

**A Dyadic Time-Series Network Analysis of Quality and Quantity of Time Spent
Together as a Couple and Relationship Quality**

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TIME SPENT TOGETHER AS A COUPLE AND RELATIONSHIP QUALITY

ÅBO AKADEMI UNIVERSITY– FACULTY OF ARTS, PSYCHOLOGY AND THEOLOGY

Subject: Psychology	
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Abstract: Previous research has found a positive correlation between high relationship quality and time spent with partner, but the previous studies have mostly relied on cross-sectional and retrospective research methods that do not take into account temporal relations. The aim of the present study was to explore the association between quality and quantity of time spent together as a couple and partners' experienced relationship quality. The present study used a dyadic daily diary design and network approach in order to gain a deeper understanding of the complex relationships between the variables. Three types of networks were used in the analysis: a temporal network which represent lagged-day associations, a contemporaneous network which depicts associations at the same measurement occasion and a between-subjects networks which illustrates average-level associations. Data was collected from seven heterosexual couples over a course of 42 days, providing a total of 588 observations. The dyadic study design allowed for analyzing both partners' data simultaneously instead of relying only on one partner's report. The contemporaneous and between-subject networks showed that for women, quality time and relationship quality were strongly associated with each other. Women's time quantity was not connected with their relationship quality in any of the networks, indicating that for women, it is only shared quality time with their partner that is associated with increased relationship quality. For men, both time quantity and quality time were connected to relationship quality in the networks, indicating that for men, overall spending time with their partner is associated with increased relationship quality. Women's and men's relationship quality did not have an edge between them in any of the networks which indicates that the experience of one's own relationship quality might be independent from their partner's experience.	
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Titel: En dyadisk nätverksanalys av kopplingarna mellan kvalitet och kvantitet av tid som par spenderar tillsammans och parrelationens kvalitet	
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Abstrakt: Tidigare forskning har funnit ett positivt samband mellan hög relationskvalitet och tid som spenderas med partnern, men tidigare studier har mestadels förlitat sig på tvärsnitts- och retrospektiva forskningsmetoder som inte tar hänsyn till tidsmässiga relationer. Syftet med studien var att undersöka sambandet mellan kvalitet och kvantitet av tiden som par spenderar tillsammans och parrelationskvalitet. Studien använde en dyadisk dagboksdesign och nätverksmetod för att få en djupare förståelse för de komplexa sambanden mellan variablerna. Tre typer av nätverk användes i analysen: ett temporalt nätverk som visualiserar associationer mellan variablerna från en dag till nästa, ett samtida nätverk som visar associationer vid samma mättillfälle och ett nätverk mellan par som illustrerar övergripande associationer. Data samlades in från sju heterosexuella par under 42 dagar, vilket gav totalt 588 observationer. Den dyadiska studiedesignen gjorde det möjligt att analysera båda partners data samtidigt i stället för att bara förlita sig på en partners rapport. De samtida nätverken och nätverken mellan par visade att för kvinnor var kvalitetstid och relationskvalitet starkt förknippade med varandra. Kvinnors tidskvantitet var inte kopplade till deras relationskvalitet i något av nätverken, vilket tyder på att för kvinnor är det i huvudsak delad kvalitetstid med sin partner som är förknippad med ökad relationskvalitet. För män var både tidskvantitet och kvalitetstid kopplade till relationskvalitet, vilket tyder på att för män, att överlag spendera tid med sin partner är förknippad med ökad relationskvalitet. Kvinnors och mäns upplevda relationskvalitet var inte associerade med varandra i något av nätverken, vilket indikerar att upplevelsen av ens egen relationskvalitet kan vara oberoende av partners erfarenheter.	
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Introduction

Positive close relationships have been described as an essential human need that has great influence on individual's lifelong trajectories of well-being (Baumeister & Leary, 1995; Deci & Ryan, 2000; Hudson et al., 2019). For many adults, one's romantic relationship is the most central social relationship. Romantic relationships have the potential to provide lifelong companionship, support, commitment and intimacy (Fincham et al., 2018) and high relationship quality is associated with better psychological well-being (Proulx et al., 2007), physical health (Robles, 2014) and overall life satisfaction throughout one's lifespan, from early adulthood to the later years of life (Collins et al., 2009; Deshpande & Mardhekar, 2019; Hudson et al, 2019). On the contrary, low quality relationships and relationship distress predict lowered overall well-being and are associated with many mental health problems, such as anxiety, depression and substance use disorder (Whisman, 2007).

Previous research has found a positive correlation between high relationship quality and time spent with partner (Aron et al., 2000; Milik et al., 2016), but the evidence is partly mixed due to different definitions of the variables and methodological approaches. Previous studies have mostly relied on cross-sectional and retrospective research methods that do not take into account temporal relations between variables. The present study will, therefore, focus on examining the association between quality and quantity of time spent with partner and partners' experienced relationship quality over time using a daily diary design and network approach in order to gain a deeper understanding of the complex associations between relationship quality and shared spousal time. Examining these associations will provide important information that has potential to provide clinically relevant perspectives to treatment planning (e.g., couples counselling).

Relationship Quality

Relationship quality is a widely studied subject in the field of romantic relationship research. A large variety of concepts is used to describe the overall quality of romantic relationships and terms such as relationship or marital quality, satisfaction, happiness or love are often used synonymously (Cepukiene, 2019; Heyman et al., 1994). The term marital quality is often used especially in the older research, but the term relationship quality reflects more accurately the diverse array of romantic relationship types in modern relationship research, as more and more couples cohabit and have children without marrying (Blake & Janssens, 2021; Graham et.al., 2011). Nevertheless, despite extensive interest in relationship quality research, it is still difficult to find a commonly agreed upon description or definition of what relationship quality is, which can be due to the subjective nature of romantic relationships (Özdemir & Demir, 2017). However, the subjective nature is a fundamental aspect of defining and studying relationship quality. Fincham & Bradbury (1987) conceptualized relationship quality already decades ago as a spouse's global, subjective evaluations of their relationship. A more recent definition from Fallis et al. (2016) characterizes relationship quality as an affective response arising from one's subjective evaluations of the positive and negative dimensions associated with one's relationship.

In psychological research, relationship quality is mostly measured with self-report questionnaires and the most common measures involve self-reported evaluations or attitudes towards one's relationship (Fincham & Bradbury, 1987; Graham et al., 2011). Previous research has examined whether there are gender differences between men's and women's experienced relationship quality, but the results are mixed. Jackson et al. (2014) found in their meta-analysis that on average, women report lower relationship quality than men, but the differences are very small. Furthermore, they found that in clinical samples, women are less likely to be satisfied with their relationship than men but in community-based samples no differences were found.

Different theoretical models and empirical studies try to explain how high quality is achieved in a romantic relationship. One theoretic framework that has been used before in the study of relationship quality and time couples spend together is social exchange theory (Fallis et al., 2016; Johnson & Anderson, 2012). Social exchange theories (Kelley & Thibaut, 1978; Levinger, 1980; Rusbult, 1983) argue that relationship quality is a function of three factors: rewards (i.e., everything the individual experiences as pleasurable and fulfilling, for example positive cognitions and emotions associated with shared time), costs (i.e., matters such as mental effort or pain, such as negative cognitions and emotions associated with time spent with partner) and one's comparison level (i.e., a standard that the individual has come to expect based on previous experiences). Relationship quality is then a function of a comparison of the relationship outcome value, both rewards and costs, to the individual's expectations.

Social exchange theories propose that relationship quality will be higher when the relationship provides more rewards, fewer costs and experiences of the relationship exceed one's expectations (Rusbult, 1983). From this perspective, time spent with one's partner can be experienced as a reward or a cost that influences one's experienced relationship quality. As a reward, spending time with one's partner gives a possibility to develop, express and maintain important relationship quality variables, such as commitment, closeness and intimacy (Fletcher et al., 2000). Expected rewards and costs guide individual's behavior and when one expects shared time to be rewarding, one is more likely to invest more time in dyadic behaviors. This greater investment of time with rewarding outcomes is then associated with higher relationship quality over time (Johnson & Anderson, 2012).

Time Spent with Partner

Standards and expectations for couples' shared time are strongly shaped by the Western ideas of couples' togetherness and positive engagement (Daly, 2001) and spending

time with one's partner is generally perceived to be important and desirable (Neilson & Stanfors, 2017; Voorpostel et al., 2009). Yet, it is unlikely that there is a universal objective quantum of time that is the key to a satisfying relationship (Milek et al., 2015). Existing evidence of whether shared time is on the rise or decline is mixed, because of the differing cultural norms for time use, definitions of togetherness and methodological approaches (Dew, 2009; Flood & Genadek, 2016; Neilson & Stanfors, 2017). Some studies indicate that couples have more opportunities to joint leisure time and that couples also spend more time in the presence of their partner than before, not only in percentages but also in absolute number of minutes (Voorpostel et al., 2010; Voorpostel et al., 2009). Interestingly, some studies suggest that couples' shared time is on the rise even among the dual-earning couples and among couples with children (Neilson & Stafors, 2017), whereas if both spouses are unemployed, women report spending less time in leisure with their spouse (Voorpostel et al., 2009).

Still, a large number of men and women experience lack of time for their partner. Men are hoping for more time with their spouses, whereas women want to improve the quality of the time they spend together as a couple (Roxburgh, 2006). Previous studies have discovered gender differences in the amount of time spent with one's spouse and women have been found to report less spousal time than men (Claxton & Jenkins, 2008; Flood & Genadek, 2016) which might be due to women's greater experience of time-based conflict when balancing between different time-consuming expectations between work and family (Roxburg, 2002). Discrepancies of shared time have been found in individual-level data, and as Flood and Genadek (2016) state, couple-level data (i.e., both partners participate in the study and provide separate answers) are needed to better understand these discrepancies.

Shared Time and Relationship Quality

The association between couple's shared time and relationship quality is well established in the literature. Shared time has been found to be associated with relationship

quality (Aron et al., 2000), relationship satisfaction (Milek et al., 2016), happiness and meaningfulness (Flood & Genadek, 2016), intimacy (Milek et al., 2015) and relationship stability (Hill, 1988). Spending time together is an important relationship maintenance and repair strategy (Baxter & Dindia, 1990; Dindia & Baxter, 1987), shared time is associated with having less marital conflict (Milek et al., 2015) and with a decrease in spouses' stress levels (Flood & Genadek, 2016). Individuals experience higher overall life satisfaction and well-being, both momentary and long-term, when investing more time into their romantic relationship (Hudson et al., 2019; Flood & Genadek, 2016).

Although previous research has acknowledged an association between shared time and relationship quality, the relationship between these variables seems to be quite complex. Earlier studies have proposed that simply spending time together is related to higher relationship quality (Kilbourne et al., 1990; Kingston & Nock, 1987) which could lead to a conclusion that the more couples spend time together the higher is their experienced relationship quality. However, this overlooks the impact of the quality of shared time. Other studies claim that the quantity of time couples spend together only has small effects, if any, or even negative effects to relationship quality, if the quality of time spent together is not taken into account (Berg et al., 2001; Gager & Sanchez, 2003; Guldner & Swensen, 1995). Therefore, researchers argue that it is not purely the quantity of time couples spent together but the quality of shared time that matters most for experienced relationship quality (Milek et al., 2016).

Aron et al. (2000) discovered that couples' participation in new and arousing activities increased their experienced and behaviorally expressed relationship quality. They reasoned that engaging together in new and exciting activities functions as a counterforce to habituation and boredom with each other's company that often occurs in relationships after the early relationship years. Other researchers claim it is not the activities itself that

contributes to relationship quality but, instead, the quality of the communication between spouses when they engage in activities that function as a stage for interaction (Flora & Segrin, 1998). Holman and Jacquart (1988) found a positive association between leisure activities and relationship satisfaction when couples reported high levels of communication while engaging in the activities, but simply doing things together without communicating with each other had no or even negative association to perceived relationship quality.

Johnson and Anderson (2012) studied longitudinal effects of time spent together and found that spending greater time together in different activities or having stimulating conversations a year and a half into the marriage was associated with higher levels of marital satisfaction after three years of marriage. Moreover, this effect was not just limited to men's and women's own relationship satisfaction but also their spouses' experienced satisfaction increased: women's perception of how much time the couple spent together was related to men's relationship satisfaction and men's perception of time together showed a trend toward significance with women's satisfaction.

Empirical evidence documents gender variation in spouses' expectations for shared time and this mismatch in expectations can have negative consequences for the experienced relationship quality (Claxton & Perry-Jenkins, 2008; Gager & Sanchez 2003, Kingston & Nock, 1987). Crawford et al. (2002) found that the more couples engaged in activities enjoyable only for men, the lower was women's satisfaction with their relationship. No parallel findings were found for men in their study. These differences might be explained by women's and men's different behavior in situations only one spouse likes as women might take more effort trying to make the situation more pleasant for both participants. (Crawford et al. 2002). Gager & Sanchez (2003) found that when wives reported more shared time together, the likelihood of divorce might decrease but for husbands the effect was the opposite, as greater amount of shared time was associated with higher odds of marital

dissolution. Women might, overall, have higher expectations for close spousal communication and friendship compared to men and therefore women might attribute more importance to shared time (Gager & Sanchez, 2003; Milek et al., 2016).

Dynamic System Modeling in Psychology

Two realities exist in every couple's relationship and partners' experiences of the same event can differ excessively (Gager & Sanchez, 2003). Moreover, partners enact many behaviors through which they influence and are influenced by each other's behavior, thoughts and emotions in their daily life together (Butler, 2015; Gable et al., 2003). Therefore, in the study of romantic relationships, both intrapersonal and interpersonal processes need to be considered in order to fully understand the complex dynamics of shared time and relationship quality. Network analysis, a class of analytical methods, provides an opportunity to study intrapersonal and interpersonal dynamics, as well as their differences, on a deeper and more comprehensive level by using time series data from multiple subjects (Bar-Khalifa & Sened, 2020).

Applying network models to psychological research has become more popular in recent years, due to a call to conceptualize psychological processes not just as indicative of latent common causes, but rather as emergent behavior of dynamic systems where complex components directly interact with each other (Borsboom et al., 2011; Borsboom & Cramer, 2013; Schmittmann et al., 2013). Network models can be applied in the analysis of cross-sectional or time-series data, but the latter has the benefit of taking into account temporal information by estimating how well each variable predicts the measured variable at the next time point (Borsboom & Cramer, 2013; Epskamp et al., 2018). Temporal information is important in relationship research as, for example, the amount of shared time per day or experienced relationship quality can be assumed to vary over time. In addition, time series data from multiple subjects is needed to be able to distinguish within-subject from between-

subject effects (Epskamp, et al., 2018). Time-series network models have previously been used assessing intraindividual dynamical structures (Bringmann et al., 2015; Wigman et al., 2015) but, in recent years, network models have also been implemented in the study of interpersonal dynamics (Bar-Khalifa & Atzil-Slonim, 2020; Bar-Khalifa & Sened, 2020).

Network model treats variables as entities that dynamically interact with each other over time. Network approach can be interpreted without any causal assumptions, but it has predictive value and may highlight potential causal relationships between observed variables (Epskamp et al., 2018). The graphical multilevel-vector-autoregressive (ML-VAR) model (Bar-Khalifa & Sened, 2020; Bringmann et al., 2013) uses a set of vector autoregressive models and can be used to estimate time-series data from multiple subjects in the context of network analysis. Network models can be represented graphically, where each variable is represented as a node and these nodes are connected to each other by edges (i.e., associations). In the visualized model, different colors represent either a positive or negative association between variables and thickness of the edges describe the strength of the association. Nodes can show autocorrelation (i.e., the degree of correlation in the same variable across different measurement occasions) in the temporal model, which is visualized by edges representing a self-loop. If no edge is present, it means that the two variables are independent after conditioning on all other variables in the data set (Epskamp, 2018).

By using a dyadic setting and time-series data, the graphical multilevel-vector-autoregressive model represents couples' relationship dynamics with three types of networks (Bar-Khalifa & Sened, 2020). A temporal network is a directed network of regression coefficients between lagged and current variables assessing the associations between each node in the network and each node in the network at the next time point (e.g., when participants are more satisfied with their relationship than usual on a specific day, will they or their partners be more satisfied with their relationship than usual on the next day?). A

contemporaneous network describes associations between nodes at the same time point (e.g., when participants are more satisfied with their relationship than usual on a specific day, will their partner be more satisfied with their relationship than usual on that same day?). A between-subject network assesses associations between nodes which are averaged across time for each couple (e.g., when a participant is more satisfied with their relationship than the average participant across time, will their partner also be more satisfied with their relationship than the average participant?). (Bar-Khalifa & Sened, 2020; Epskamp et al., 2018.)

Aims and Hypotheses

The aim of the present study is to explore the association between quantity and quality of time couples spend together and relationship quality in romantic relationship dyads on a day-to-day basis. Using dyadic time-series networks, I explored the extent to which interpersonal vs. intrapersonal dynamics are associated with couples' relationship quality over time. Although the association between couple's shared time and relationship quality has been studied previously, previous research has not managed to establish a general consensus of the complex dynamics between these variables. Most studies so far have relied on cross-sectional and retrospective designs that measure relationship quality at one single time point, which does not consider temporal relations between variables. Moreover, most of the previous studies have used individual-level data which do not necessarily reflect the dynamics at the couple level, and the lack of distinction between quality and quantity of time has led to partly mixed results.

The present study used daily diary data collected separately from men and women who are in a relationship, and the data from partners were analyzed simultaneously instead of separately or relying only on one partner's report. To the best of my knowledge, no other research has studied the associations between couples' shared time and relationship quality

by using network approach, which takes into account temporal effects, allows studying both intraindividual and interpersonal aspects at the same time and makes it possible to analyze data in a dyadic setting.

The present study was mainly exploratory due to the nature of the network method. Based on previous research, the following research questions (1, 2, 3, 4) and hypotheses (5, 6, 7) were formulated:

- 1) How are the variables measuring time quality, time quantity and relationship quality connected in the networks?
- 2) Are there gender differences in the structure of the networks?
- 3) Are there differences between the three types of networks?
- 4) Do the networks display more intrapersonal or interpersonal connectivity?
- 5) Women's and men's relationship quality do not differ significantly
- 6) Women report less shared quantity and quality time than men
- 7) Strong positive association between quality time and relationship quality, for both men and women

Method

Participants and Procedure

Data were collected between December 2020 and January 2021. An invitation to participate in the study was sent to students at Åbo Akademi University by e-mail via the student union. The e-mail advertised a study on romantic relationships, sexual behavior and mood for which couples were needed in return for a monetary award (50 euros). To be eligible for the current project, couples had to: 1) be in a romantic relationship, 2) live together in the same household and 3) both partners had to agree to participate in the study. In total, ten couples announced their interest, of which I met nine couples in person before they started the data collection. The purpose of the meetings was to explain the procedure of

the current study, go through the diary items in order to ensure a good understanding of all the questions and give instructions for how to use a wearable device (Empatica E4 wristband) that each participant was given to collect physiological measures by the participants (i.e., heart rate variability). Data from the wearable devices will not be used in the present study, but the use of these devices is important to mention because it might have affected some couples' decision to decline their participation. One of the couples declined to participate after they were given additional information about the study via e-mail, and one couple declined to participate after they were given all the additional information in the meeting. Additionally, one couple was removed from this study after the data collection, because their sexual orientation was something else than heterosexual and therefore their data cannot be used for studying the hypotheses made for the current study.

The final number of participants included in this study was 7 couples (14 individuals). Daily diary methodology was used to create more comprehensive and ecologically valid models of relationship quality that include both intrapersonal and interpersonal variables. Participants were asked to fill out a daily diary questionnaire each night over the course of six weeks (42 days). Participants were instructed to fill out the survey individually each night approximately one hour before going to sleep without discussing the survey with their partner. The questionnaire was online, so that participants could choose whether they wanted to answer on their phones or computers. Participants were given an option to receive text messages to remind them of their diary to improve compliance. Additionally, participants were asked to fill out another questionnaire containing questions on background information and relationship-related variables before they started with the daily diary and in the end after completing the daily diary for 42 days. To ensure the participants' anonymity, each participant was given a personal code in the data file. The completion rate of the diaries for different variables ranged between 67.5 and 83.4 %.

Ethical Review

Ethical permission for the current study was granted by the Ethics Board of Åbo Akademi University. Written informed consent was collected from all participants prior to answering the survey and participants were informed that participation was voluntary, and they could stop answering at any given time without providing an explanation.

Measures

Relationship quality on a daily level was assessed from participants' separate evaluations to the following questions: (1) *How satisfied have you been with your relationship today?* (2) *How much closeness have you experienced in your relationship today?* (3) and *How committed have you been toward your relationship today?* Participants reported their answers on a scale ranging from 0 to 100 where higher scores indicate more satisfaction, closeness or commitment. These items were selected from previous diary studies on relationship experiences (Dewitte & Mayer, 2018). Because of the daily diary methodology, the number of items in the questionnaire needed to be very limited to ensure a better completion rate of the diaries. A mean relationship quality score was calculated from these three questions. This multi-item scale showed acceptable reliability $\alpha = .691$.

Measures of couples' time spent together were constructed from participants' responses to the following question: *How many (awake) hours have you spent with your partner today?* Participants reported their answers on a scale ranging from less than one hour, one to two hours, three to four hours etc. up to thirteen to fourteen hours to more than fifteen hours. The amount of quality time couples spend together were assessed from the following question: *How much quality time have you and your partner spent together today?* Here, participants estimated how many percent of the total amount of shared time they experienced as quality time. Participants were provided a definition that quality time is what participants themselves count as quality interaction with their partner.

Statistical Analysis

SPSS 26.0 for Windows was used for data preparation and for the creation of the relationship quality variable. In addition, SPSS 26.0 was used to conduct a paired samples *t*-test which was used to make estimations between men's and women's shared time and relationship quality. The statistical analyses of the network models were performed in R version 4.0.5 for Mac software, utilizing R-Studio version 1.4.1106. Missing value imputation was done by using interpolation, that is to find the missing value with help of its neighboring values (package *imputeTS*, Moritz & Gatscha, 2022). Graphical multilevel-vector-auroregressive (ML-VAR) modeling was used to estimate the dynamics between and the predictive value of partners' relationship quality, quality and quantity time couples spent together. Networks were constructed by using *mlVAR* package (Epskamp, Deserno & Bringmann, 2021), which utilizes the graphical ML-VAR model to estimate temporal, contemporaneous and between-couple networks simultaneously. One lag ($t - 1 \rightarrow t$) was included in the estimation of the temporal network. The *dyadmlvar* package was used to construct networks in the context of dyads (Bar-Kalifa, 2019). The chosen estimator was sequential univariate multi-level estimation.

Results

Descriptive Statistics

The mean age of the participants was 23.93 years ($SD = 3.45$). The average duration of the relationship of the couples were 6.64 years ($SD = 5.12$) and the couples' mean length of cohabiting was 3.36 ($SD = 2.75$) years. Women ($M = 4.70$, $SD = 2.20$) reported spending slightly more time with their partner compared to men ($M = 4.59$, $SD = 2.27$), but the difference was not statistically significant ($t(190) = -1.49$; $p = 0.137$). Men reported on average that 54.07% ($SD = 26.06$) of the total amount of shared time per day was shared quality time. Women reported on average that 50,96% ($SD = 30.52$) of the total amount of

daily shared time was quality time, which was less than men but the difference was not significant ($t(182) = 1.74$; $p = 0.083$). Women's experienced relationship quality ($M = 68.96$, $SD = 19.75$) was slightly higher than men's ($M = 66.55$, $SD = 15.13$). The difference between women's and men's relationship quality was statistically significant ($t(190) = -2.01$; $p = 0.046$) but the effect was very weak ($d = 0.14$).

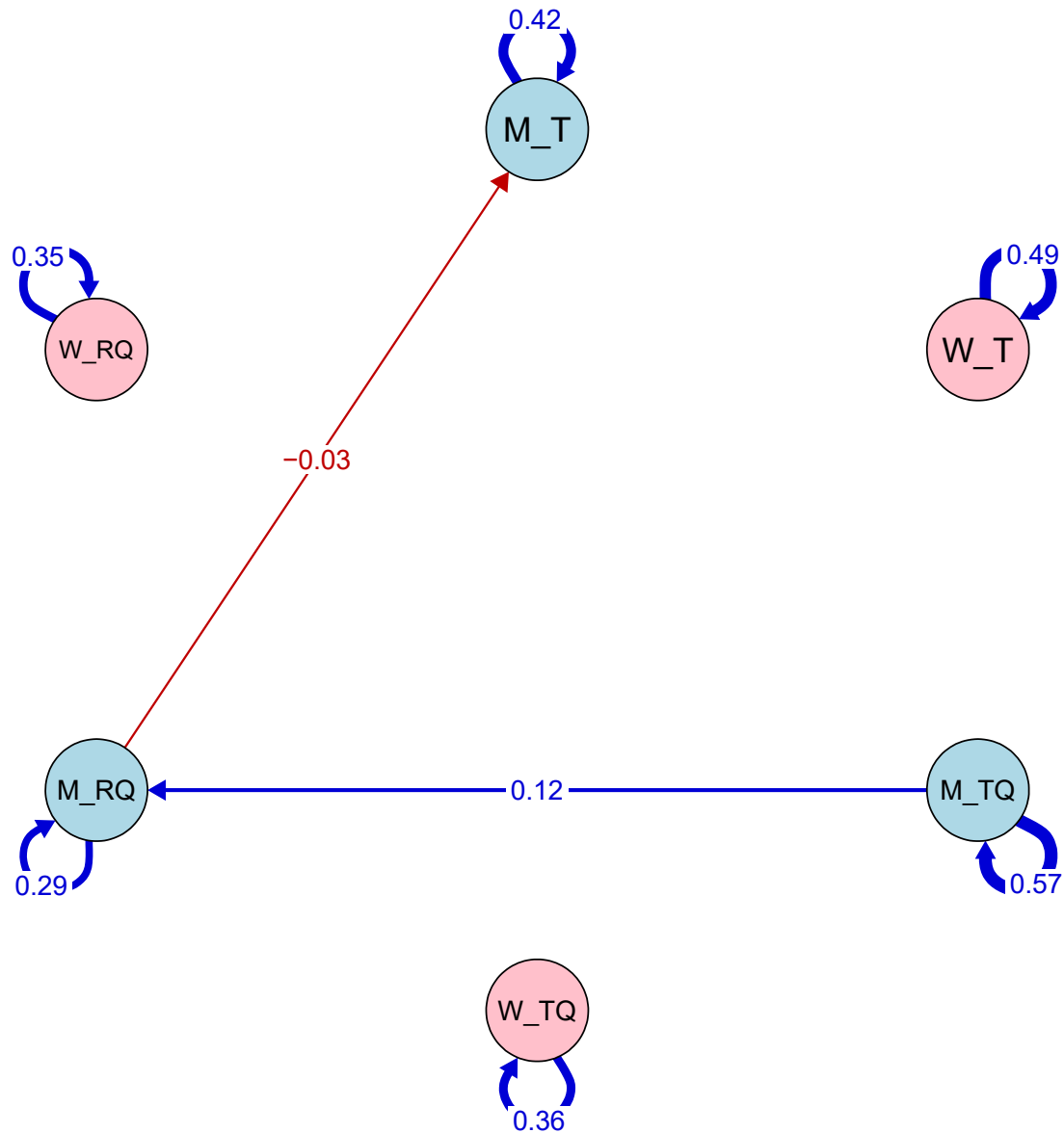
Network Structures

Three different networks of the associations between couples' shared quality and quantity of time spent together and relationship quality are represented. A temporal network represents lagged-day ($t - 1 \rightarrow t$) associations, contemporaneous network which depicts associations at the same measurement occasion (i.e., same day associations) and between-subjects network that illustrates average-level associations. Blue lines indicate positive associations and red lines indicate negative associations in figures 1, 2 and 3. Line thickness indicates association's strength. Only significant edges are shown. Missing values were imputed before conducting the network analysis. The total number of observations for network analysis was 588.

Temporal Network

The autocorrection (i.e., positive self-loops) shows that a subject's better than usual relationship quality, more quality time or more overall time spent with partner on a specific day predicted better relationship quality, more quality time or more overall time spent with partner the next day. Self-loops were found for all the variables in the temporal network for both men and women and all the self-loops were positive. A positive intrapersonal association was found between men's relationship quality and the amount of quality time spent with their partner, meaning that for men spending more than usual quality time with their partner predicted that men experience better relationship quality on the next day. A

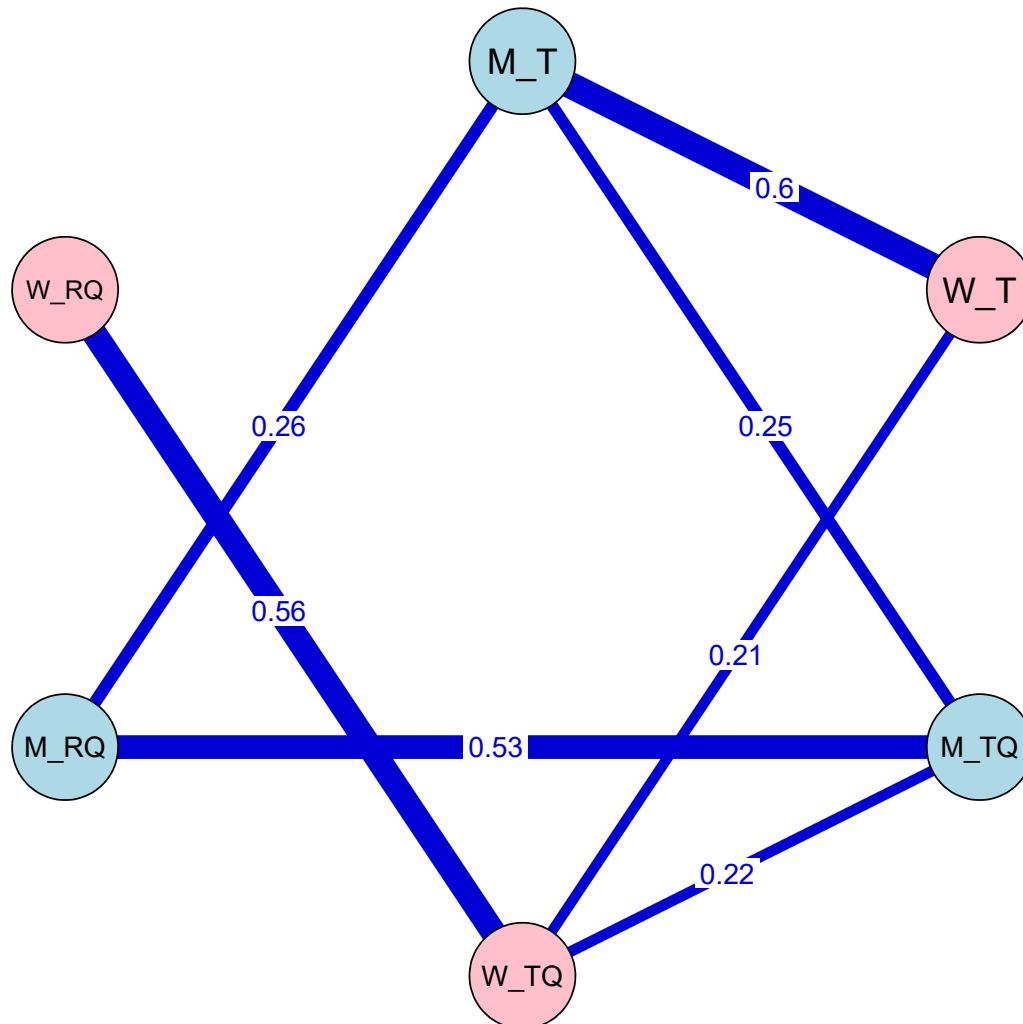
negative intrapersonal association was found between men's relationship quality and time spent with partner, meaning that when men experienced better than usual relationship quality on a specific day, it predicted that they spent less time than usual with their partner on the next day. Interpersonal associations were not found in the temporal network. Associations found in the temporal network model are visualized in figure 1.

Figure 1*Temporal network model*

Note. M_T = Men's quantity time, W_T = Women's quantity time, M_TQ = Men's quality time, W_TQ = Women's quality time, M_RQ = Men's relationship quality, W_RQ = Women's relationship quality. Blue lines indicate positive associations and red lines indicate negative associations. Line thickness indicates associations' strength.

Contemporaneous Network

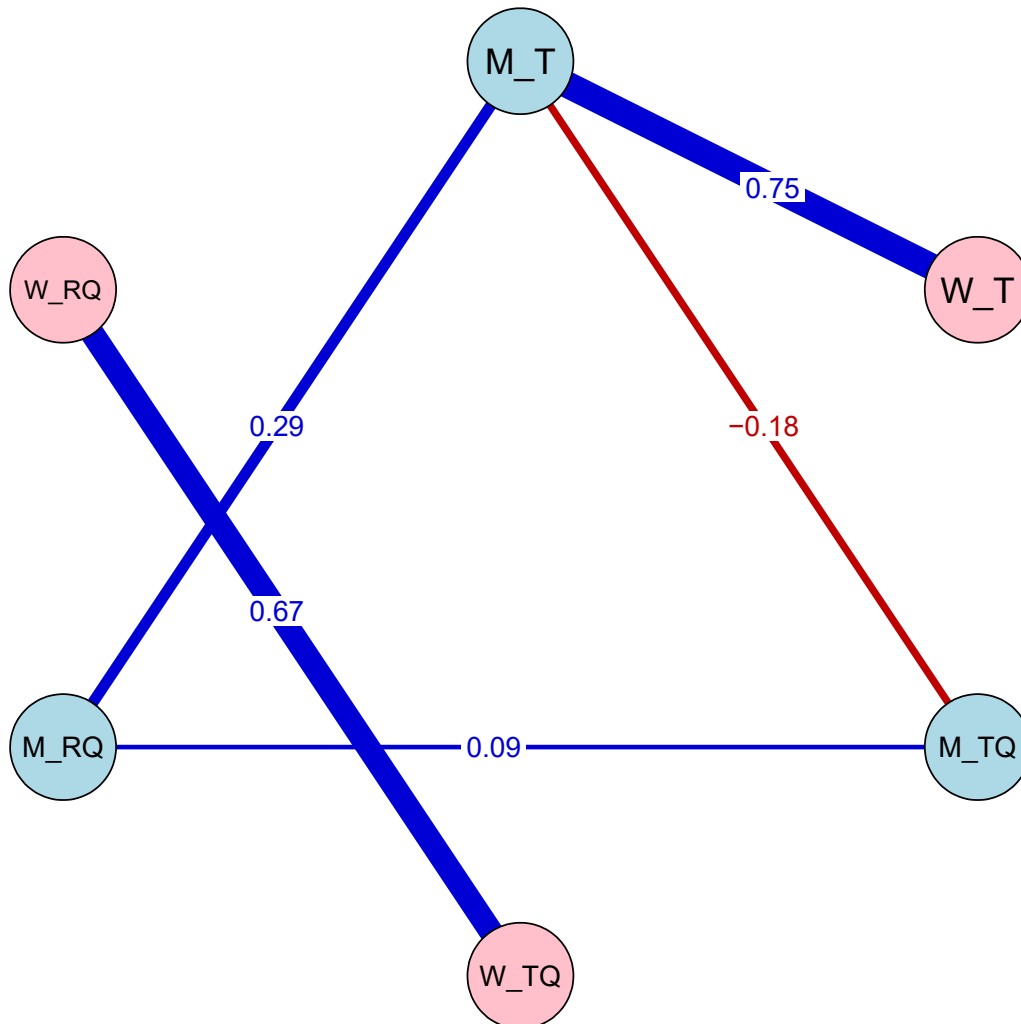
Several intrapersonal and interpersonal connections were found in the contemporaneous network. All the contemporaneous associations were positive. The strongest intrapersonal associations were found both between women's and men's relationship quality and the amount of quality time spent with partner. This means that when women (or men) reported that they spend more quality time with their partner than usual, they also reported better relationship quality than usual at the same measurement occasion. The association between shared quality time and relationship quality was slightly higher for women. Men's relationship quality was also associated with the quantity of time spent with partner, which was not found for women, but the association found for men was weaker for quantity of time than quality time. This means that when men reported spending more than the average amount of time with their partner, they also reported better relationship quality than usual at the same measurement occasion. Associations were found for both men and women between the amount of quality and quantity of time, meaning that when they overall spent more time with their partner than usual, also the experienced amount of quality time increased for both partners at the same day. Interpersonal associations were found between men's and women's quantity of time spent with partner and between men's and women's quality time spent with partner. Association between men's and women's quantity time was stronger than quality time, meaning that partners agreed more on how much time they overall spent together than what counts as quality time. No association was found between men's and women's relationship quality, meaning that partners did not share their experienced rate of relationship quality at the same measurement occasion. Associations found in the contemporaneous network are visualized in figure 2.

Figure 2*Contemporaneous network model*

Note. M_T = Men's quantity time, W_T = Women's quantity time, M_TQ = Men's quality time, W_TQ = Women's quality time, M_RQ = Men's relationship quality, W_RQ = Women's relationship quality. Blue lines indicate positive associations and red lines indicate negative associations. Line thickness indicates associations' strength.

Between-couples Network

Four intrapersonal associations were found in the between-couples network. The strongest positive intrapersonal association was found between women's relationship quality and the amount of quality time they spent with their partner, which means that when women spent more quality time with their partner than the average participant across time, they also reported better relationship quality than the average participant. Other positive associations found in the between-couples network were between men's relationship quality and men's quantity time, and between men's relationship quality and the amount of quality time spent with partner. This means that when men spent more (quality) time with their partner than the average participant across time, they also reported better relationship quality than the average participant. For men, the association between relationship quality and time quantity was stronger than the association between quality time and relationship quality. A negative association was found between the amount of men's quantity and quality of time spent with their partner, which means that when men spent more time with their partner than the average participant across time, they reported less quality time spent with their partner than the average participant. The only interpersonal association in the between-couples network was found between men's and women's reported time quantity but not between the quality time or relationship quality. Associations found in the between-couples network are visualized in figure 3.

Figure 3*Between-couple network model*

Note. M_T = Men's quantity time, W_T = Women's quantity time, M_TQ = Men's quality time, W_TQ = Women's quality time, M_RQ = Men's relationship quality, W_RQ = Women's relationship quality. Blue lines indicate positive associations and red lines indicate negative associations. Line thickness indicates associations' strength.

Discussion

The aim of the present study was to examine the complex associations between couples' shared time and relationship quality, considering the dyadic interplay between partners. In this study, daily diary methodology was used and applied in the context of network analysis. Specifically, three different exploratory networks of the associations between partners' estimated quality time, quantity time and relationship quality were examined: temporal network that depicted lagged day associations, contemporaneous network that depicted same day associations and between couples' network that depicted average level associations. The present study was mainly exploratory and aimed to examine the connections found in the networks, possible variation between the three different networks and between genders and intrapersonal vs. interpersonal connectivity. Based on the previous research, I expected to find a strong positive association between quality time and relationship quality for both men and women. Furthermore, I hypothesized that women's and men's relationship quality would not differ significantly and that women would report less shared time than men.

Women was found to experience a slightly higher relationship quality compared to men. The effect was statistically significant but weak. This finding was contradictory to the hypotheses made for this study and previous findings, as previous meta-analysis suggests that there is no difference between women's and men's experienced relationship quality in non-clinical samples (Jackson et al., 2014). Contradictory with the previous studies (Claxton & Jenkins, 2008; Flood & Genadek, 2016), women were found to report spending slightly more time with their partner compared to men. These findings could be a result of the methodology and sample used in the current study, such as small sample size or the relatively young age of the participants. Previous research has mostly focused on married couples with children who can be assumed to experience different time-based conflicts in their everyday life compared

to younger couples at a different stage of life (Roxburg, 2002). Women were found to experience less shared quality time compared to men which is not surprising, as previous research has found that women are more likely to want to improve the quality of time spent with partner (Roxburg, 2006) and that women might overall have higher expectations for spousal quality time compared to men (Gager & Sanchez, 2003; Milek et al., 2016). However, the differences between women's and men's quantity or quality time were not significant.

Contemporaneous Network

The contemporaneous network (i.e., that examined same day associations between observed variables) shows that quality time and relationship quality were strongly associated with each other at the same measurement occasion, as hypothesized. This was found for both men and women. This finding is in line with numerous previous studies that have established an association between shared quality time and relationship quality (Aron et al., 2000; Claxton & Perry-Jenkins, 2008; Malik et al., 2016). A contemporaneous network does not, however, determine causal pathways between variables, which means that participants might have experienced higher relationship quality because they were spending quality time together or that they had been more satisfied with their relationship than usual and, therefore, wanted to spend more quality time together.

A positive edge was found between men's time quantity and relationship quality, indicating that simply spending time with one's partner is associated with better relationship quality for men, but the association is not as strong as with quality time. For women, time quantity was not associated with relationship quality, which is not surprising as findings from the previous research indicate women might attribute more importance to quality than quantity time (Gager & Sanchez, 2003; Roxburg, 2006). The edge between women's and men's time quantity was stronger than the edge between women's and men's quality time,

indicating that partners agreed more on how much they overall spend time together than what kind of activities or communication counts as quality time. This was to be expected as what constitutes as quality time is more subjective than simply reposting time quantity. Moreover, previous studies have discovered that partners do not always agree what kind of activities, they find enjoyable (Crawford et al., 2002). This finding is important to keep in mind when working with couples, as it is the distinct expectations and experiences that affect partners' relationship quality negatively, rather than just spending only little time together (Crawford et al., 2002; Gager & Sanches 2003).

An interesting finding is that there was no edge between men's and women's relationship quality, meaning that women and men did not share their experiences of the quality of their relationship at the same measurement occasion and that even if one partner was very satisfied with their relationship, it did not affect the other partner's experience. Furthermore, no edges were found between women's (or men's) relationship quality and men's (or women's) quantity or quality time indicating that only one's own perception of shared time is associated with their experienced relationship quality. These findings suggest that on a day-to day level, the processes within individuals' weight more than the processes between partners.

Temporal Network

The temporal network (i.e., that depicted lagged day associations between observed variables) showed that for men, spending quality time with their partner on a specific day predicted experiencing higher relationship quality on the next day. This association was significant but weak. No similar edge was found for women, which is surprising because in previous cross-sectional studies, the association between quality time and relationship quality is well established (Aron et al., 2000; Claxton & Perry-Jenkins, 2008; Malik et al., 2016). Considering this finding together with the edges found in the contemporaneous network, it

seems that for women, the association between shared quality time and relationship quality is only momentary whereas for men, the effects of spending quality time with their partner has a more stable impact on men's relationship quality.

For men, experiencing higher than usual relationship quality on a specific day predicted spending slightly less time than usual with their partner on the next day. Our data do not, however, reveal why men's relationship quality is negatively associated with time quantity. One possible hypothesis to explain this could be that men do not feel the need to spend that much time with their partner on the next day and instead make other plans that do not include their partner, because they already feel satisfied with their relationship or that they appreciate their relationship more on a specific day when they know that they do not have a possibility to spend time with their partner on the next day. For women, no edge was found between time quantity and relationship quality, which means that the overall time spent together with their partner on a specific day did not affect women's relationship quality on the next day.

All the variables had moderate or strong positive autocorrelations, which means that given measure of each of the variable is similar to the lagged version of the same variable. For example, if a participant felt that the relationship quality is high one day, they were more likely to feel that the relationship quality is high the next day as well. No interpersonal associations were found in the temporal network indicating that women's (or men's) relationship quality or shared time on a specific day does not affect men's (or women's) relationship quality or shared time on the next day. This means the variables' temporal relations are quite independent.

Between-subjects Network

The between-subjects network (i.e., that depicted average-level associations) showed that the strongest intrapersonal association found in the network was between women's

quality time and relationship quality, same as in the contemporaneous network. In contrast to the associations found in the contemporaneous network, men's time quantity had a stronger association with their relationship quality compared to the edge between men's quality time and relationship quality. Like the contemporaneous network, the between-couples network does not establish causal pathways, which means that participants might experience better relationship quality than the average participant across time because they spend more quantity time with their partner than the average participant or that they experience better relationship quality than the average participant and therefore want to spend more quantity time with their partner.

Surprisingly, men's time quantity and quality time was negatively associated which could indicate that spending a lot of time together leads to habituation and boredom with each other's company across time (Aron et al., 2000) lowering the quality of the shared time, or that if one has only little time to spend with their partner, they are willing to make an effort to make the time available quality time (Voorpostel et al., 2009).

Women's and men's quantity time was strongly associated in the between-subjects network, similar to the edges found in the contemporaneous network. These finding suggest that partners agree on the overall amount time they spend together, both on the same day and as the average level. Contrary to the weak edge found in the contemporaneous network, no edge was found between men's and women's quality time in the between-subjects network suggesting that even though partners agree to some extent what counts as quality time on the same day, there is no agreement on quality time on average level. As in the other networks, women's and men's relationship quality did not have an edge in the between-subjects network.

General Findings

Some interesting results arise when estimating the results from all the three networks. First, all the networks show that there are quite few interpersonal associations compared to the number of intrapersonal associations found in the networks. This indicates that the dynamics between shared time and relationship quality is overall more affected by processes within individuals than between partners. For example, no edge was found between men's and women's relationship quality in any of the networks, which is surprising because affect contagion between romantic partners' is well documented in previous research (Butner et al., 2007; Schoebi & Randall, 2015; Sels et al., 2017).

Second, the networks showed that partners agreed more on how much time they overall spend together on a daily basis than how they experience quality time. Previous research has claimed that partners' perception of shared time correlates only moderately between partners (Claxton & Perry-Jenkins, 2008; Gager & Sanchez, 2003), but the previous studies has not made a differentiation between quantity and quality time. The possibility that partners experience quality time very differently is important to keep in mind when working with couples. Many men and women are dissatisfied with the current level of their spousal time (Roxburg, 2006) and the current findings underline that partners need open communication about what they really mean when they are hoping for changes for their shared time and what kind of time use they experience as quality time.

Third, the current study highlights how important it is to use time series data in romantic relationship research. Different edges were found in different networks, demonstrating how complex systems romantic relationships indeed are. By using cross-sectional data, plenty of information will be unnoticed, which could lead to simplified or even false conclusions. Furthermore, the current study has shown how important it is to include both partners in the relationships research because spouses were shown to experience the same events differently.

Strengths, Limitations and Future Directions

One of the main strengths of the present study is that it uses daily diary methodology, which makes it possible to study temporal relations (i.e., how well each variable predicts the measured variable at the next day) between different variables, in addition to the dynamics at the same measurement occasion. Another strength of the study is the dyadic research setting which means that data was collected separately from men and women in romantic relationships, and that the data from partners were analyzed simultaneously. A dyadic research setting reflects the couple level dynamics in a more reliable way compared to a setting where data is collected only from one partner. Another strength of the present study is the chosen statistical method, as using time series data in the context of the network analysis allows estimating the relationship dynamics at various levels.

Nevertheless, despite the many strengths of network analysis, it can also be seen as a limitation because the method is relatively new, and it has raised concerns regarding replicability and interpretability (Forbes et al., 2017; see counterarguments by Borsboom et., 2017). An additional limitation in this study is the small sample size and the number of missing data. Due to the small number of participants, every participant filled in the daily diary for a longer period than many of the previous daily diary studies (see Bar-Khalifa & Sened, 2020; Gadassi et al., 2016), and the number of variables included in the analysis were kept limited in order to ensure as reliable results as possible. Despite these efforts, it is still to be acknowledged that the small sample size could potentially have affected some of the results. Moreover, the participants were selected by convenience sampling and due to the sampling method, the participants were a very homogeneous group. All the participants were for example young adults and had a connection to the university. Because of these limitations, the results cannot be generalized directly to a wider population. Further research

is needed, and future studies should use a larger and more comprehensive sample to study the complex relationship between couples' shared time and relationship quality.

Conclusion

In accordance with previous research, the contemporaneous and between-subject networks show that for women, quality time and relationship quality are strongly associated with each other. Temporal associations were not found between women's quality time and relationship quality making it impossible to differentiate causal connections between these variables. Women's time quantity was not connected with their relationship quality in any of the networks indicating that for women, it is only sharing quality time with their partner that is associated with their experienced relationship quality. For men, the relationship between the variables were more multifaceted. For men, both time quantity and quality time were connected to their relationship quality in the networks. Moreover, when men spend quality time with their partner, it predicts they experience higher relationship quality on the next day. Women's and men's relationship quality did not have an edge between them in any of the networks which indicates that the experience of one's own relationship quality is independent from their partner's experience. Furthermore, the results suggest that partners have different ideas what kind of time use counts as quality time.

Summary in Swedish – Svensk sammanfattning

En dyadisk nätverksanalys av kopplingarna mellan kvalitet och kvantitet av tid som par spenderar tillsammans och parrelationens kvalitet

Hög parrelationskvalitet är förknippad med bättre psykiskt välbefinnande, fysisk hälsa och övergripande tillfredsställelse med livet, medan parrelationer av låg kvalitet och relationsproblem förutsäger sänkt allmänt välbefinnande och är förknippade med många psykiska problem, såsom ångest, depression och missbruksstörning. Tidigare forskning har funnit ett positivt samband mellan hög relationskvalitet och tid spenderat med partner men evidensen är delvis blandad på grund av olika definitioner av variablerna och metodologiska tillvägagångssätt.

Ett teoretiskt ramverk som har använts tidigare i studiet av relationskvalitet och tid som par tillbringar tillsammans är teorin om socialt utbyte. Relationskvalitet är då en funktion av en jämförelse av relationens resultatvärde, både belöningar och kostnader, med individens förväntningar. Teorier om socialt utbyte föreslår att relationskvaliteten blir högre när relationen ger fler belöningar, färre kostnader och upplevelser av relationen som överträffar ens förväntningar.

Att spendera tid med sin partner är associerat med högre relationskvalitet, relationstillfredsställelse, lycka och meningsfullhet, intimitet, och relationsstabilitet. Studier hävdar dock att mängden tid som par tillbringar tillsammans endast har små effekter, om några, eller till och med negativa effekter på relationskvaliteten, om kvaliteten på den tid som spenderas tillsammans inte beaktas. Därför hävdar forskare att det inte bara är mängden tid som par spenderar tillsammans utan kvaliteten på delad tid som är viktigast för upplevd relationskvalitet.

Nätverksanalys är en statistisk metod som ger möjlighet att studera intrapersonell och interpersonell dynamik, såväl som deras skillnader, på en djupare och mer omfattande nivå.

Att tillämpa nätverksmodeller på psykologisk forskning har blivit mer populärt de senaste åren, på grund av en uppmaning att konceptualisera psykologiska processer som framväxande beteende hos dynamiska system där komplexa komponenter direkt interagerar med varandra. Nätverksmodeller kan representeras grafiskt, där varje variabel representeras som en nod som är associerade till varandra. Om ingen koppling finns, betyder det att de två variablerna är oberoende efter konditionering av alla andra variabler i datamängden.

Multilevel-vektor-auroregressiva modellen representerar pars relationsdynamik med tre typer av nätverk. Ett temporalt nätverk är ett riktat nätverk av regressionskoefficienter mellan fördröjda och aktuella variabler som bedömer associationerna mellan varje nod i nätverket och varje nod i nätverket vid nästa tidpunkt. Ett samtida nätverk beskriver associationer mellan noder vid samma tidpunkt. Ett nätverk mellan individer bedömer associationer mellan noder som är medelvärde över tiden för varje par.

Syftet med studien är att undersöka sambandet mellan kvalitet och kvantitet av tiden som par spenderar tillsammans och parrelationskvalitet. Avhandlingen är delvis exploratorisk och målet är att se vilka kopplingar finns i nätverksmodellen, vilka kopplingar som är starkaste och om det finns könsskillnader.

Metod

Studiens data samlades in mellan December 2020 och Januari 2021. Invitation för att delta i studien skickades till studerande vid Åbo Akademi Universitet. Etiskt tillstånd för den aktuella studien har beviljats av Etiknämnden vid Åbo Akademi. För att kunna delta måste par: 1) vara i ett romantiskt förhållande, 2) bo tillsammans i samma hushåll och 3) båda parter måste samtycka till att delta i studien. Det slutliga antalet deltagare som ingick i denna studie var 7 par (14 individer) vilket gav totalt 588 observationer. Daglig dagboksметодik användes för att skapa mer omfattande och ekologiskt giltiga modeller för relationskvalitet. Deltagarna ombads att fylla i ett dagligt dagboksfrågeformulär varje natt under loppet av sex

veckor (42 dagar). Färdigställandegraden av dagböckerna för olika variabler varierade mellan 67,5 och 83,4 %.

Relationskvaliteten på daglig nivå utvärderades från deltagarnas separata utvärderingar till följande frågor: (1) Hur nöjd har du varit med din relation idag? (2) Hur mycket närhet har du upplevt i ditt förhållande idag? (3) och hur engagerad har du varit i ditt förhållande idag? Ett medelvärde för relationskvalitet beräknades från dessa tre frågor. Mått på pars tid tillsammans konstruerades från deltagarnas separata svar på följande fråga: Hur många (vakna) timmar har du tillbringat med din partner idag? Mängden kvalitetstid som par tillbringar tillsammans bedömdes utifrån följande fråga: Hur mycket kvalitetstid har du och din partner tillbringat tillsammans idag?

SPSS 26.0 för Windows användes för databeredning och för att skapa relationskvalitetsvariabeln. Dessutom användes SPSS 26.0 för att genomföra ett t-test med parade prover som användes för att göra uppskattningar mellan mäns och kvinnors delade tidskvantitet, kvalitetstid och relationskvalitet. De statistiska analyserna av nätverksmodellerna utfördes i R-version 4.0.5 för Mac-programvara, med användning av R-Studio version 1.4.1106

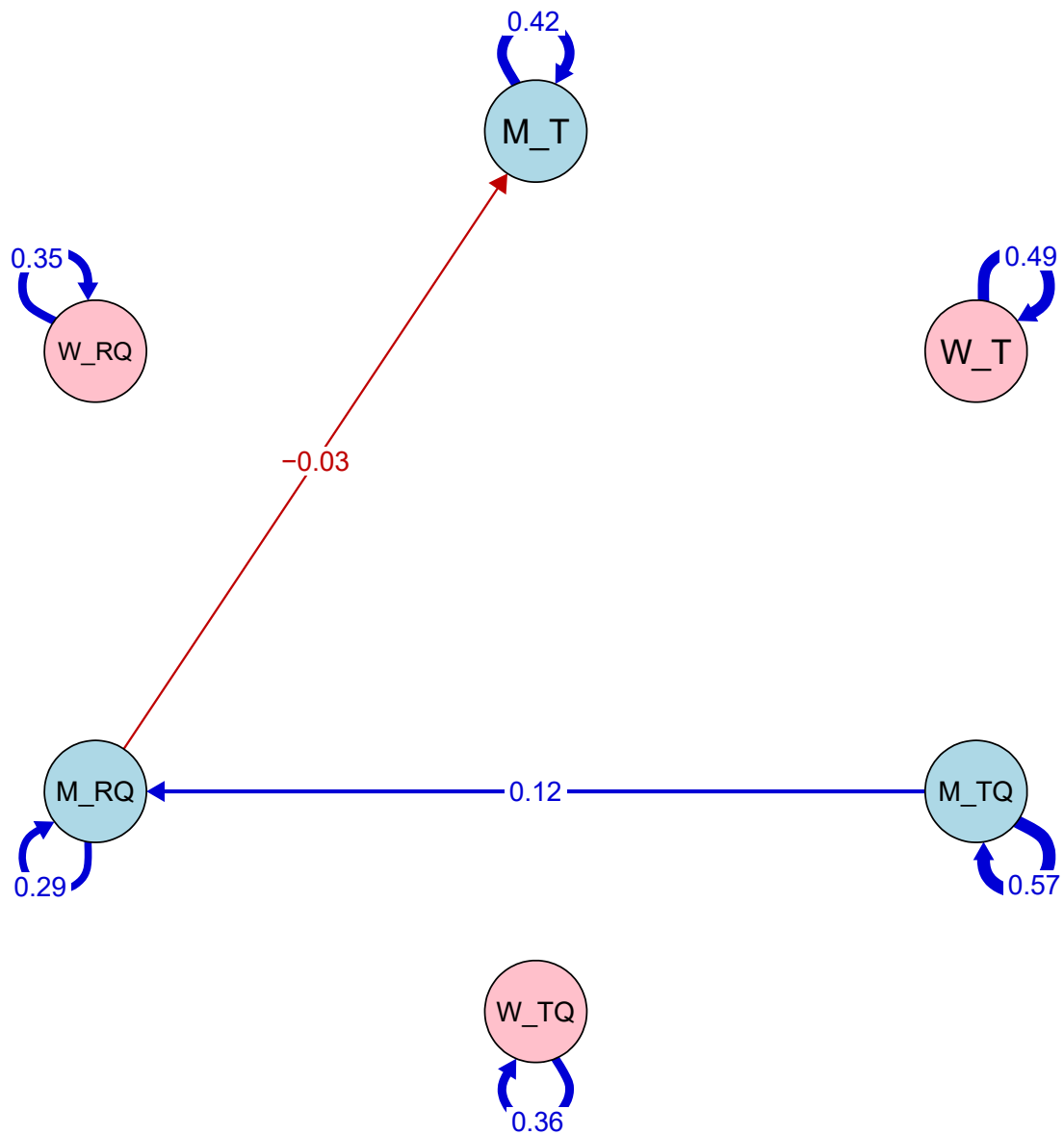
Resultat

Medelåldern för deltagarna var 23.93 år (SD = 3.45). Den genomsnittliga varaktigheten av förhållandet mellan paren var 6.64 år (SD = 5.12) och parens genomsnittliga sambolängd var 3.36 (SD = 2.75) år. Kvinnor (M = 4.70, SD 2.27) rapporterade att de spenderade något mer tid med sin partner jämfört med män (M = 4.59, SD = 2.27), men skillnaden var inte statistiskt signifikant ($t(190) = -1.49$; $p = 0.137$). Män rapporterade i genomsnitt att 54.07 % (SD = 26.06) av den totala mängden delad tid per dag var delad kvalitetstid. Kvinnor rapporterade i genomsnitt att 50.96 % (SD = 30.52) av den totala mängden daglig delad tid var kvalitetstid, vilket var mindre än män men skillnaden var inte

signifikant ($t(182) = 1.74; p = 0,083$). Kvinnors upplevda relationskvalitet ($M = 68.96, SD = 19.75$) var något högre än mäns ($M = 66.55, SD = 15.13$). Skillnaden mellan kvinnors och mäns relationskvalitet var statistiskt signifikant ($t(190) = -0.2.01; p = 0.046$) men effekten var mycket svag ($d = 0.14$).

Temporärt nätverk

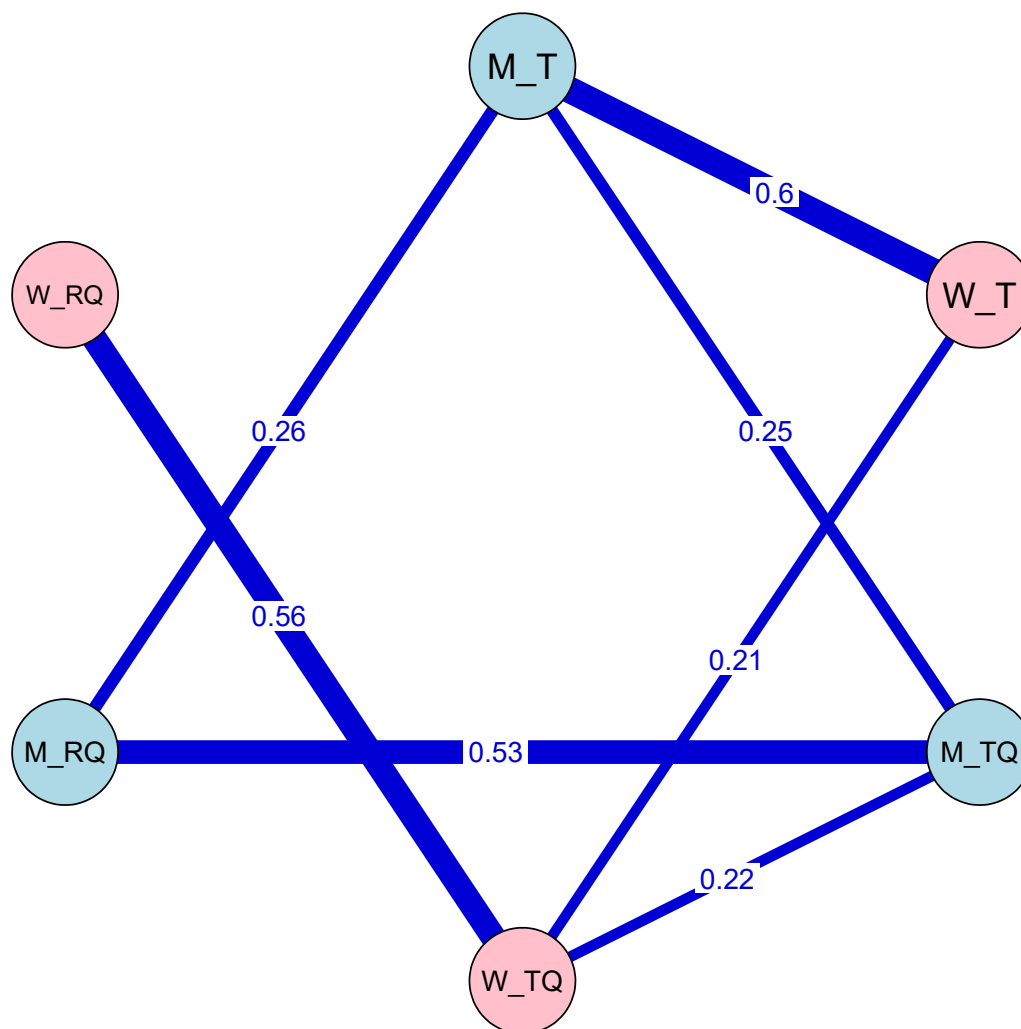
Ett temporalt nätverk representerar sammanslutningar med eftersläpning ($t - 1 \rightarrow t$). Autokorrelation (självslingor) visar att en individs bättre än vanlig relationskvalitet, mer kvalitetstid eller mer övergripande tid tillbringad med partner på en specifik dag förutspådde bättre relationskvalitet, mer kvalitetstid eller mer total tid spenderad med partner nästa dag. Ett positivt intrapersonellt samband fann man mellan mäns relationskvalitet och mängden kvalitetstid som spenderades med sin partner, Ett negativt intrapersonellt samband hittades mellan mäns relationskvalitet och tid med partner. Interpersonella associationer hittades inte i det tidsmässiga nätverket.

Figur 1*Temporärt nätverk*

Notera. M_T = Delad tid för män, W_T = Delad tid för kvinnor, M_TQ = Kvalitetstid för män, W_TQ = Kvalitetstid för kvinnor, M_RQ = Kvalitet för mäns relationer, W_RQ = Kvalitet för kvinnors relationer. Blå linjer indikerar positiva associationer och röda linjer indikerar negativa associationer. Linjetjocklek indikerar associationernas styrka.

Samtida nätverk

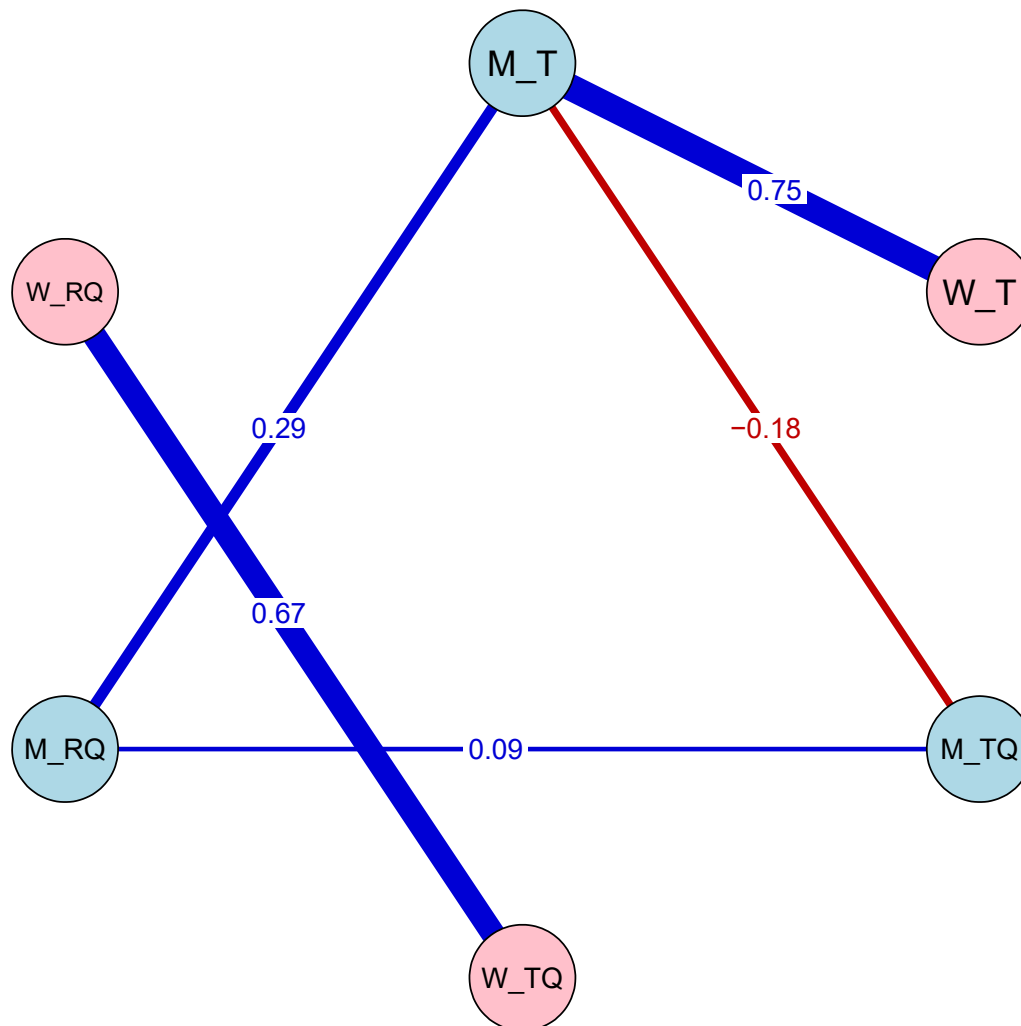
Samtida nätverk visar associationer vid samma mättillfälle (d.v.s. associationer samma dag). Alla samtida associationer som hittades var positiva. De starkaste intrapersonella sambanden hittades både mellan kvinnors och mäns relationskvalitet och mängden kvalitetstid som spenderades med partner. Mäns relationskvalitet var också associerad med mängden tid som spenderades med partner. Samband hittades för både män och kvinnor mellan mängden kvalitet och kvantiteten av tid. Interpersonella samband hittades mellan mäns och kvinnors mängd tid tillbringade med partner och mellan mäns och kvinnors kvalitetstid med partner.

Figur 2*Samtida nätverk*

Notera. M_T = Delad tid för män, W_T = Delad tid för kvinnor, M_TQ = Kvalitetstid för män, W_TQ = Kvalitetstid för kvinnor, M_RQ = Kvalitet för mäns relationer, W_RQ = Kvalitet för kvinnors relationer. Blå linjer indikerar positiva associationer och röda linjer indikerar negativa associationer. Linjetjocklek indikerar associationernas styrka.

Nätverk mellan par

Nätverk mellan par illustrerar associationer på medelnivå. Fyra intrapersonella associationer hittades i nätverket mellan par. Det starkaste positiva sambandet hittades mellan kvinnors relationskvalitet och mängden kvalitetstid de tillbringade med sin partner. Andra positiva samband som hittades i nätverket mellan par var mellan mäns relationskvalitet och den totala tiden tillbringade tillsammans med sin partner och mellan mäns relationskvalitet och mängden kvalitetstid som spenderades med partnern. Ett negativt samband hittades mellan mängden mäns kvantitet och kvaliteten på den tid som spenderades med sin partner. Det enda interpersonell koppling i nätverket mellan par hittades mellan mäns och kvinnors rapporterade tidskvantitet.

Figur 3*Nätverk mellan par*

Notera. M_T = Delad tid för män, W_T = Delad tid för kvinnor, M_TQ = Kvalitetstid för män, W_TQ = Kvalitetstid för kvinnor, M_RQ = Kvalitet för mäns relationer, W_RQ = Kvalitet för kvinnors relationer. Blå linjer indikerar positiva associationer och röda linjer indikerar negativa associationer. Linjetjocklek indikerar associationernas styrka.

Diskussion

Syftet med denna studie var att undersöka de komplexa sambanden mellan tid par spenderar tillsammans och relationskvalitet, med hänsyn till det dyadiska samspelet mellan partners. I denna studie tillämpades daglig dagboksmetod i samband med nätverksanalys. Specifikt undersöktes tre olika nätverk av sambanden mellan partners kvalitetstid, kvantitet av tid och relationskvalitet

Nätverk visar att kvalitetstid och relationskvalitet hade flest kopplingar i de tre olika nätverk. Detta fynd är i linje med många tidigare studier som har etablerat ett samband mellan kvalitetstid och relationskvalitet. Mäns tidskvantitet var kopplade med deras relationskvalitet medan för kvinnor var tidskvantitet inte kopplade med relationskvalitet i något av nätverken. Detta är i linje med tidigare forskning om att kvinnor kan tillskriva mer vikt för delad kvalitetstid. Resultaten tyder på att partners är mera överens om hur mycket tid de över lag spenderar tillsammans än att vad som räknas som kvalitetstid. Det fanns inte kopplingar mellan mäns och kvinnors relationskvalitet vilket tyder på att mäns och kvinnors upplevelser av relationskvalitet är inte kopplade till varandra utan är oberoende.

Samplet i den här studien var litet, vilket är en begränsning. En annan begränsning i denna studie var att respondenter rekryterades via bekvämlighetsurval. Framtida forskning borde undersöka dessa frågor med populationsbaserat data med ett större urval av respondenter.

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