionally, Gelfand and colleagues (2014) found tightness to be related to more conservative attitudes, more traditional gender roles and social inequality. One way of maintaining social order is accomplished by religious institutions making sure citizens follow their moral rules and conventions. As a consequence of this, tighter nations are more religious (Norenzayan & Shariff, 2008). Strong social norms and sanctioning behavior for violating them stems from the threat of danger as collaborating successfully was necessary for collective survival in tight nations, whereas being less restrictive is something a society can afford in loose nations (Gelfand et al., 2011). Thus, tightness can be viewed as a cultural adaptation securing social cohesion in the face of adversity. Looseness on the other hand is also reflected in higher rates of homeless people, more alcohol and drug abuse and higher creativity (Harrington & Gelfand, 2014). Both extremes can be disadvantageous, as too many restrictions are related to unhappiness and social disorganization, and thus instability, may also contain costs. Moreover, tightness-looseness may also change over time or temporarily, for instance triggered by local events and developments (Harrington & Gelfand, 2014).

As discussed before, different cultural backgrounds have different norms which affect social behavior and interactions (Triandis, 1989) and thereby also influence romantic relationships. Furthermore, the literature suggests that different cultural groups have different norms around marriage and divorce (Fu, 2006). Applying the tightness-looseness dimension to relationship research may help to systematically differentiate between couples from different cultures and to understand potential causes of differences rooted in ecological and

historical factors. Comparing for instance Western and non-Western relationships by applying the tightness-looseness dimension could give important insights into relationship functioning across cultural backgrounds. This is in line with the idea of value or social distance (Dribe & Lundh, 2012; Zhang & Van Hook, 2009), with DISC-partners on opposite ends of the tightness-looseness continuum probably facing higher social distance. Having a different understanding of what social behavior is appropriate for which social context might contain potential for conflicts in DISC-couples. Future research should examine if a higher distance of tightness and looseness between DISC-partners is associated with more conflicts. Knowing the underlying causes for different social norms might help DISC-partners to accept (Gelfand, 2012) each other. At the same time, DISC-partners might become more similar over time regarding tightness-looseness in social and relationship norms or start adopting each other's norms which will be interesting to investigate.

These differences rooted in tightness or looseness also have important implications for clinical and counseling psychology, as the causes and symptoms of disorders or dysfunctions may differ across tight and loose nations (Gelfand, 2012). Similarly, couples or individuals from tighter societies might express problems differently, for instance by using different communication or attributions styles, and they may have other needs and preferences (Lun et al., 2012) in a therapeutic setting than couples or individuals from looser countries. This is particularly important to consider for therapists working with foreign- or DISC-couples. Especially with sensitive topics such as sexuality, differences in communication or different norms around that topic can be very pronounced and might require a culturally attuned therapist.

### **5.3. Future Research: Sexuality and Attachment**

Coming back to the important topic of sexuality, a promising research area worth pursuing further is the link between the sexual and attachment system, both crucial behavioral

systems in romantic relationships (Hazan & Shaver, 1987). The attachment style is also related to the goals people pursue when having sex (Dewitte, 2012). Attachment security is related to high relationship satisfaction as well as stability with high levels of intimacy, commitment, trust and constructive communication (Mikulincer et al., 2002) and therefore has many implications for sexuality. Higher attachment insecurity on the other hand is related to lower sexual arousal and sexual satisfaction, lower orgasm frequency in women, more negative emotions during intercourse as well as worries about one's performance during sex (Birnbaum, 2007). Anxiously attached individuals tend to prefer sexual intercourse within a committed relationship (Brennan & Shaver, 1995), are more interested in the emotional intimacy aspect rather than the physical sensations (Hazan & Zeifman, 1994) and use the sexual relationship as an indicator of overall relationship satisfaction (Davis, Shaver, & Vernon, 2004). This often leads to being preoccupied with satisfying the partner during sex, thereby neglecting their own sexual needs (Dewitte, 2012) which might also incur costs for the (sexual) relationship (Muise, Bergeron, Impett, & Rosen, 2017). Thus, sex serves as a means to satisfy unmet attachment needs for anxiously attached individuals (Dewitte, 2012).

In contrast, more avoidant individuals have more positive attitudes towards casual sex (Brennan & Shaver, 1995), exhibit a higher interest in sex without emotions and are more likely to be in sexually open relationships (Gillath & Schachner, 2006). They also report a lower sex frequency (Brassard et al., 2007) and are more focused on enjoying the physical aspects of sex rather than intimacy (Brennan, Clark, & Shaver, 1998) as these individuals tend to separate sex and love due to discomfort with closeness (Hazan & Shaver, 1987).

Avoidantly attached individuals report motives to engage in sex such as increasing one's self-esteem, stress reduction (Davis et al., 2004) or to avoid negative relationship events such as conflicts (Impett, Gordon, & Strachman, 2008). Interestingly, with a high sex frequency, sexual satisfaction was not associated with relationship satisfaction for individuals higher in attachment avoidance (Little et al., 2010). These differences are, similarly to attachment

theory, explained in terms of “sexual working models” which represent mental representations that are developed based on sexual experiences. These sexual working models contain memories, expectations, feelings, motives and beliefs about the self as well as the partner (Birnbaum & Reis, 2006).

There is already evidence that the attachment style is also highly relevant for relationship satisfaction in Iranian couples (Sabour Esmaeili & Schoebi, 2017). Thus, including attachment when investigating sexuality and relationship functioning in non-Western samples could be one future avenue extending the work of this thesis on sexuality and relationship satisfaction. Particularly, extending study one, it would be interesting to investigate if more anxious Iranians are more likely than securely attached individuals to use make-up sex to reinstate and reassure closeness after having an argument with the partner. Based on the findings in study two, it would also be interesting as a next step to examine whether more avoidantly attached Iranians do benefit less than securely attached individuals from intimacy after sexual intercourse and whether sexual satisfaction is, similarly to the study by Little and colleagues (2010), primarily driven by a higher sex frequency.

#### **5.4. Summary, Strengths and Limitations**

This thesis successfully examined different levels of intimate relationships using several methodological and statistical approaches in understudied samples within one non-Western culture as well as when several cultural backgrounds were involved. All three studies are an important contribution in laying a groundwork for building a literature in relationship research for an understanding of relationship functioning in diverse samples. Important findings of this thesis include tracking relationship processes in Iranian couples that revealed the importance of sexuality in couple interactions and its association with relationship satisfaction as well as other predictors of relationship quality (studies one and two) and summarizing the literature and computing effect sizes regarding DISC-couples which led to

the surprising insight that DISC-couples are not necessarily less stable and less satisfied as this depends on a number of demographic correlates. Lastly, as discussed above and highlighted by all three articles included in this work, there are manifold reasons to investigate samples from different cultures and couples with different cultural backgrounds to understand all types of romantic relationships.

Study one identified an important mediational mechanism demonstrating the consequences of low sexual satisfaction on distressed Iranian couple interactions. One aspect related to study one that deserves consideration concerns the question of whether relationship and sexual satisfaction are distinct constructs. Some frequently used instruments suggest an overlap between the constructs relationship and sexual satisfaction when measuring relationship satisfaction as the scales often contain items about sexuality (e.g. Locke & Wallace, 1959; Roach, Frazier, & Bowden, 1981; Spanier, 1976). Due to the bidirectional nature of the constructs (McNulty et al., 2016), this raises the question of how much sexual and relationship satisfaction are overlapping or whether sexual satisfaction is merely a part of relationship satisfaction. Although sexual and relationship satisfaction are positively correlated, research suggests that the two constructs are distinct (Fallis et al., 2016) and the variables are measuring different aspects of the relationship. High sexual satisfaction itself is an important reward in a romantic relationship, affecting the overall evaluation of the relationship favorably (Fletcher et al., 1999). However, the strength of the association varies for individuals who differ on relationship characteristics such as communication (Litzinger & Gordon, 2005), attachment style (Birnbaum, Reis, Mikulincer, Gillath, & Orpaz, 2006) and gender (Hassebrauck & Fehr, 2002). Additionally, there are individuals reporting high relationship satisfaction and low sexual satisfaction simultaneously, as well as high sexual satisfaction and low relationship satisfaction (Apt et al., 1996). If sexual satisfaction and relationship satisfaction were the same constructs, the association would be consistent across individuals despite different characteristics (Fallis et al., 2016). Furthermore, both constructs

are predictive for relationship dissolution and divorce, independently of each other (Fallis et al., 2016). This implies that sexual satisfaction, as study one suggests, is not just a correlate of relationship quality.

Study two illustrated the importance of regular sexual intercourse as well as the presence of intercourse for the couple's emotional intimacy and relationship satisfaction over time. The complex data structure including dyadic and repeated measures in studies one and two allowed advanced analytical methods. Furthermore, studies one and two are based on a sample of working married couples which might be more representative of Iranian adults than a sample of college students. These two studies are unique as they represent one of the very few studies investigating relationship processes longitudinally in non-Western married couples.

Article three is the first to summarize the literature on relationship functioning in DISC-couples and quantifying the effect of being in a DISC-relationship on relationship functioning across numerous studies and samples. So far, a lot of research has been performed regarding divorce rates and relationship stability (e.g., Davis, 1941; Merton, 1941) in DISC-couples. As a next step, it would be interesting to also track relationship processes in DISC-couples using an intensive repeated measures design, similar to studies one and two, to get a better understanding of relationship functioning in DISC-couples. Besides including samples of non-Western couples and couples with different socio-cultural backgrounds, when studying relationships in general it would be useful to focus more on marriages or long-term relationships.

A limitation of all three articles is present in the correlational nature of the studies, with none of them having an experimental design. Due to the highly sensitive topics within intimate relationships, and especially regarding the sexual relationship, adding implicit measures for sexuality is certainly useful (Dewitte, 2012), particularly when studying cultural samples in which sexuality tends to be an even bigger taboo. Furthermore, future studies

could include other data sources besides self-report measures such as biological data or video-taping couple interactions.

Based on this thesis, it can be concluded that it is highly important in psychology in general, and in relationship research in particular, to focus more on non-WEIRD samples. Future studies regarding (cross-)cultural research or research on DISC-couples should include the tightness-looseness dimension and conduct more studies measuring relationship dynamics in the couples' daily lives. Sex research based on non-Western samples should investigate the association between sexuality and attachment extending studies one and two. Recommendations for practitioners, such as taking the tightness-looseness concept into account, especially when working with foreign couples, were also derived.

### **5.5. General Conclusion**

Investigating different levels of romantic relationships offers new insights into relationship functioning, uncovering similarities between different cultural groups such as further evidence for the universal importance for sexuality within relationships but also differences, for instance additional stressors putting a strain on the relationship of minorities. This work also underlines the complexity of intimate relationships, demonstrating the numerous indicators contributing to relationship functioning. More research based on understudied samples is needed to replicate and extend existing findings from WEIRD samples or college student samples. This is especially true for relationship research, as the partner is one of the most important social relationships throughout life and potentially across cultures. We, as the human species, as well as our intimate relationships are multi-faceted and more than WEIRD, which is why we need to investigate the whole spectrum of humanity and romantic relationships.

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“Ωιλλ ψου μαρρη με Δανιελ?”