A Network Analysis of Male Sexual Function: Comparing Symptom Networks in Men with Varying Degree of Sexual Dysfunction During First Sexual Intercourse

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Title: A Network Analysis of Male Sexual Function: Comparing Symptom Networks in Men with Varying Degree of Sexual Dysfunction During First Sexual Intercourse	
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Abstract:	
The aim of the present study was to examine associations between sexual difficulties during first experience of sexual intercourse and aggressive tendencies, psychological distress, current sexual difficulties, childhood maltreatment, current alcohol consumption and age of first sexual experience. The study utilized the novel method of network analysis to examine the associations between the multiple variables included. Data was collected from a large-scale Finnish population-based study and consisted of questionnaire responses from 1,056 Finnish men. The participants were divided into three separate groups depending on whether they had experienced sexual difficulties during first experience of sexual intercourse or not (NP = no problems, PnP = problems that did not persist and PP = problems that persisted). The study was explorative in nature, and the main aim was to generate hypotheses about male sexual dysfunctions during first intercourse. Two hypotheses were formulated. The first stated that an increase in connectivity was to be expected from the NP to the PP group, which would be evident by the PnP and PP groups having more associations between the different nodes. The second hypothesis proposed a decrease in fragmentation from the NP group to the PP groups, which would be supported by bigger and more interconnected communities in the problem groups. The hypotheses were based on the network theory of psychopathology, which suggests that a network with high connectivity and low fragmentation has an increased vulnerability and a higher risk of becoming self-sustaining. No increase in connectivity was found between the networks, which was contrary to the expectations stated in hypothesis one. However, structural differences between the NP group and the PP group were found, as was a decrease in fragmentation, lending support to hypothesis two. Visual inspections of the network of the group that experienced persisting sexual difficulties found a possible association between aggressive tendencies and sexual difficulties, going through psychological distress. Future research could focus on clarifying the associations between sexual difficulties and aggressive tendencies. This could be done by using longitudinal data to examine whether aggressive tendencies cause sexual difficulties or if early failures in sexual activities cause aggressive tendencies later in life.	
Keywords: First sexual intercourse, sexual distress, erectile dysfunction, premature ejaculation, aggressive tendencies, sexual aggression, network analysis	
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Titel: En nätverksanalys om manlig sexuell funktion: jämförande av symptomnätverk hos män som upplevt varierande grad av sexuella dysfunktioner under första samlaget

Handledare: Patrick Jern, Sabina Nickull

Abstrakt:

Målet med föreliggande avhandling var att undersöka associationerna mellan sexuella svårigheter under första samlaget och aggression, psykologiska problem, nuvarande sexuella dysfunktioner, barndomstrauma, nuvarande alkoholkonsumtion samt ålder vid första samlaget. Nätverksanalyser användes i avhandlingen för att undersöka associationerna mellan de inkluderade variablerna. Data samlades från en stor finsk populationsbaserad studie, och innehöll 1056 finska mäns svar på olika frågeformulär. Deltagarna delades in i tre lika stora grupper baserat på om de hade upplevt sexuella svårigheter under första samlaget eller inte (IP = inga problem, PFI = problem men som inte fortsatte och PF = problem som fortsatte). Avhandlingen var explorativ till sin natur, och det huvudsakliga målet var att generera nya hypoteser om manliga sexuella dysfunktioner under första samlaget. Två hypoteser formulerades. Den första var att en ökning i antalet kopplingar mellan variablerna skulle öka från IP gruppen till PF gruppen. Den andra var att splittringen inom nätverken skulle minska från IP gruppen till PF gruppen, vilket skulle synas genom att problemgrupperna skulle ha större och starkare kopplade kluster inom sig än de andra grupperna. Hypoteserna baserades på nätverksteorin om psykopatologier, som påstår att ett nätverk med högre antal kopplingar och lägre splittring är mera sårbart, vilket innebär att nätverket har en högre risk att bli självupprätthållande.

Ingen ökning i antalet kopplingar hittades mellan nätverken, vilket gick emot förväntningarna från hypotes ett. En signifikant strukturell skillnad hittades dock mellan IP gruppen och PF gruppen, och analyserna visade även på en lägre splittring i PF gruppen än i de andra grupperna, vilket ger stöd åt hypotes två. Visuella inspektioner av nätverken visade även på att män som hade upplevt bestående sexuella svårigheter från det första samlaget hade associationer mellan psykologiska problem och aggressiva tendenser samt sexuella svårigheter. Framtida forskning kunde bygga vidare på dessa resultat genom att göra klarare associationerna mellan sexuella dysfunktioner och aggressiva tendenser. Detta kunde utföras genom att med longitudinellt data undersöka huruvida aggressiva tendenser orsakar sexuella problem, eller om tidigare sexuella misslyckanden kan orsaka aggressiva tendenser.

Nyckelord: Första samlaget, sexuell ångest, erektil dysfunktion, prematur ejakulation, aggressiva tendenser, sexuell aggression, nätverksanalys

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1 Introduction

Usually occurring in late adolescence or early adulthood, the first experience of sexual intercourse is a formative and important experience in most people's lives. It signifies the beginning of a person's sexual and reproductive life. (Heywood, Patrick, Smith, & Pitts, 2015). Numerous studies have examined how different variables, such as age at first intercourse, substance use, and mental health during first intercourse impact a person's development (Bingham & Crockett, 1996; Crockett, Bingham, Chopak, & Vicary, 1996; Heywood et al., 2015; Zimmer-Gembeck & Helfand, 2008). However, few studies have tried to examine which factors might be associated with sexual difficulties during first intercourse and how these sexual difficulties influence an individual later in life (Rapsey, 2014). Furthermore, not much is known about if and how sexuality-related difficulties are associated with anger and aggressive behaviors and tendencies, even though some studies have found an association between the two (Gebhard, Cattaneo, Tangney, Hargrove, & Shor, 2019; Levy, 2002). Another important question concerns the possible associations between aggressive tendencies, sexual aggression and the experience of sexual difficulties during first sexual intercourse, an association that the present study attempted to elucidate.

1.1 Male sexual dysfunctions

Sexual dysfunction poses a big problem for many men and is a problem that often goes undiagnosed and untreated. The International Classification of Diseases -11 (World Health Organization, 2018) defines sexual dysfunctions as the various ways in which an individual is unable to participate in a sexual relationship as he or she would wish. The dysfunction must occur frequently, have been present for several months and cause significant distress to the affected individual (World Health Organization, 2018). Sexual dysfunction in men can, for example, be an inability to achieve a satisfactory erection, an experience of loss of control over orgasmic functioning, or a decrease in libido or desire. The present study focused on the two most common male sexual dysfunctions: erectile dysfunction and premature ejaculation (Laumann, Paik, & Rosen, 1999; Santtila, Sandnabba, & Jern, 2009).

Erectile dysfunction. Erectile dysfunction (ED) is defined by the ICD-11 as the inability to achieve or maintain an erection long enough for sexual activity (World Health Organization, 2018). Erectile dysfunction is more common in older individuals; studies have shown a prevalence of 52% in a sample of 40-70-year-olds (Feldman, Goldstein, Hatzichristou, Krane, & McKinlay, 1994). In younger individuals, the prevalence has been shown to be around 13% – 30% (Mialon, Berchtold, Michaud, Gmel, & Suris, 2012; Musacchio, Hartrich, & Garofalo, 2006). Prevalence for erectile problems during the first intercourse was found to be 15%, with a prevalence rate that was positively correlated with the age of first intercourse (Santtila, Sandnabba, & Jern, 2009).

ED is strongly associated with aging, meaning that older men are more likely to experience problems with ED. This correlation is likely explained by an increase in physical health problems, such as diabetes or cardiovascular diseases, that are more common in older men. ED in younger men is commonly associated with lifestyle-related factors (such as being overweight), medical conditions, pharmacological agents (Bortolotti, Parazzini, Colli, & Landoni, 1998), and is furthermore more closely linked with different psychological factors (Jern, Gunst, Sandnabba, & Santtila, 2012). Mental health is associated with ED in a bidirectional way, where mental health issues causes ED and ED causes mental health issues (Berchtold et. al., 2012; Niolu, Lisi, & Siracusano, 2018), and occurs comorbidly with both depression and anxiety (Jern, Gunst, Sandnabba, & Santtila, 2012; Latini, Penson, Wallace, Lubeck, & Lue, 2006; Rajkumar & Kumaran, 2015). Negative affect during first intercourse was also found to be associated with higher rates of ED (Santtila, Sandnabba & Jern, 2009). The same study also found that ED correlated with intoxication, not knowing the partner, not wanting to have intercourse and group pressure. An association between early sexual intercourse and ED has also been reported, but this correlation seems to decrease with time and experience for most men (Jern, Gunst, Sandnabba, & Santtila, 2012).

Premature ejaculation. Premature ejaculation (PE) is difficult to clinically define, but is generally defined as the inability to control ejaculation long enough for the enjoyment of both partners (World Health Organization, 2018). What seems to be essential in most definitions of PE are the three dimensions of timing, lack of control

and stress (Jannini et al., 2015). Timing stands for how long after penetration ejaculation occurs, stress represents the negative personal consequences that PE can have, and lack of control is the sensation that the individual loses control over when one ejaculates (Jannini et al., 2015). The prevalence of PE ranges from around 4% (when an ejaculation latency time of under one minute during most intercourses is included in the definition) to around 30% (when only subjective PE indicators, such as worrying about ejaculatory function or a perception that ejaculation occurs too quickly are measured; Althof et al., 2014). PE has negligible association with age and, if anything, appears to get slightly worse with increasing age (Porst et al., 2006).

PE is associated with decrements in mental health, and comorbidities with anxiety and depression are common (Berchtold et. al., 2012). However, a longitudinal study only found weak associations between PE and indicators of psychopathology, and these did not seem to be stable over time (Ventus, Gunst, Kärnä, & Jern, 2017). Additionally, strong positive affect during intercourse have been shown to increase PE, possibly because positive affects raise the level of excitement, which increases the possibility of PE (Santtila, Sandnabba & Jern, 2009).

1.2 The first sexual intercourse

The first experience of sexual intercourse stands as a formative part of an individual's development, and for men in Finland, it usually occurs around the age of 17 (Johansson et al., 2013). Why is the sexual debut of special importance? The life course perspective, introduced by Elder (1998), suggests that the timing of special milestones, such as first intercourse, are essential for the trajectory of the person's development. Milestones that occur off-timing can therefore have ramifications for future development. Another theory, sexual self-schema (Andersen, Cyranowski & Espindle, 1999), proposes that sexual self-schemas are developed prior to and during the first sexual experiences, and influence how, when and why one has sex in the future. Different factors, such as age of first intercourse, friends' and family's attitude towards sexuality, and the context and quality of the sexual experience, can therefore influence the schemas that a person develops regarding sex and sexuality.

Zimmer-Gembeck and Helfand (2008) conducted a systematic review where they studied how physical development, problem behaviors, school-related behaviors and attitudes, sex-related attitudes, religious behavior and attitudes, mental health, and family and peer factors, including status and qualities of relationships predated and correlated with the age of sexual debut. They found a correlation between having made one's sexual debut under the age of 15 and aggression, alcohol use, and poorer academic results in boys (Bingham & Crockett, 1996; Kinsman, Romer, Furstenberg, & Schwarz, 1998; Whitbeck, Yoder, Hoyt, & Conger, 1999). Studies have also found that younger initiators of first sex are more likely to experience a more diverse sexual life, with more sexual partners and different sexual practices (Heywood et.al., 2015; Zimmer-Gembeck & Helfand, 2008). Another systematic review found a relationship between a young age of first intercourse and increased likelihood of psychological problems (Mota, Cox, Katz, & Sareen, 2010). The authors hypothesized that sexual intercourse might be more mentally distressing to younger individuals due to high expectations, peer pressure, the increased likelihood of involvement of alcohol and less stable relationship with the sexual partner. Due to the associations between age of first sexual intercourse and problem behaviors, an adolescent who has sex earlier when compared to peers is more likely to have more developmental and current problems when compared with peers who initiate sex at an older age (Jessor & Jessor, 1977; Zimmer-Gembeck & Helfand, 2008).

First intercourse and sexual dysfunctions. Research has shown that sexual dysfunctions have a myriad of correlates, for example psychological problems, substance use, somatic health and relationship quality. However, less is known about the association between specifically first sexual experience of intercourse and sexual difficulties later in life. A study by Sandfort, Orr, Hirsch, and Santelli (2008) found an association between the timing of the sexual debut and sexual difficulties. They found that men who initiate sexual intercourse later or earlier than peers were at an increased risk for sexual difficulties. However, they concluded that the relationship could be due to other variables, such as alcohol consumption during first intercourse or anxiety over late debut. Studies by Else-Quest, Hyde and DeLamater (2005) and Rapsey (2014) examining sexual dysfunctions during first sexual experience in both men and women gave support to this theory. No direct association between age of first intercourse and sexual difficulties was found, instead they found that the

emotional quality of first sex (how well known the sexual partner was) and how well communication worked between the partners, seemed to be of greater importance. As previously stated, sexual debut at a younger age is related to higher alcohol consumption and less stable relationships, all factors that can affect the emotional quality of sexual intercourse negatively (Else-Quest, Hyde, & DeLamater, 2005; Rapsey, 2014). Other studies have, however, found an association between higher age at first intercourse and erectile dysfunction, possibly due to more relaxed attitudes towards sexuality and less sexual guilt in men who have an earlier age of sexual debut (Else-Quest, Hyde & DeLamater. 2005; Santtila, Sandnabba, & Jern, 2009).

The previously mentioned sexual self-schema theory, proposed by Andersen, Cyranowski and Espindle (1999), might give an insight into how sexual dysfunctions experienced during first intercourse might persist. Andersen and colleagues (1999) defined the sexual self-schema as something that is created during earlier experiences and that manifests in present experiences. The schemas help the processing of sexually relevant social information, and give a framework for sexual responses, affects and behavior. To clarify, the sexual self-schemas, created during early sexual experiences, influence later sexual experiences and may be the reason for sexual difficulties, especially if the schemas are based on negative experiences. Negative self-schemas might instigate a negative loop of self-fulfilling prophecies, where a person, based on previous experiences, expect to have negative experiences during sexual intercourse, which worsens the experience (Rowland, Kostelyk, & Tempel, 2016).

1.3 Sexual aggression, aggressive tendencies and links to sexual dysfunctions

Fite, Richey, Dipierro, Brown, and Bortolato (2016) found that proactively aggressive men were more inclined to risky sexual behavior, including having a higher number of sexual partners and less frequent use of contraception. Men who were more inclined to reactive aggression were more likely to have a lower number of lifetime partners. Men with reactive aggressive tendencies also had a higher tendency to experience shame over their aggressive behavior. Gebhard, Cattaneo, Tangney, Hargrove, and Shor (2019) further examined how shame-related responses

based on threatened masculinity related to physical aggression. They found that men who responded with expressions of shame when confronted with situations perceived as threatening to their masculinity had a higher tendency to physically aggressive behavior.

Feiring, Simon, and Cleland (2009) found that individuals who suffer from internalizing problems (e.g., post-traumatic stress syndrome and depressive symptoms) following childhood sexual abuse displayed more aggressive behaviors when dating. Another study, focusing on men specifically, found a similar link between suffering childhood sexual abuse and sexually aggressive behavior in adulthood (King, Kuhn, Strege, Russell, & Kolander, 2019). Participants with experiences of childhood sexual abuse were found to be more likely to have tried or succeeded in either coercing someone into having sex or rape. King and colleagues (2019) also found associations between other forms of childhood maltreatment, physical or emotional, and sexually aggressive behavior.

Aggressive tendencies and sexual dysfunctions. Most of the research on sexual aggression has been performed on male samples, since sexually aggressive acts are mainly committed by men (Ybarra & Mitchell, 2013). Studies have shown ED to be related to increasing anger in men who suffer from it (Levy, 2002). Men with high tendencies for anger suppression or anger expression were more likely to suffer from erectile problems. The same study also found that a low desire for dominance (i.e., a desire to influence and control people around them) was associated with more erectile problems (Feldman, Goldstein, Hatzichristou, Krane, & McKinlay, 1994).

1.4 Network perspective on psychopathology

The network perspective on psychopathology is a theoretical framework that aims to give a new way of looking at psychological problems. It conceptualizes psychological problems as a dynamic system of symptoms interacting with each other. Instead of searching for the underlying “common cause” behind psychological disorders, the network perspective proposes that psychological disorders emerge from causal interactions of symptoms in a network (Borsboom, 2017).

Consider Jake, a hypothetical man suffering from ED with loss of sexual desire and problems maintaining an erection, a low tolerance for stress, a habit of drinking too much alcohol, and a habit of reacting with anger to sexual disappointment. Jake might be doing fine when he can keep the stress he experiences to a minimum, but prolonged experiences of stress increases his symptoms of ED and his propensity to drinking. A network conceptualization of Jake's problems might give more insight into the difficulties he experiences. Through the network perspective, Jake's problems are not caused by underlying biological factors, but by the interplay of the variables in the network.

In a symptom network, the different symptoms and other relevant variables are called *nodes*. Nodes that affect each other are connected by *edges* (i.e., statistical associations, typically partial correlations) that indicate the associations between the nodes. Events not in the network can also influence nodes in the network, which in turn may "activate" the rest of the network (Borsboom, 2017). The conceptualization of Jake's symptom network would involve nodes representing loss of sexual desire, problems maintaining an erection, alcohol consumption and aggressive tendencies. The nodes in his network do not affect each other when stress levels are low, but do so when levels of experienced stress increase. For example, an external factor, such as stress experienced from a high workload, might activate nodes in the network, which in turn activates the other symptoms in the network, causing Jake to suffer the symptoms of ED, drink more and react more aggressively to difficulties (Cramer, van Borkulo, Giltay, van der Maas, Han, Kendler, Scheffer, & Borsboom, 2016).

When sexual dysfunctions are not organic in etiology, one questions become especially vital; what is maintaining the sexual dysfunction? Sexual self-schemas and self-fulfilling prophecies are examples of ideas that propose negative feedback loops and cognitive schemas that help instigate and uphold the dysfunctions (Andersen et. al., 1999). The network perspective on psychopathology is also centered on the idea of self-sustaining feedback loops. Networks vary in *connectivity* (i.e., the strength of the correlations between nodes), and networks with strong connectivity risk becoming self-sustaining more easily (Borsboom, 2017; Cramer et al., 2016). Jake's difficulties are highly dependent on the amount of stress he experiences, so that the nodes only affect each other when levels of stress are high, but do not affect each other when stress decreases. Such is a network with weak connectivity. Another hypothetical person, Charles, might experience the same

problems as Jake, but, due to increased vulnerability, in this case caused by childhood maltreatment, have a higher connectivity in his network. For Charles, decreased levels of stress would not help because other variables, once activated, maintain the activation of the network and increase stress, for example, so that ED symptoms increase the amount of stress he experiences. Nodes that strongly interact with each other can gather in communities inside the network. Due to the high connectivity found in communities of nodes, it is theorized that a higher likelihood of system activation is present inside the community. Nodes also vary in *centrality*, which indicates how important a single node is in the network. Central nodes influence the network more than nodes with low centrality (Borsboom, 2017).

The etiology behind most male sexual dysfunctions is unclear. A myriad of organic, biological, social and psychological factors functions together to generate sexual dysfunction. By studying what variables factor into the development and sustaining of sexual dysfunctions with the help of networks, new insight might be gained about how to help people that are stuck in a loop of network activation. Network analysis can be performed on a single individual with data gathered from several different times, or as a cross-sectional analysis of a phenomenon. The present study will utilize the latter method.

1.5 Aims and hypotheses

The aim of the present study was to examine the associations between problems during first experience of sexual intercourse and aggression, sexual difficulties and psychological difficulties in males by using network analysis. The participants, amassed from a large population-based sample, were divided into three different groups based on their retrospectively self-reported experiences during their first sexual intercourse. The three groups consisted of:

1) men who reported no occurrence of sexual dysfunctions or problems
2) men who reported experiencing sexual dysfunction or problems that did not persist over time
3) men who reported experiencing sexual dysfunctions or problems, which persisted over time

Variables measuring sexual dysfunctions in men and variables relevant to sexual difficulties, such as depression and anxiety, sexual distress, age of first intercourse, alcohol consumption and childhood maltreatment, were included in the study. The study also included variables measuring aggression, anger and sexual aggression, in order to examine whether the relationships between these variables differed between the groups.

The present study was exploratory in nature, since so few studies have studied the relationship between problems during first sexual experience of intercourse, aggressive tendencies and the other variables relevant to sexual dysfunction. A main aim of this study was to develop hypotheses for scrutiny of male sexual dysfunctions during first intercourse by examining the central variables and their connections to other variables. The information gained could also help highlight central symptoms that might sustain problems developed during first sexual intercourse and give insight into possible ways of stopping the self-fulfilling prophecies of people stuck in bad loops.

Because sexual difficulties have been linked to a number of other difficulties, such as mental health problems and alcohol consumption, the first main hypothesis of the present study was that the connectivity of the networks would be increased in the group of people experiencing persisting problems. This would mean that the group with persisting problems would have more associations, or stronger edges, between different variables in the network. This hypothesis is also in line with the network theory of psychopathology, which states that more strongly connected networks have a higher risk to develop prolonged symptom activation. The second hypothesis concerned the fragmentation of the networks. Network theory states that symptoms that are closely related can form communities, where symptoms more easily activate each other. It was thus hypothesized that networks of people with more sexual difficulties would have less fragmented networks (i.e., the nodes in the networks with sexual difficulties would form bigger and more interconnected communities).

2 Methods

2.1 Participants

The network analyses in the present study were performed on a sample of 1,056 men between the ages of 18 and 46 years (*M* = 26.5, *SD* = 4.5). Questionnaire responses from men, who had taken part in a large-scale Finnish population-based study (the Genetics of Sexuality and Aggression study; see Johansson et al., 2013), composed the basis for the sample. In the Genetics of Sexuality and Aggression study (GSA), conducted at Åbo Akademi in Finland 2006, a questionnaire was sent out to all Finnish speaking twins between the ages of 18 and 33 and living in Finland, and to their siblings above the age of 18. An ethical research permit was obtained for the original data collection from the Ethics Committee of Åbo Akademi University, in accordance with the Helsinki Declaration. The purpose of the study was clearly described, and the voluntary and anonymous nature of the participation emphasized. Written informed consent was obtained from all participants.

The focus of the present study was on male sexual dysfunctions; therefore, all female respondents were excluded from the analysis. The sample originally consisted of 3,331 men (see flowchart in Figure 1). One individual per family was selected randomly to avoid statistical bias resulting from genetical relatedness. Additionally, network analysis requires full data from all participants, so individuals with quantitative variables with missing data were either deleted or imputed, depending on the amount of missing data (this process is more thoroughly described in chapter 2.3.1). An essential aspect when comparing differences between networks is that the sample size for each subgroup is of equal size. Different sample sizes would affect the estimated network structures, potentially leading to biased estimations. (Epskamp & Fried, 2018). To avoid this, we randomly selected 352 participants (based on the smallest group) from all three subgroups, giving us a final sample of 1,056.

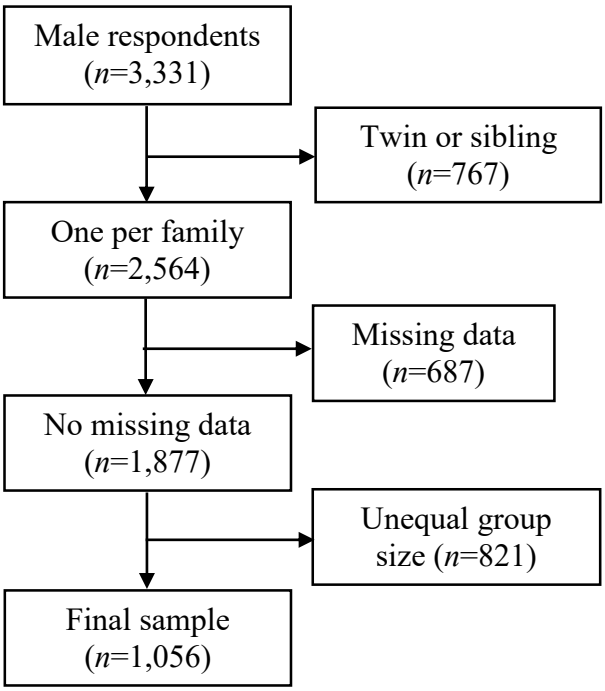


Figure 1. Exclusion process for network analysis. Arrows to the right indicate individuals who have been excluded from the analyses.

2.2 Measures

The variables included in the present study were premature ejaculation, erectile dysfunction and sexual distress to measure sexual function; experienced childhood maltreatment; sexual aggression and aggressive tendencies; depression and anxiety symptoms; alcohol consumption; and age of first sexual intercourse. These were chosen based on relevance to the field of male sexual dysfunctions and first sexual experience of intercourse, as described in the introduction.

Premature ejaculation. The Multiple Indicators of Premature Ejaculation, or MIPE, was used to measure the participants' subjective experience of premature ejaculation (Jern, Piha, & Santtila, 2013). The MIPE consists of seven items that measure the three central themes for PE: the sense of control over when to ejaculate, self-reported ejaculation latency time and worrying over premature ejaculation. The items on the MIPE scale was computed into a composite score that ranged from 7 to 28, with

higher values meaning more pronounced PE symptoms. Previous studies have shown this test to have good reliability and good ability to distinguish between patients with PE and control groups (Jern et al., 2009; Jern et al., 2013). The internal consistency of MIPE for the sample of the present study was low (α = .59).

Erectile dysfunction. The 5-item version of the International Index of Erectile Function (IIEF-5; Rosen, Cappelleri, Smith, Lipsky, & Peña, 1999; IIEF; Rosen, Riley, Wagner, Osterloh, Kirkpatrick, & Mishra, 1997) was used to measure erectile dysfunction. The five items chosen from the original IIEF focus on erectile dysfunction and intercourse satisfaction and was selected based on capacity to distinguish between the presence or absence of ED. The items measure confidence in maintaining erection, ability to maintain erection, frequency in ability to maintain erection, the firmness of the erection and satisfaction with intercourse (Rosen et al., 1999). The IIEF-5 consists of 5 Likert-type questions with a range from 1-5, where lower scores means more problems. The items were calculated into a composite variable that had a range from 1-25, and to facilitate interpretations of the network analysis, higher scores were calculated to represent more problems. The IIEF-5 has shown good psychometric properties, with high specificity, sensitivity and inter-rater reliability (Rosen et al., 1999). The internal consistency of the IIEF-5 scale was excellent in the present sample (α = .90).

Sexual distress. The Female Sexual Distress Scale **(**FSDS; Derogatis, Rosen, Leiblum, Burnett, & Heiman, 2002), made gender neutral and named Sexual Distress Scale (SDS; Santos-Iglesias, Mohamed, Danko, & Walker, 2018) was used as a measurement of sexual distress. The items included in the analysis measured if the participants, during the last four weeks, had felt stressed, anxious, guilty, embarrassed or dissatisfied with their sex life, and if they had felt sexually inadequate or if they had had regrets about their sexuality. The original questionnaire contained 12 items, a shortened version with seven gender-neutral items (items 1, 3, 5, 8, 9, 10 and 11) was used in the present analysis. Responses were given on a Likert-scale ranging from 0 to 4, with higher scores indicating more sexual distress, and a composite variable with a range of 0 to 28 was created by summing the items together. Studies have shown SDS to have good psychometric properties on both male and female samples (Santos-Iglesias et al., 2018; DeRogatis, Clayton, Lewis-

D'Agostino, Wunderlich, & Fu, 2008; Derogatis et al., 2002). The internal consistency of the SDS was good (α = .88).

Psychological distress. The participants' levels of anxiety and depression were measured with the subscales from the Brief Symptoms Inventory-18 (BSI-18; Derogatis & Melisaratos, 1979). The subscales consist of six items that measure symptoms of depression and six items that measure symptoms of anxiety in the last seven days. The items were rated on a Likert-scale that ranged from 0 (*not at all)* to 4 (*extremely),* and were summed into two separate composite variables, one measuring depression and one measuring anxiety, both ranging from 0 to 24 were a higher score means more symptoms. The subscale measuring depression showed a good internal consistency (α = .85), as did the subscale for anxiety (α = .85).

Alcohol consumption. The Alcohol Use Disorders Identification Test for Consumption (AUDIT-C; Bush, Kivlahan, McDonell, Fihn, & Bradley, 1998) was used to measures the participants' alcohol consumption. AUDIT-C is the subscale of AUDIT that measure consumption and consists of three Likert-style questions measuring amount and frequency of alcohol intake. These three questions were summed into one composite variable that ranged from 1 to 12, were a higher score indicated a higher consumption. The AUDIT has been shown to be a reliable and valid measure of problematic alcohol use (Allen, Litten, Fertig, & Babor, 1997; Reinert & Allen, 2002*),* and the AUDIT-C has shown to be equally good as the AUDIT at detection heavy drinking (Bush et al.,1998). In the present sample, AUDIT-C had a low internal consistency (α = .42), which is perhaps unsurprising given that the composite variable contained only three items.

Aggressive behavior. The verbal and physical aggression subscales from Buss' and Perry's (1992) Aggression Questionnaire (AQ) was used to measure self-evaluated aggressive tendencies. The AQ originally contains 29 items that measure verbal (5 items) and physical (9 items) aggression, anger (7 items) and hostility (8 items). The 14 items from the physical and verbal aggression subscales used in the analysis were on a Likert-style scale ranging from 1 (*extremely uncharacteristic of me*) to 5 (*extremely characteristic of me*). A composite variable for aggressive behavior was calculated by summing the items together, with a range from 14 to 70, were a higher

score equaled more aggressive behavior. The AQ has shown to have a good reliability for both test-retest correlations and internal consistency and has also shown good construct validity by relating to other self-evaluated aggression scales (Buss & Perry, 1992; Harris, 1997). The internal consistency in the present sample was good (α = .83).

Trait anger. The Trait Anger scale from the State-Trait Anger Expression Inventory second version (STAXI-2; Spielberger, 1999) was used to measure the participants' trait anger. The Trait Anger scale is a self-report questionnaire that involves 10 questions on a Likert-style scale ranging from 1 (*almost never*) to 4 (*almost always*). The questions measure how a person generally feels or reacts, with a focus on aggression and anger. A composite variable, ranging from 10 to 40, where a higher value meant higher trait anger, was created by summing together the items. The STAXI-2 Trait Anger scale has previously shown to have good psychometric properties (Deffenbacher, Oetting, Lynch, & Morris, 1996; Spielberger, 1999). In the present study, the scale had a good internal consistency (α = .82).

Sexual aggression. Sexual aggression was measured with a scale that was developed by Malamuth (1989) and modified by Johansson and colleagues (2013) for the GSA study. The scale, called Male Interest in Coercion scale (MIC) in the present study, was based on the short version of the Attraction to Sexual Aggression Scale (ASA; Malamuth, 1989) and included nine items that measured male's interest in and fantasies about sexually coercive behavior. The MIC questionnaire was made gender-neutral and included more forms of sexual penetrative activities than the original scale. Three items (items 3, 4 and 8) had scales ranging from 0% to 100% in increments of 10%, four items (items 5, 6, 7 and 9) had Likert-style scales ranging from 1 (*very unlikely*) to 7 (*very likely*), one item had a Likert-style scale ranging from 0 (*never*) to 2 (*often*) and one had a Likert-style scale ranging from 1 (*very repulsing*) to 4 (*very tempting*). These were all summed together to create a composite variable with a range of 5 to 64 for MIC, where a higher score meant more interest in coercion. The ASA was found to have good psychometric properties, with good measures of internal consistency, construct validity and test-retest reliability (Malamuth, 1989; Voller, Long, & Aosved, 2009). The MIC scale had a good internal consistency (α = .83).

Childhood maltreatment. To measure the participants self-evaluated experiences of childhood maltreatment I used the short version of the Childhood Trauma Questionnaire (CTQ-SF; Bernstein et al., 2003). The CTQ-SF is comprised of 28 items, grouped into six different subscales. Each subscale contains five items, except for a minimizing/denial subscale that contains three items. The minimizing/denial has been shown to be of questionable relevance for research purpose and was for such reasons excluded from the analysis (Gerdner & Allgulander, 2009; MacDonald, Thomas, MacDonald, & Sciolla, 2015). The five subscales of the CTQ-SF included in the analysis were physical abuse, physical neglect, emotional abuse, emotional neglect and sexual abuse, each with five Likert-style questions ranging from 1 (*not at all)* to 5 (*very often*). Items where lower scores indicated more problems were reversed (in total seven items), and five separate composite variables were calculated, each one ranging from 5 to 25, where higher scores indicated more childhood maltreatment. The CTQ-SF has shown good psychometric properties, with good validity in clinical samples and good internal consistency (Gerdner & Allgulander, 2009). The construct validity of the CTQ-SF subscales has also shown to be good, except for physical neglect, which has shown to be more questionable (Gerdner & Allgulander, 2009). The internal consistency was good for emotional neglect and sexual abuse ($\alpha = .84$ and $\alpha = .80$ respectively), acceptable for emotional abuse ($\alpha = .77$), questionable for physical abuse ($\alpha = .65$) and poor for physical neglect ($\alpha = .56$).

Other variables. Age of first intercourse was asked for from the participants and included in the analysis.

2.3 Statistical analyses

2.3.1 Data preparation

IBM SPSS statistics 25 for Mac was used to impute missing data, compute descriptive statistics and to prepare the data set for the network analysis. Quantitative variables with missing data were imputed based on intra-scale information using the Expectation Maximization procedure of the Missing Value Analysis module in

SPSS. By using imputation based on intra-scale information, participants with more than 50% of missing data on a single scale were excluded before imputation (this was done to avoid biases in the imputation due to lack of sufficient amount of data). No imputation was done for the grouping variable or the variable "age of first intercourse", as these variables were not part of any scale; participants with missing data for these variables were excluded from statistical analyses.

The participants were subsequently asked if they had experienced any difficulties or problems during their first experience of sexual intercourse and were then divided into three separate groups depending on their answers on the question "did any of these problems persist?". The response options for this question were "the problems did not persist", "the problems continued", "there were no problems" and "have not had sex again". Those who answered that they had not had sex again were excluded from the analysis (n = 9), and the rest were arranged, based on their answers, into three groups. To aid with the readability of the text, the groups will henceforward be called *NP* (no problems), *PnP* (problems did not persist), and *PP* (problems persisted). The groups were subsequently made equal in size to allow for quantitative comparisons, and 352 (based on the PP-group, which was the group with least participants in it) participants per group were selected randomly.

Correlations were calculated between the grouping variable and the rest of the sample. This was done to identify possible strong correlations between the grouping variable and the other variables used in the network analyses, since such correlations could produce biases and uncontrolled dependencies in the analyses. Finally, descriptive statistics for each group were calculated.

2.3.2 Network analysis

The network analyses were performed with the free software environment R 3.6.1, using R Studio version 1.2.335 (R Core Team, 2018). Additionally, four free-to-use statistical packages where used for the analysis: *bootnet* (Epskamp, Borsboom, & Fried, 2018), *qgraph* (Epskamp, Cramer, Waldorp, Schmittmann, & Borsboom, 2012), *igraph* (Csárdi & Nepusz, 2014) and *NetworkComparisonTest* (NCT; van Borkulo et al., 2016). All R code to replicate the analyses performed in the present study, and their associated outputs, can be found in the Appendices section.

Network estimation and visualization. The networks for each problem group were estimated using the *bootnet*-package according to the instructions given in the tutorial by Epskamp and Fried (2018). Three Gaussian Graphical Models (GGM), one for each of the problem groups, where fitted to the data to visualize partial correlation networks. In the GGMs, variables are represented by nodes, the partial correlations between variables are represented by edges and the partial correlation coefficients are represented by edge weights. If the partial correlation coefficient between two nodes is exactly zero, no edge will be drawn between them, indicating that they are independent from each other when controlling for all the other variables in the network. That means that if an edge is drawn between two nodes, one can assume a relationship between these nodes that is not explained by any other variable in the network (Epskamp & Fried, 2018).

Due to sampling variation, the partial correlations found in the network analysis are never exactly zero. Variables that are conditionally independent in the true network still exhibit weak partial correlation, so called spurious or false positive edges. To combat these type 1 errors, and to make the networks more interpretable, we used the "Least Absolute Shrinkage and Selection Operator" regularization technique (LASSO; Tibshirani, 2011). The LASSO limits the sum of the partial correlation coefficient, so that all coefficient shrinks, and some become exactly zero. This creates a sparse network, where probable spurious edges are removed (Epskamp, Kruis, & Marsman, 2017). The aim of the sparse network is to minimize problems of specificity, in other words false positives, but is in the process of doing so more vulnerable to problems of sensitivity, in other words false negatives. A tuning parameter, λ (lambda), was used to determine the level of sparsity of the network. A higher λ equals more edges removed and a sparser network. The LASSO generates several networks for different values of λ, and subsequently Extended Bayesian Information Criterion model selection (EBIC; Foygel & Drton, 2010) was used to choose the model with the best fit for the data, with as few problems of sensitivity and specificity as possible. The EBIC uses a hyperparameter γ (gamma) that controls for the simplicity (amount of edges) of the model the EBIC chooses. As with the λ, a higher value on γ lead to a model with less edges. The γ was set to 0.5 in the present analysis, as by the recommendations of others to stay on the side of caution and favor excluding true edges than including spurious ones (Epskamp & Fried, 2018; Foygel & Drton, 2010). The present analysis used the *glasso* (graphical

LASSO) in combination with the EBIC model selection as described by Foygel and Drton (2010), called via the *bootnet*-package.

Partial correlation networks must meet the assumption of multivariate normality. The assumption of normality can however be relaxed, if one can make the assumption that the observed data are a transformation of a latent multivariate normally distributed system. As the present study was based on ordinal data from non-normal questionnaire responses, I used the *bootnet*-package function "cor_auto" for polychoric and polyserial correlations to detect and transform the ordinal variables to adjust for the assumptions of multivariate normality.

The three networks in the present analysis were visualized using the *qgraph*-package, and the layouts were determined by the the Fruchterman-Reingold algorithm. This algorithm organizes the data so that nodes that are connected attract each other and nodes that are not connected reject each other. An average layout was used for all three networks, to facilitate visual interpretation of the networks.

Network centrality and accuracy. After estimating and visualizing the networks, the *qgraph*-package was used to produce centrality indices, which were used to further analyze the different aspects of the networks. Node centrality aids in exploring and analyzing how individual nodes influence the network. Nodes with high centrality have a lot of predictive power in the network (Epskamp et al., 2018). The most common centrality measures are strength (the sum of absolute edge weights connected to a node), closeness (the inverse of the sum of distances from one node to all other nodes in the network) and betweenness (measures how often a node is in the shortest paths between other nodes). However, as argued by Bringmann and colleagues (2019), the centrality measures closeness and betweenness seem to lack relevance in networks estimated on psychological variables. Therefore, I came to the conclusion to only include the strength measurement of centrality in the analyses.

The strength of the nodes was calculated and then compared within the groups. A non-parametric case-dropping subset bootstrapping test was performed before analyzing the strength estimates. This was done to measure the stability of the strength estimates. The case-dropping bootstrap was performed by re-evaluating the centrality parameters several times by dropping cases (participants) from the data and correlating these subsets of the data with the original, full data set. If the

correlations in the centrality parameters would drop drastically between the subsets of the data and the original data, it would indicate that the strength measurement was unstable and prone to error. The stability was quantified by calculating the *correlation stability coefficient* (CS-coefficient; Epskamp et al., 2018), which represents the maximum amount of cases that can be dropped before the 95% confidence interval drops below 0.7. The CS-coefficient should preferably be above 0.5, but at least above 0.25 (Epskamp, Borsboom, & Fried, 2018). The significance of the difference in node strengths between the three networks was also tested for.

Following the centrality analyses, the accuracy and stability of the edge weights were tested. To visualize the accuracy of the edge weights, the *bootnet*-package was used to compute an edge stability plot for each group. The edge stability plots were calculated with 95% bootstrapped confidence intervals (CI), and in the plots, wide CI: s indicates an unstable network, where the estimated edge weight magnitudes varied a lot across the bootstrapped samples, and narrow CI: s indicates a more stable network with less variation. Bootstrapped difference tests were also performed and visualized through edge significance plots, to analyze and detect differences between edge weights inside the separate networks. The test was not able to infer if an edge significantly differed from zero. However, as earlier described, the regularization process included in the estimation of the networks does this automatically, as it shrinks low edges towards zero. Edges included after the regularization process were therefore automatically assumed to differ from zero.

Network comparison test. To compare entire networks with each other I used the Network Comparison Test (NCT), developed by van Borkulo and colleagues (2016). The test is a permutation test developed to test differences between two networks, and tests four separate hypotheses: differences in overall connectivity, differences in the structures of the networks, differences in centrality between the networks, and, if structural differences are detected, difference in the strength of specific edges between the networks. The NCT permutation test was used with 1000 iterations, and the Holm-Bonferroni correction was used to account for familywise errors when testing for hypothesis 3 and 4. Hypothesis one was tested by measuring the difference in global strength (M = the weighted absolute sum of all edges in the networks). Hypothesis two was tested by analyzing if the networks are structurally different by examining the present edges and their positive or negative values (S).

Hypothesis three was tested by examining if the centrality of the nodes significantly differed between the networks. Hypothesis four was tested by examining which specific edges showed significant differences between the groups. In the present analysis, NCT was performed three times: 1) comparing the NP group with the PP group, 2) comparing NP group with the PnP group, and 3) comparing the PnP group with the PP group.

Network communities. Additionally, I wanted to know if the networks featured any communities. To do this, community analyses were performed to determine the level of fragmentation, or the way nodes form sub-networks in the networks. The communities might also indicate the existence of a latent variable causing the covariance in the community (Epskamp & Fried, 2018). Visual and descriptive analysis of the communities where performed, and the *Walktrap* algorithm from the *igraph*-package (Csárdi & Nepusz, 2005) was used to explore the levels of fragmentation across networks. This algorithm tries to find communities by making short random walks inside the network (Pons & Latapy, 2006). After running several estimations with increasing number of steps, I chose to apply 200 steps in the community analysis, as it was the first number of steps which resulted in a stable amount of communities.

3 Results

3.1 Descriptive statistics and correlations

No strong correlations were found for the problem during first sex grouping variable (see Appendix for more information). The two strongest correlations found were between the grouping variable and sexual distress (r = .28) and the grouping variable and PE (r = .25). This was beneficial, as the absence of strong correlations between the grouping variable and the rest of the variables indicated that no confounding variable were likely to affect the estimations of the networks. Next follows descriptive data for all three networks (n = 352 for all groups) in Table 1.

Table 1

Descriptive Statistics for the NP, PnP, and PP Groups

	NP	PnP	PP
	M (*SD*)	*M* (*SD*)	*M* (*SD*)
PE	7.77 (2.86)	8.47 (2.95)	9.80 (3.71)
ED	3.98 (5.51)	4.37 (5.62)	6.65 (7.12)
Age of first sex	17.46 (2.80)	17.83 (2.41)	18.25 (2.81)
Anxiety	2.70 (3.18)	3.24 (3.91)	3.85 (4.01)
Depression	3.95 (4.02)	4.15 (4.03)	5.41 (4.50)
Aggression	29.24 (7.60)	29.17 (7.49)	28.89 (7.07)
Anger	17.19 (4.08)	17.23 (4.33)	17.15 (4.30)
Interest in coercion	11.89 (6.33)	13.07 (6.95)	13.60 (7.40)
Alcohol consumption	5.92 (2.33)	6.16 (2.28)	6.25 (2.37)
Sexual distress	4.88 (4.19)	5.73 (4.24)	8.45 (5.57)
Physical Abuse	6.94 (2.62)	6.82 (2.69)	6.81 (2.26)
Physical Neglect	6.60 (2.40)	6.41 (2.32)	6.54 (2.24)
Emotional Abuse	6.98 (2.89)	6.91 (2.75)	7.19 (2.95)
Emotional Neglect	8.89 (3.45)	8.64 (3.36)	9.29 (3.68)
Sexual Abuse	5.24 (1.48)	5.12 (0.55)	5.29 (1.16)

Note. M = mean; *SD* = standard deviation; NP = no problems during first intercourse; PnP = problems during first intercourse that did not persist; PP = problems during first intercourse that did persist; PE = premature ejaculation; ED = erectile dysfunction

3.2 Network comparison test

The network comparison test (NCT) was used to test for differences between the networks. The NCT found a significant difference in the structures of the networks between the NP group and the PP group ($M = .30$, $p < .05$). No other significant differences were found either in global strength or in the overall structure of the networks. The global strength value of the groups was: NP = 3.56, PnP = 3.02 and PP = 3.73. The differences in global strength between the NP group and the PnP group ($S = .54$, $p = .36$), the PnP group and the PP group ($S = .71$, $p = .18$) and the NP group and the PP group ($S = .17$, $p = .75$) were not significant. No differences in the structures of the networks between the NP and the PnP group were detected ($M = .27$, $p = .54$), and the same was true for the PnP and the PP groups ($M = .24$, $p = .81$). Neither the individual edges nor the strength centrality estimate for the different

nodes differed significantly between the groups. (See the Appendix for more information and numerical values).

3.3 Visual examination of the network structures

Upon observing the visual representation of the network, it was clear that the overall connectivity was relatively low (Figure 2). The nodes representing alcohol consumption and age of first intercourse lacked connections to any other node in either of the three networks, and all three networks had nodes unconnected to the rest of the networks. The networks did display a small difference in overall connectivity; the NP group and the PP group had 12 edges each, whereas the PnP group only had 9 edges.

Aside from differences, observations of the networks revealed several structural similarities between the networks. The similarities in the structural framework found between the networks included similar connection between the nodes depicting childhood maltreatment in the form of physical or emotional neglect or abuse. The amount of childhood maltreatment experienced was also found to be on comparable levels across the three networks (Table 1). Furthermore, aggression and anger were also connected in all networks, as was depression and anxiety. No edges were found to reverse their associations between networks. (See the Appendix for figures with numerical values for the partial correlations found between the nodes).

Connections between aggressive tendencies, psychological distress and sexual difficulties. The PP group was the only group where connections were found between psychological distress and both aggressive tendencies and sexual distress. This indicated that sexual distress and aggressive tendencies in the PP group might be connected through the nodes measuring psychological distress. However, since the directions of the edges are unknown, it is unclear whether a connection between sexual distress and aggressive tendencies exists, or if psychological distress represents causal endpoints for both associations. The associations were positive, indicating that more problems in one domain increased the amount of problems in the other domains. This group was also the only group to contain an association, in

this case a positive one, between the aggression and anger nodes and the node measuring interest in sexual coercion. This indicated that a higher interest in coercion was associated with having higher aggressive tendencies, which in turn was connected to the sexual dysfunction nodes via the nodes measuring psychological distress.

The two other groups had no connections between aggressive tendencies and any other included variables in the analysis. Also, they did not show any connections between an interest in sexual coercion and aggression or trait anger. The PP group was also the only group to have connections between sexual distress and both PE and ED, so that more sexual distress indicated more problems with both ED and PE, or vice versa. The PnP group had a connection between ED and sexual distress, but no connections to PE, while the NP group had a similar connection, but only between sexual distress and PE. Additionally, the PnP group was the only group not to show a connection between sexual distress and psychological distress. The other two groups showed connections between sexual distress and depression (PP) and sexual distress and anxiety (NP).

Connections between childhood maltreatment and psychological distress and sexual difficulties. The PP group was the only group not to exhibit any connections between the four nodes measuring physical or emotional neglect or abuse and the node measuring sexual abuse or with any of the other variables in the network. The two other groups had a connection between sexual abuse and emotional abuse, indicating that participants who had experienced more emotional abuse also had experienced more sexual abuse, or vice versa. Sexual abuse was not found to have any other connection in either of the networks (although it should be mentioned that the base rate of having experienced sexual abuse was very low in the present sample). Participants who had not experienced any problems during first intercourse were found to have the highest number of edges connecting childhood trauma to psychological distress and sexual difficulties. All edges were positive, showing that more emotional neglect was associated with more sexual distress, more physical neglect was associated with anxiety and that more emotional abuse was associated with more depression. The network of those who had experienced PnP revealed a connection between emotional abuse and anxiety.

Connection between alcohol consumption and age of fist intercourse. None of the networks found any connections with alcohol consumption at the time when participants answered the questionnaire and age of first sex and the rest of the variables. The two networks of the groups of people who had experienced problems during first intercourse did however locate a negative association between alcohol consumption at present time and age of first sex. This indicated that if one had experienced problems during first intercourse, a younger age of first intercourse was correlated with more alcohol consumption in the present.

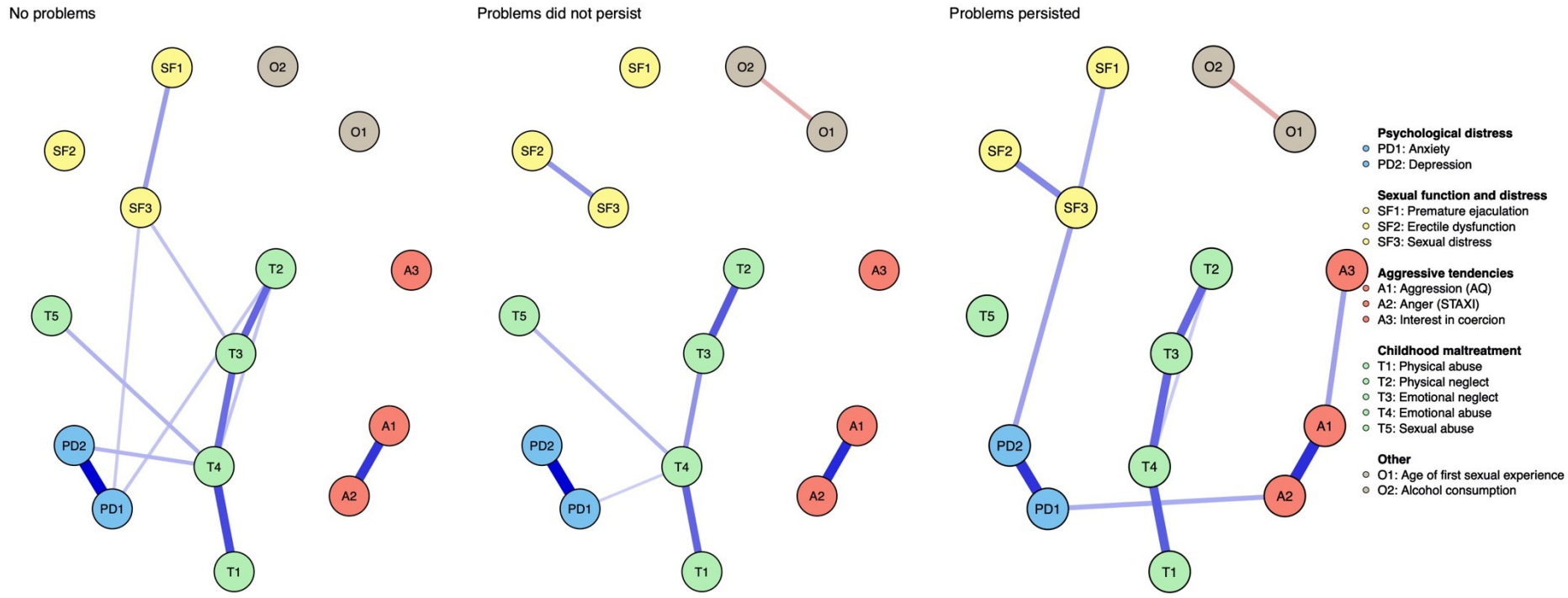


Figure 2. Visualization of the three problem networks.

3.4 Network communities

The community analysis discovered differences between the level of fragmentation and how the nodes cluster depending on the different networks. The number of communities in the different networks were: seven in the NP group, eight in the PnP group, and three in the PP group (Figure 3). This showed a decrease in fragmentation of the networks when difficulties experienced during first sexual intercourse persisted and indicated that the nodes in the network of those with persisting difficulties were more densely connected. The NP group and PnP group had similar amounts of communities, but they differed in the sizes and shapes of the communities.

The NP group consisted of two larger communities and five smaller ones. All five nodes measuring childhood trauma were included in the largest community, and the nodes measuring PE and sexual distress and the two nodes measuring psychological distress were included in the second largest community. One two node community was also identified, containing the nodes symbolizing aggression and anger. The rest were communities containing only a single node. Three associations were identified between the largest and second largest communities.

The PnP group had eight communities. The largest community contained three of the childhood trauma variables (sexual, physical and emotional abuse). Five communities with two nodes were also identified: one containing alcohol consumption and sexual debut age, one containing sexual desire and ED, one containing anger and aggression, one containing anxiety and depression, and one containing physical and emotional neglect. The remaining two communities contained one node each, sexual aggression and PE.

The PP group had three communities, one with nine nodes, one with four nodes and one with two nodes. The largest community included all three nodes measuring aggressive tendencies, both nodes measuring psychological distress, all three nodes measuring sexual function and distress and the node measuring sexual abuse. The second largest community included the four remaining nodes measuring childhood trauma, and the smallest community included alcohol consumption and age of first intercourse.

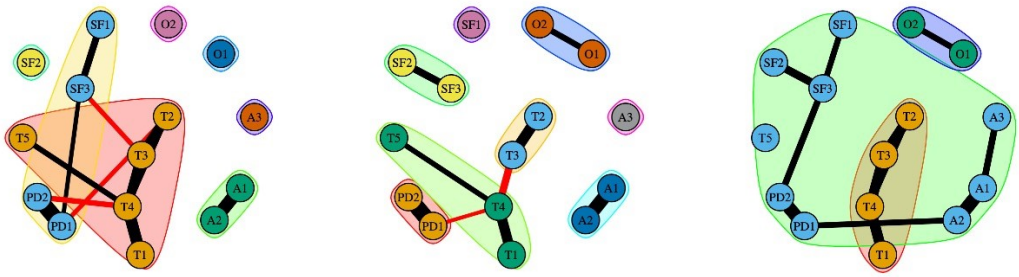


Figure 3. Node communities of the NP, PnP and PP groups. Different colors indicate different communities. Red lines between nodes indicate associations between different communities. PD1 = Anxiety; PD2 = Depression; SF1 = Premature ejaculation; SF2 = Erectile dysfunction; SF3 = Sexual distress; A1 = Aggression; A2 = Anger; A3 = Interest in coercion; T1 = Physical abuse; T2 = Physical neglect; T3 = Emotional neglect; T4 = Emotional abuse; T5 = Sexual abuse; O1 = Age of first sexual experience; O2 = Alcohol consumption.

3.5 Strength centrality and stability

Plots for the standardized strength centrality for the different nodes of the three problem networks are found in Figure 4. The node representing emotional abuse was found to have the highest strength centrality in all three networks, and all three networks found low strength centrality for the nodes representing sexual abuse, alcohol consumption, interest in coercion, PE, ED and age of first sex. The strength centrality indices followed similar patterns across the three networks, with variations that were small and, as the NCT results showed, not significant. Interesting, even though non-significant, differences between the groups included a reversal of importance for PE and ED in the NP group and the PnP group and a fairly large differences between the three networks in the importance of the nodes representing sexual distress, aggression and anger, where PP following first sex signified a higher importance of these nodes in the network.

The node strength comparison test (see appendix for plots) found that the node emotional abuse was significantly higher in strength than all except for two nodes in the NP group. The difference in strength centrality was not as clear in the two other groups. Emotional abuse was significantly higher than all but seven nodes in the PnP group and all but six nodes in the PP group.

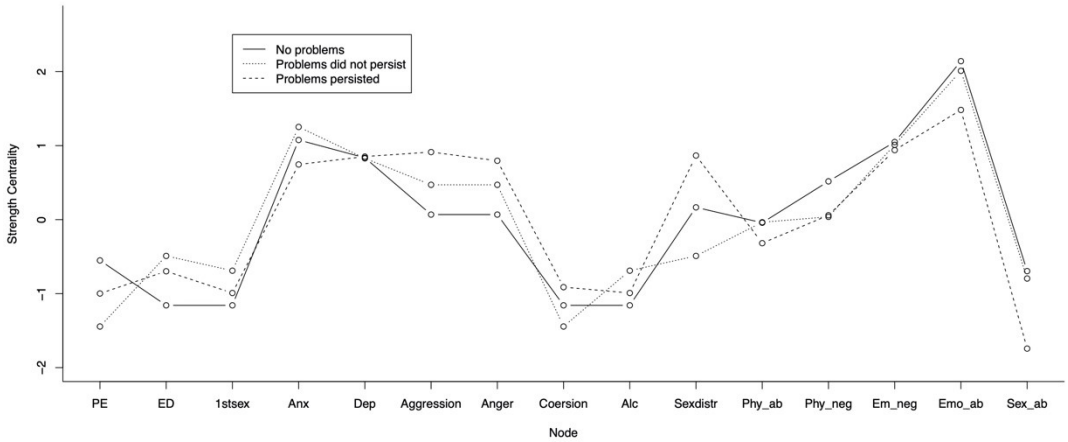


Figure 3. Standardized strength centrality measures for the NP, PnP, and PP groups. PE = Premature Ejaculation; ED = erectile dysfunction; 1stsex = age of first sexual experience; Anx = anxiety; Dep = depression; Coercion = interest in coercion; Alc = alcohol consumption; Sexdistr = sexual distress; Phy_ab = physical abuse; Phy_neg = physical neglect; Em_neg = emotional neglect; Emo_ab = emotional abuse; Sex_ab = sexual abuse.

The CS-coefficient, which was a measurement for the stability of the edge weight estimates, was good (0.59) in the NP group and the PP group, and somewhat low in the PnP group (0.44). Figure 5 visualizes the outcome of the case-dropping bootstrap test for the PnP group, and the plots for the two other networks can be found in the appendix.

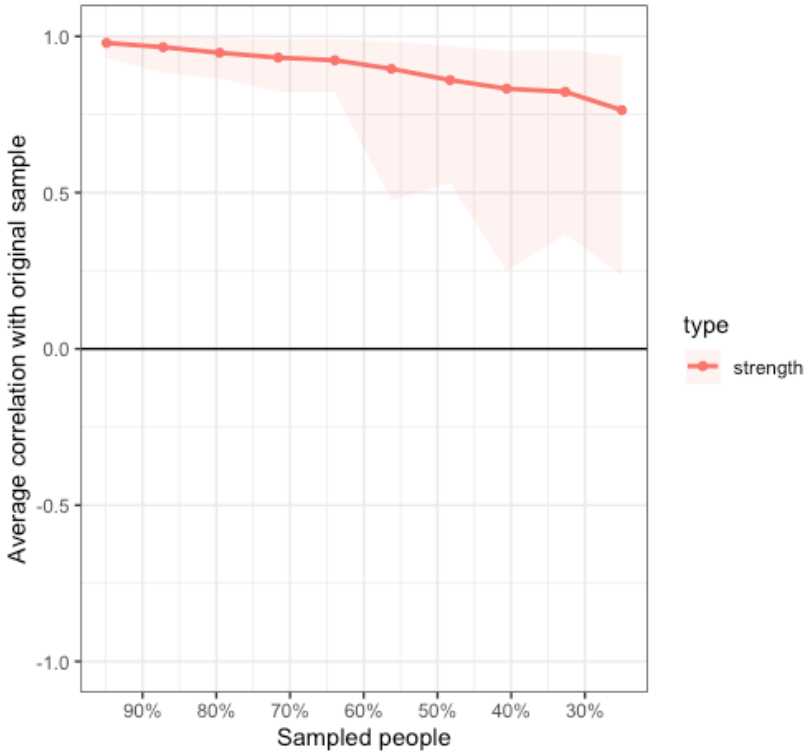


Figure 4. Plot of the case-dropping subset bootstrap test of PnP network (lowest CS-coefficient). The node strength is represented by the red line, and the confidence intervals are represented by the pink area. The plot visualizes how many cases can be dropped before the correlation between the subset's strength centrality 95% CI and the original samples strength centrality 95% CI drops below 0.7.

3.6 The strength and accuracy of edge weights

The edge weight accuracy was tested by bootstrapping the confidence intervals of the edge weight (see Figure 6 for plot of PP group). The visual inspection of the plots revealed quite a lot of variability, with some nodes having overlapping CIs. Interpretation of the differences in magnitude between nodes should therefore be done with caution, as nodes with overlapping CIs indicate the size difference between the edge weight are unclear. Some bootstrapped means uncovered edges that had previously not existed. That indicated that the LASSO-regularization applied to reduce type I error might have resulted in type II errors instead. This was to be expected, as the LASSO-regularization creates a sparse network more inclined towards type II errors. Nevertheless, as the existing edges have bootstrapped means that are reasonably close to the edges of the original networks, it seems as though the

LASSO-regularization have succeeded in minimizing type I errors. Comparable plots were obtained for all three networks (see Appendix).

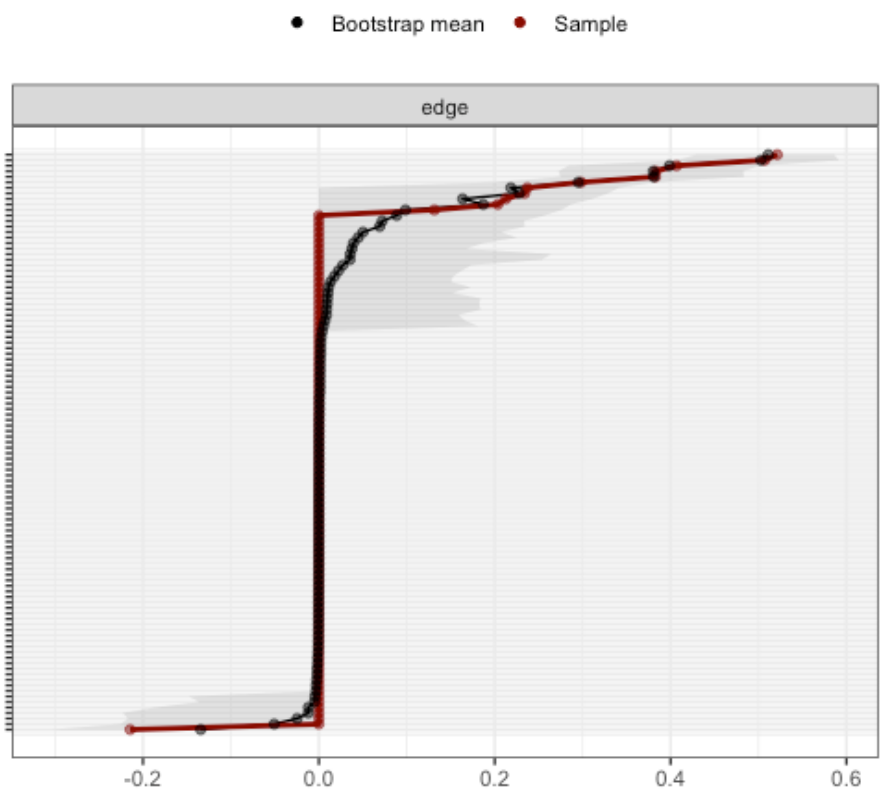


Figure 6. Plot of the bootstrapped confidence intervals for the edge weight for the PP group. The red line indicates the edges of the original sample, while the black line represents the bootstrapped means for the edges. The grey areas are the bootstrapped CIs.

Edge significance tests were also performed to examine if the edges significantly differ from each other (see Appendix for plots). The edges between anxiety and depression and aggression and anger was the strongest edges in all three networks and differed significantly from the other edges in both the NP group and the PnP group. The edges were strongest in the PP group as well, but their significance was not as clear. The two groups who had experienced problems during first intercourse displayed a negative edge between alcohol consumption and age of first sex. This edge was significantly different than all but three other edges in the PnP group, and all but four other edges in the PP group.

4 Discussion

The present study examined the associations between male sexual dysfunctions during first experience of sexual intercourse and aggressive tendencies, current sexual dysfunctions, psychological distress, childhood maltreatment and other relevant variables, using network analysis. The population-based sample was divided into three equally sized groups based on whether they had experienced sexual difficulties during first intercourse or not, and if the experienced difficulties had persisted (NP = no problems; PnP = problems did not persist; PP = problems persisted). The aim of the study was mainly explorative, with the hopes that new insights and hypotheses could be generated regarding male sexual dysfunctions during first sexual intercourse. The first hypothesis of the study related to the overall connectivity of the networks. I expected that persisting sexual dysfunctions would result in a higher network connectivity. However, the NCT found no significant differences in the sum of all edges between the networks. The second hypothesis concerned the fragmentation of the networks and stated that more sexual difficulties would lead to a less fragmented network. This hypothesis was supported by the community analysis, which showed that the PP group had the fewest amount of communities. Additionally, the NCT test found a significant structural difference between the NP group and the PP group. Further visual inspections of the two networks found that the PP group was the only group where aggressive behavior, psychological distress and sexual dysfunctions were connected. The PP group was also the only group with a network that displayed a community that involved both sexual difficulties and aggressive tendencies.

4.1 Network differences

Visual inspection of the networks did reveal a small increase in number of edges from the PnP group to the PP group, which could indicate that persisting difficulties yield a more connected network. However, the network comparison test revealed no significant differences in either number of edges or edge weight between any of the three networks. These results fail to support the first hypothesis, which assumed that

more problems would be associated with a more densely and strongly connected network.

The second hypothesis related to the fragmentation of the networks and was supported by the network community analysis. The NP and PnP groups had seven and eight communities respectively, while the PP group had three separate communities. This indicated that the PP group was less fragmented than the other groups. The largest community in the PP groups network was also the only community in all of the networks to include the nodes measuring sexual difficulties and distress, aggressive tendencies, psychological distress and the node measuring childhood maltreatment in the form of sexual abuse. Furthermore, visual inspection only found a connection between sexual difficulties and aggressive tendencies, going through psychological distress, in the PP group. This difference between the networks was supported by the significant structural differences found by the NCT between the NP group and the PP group. According to the network theory of mental illness, networks with larger communities and stronger connectivity increase the likelihood of self-sustaining feedback loops. A triggering event, which could be the initial bad sexual experience, is hypothesized to activate the nodes in the network, which in turn would activate other strongly connected nodes, creating a negative, self-sustaining feedback loop.

These results are in line with Andersen and colleagues (1999) theory of sexual self-schemas. A negative experience during first experience of sexual intercourse might help formulate negative expectations relating to sexual intercourse, expectations that in turn increase the likelihood of further negative experiences. Additionally, Gebhard and colleagues (2019) found that men reacting with shame when confronted with situations that threatened their masculinity were prone to be more physically aggressive, which gives further credence to a self-fulfilling prophecy. A predisposition to react with aggression to difficult experiences during first intercourse, could lead to a higher likelihood to reacting aggressively in future encounters. This could in turn lead to more sexual problems by either directing the anger towards new sexual partners or suppressing the anger, leading to a self-fulfilling prophecy. The inclusion of the solitary childhood maltreatment factor sexual abuse in the largest community of the PP group was also of special interest, as it aligns with the previous findings (Feiring et al., 2009; King et al., 2019), which have found associations between being sexually abused as a child and aggressive

behavior in adulthood, including sexually aggressive behavior. Since sexual dysfunctions have been associated with increased anger (Levy, 2002), another possible hypothesis is generated by these results; do early failures in sexual activities cause aggression and hostility in the individual later in life?

4.2 Differences and similarities on node level

Some interesting observations were found concerning differences and similarities on individual node level, despite the fact that no significant results were found between the networks. First of all, examining the descriptive data reveals that childhood maltreatment does not seem to vary between the different groups, which indicates that the differences found between the networks were not conditioned by differences in childhood maltreatment. Aggressive tendencies were roughly equal in all the groups, except for interest in coercion, which was somewhat elevated in the PP and PnP groups. The PnP and the PP groups were the only groups to feature a negative association between alcohol consumption and age of first sexual intercourse. This negative association indicates that a higher current alcohol consumption is linked with earlier sexual debut, or vice versa, that a lower current alcohol consumption indicates a higher age of first sexual intercourse. Moreover, this negative association was only evident in males who reported that they had experienced some kind of problem during first experience of sexual intercourse. The first option is somewhat in line with previous studies, that have found that an earlier sexual debut often coincides with a higher alcohol consumption (Zimmer-Gembeck & Helfand, 2008). Examining the descriptive data also revealed a slight increase in age of sexual debut and alcohol consumption from the NP to the PP groups. This indicated that people who had difficulties during first sexual intercourse, and those who had difficulties during first intercourse that persisted, have a higher current alcohol consumption and a later sexual debut compared to people who did not experience any difficulties during first intercourse. A slight increase in anxiety was also found in the PnP and PP groups, which gives support to Capaldi's, Crosby's and Stoolmiller's (1996) study, that found an association between a later sexual debut and anxiety. The increase in age and anxiety coupled with the associations between aggressive tendencies, psychological distress and sexual difficulties, especially ED, found in the

PP group is in line with previous studies, which has found an older age of first intercourse to be associated with less relaxed attitudes toward sexuality and more sexual guilt, which in turn could result in more sexual difficulties, especially ED (Else-Quest, Hyde & DeLamater. 2005; Santtila, Sandnabba, & Jern, 2009). Furthermore, Levy (2002) found that ED in particular was linked with increased anger (Levy, 2002).

Secondly, emotional abuse was the most central node in all of the networks. This could partly be due to it sharing strong edges with most of the other childhood maltreatment nodes. The centrality of emotional abuse was strongest in the NP group and decreased slightly in the following groups. The centrality of anger, aggression and ED seemed to increase slightly in the groups that had experienced problems during first intercourse, and the centrality of sexual distress appeared to increase in the PP group. Due to the nature of partial correlation networks, it is not possible to determine whether these nodes were more influential in these networks, or if they correlated highly with surrounding nodes because they were the end of different causal sequences.

4.3 Strengths, limitations and implications for future research

A notable strength of the present study was the population-based data set, which stands out with its large sample size and because it had numerous measures that captured both sexual function and variables related to sexual functioning. With the exception of a few, most of the included measures had great psychometric properties, and was thus well fitted for a self-assessment-based sample, which this study utilized (e.g., ED, trait anger and aggression).

A limitation of the present study is its cross-sectional nature, as the conclusions one can draw from a network based cross-sectional data is limited. Questions regarding direction of causality cannot be examined without information about the temporal order of symptoms, information that a cross-sectional design is unable to give as cross-sectional data measures a perceived symptom at a single point in time. Time-series data, on the other hand, is based on multiple connectable measurements from different time points and would thus be better suited to make conclusions regarding causality. The cross-sectional design prohibits me from

concluding if an individual with persisting difficulties stemming from the first experience of sexual intercourse currently experiences higher levels of aggressive tendencies or psychological distress due to the persisting problems, or if the persisting problems were caused by already present aggressive tendencies or psychological distress. Cross-sectional data has also been criticized for not being able to accurately measure centrality in networks (Bos et al., 2017). However, cross-sectional data has been proposed to be useful to examine how different symptoms co-occur in the networks.

Another possible limitation is that retrospective self-report data may be vulnerable to biases, not least self-disclosure bias, which is the tendencies to deliberately give false information about oneself in regard to sensitive information such as sexual history and recall bias. (Graham, Catania, Brand, Duong, & Canchola, 2003). Recall bias is a kind of measurement bias which stems from the variability in participants' capacity to recall events or experiences accurately, and can be affected by our unreliable memory, our tendencies to seek meaning in memories and past experiences, and mood states at the time of self-assessment (Hardt & Rutter, 2004; Reuben et al., 2016). Depression, psychological distress or chronic stress has also shown to increase the likelihood of self-reported childhood adversity (Colman et al., 2016). As both depression and anxiety seemed to be more prevalent in the groups that had experienced sexual difficulty during first sexual intercourse, it could have affected the participants' recollection of their experience. Furthermore, as the present study was retrospective and asked the participants to self-evaluate their sexual difficulties, it could be influenced by the above-mentioned biases.

There were also limitations in some of the used measurements: The variable used to measure interest in coercion was, in its current form, not validated, although the original scale has shown good psychometric properties. The MIPE-scale, used to measure PE, had a low internal consistency when measured in the present sample. A reason for the low internal consistency might be that the items in the MIPE cover currently used diagnostic criteria, and these do not necessarily have high correlations between each other (Ventus, 2019). The measure has however been shown to have good psychometric properties in confirmatory factor analyses, and it can reliably distinguish between diagnosed PE patients and controls (Jern, Piha, & Santtila, 2013).

The main aim of the present study was to formulate new hypotheses for scrutiny of male sexual dysfunctions during first intercourse. One hypothesis developed from the results of this study is whether aggressive tendencies increase the likelihood of experiencing persisting sexual difficulties later in life. Another possible hypothesis is whether these early failures in sexual activities causally leads to increased aggression and hostility in the future. It would be interesting to gain more insight into how much sexual difficulties during first intercourse affect aggressive tendencies in men, or if it is aggressive tendencies that cause increased sexual difficulties. These are questions that future research could focus on. Future research should also include more variables connected to sexual dysfunctions in men. Due to the limitations accompanied with cross-sectional data, it would be of interest to use longitudinal samples to investigate cause-and-effect relationships between variables. However, a dataset with numerous longitudinal observational points revolving all the relevant factors do not, to the best of my knowledge, exist. However, to gather information from a randomly selected group of men over a span of several years would give us a better understanding of the directions of the found associations. As this study is unable to examine whether sexual difficulties result in an increase in aggressive tendencies, or if aggressive tendencies increase the likelihood of sexual difficulties, a longitudinal study would be beneficial.

4.4 Conclusions

The present study used network analysis to investigate associations between sexual difficulties during first experience of sexual intercourse, and current sexual difficulties, aggressive tendencies, psychological distress, experience of childhood trauma, age of first intercourse and current alcohol consumption. No differences were found either in the global strength between the networks, in the edges between the nodes or in strength centrality. A significant structural difference was however found between the NP group and the PP group. Visual inspections and community analysis only revealed associations between aggressive tendencies, mental distress, sexual difficulties and the experience of childhood sexual abuse in the PP group.

Network analysis provides a unique ability to control for multiple variables. This was beneficial to the explorative nature of the present study, as it could give

insight into several associations of importance. As the study was explorative, future research should try to delve deeper into the exploration of the different associations discovered in the present study, preferably with longitudinal data, to gain more insight into the causes for and implications of sexual difficulties during first sexual intercourse.

5 En nätverksanalys om manlig sexuell funktion: jämförande av symptomnätverk hos män som upplevt varierande grader av sexuella dysfunktioner under första samlaget

5.1 Introduktion

Första erfarenheten av samlag är en formativ och central händelse för de flesta, och symboliserar början på en persons sexuella och reproduktiva liv (Heywood et al., 2015). Få studier har granskat vilka faktorer som är kopplade till sexuella svårigheter under första samlaget, och hur dessa svårigheter kan påverka individen senare i livet (Rapsey, 2014). Utöver detta finns det även få studier som undersökt hur sexualitetsrelaterade svårigheter är kopplade till aggressiva tendenser, speciellt då det kommer till associationen mellan sexuell aggression och sexuella svårigheter under ens första samlag (Gebhard et al., 2019; Levy, 2002). Denna avhandling ämnade undersöka de potentiella associationer som kan finnas mellan sexuella dysfunktioner under första samlaget och aggressiva tendenser, sexuell aggression, psykologiska problem och flertalet andra relevanta variabler.

Manlig sexuell dysfunktion

Den internationella klassifikationen av sjukdomar och relaterade hälsoproblem -11 (World Health Organization, 2018) definierar sexuella dysfunktioner som de olika sätt en individ kan vara oförmögen att delta i en sexuell relation så som han eller hon önskar. De två mest prevalenta manliga sexuella dysfunktionerna är erektil dysfunktion (ED) och prematur ejakulation (PE) (Santtila, Sandnabba, & Jern, 2009). ED definieras som oförmågan att uppnå och upprätthålla en erektion tillräckligt länge för sexuell aktivitet (World Health Organization, 2018), och tenderar vara mera prevalent hos äldre individer (Feldman et al., 1994). ED är även associerat med övervikt, diabetes och mental ohälsa (Bortolotti et al., 1998; Jern et al., 2012). PE kan beskrivas som en oförmåga att kontrollera ejakulationen tillräckligt länge för båda de involverade partnernas tillfredsställelse (Jannini et al., 2015; World Health Organization, 2018). Prevalensen för PE är inte kopplat till ålder, och studier har enbart visat på svaga korrelationer mellan PE och mental ohälsa, korrelationer som inte verkar vara stabila över tid (Prost et al., 2006; Ventus et al., 2017).

Första sexuella samlaget, sexuella dysfunktioner och aggressiva tendenser

I Finland ligger mäns medelålder för det första samlaget på 17 år (Johansson et al., 2013). En systematisk litteraturöversikt gjord av Zimmer-Gembeck och Helfand (2008) har påvisat associationer mellan att ha sin sexuella debut under 15 års ålder och aggression samt alkoholanvändning. Systematiska litteraturöversikter har även funnit att de som har sin sexuella debut i en yngre ålder har en större sannolikhet att lida av psykologiska problem (Mota, Cox, Katz, & Sareen, 2010). Åldern vid det första samlaget har även en central roll då kopplingar till sexuella dysfunktioner undersöks. I sin studie konstaterade Sandfort, Orr, Hirsch, and Santelli (2008) att män som initierade samlag tidigare eller senare än sina jämnåriga hade en ökad risk för sexuella dysfunktioner. Författarna till studien ansåg dock att denna koppling sannolikt kunde förklaras av andra variabler än ålder, så som alkoholkonsumtion i samband med samlaget eller oro över sen sexuell debut. Denna förklaring stöddes av Else-Quesst, Hydes och DeLamaters (2005) samt Rapseys (2014) studier, som inte fann någon direkt association mellan ålder vid första samlaget och sexuella dysfunktioner. De fann däremot att den emotionella kvaliteten av det första samlaget var av störst vikt. Andersens, Cyranowskis och Espindles (1999) teori om sexuella självscheman (eng. sexual self-schemas), kan ge en insikt i hur de sexuella dysfunktioner som upplevts under första samlaget består. Sexuella självscheman skapas före och under det första samlaget, och påverkar hur en person tänker om sexualitet i framtiden. Negativa upplevelser som skapar negativa scheman kan alltså leda till självuppfyllande profetior (Rowland, Kostelyk, & Tempel, 2016).

Studier har även visat på att individer som har benägenhet för att känna stark skam i situationer då deras maskulinitet blivit hotad har en högre tendens för aggressivt beteende (Gebhard et al., 2019). Att ha blivit utsatt för sexuell misshandel som barn har även kopplats till aggressivt och sexuellt aggressivt beteende i vuxen ålder. (Feiring, Simon och Cleland, 2009; King et al., 2019).

Nätverksanalys

Nätverksperspektivet på psykopatologier är ett teoretiskt ramverk som, istället för det traditionella synsättet med underliggande psykologiska sjukdomar, beskriver psykologiska problem som dynamiska nätverk, där symptomen samverkar med varandra (Borsboom, 2017). I en nätverksanalys kallas de olika symptomen eller

variablerna för noder (eng. nodes). Noder som påverkar varandra kopplas samman genom partiella korrelationer (eng. edges). Händelser utanför nätverket, till exempel stress på jobbet, kan influera noder i nätverket, som sedan aktiverar resten av nätverket (Borsboon, 2017). Noder som är starkt kopplade till varandra kan i och med en yttre aktivering fastna och aktivera varandra trots att den initiala yttre stimuleringen försvinner. Detta fenomen, då noder upprätthåller varandras aktivitet utan yttre stimuli kallas på engelska ”hysteresis”, och uppkommer mera sällan i nätverk som har svaga och få kopplingar mellan noderna. Ett nätverk med många starka kopplingar är således mera sårbart än ett nätverk med svaga kopplingar (Borsboom, 2017), och i starkt kopplade nätverk kan det skapas kluster (eng. communities) av noder som starkt influerar varandra. Noderna i ett nätverk kan även variera i centralitet, alltså hur stor betydelse den specifika noden har i nätverket.

Syfte och hypotes

Syftet med föreliggande avhandling var att använda mig av nätverksanalyser för att undersöka associationerna mellan problem under första samlaget och aggression, nuvarande sexuella dysfunktioner och psykologiska problem hos män. Männen i studien togs från ett populationsbaserat sampel, och delades in i tre grupper baserat på om de upplevt några problem under första samlaget eller inte. Eftersom få studier undersökt sambandet mellan problem under första samlaget och aggression var studien explorativ. Det huvudsakliga syftet var att utveckla nya hypoteser gällande manlig sexuell dysfunktion under första samlaget. I hypotes ett antogs att kopplingarna skulle vara starkare i nätverken hos män hade upplevt problem under första samlaget. Hypotes två var att splittringen (eng. fragmentation) skulle vara lägre i nätverken hos män som upplevt problem under första samlaget. Detta skulle innebära att dessa nätverk skulle innehålla större kluster av starkt sammankopplade noder.

5.2 Metod

Deltagare och mått

Nätverksanalyserna i den föreliggande avhandlingen utfördes på ett sampel av 1056 män mellan åldrarna 18 och 46 år. Samplet bestod av frågeformulärssvar av män

som deltagit i en storskalig finsk populationsbaserad datainsamling (the Genetics of Sexuality and Aggression study; se Johansson et al., 2013). Deltagarna hade gett sitt skriftliga samtycke till att delta i studien, och forskningsetiknämnden vid Åbo Akademi gav tillåtelse för studien. Ursprungligen bestod samplet av 3331 män. I de fall där flera syskon från en familj deltagit valdes ett av syskonen slumpmässigt ut för denna studie. Respondenter som hade för mycket obesvarade frågor exkluderades.

De inkluderade variablerna i nätverksanalyserna mätte sexuella problem, psykologiska problem, barndomstrauma, aggressiva tendenser, alkoholkonsumtion och ålder för första samlaget. Sexuella problem mättes med tre variabler: PE (Multiple Indicators of Premature Ejaculation [MIPE]; Jern, Piha, & Santtila, 2013), ED (International Index of Erectile Function -5[IIEF-5]; Rosen et al., 1999) och sexuell ångest (Sexual Distress Scale [SDS]; Santos-Iglesias et al., 2018). Psykologiska problem mättes med hjälp av två depressions- och ångestskalor (Brief Symptoms Inventory-18[BSI-18]; Derogatis & Melisaratos, 1979), medan alkoholkonsumtion mättes med hjälp av AUDIT-C (Alcohol Use Disorders Identification Test for Consumption; Bush et al., 1998). Tre variabler användes för att mäta aggressiva tendenser: aggressivt beteende, mätt med den verbala och fysiska underskalan från Buss och Perrys (1992) ”Aggression Questionnaire” (AQ), ilska (STAXI-2; Spielberger, 1999) och sexuell aggression (Male interest in Coercion scale [MIC]; Malamuth, 1989). För barndomstrauma inkluderades fem variabler: fysisk misshandel, fysisk negligering, emotionell misshandel, emotionell negligering och sexuell misshandel, alla tagna från ”Childhood Trauma Questionnaire” (CTQ-SF; Bernstein et al., 2003). Utöver dessa frågades även deltagarna efter ålder vid första samlaget.

Statistiska analyser

Deltagarna delades in i tre lika stora grupper (n = 352) baserat på deras svar på en fråga som undersökte om de upplevt problem under första samlaget, och ifall dessa problem fortsatt eller ej. Svarsalternativen var ”inga problem”, ”problemen fortsatte inte”, ”problemen fortsatte” och ”har inte haft sex igen”. De som svarade att de inte haft sex igen (n = 9) exkluderades, och 352 per grupp valdes slumpmässigt ut. För att underlätta läsande kommer grupperna hädanefter kallas för IP (inga problem), PFI (problemen fortsatte inte) och PF (problemen fortsatte). Variablerna imputerades

för att hantera bortfall, och summavariabler kalkylerades av de imputerade variablerna. Analyserna utfördes i R 3.6.1, och paketen *bootnet* (Epskamp, Borsboom, & Fried, 2018), *qgraph* (Epskamp, Cramer, Waldorp, Schmittmann, & Borsboom, 2012), *igraph* (Csárdi & Nepusz, 2014) och *NetworkComparisonTest* (NCT; van Borkulo et al., 2016) användes.

De nätverk som estimerades i denna avhandling var så kallade ”Gaussian Graphical Models” (GGM), och ett nätverk per grupp estimerades för att visualisera de partiella korrelationerna mellan variablerna. För att göra nätverken mera överskådliga, och för att undvika falska positiva partiella korrelationer, så användes en strikt regulariseringsteknik (LASSO; Tibshirani, 2011). LASSO estimerar flera olika modeller, och för att välja den modell som passade bäst in på data användes sedan metoden ”EBIC model selection” (Foygel & Drton, 2010). Partiella korrelationsnätverk kräver normalt fördelade kontinuerliga variabler, dock kan *bootnet* paketet identifiera och automatiskt omvandla de ordinala variabler som var inkluderade i denna avhandling så att de passar in i modellen. Fruchterman-Reingold algoritmen användes för att bestämma nätverkens visuella utseende. Algoritmen organiserar data så att noder som är kopplade attraherar varandra, medan icke kopplade noder avstöter varandra. För att vidare undersöka de specifika nodernas inflytande inom nätverken utfördes analyser av nodernas centralitet. Nodernas centralitetsmått och partiella korrelationer undersöktes därefter vidare, och mått på modellens precision och stabilitet kalkylerades för dessa. Nätverken jämfördes även med varandra för att se huruvida det fanns signifikanta skillnader i endera strukturen, den totala styrkan, dess centralitet, eller ifall skillnader hittades i strukturen, skillnader i specifika partiella korrelationer. Avslutningsvis utfördes även klusteranalyser (eng. communityanalyses), för att undersöka hurdana kluster som bildades inom nätverken. En högre splittring inom nätverken tydde på att nätverket innehöll färre kluster av starkt kopplade noder (Epskamp & Fried, 2018).

5.3 Resultat

En strukturell signifikant skillnad hittades mellan IP gruppen och PF gruppen (M = 0,30, $p < 0,05$), dock hittades ingen signifikant strukturell skillnad mellan vare sig IP gruppen och PFI gruppen ((M = 0,27, p = 0,54) eller mellan PFI gruppen och PF

gruppen (M = 0,24, p = 0,81). Skillnaderna i total styrka mellan IP gruppen och PFI gruppen (S = 0,54, p = 0,36), PFI gruppen och PF gruppen (S = 0,71, p = 0,18) samt IP gruppen och PF gruppen (S = 0,17, p = 0,75) var inte signifikanta. Ingen av de individuella kopplingarna eller styrkan i centraliteten för de olika noderna avvek sig signifikant från varandra mellan någon av grupperna.

Observationer av de visuella representationerna av nätverken visade att nätverken överlag hade få kopplingar (Figur 1). En liten skillnad i mängden kopplingar kunde dock observeras mellan nätverken, där IP gruppen och PF gruppen hade 12 kopplingar var, medan PFI gruppen enbart hade 9 kopplingar. Alla nätverk hade noder som var utan kopplingar, dock bytte ingen koppling riktning mellan grupperna.

PF gruppen var den enda gruppen som uppvisade en koppling mellan noderna som mätte aggressiva tendenser och sexuella svårigheter. Kopplingen gick genom de noder som mätte psykologisk problematik och var positiv, vilket tyder på att mera problem i någon av dessa domäner är associerat med mera problem i de andra domänerna. Denna grupp var även den enda gruppen som visade på en, i detta fall positiv, koppling mellan noderna som representerar aggression och ilska och noden som representerar sexuell aggression. PF gruppen var även den enda gruppen som visade på en association, i detta fall en negativ sådan, mellan alkoholkonsumtion och ålder vid första samlaget.

Klusteranalyserna visade både på skillnader i splittring och i hur noderna ordnade sig i kluster i de olika nätverken (Figur 2). IP gruppen hade sju kluster, PFI gruppen hade åtta kluster och PF gruppen hade tre kluster. PF gruppen hade inte enbart det minst splittrade nätverket, utan var även det enda nätverket med ett kluster som innehöll både aggressiva tendenser, psykologiska problem och sexuella problem.

Figur 3 visar de standardiserade centralitetsmåtten för de tre nätverkens noder. Emotionell misshandel hade högst centralitet i alla nätverk, och alla tre nätverk fann låg centralitet för noderna som representerar sexuell misshandel, alkoholkonsumtion, sexuell aggression, PE, ED och ålder vid första samlaget. Centralitetsmåtten följde liknande mönster i alla tre grupper. Bootstrap-estimeringar utfördes för att testa hur precis och stabil modellen var. Centralitetsmåtten var stabila i IP och PF grupperna, men något ostabila i PFI gruppen. En del av kopplingarna

visade sig potentiellt vara ostabila (se kompletterande materialet för mera information).

5.4 Diskussion

I förevarande avhandling estimerade jag partiella korrelationsnätverk för att utforska sambandet mellan manlig sexuell dysfunktion under det första samlaget och aggressiva tendenser, nuvarande sexuella dysfunktioner, psykologiska problem, barndomstrauma och andra relevanta variabler. Avhandlingen var av en explorativ karaktär, och hade som huvudsakligt mål att bidra med nya insikter och hypoteser gällande manliga sexuella dysfunktioner under första samlaget. I hypotes ett antogs att antalet kopplingar inom nätverken skulle öka från IP gruppen till PF gruppen. Resultaten från nätverksanalyserna gav dock inte stöd för denna hypotes, då inga skillnader upptäcktes i den totala styrkan mellan någon av grupperna. Hypotes två formulerades som att splittringen skulle minska inom nätverken från IP gruppen till PF gruppen. Resultaten från klusteranalyserna gav stöd till denna hypotes, och visade på att PF gruppen hade färre kluster än de andra grupperna. Utöver detta visade även resultaten från analyserna på en signifikant skillnad i strukturen på nätverken mellan IP gruppen och PF gruppen.

Visuella inspektioner av nätverken fann att enbart PF gruppen hade kopplingar mellan sexuella dysfunktioner och aggressiva tendenser, kopplingar som i detta fall var positiva och gick igenom noderna som representerade psykologiska problem. Dessa kopplingar understöddes av de strukturella skillnader som påvisades mellan IP gruppen och PF gruppen, och av resultaten från de klusteranalyser som utfördes. Enligt nätverksteorin för mentala sjukdomar ökar nätverk med större kluster och starkare kopplingar risken för självupprätthållande återkopplingskretsar (Cramer et al., 2016). Dessa resultat är i linje med teorin om sexuella självscheman (Andersen et al., 1999). En negativ upplevelse under första samlaget kan ha en negativ inverkan på ens förväntningar relaterat till samlag. Dessa förväntningar ökar därefter sannolikheten för ytterligare negativa upplevelser.

Den negativa associationen mellan alkoholkonsumtion och ålder vid första samlaget i PF gruppen indikerar att en högre alkoholkonsumtion är relaterat med en yngre ålder vid första samlaget, eller tvärtom, hos de som upplevt bestående problem

från första samlaget. Det första alternativet av denna koppling är i linje med tidigare studier, som visat att en yngre ålder vid första samlaget är associerat med större alkoholkonsumtion (Zimmer-Gembeck & Helfand, 2008).

Noden emotionell misshandel hade högst centralitet i alla tre nätverk. Detta kan delvis förklaras av att noden delar starka kopplingar till de andra noderna som stod för barndomstrauma.

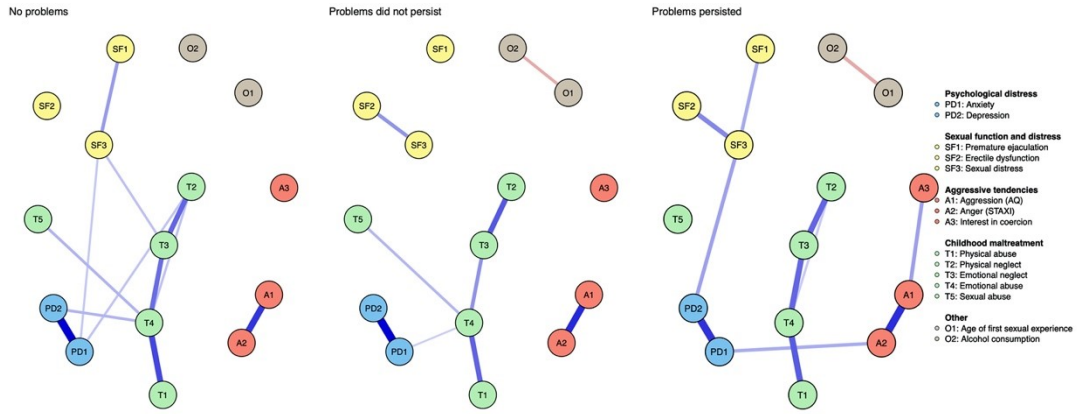
Styrkor, begränsningar och sammanfattning

En noterbar styrka med föreliggande avhandling var det populationsbaserade data, som står ut i sin sampelstorlek och i de åtskilliga mått på sexuell funktion som inkluderats. Med några få undantag visade de använda måtten även på bra psykometriska egenskaper, vilket var en styrka. Användningen av nätverksanalyser var även väl lämpad för avhandlingen, då den var explorativ till sin karaktär.

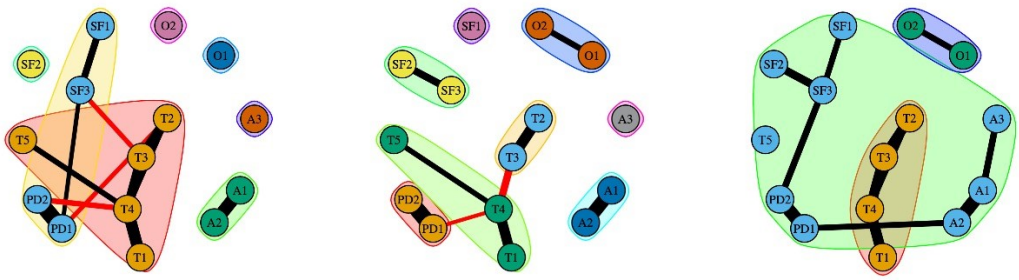
Den första begränsningen med avhandlingen var användningen av tvärsnittsdata framom longitudinellt data, då frågor gällande kausalitet inte kan besvaras av tvärsnittsdata. En annan potentiell begränsning är det faktum att retrospektivt självrapporterat data kan vara utsatt för skevhet. Både skevhet baserat på en deltagares ovilja att ge ärliga svar (eng. self-disclosure bias) och skevhet på grund av svårigheter med att korrekt utvärdera tidigare händelser och känslor (eng. recall bias) kan påverka hur deltagarna svarat på de olika frågorna i frågeformulären (Graham, Catania, Brand, Duong, & Canchola, 2003). Ett mål med denna avhandling var att skapa nya hypoteser gällande manliga sexuella dysfunktioner under första samlaget. Baserat på resultaten från denna avhandling uppstår frågorna huruvida aggressiva tendenser leder till bestående sexuella dysfunktioner, eller om tidiga sexualla misslyckanden kan orsaka framtida aggressiva tendenser. För att svara på dessa frågor kunde framtida forskning estimera nätverk baserat på individuellt longitudinellt data.

Sammanfattningsvis kan man konstatera att PF gruppen hade det minst splittrade nätverket, alltså hade denna grupp få och stora kluster med starkt kopplande noder i sig. Positiva kopplingar mellan sexuella problem, psykologiska problem och aggressiva tendenser var även tydliga enbart i denna grupp, vilket tyder på att ett samband mellan nuvarande sexuella problem och aggressiva tendenser existerar hos de som upplevt problem under första samlaget. Signifikanta skillnader uppvisades även i strukturen mellan PF gruppen och IP gruppen. Nätverksanalyser

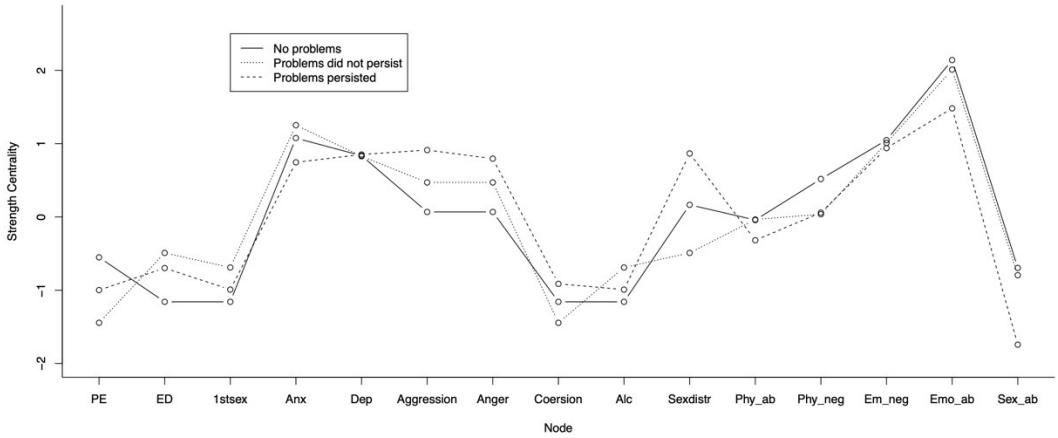
tillhandahåller en unik förmåga att kontrollera multipla variabler, och således är de väl anpassade för att undersöka komplexa fenomen. De olika associationer som denna avhandling upptäckte har bidragit med ny information till ämnet, information som framtida forskning kunde utforska djupare.



Figur 1. Visualisering av nätverken för IP gruppen, PFI gruppen och PF gruppen.



Figur 2. Visualiserade nodkluster för IP gruppen, PFI gruppen och PF gruppen. Olika färger indikerar olika kluster, och röda linjer mellan noder tyder på associationer som går mellan olika kluster. PD1 = Ångest; PD2 = Depression; SF1 = Prematur ejakulation; SF2 = Erektil dysfunktion; SF3 = Sexuell ångest; A1 = Aggression; A2 = Ilska; A3 = Sexuell aggression T1 = Fysisk misshandel; T2 = Fysisk negligering; T3 = Emotionell negligering; T4 = Emotionell misshandel; T5 = Sexuell misshandel; O1 = Ålder vid första samlaget; O2 = Alkoholkonsumtion.



Figur 3. Standardiserade centralitetsmått för IP gruppen, PFI gruppen och PF gruppen. PE = Prematur ejakulation; ED = Erektil dysfunktion; 1stsex = Ålder vid första samlaget; Anx = Ångest; Dep = Depression; Coercion = Sexuell aggression; Alc = Alkoholkonsumtion; Sexdistr = Sexuell ångest; Phy_ab = Fysisk misshandel; Phy_neg = Fysisk negligering; Em_neg = Emotionell negligering; Emo_ab = Emotionell misshandel; Sex_ab = Sexuell misshandel

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Appendix

Table of Contents

1 Data Import and Preparation

```
setwd("/Users/johannesnylund/Documents/GRADU/Data/Data_New")
library(haven)
Data <- read_sav("DATA_DONE(UtanDSFI)NEW.sav")

DataNetwork <- Data[,2:17]
DataNetwork[,1] <- Data$Problems_persisted

colnames(DataNetwork)[1] <- "Problem_groups"
colnames(DataNetwork) [2] <- "PE"
colnames(DataNetwork) [3] <- "ED"
colnames(DataNetwork) [4] <- "1stsex"
colnames(DataNetwork) [5] <- "Anx"
colnames(DataNetwork) [6] <- "Dep"
colnames(DataNetwork) [7] <- "Aggression"
colnames(DataNetwork) [8] <- "Anger"
colnames(DataNetwork) [9] <- "Coersion"
colnames(DataNetwork) [10] <- "Alc"
colnames(DataNetwork) [11] <- "Sexdistr"
colnames(DataNetwork) [12] <- "Phy_ab"
colnames(DataNetwork) [13] <- "Phy_neg"
colnames(DataNetwork) [14] <- "Em_neg"
colnames(DataNetwork) [15] <- "Emo_ab"
colnames(DataNetwork) [16] <- "Sex_ab"
```

2 Descriptive data

2.1 Missing values

```
# check whether there are any variables with missing values left

library(psych)

apply(apply(DataNetwork, 2, is.na), 2, sum) # no NA

Problem_groups             PE             ED         1stsex            Anx
             0              0              0              0              0
            Dep     Aggression          Anger       Coersion            Alc
             0              0              0              0              0
      Sexdistr         Phy_ab        Phy_neg         Em_neg         Emo_ab
             0              0              0              0              0
        Sex_ab
             0
```

2.2 Correlation matrix

```
# Checking the correlation matrix

cor(DataNetwork)

# Problem group variable is not too strongly correlated with other variables?
# this would be a problem because we might otherwise condition on a latent effect!
```

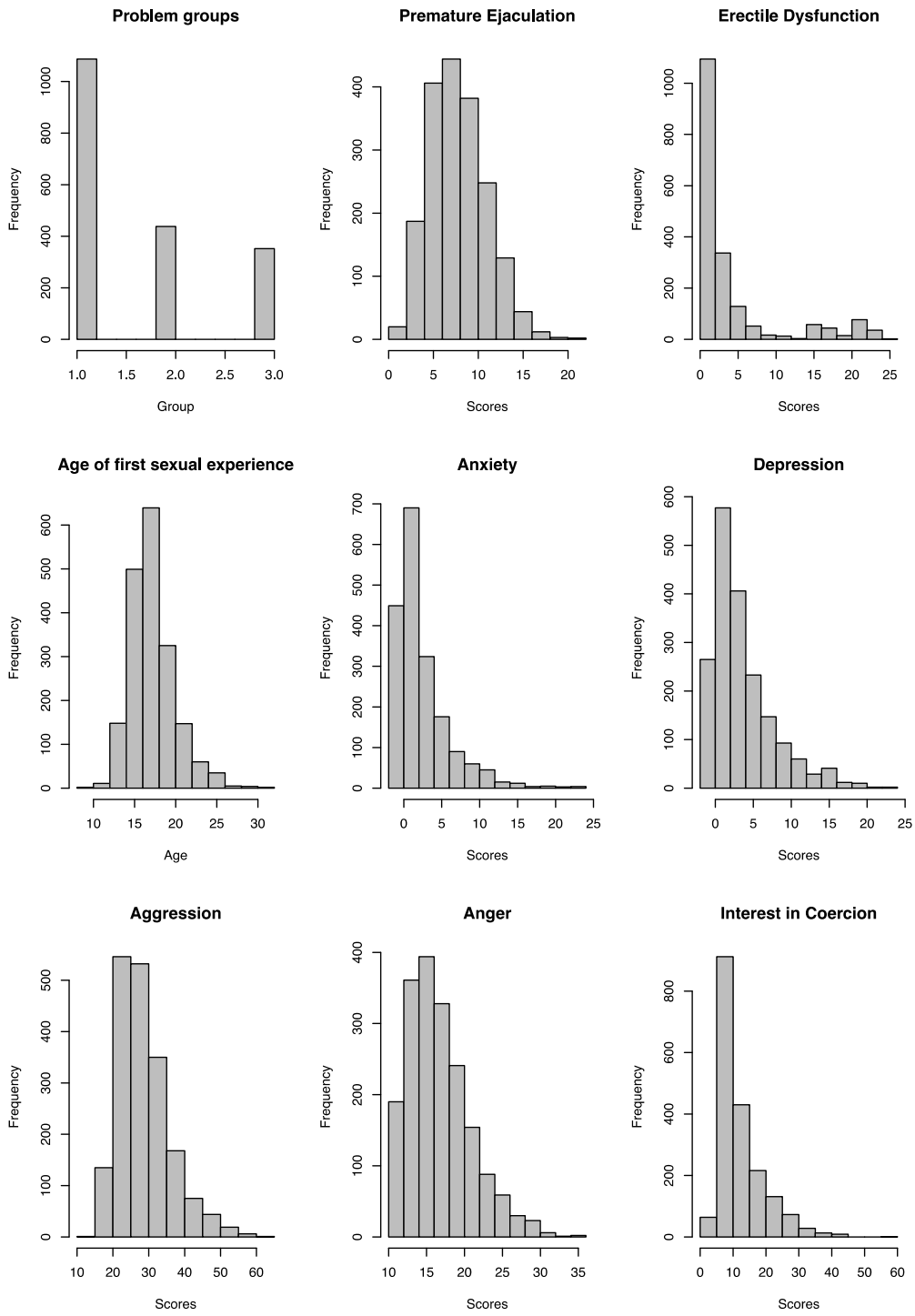
Correlations

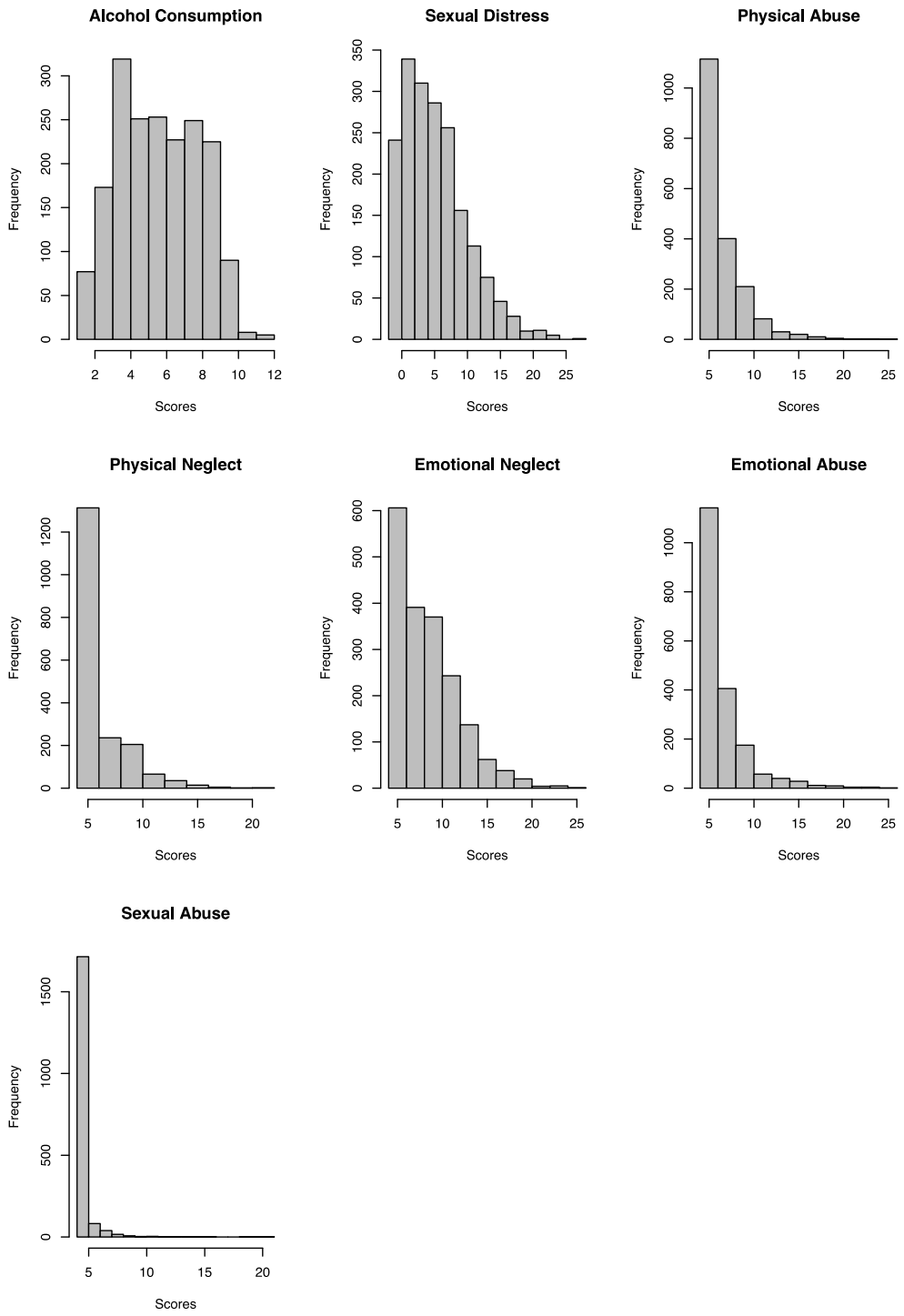
	PE	*ED*	*1stSex*	*Anx*	*Dep*	*Aggr*	*Anger*	*Coerc*	*Alc*	*SexDstrs*	*PhyA*	*PhyN*	*EmN*	*EmA*	*SexA*	*ProblemG*
PE																
ED	0.12															
1stSex	0.03	0.1														
Anx	0.11	0.14	-0.04													
Dep	0.11	0.25	-0.03	0.71												
Aggr	0	0.01	-0.25	0.24	0.23											
Anger	0.05	-0.01	-0.16	**0.36**	**0.32**	**0.58**										
Coercion	0.05	0.05	-0.05	0.16	0.16	0.2	0.17									
Alc	0.003	0.1	-0.26	0.14	0.17	0.25	0.18	0.07								
SexDistress	**0.33**	**0.33**	0.04	**0.38**	**0.44**	0.11	0.21	0.17	0.12							
PhyA	0.002	-0.004	-0.13	0.15	0.16	0.23	0.18	0.07	0.08	0.11						
PhyN	0.02	0.05	-0.07	0.22	0.23	0.1	0.11	0.08	0.05	0.13	**0.35**					
EmN	0.04	0.04	-0.02	0.22	0.26	0.08	0.11	0.12	0.04	0.17	**0.36**	**0.58**				
EmA	0.04	0.07	-0.04	0.29	**0.33**	0.21	0.22	0.12	0.06	0.22	**0.57**	**0.49**	**0.57**			
SexA	-0.01	0.03	0.04	0.09	0.07	0.03	0.07	0.12	-0.02	0.04	0.15	0.19	0.18	0.24		
ProblemG	0.25	0.16	0.11	0.14	0.15	-0.01	0.002	0.07	0.05	0.28	-0.02	0.01	0.05	0.04	0.04	

```
# Moderate correlations or larger (r < .3) are displayed in black
```

2.3 Histogram

```
# Histograms of all variables to check distributions#

colnames(DataNetwork) # to use with histograms

apply(DataNetwork, 2, hist)

pdf("Histograms.pdf", paper = "a4", width = 21/2.54, height = 29.7/2.54)

par(mfrow = c(3,3))
hist(DataNetwork$Problem_groups, main = "Problem groups", xlab = "Group", col =
"grey")
hist(DataNetwork$PE, main = "Premature Ejaculation", xlab = "Scores", col =
"grey")
hist(DataNetwork$ED, main = "Erectile Dysfunction", xlab = "Scores", col = "grey")
hist(DataNetwork$1stsex, main = "Age of first sexual experience", xlab = "Age",
col = "grey")
hist(DataNetwork$Anx, main = "Anxiety", xlab = "Scores", col = "grey")
hist(DataNetwork$Dep, main = "Depression", xlab = "Scores", col = "grey")
hist(DataNetwork$Aggression, main = "Aggression", xlab = "Scores", col = "grey")
hist(DataNetwork$Anger, main = "Anger", xlab = "Scores", col = "grey")
hist(DataNetwork$Coersion, main = "Interest in Coercion", xlab = "Scores", col =
"grey")

par(mfrow = c(3,3))
hist(DataNetwork$Alc, main = "Alcohol Consumption", xlab = "Scores", col = "grey")
hist(DataNetwork$Sexdistr, main = "Sexual Distress", xlab = "Scores", col =
"grey")
hist(DataNetwork$Phy_ab, main = "Physical Abuse", xlab = "Scores", col = "grey")
hist(DataNetwork$Phy_neg, main = "Physical Neglect", xlab = "Scores", col =
"grey")
hist(DataNetwork$Em_neg, main = "Emotional Neglect", xlab = "Scores", col =
"grey")
hist(DataNetwork$Emo_ab, main = "Emotional Abuse", xlab = "Scores", col = "grey")
hist(DataNetwork$Sex_ab, main = "Sexual Abuse", xlab = "Scores", col = "grey")

dev.off()
```


Problem groups
Frequency
0 200 400 600 800 1000
1.0 1.5 2.0 2.5 3.0
Group
Premature Ejaculation
Frequency
0 100 200 300 400
0 5 10 15 20
Scores
Erectile Dysfunction
Frequency
0 200 400 600 800 1000
0 5 10 15 20 25
Scores
Age of first sexual experience
Frequency
0 100 200 300 400 500 600
10 15 20 25 30
Age
Anxiety
Frequency
0 100 200 300 400 500 600 700
0 5 10 15 20 25
Scores
Depression
Frequency
0 100 200 300 400 500 600
0 5 10 15 20 25
Scores
Aggression
Frequency
0 100 200 300 400 500
10 20 30 40 50 60
Scores
Anger
Frequency
0 100 200 300 400
10 15 20 25 30 35
Scores
Interest in Coercion
Frequency
0 200 400 600 800
0 10 20 30 40 50 60
Scores


Alcohol Consumption
Sexual Distress
Physical Abuse
Physical Neglect
Emotional Neglect
Emotional Abuse
Sexual Abuse
Frequency
Scores

2.4 Descriptive statistics for subgroups

```
# Subset data into groups

NoProb <- subset(DataNetwork,Problem_groups==1)
ProbThen <- subset(DataNetwork, Problem_groups==2)
ProbNow <- subset(DataNetwork, Problem_groups==3)

nrow(ProbThen) + nrow(ProbNow) + nrow(NoProb) # check whether everyone has been
# assigned

## [1] 1877

# Create random subsamples of same size

nrow(NoProb)
## [1] 1087
nrow(ProbThen)
## [1] 438
nrow(ProbNow)
## [1] 352

# The problems now group has the lowest sample size (n=352). The no problems and
# the problems then group will be shrunk to match the low group

# We create a function that will take random samples out of the groups

set.seed(17) # to make sure we always get the same random sample

randomSample = function(df,n) {
  return (df[sample(nrow(df), n),])
}

# Then we use it to pick out the samples:
NoProbRS <- randomSample(NoProb, n = 352)
ProbThenRS <- randomSample(ProbThen, n = 352)
ProbNowRS <- ProbNow

# Checking descriptives on the random samples:

library("sjPlot")

NoProbdescribe <- print(describe(NoProbRS[,2:16]), digits = 2)
ProbThendescribe <- print(describe(ProbThenRS[,2:16]), digits = 2)
ProbNowdescribe <- print(describe(ProbNowRS[,2:16]), digits = 2)

tab_dfs(list(NoProbdescribe[,c(3:5,8:9)],ProbThendescribe[,c(3:5, 8:9)],
ProbNowdescribe[,c(3:5,8:9)]),
        titles = list("No Problems Group", "Problems Then Group", "Problems Now
                      Group"),
        file = "Descriptives.doc")
```

No Problems Group

Row	*mean*	*sd*	*median*	*min*	*max*
PE	7.77	2.86	8	1	19
ED	3.98	5.51	2	1	25
1stsex	17.46	2.8	17	8	29
Anx	2.7	3.18	2	0	20
Dep	3.95	4.02	3	0	21
Aggression	29.24	7.6	28	17	61
Anger	17.19	4.08	17	10	32
Coersion	11.89	6.33	10	5	44
Alc	5.92	2.33	6	1	12
Sexdistr	4.88	4.19	4	0	19
Phy_ab	6.94	2.62	6	5	25
Phy_neg	6.6	2.4	6	5	20
Em_neg	8.89	3.45	8	4.97	25
Emo_ab	6.98	2.89	6	5	24
Sex_ab	5.24	1.48	5	4.96	21

Problems Then Group

Row	*mean*	*sd*	*median*	*min*	*max*
PE	8.47	2.95	8	2	21
ED	4.37	5.62	2	1	24
1stsex	17.83	2.41	18	11	25
Anx	3.24	3.91	2	-0.01	24
Dep	4.15	4.03	3	0	19
Aggression	29.17	7.49	28	16	60
Anger	17.23	4.33	16	10	34
Coersion	13.07	6.95	10	5	43
Alc	6.16	2.28	6	1	10
Sexdistr	5.73	4.24	6	-0.13	21
Phy_ab	6.82	2.69	6	5	20
Phy_neg	6.41	2.32	5	5	22
Em_neg	8.64	3.36	8	5	21
Emo_ab	6.91	2.75	6	5	25
Sex_ab	5.12	0.55	5	4.99	11

Problems Now Group

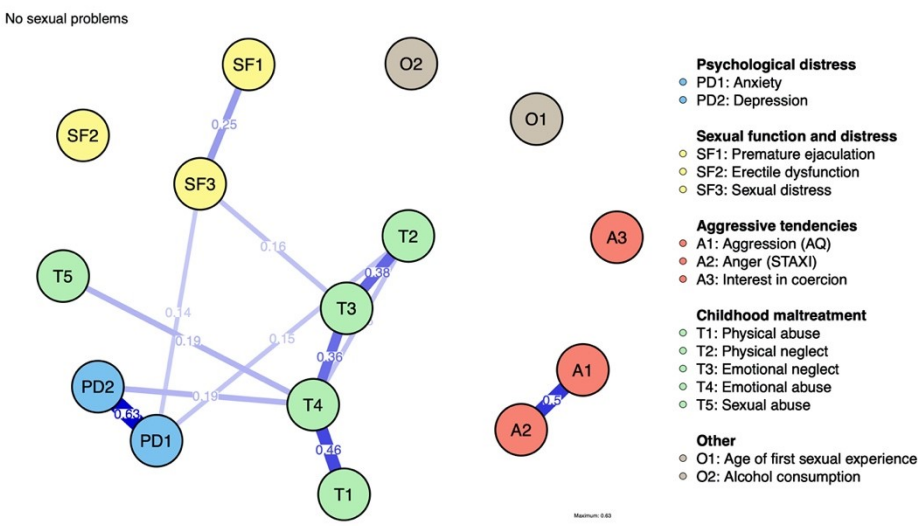
Row	*mean*	*sd*	*median*	*min*	*max*
PE	9.8	3.71	10	2	22
ED	6.65	7.12	3	1	24
1stsex	18.25	2.81	18	12	31
Anx	3.85	4.01	3	0	24
Dep	5.41	4.5	4	0	24
Aggression	28.89	7.07	28	16	57
Anger	17.15	4.3	16.5	10	36
Coersion	13.6	7.4	11	5	42
Alc	6.25	2.37	6	1	11
Sexdistr	8.45	5.57	8	0	28
Phy_ab	6.81	2.26	6	5	16
Phy_neg	6.54	2.24	6	5	18
Em_neg	9.29	3.68	9	5	23
Emo_ab	7.19	2.95	6	5	24
Sex_ab	5.29	1.16	5	4.97	14

3 Network Estimation

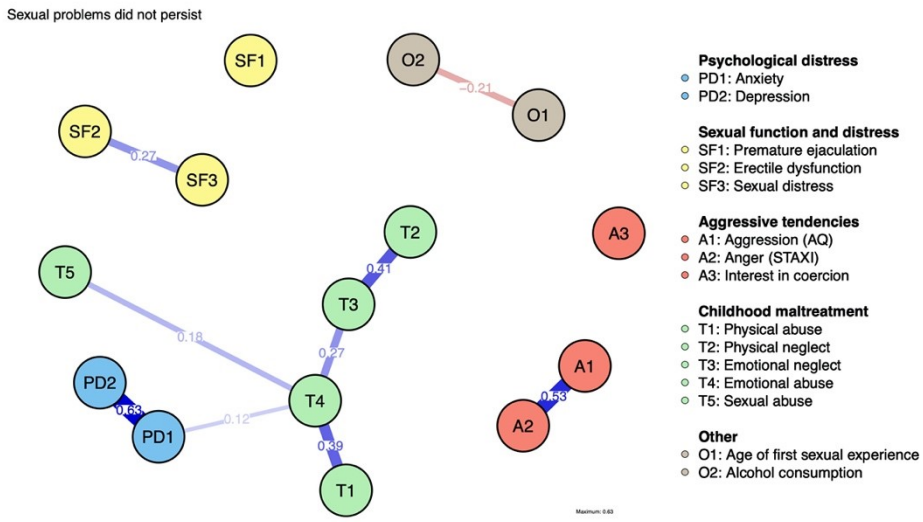
```
library(qgraph)
library(bootnet)

DataNo <- NoProbRS[,2:16]
DataThen <- ProbThenRS[,2:16]
DataNow <- ProbNowRS[,2:16]

fit_No <- estimateNetwork(DataNo,
                          default = "EBICglasso",
                          threshold = TRUE,
                          corMethod = "cor_auto",
                          tuning = 0.5)

fit_Then <- estimateNetwork(DataThen,
                            default = "EBICglasso",
                            threshold = TRUE,
                            corMethod = "cor_auto",
                            tuning = 0.5)

fit_Now <- estimateNetwork(DataNow,
                           default = "EBICglasso",
                           threshold = TRUE,
                           corMethod = "cor_auto",
                           tuning = 0.5)
```

4 Network Visualization

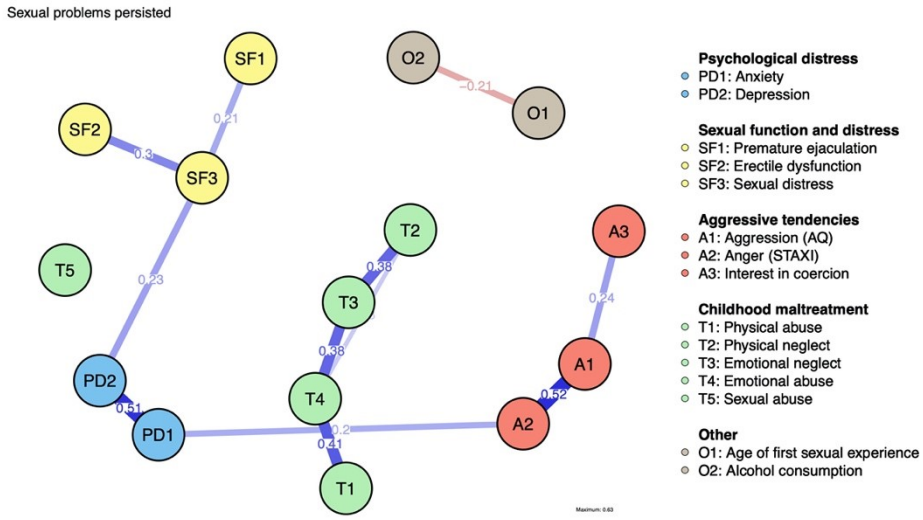
```
# Set a vector with the names you want for the plotted nodes
names<-c("SF1", "SF2","O1", "PD1", "PD2", "A1", "A2", "A3", "O2", "SF3", "T1",
"T2", "T3", "T4", "T5")

# Set a vector for the node descriptions in the legend
longnames <- c("Premature ejaculation", "Erectile dysfunction","Age of first
sexual experience",
               "Anxiety", "Depression", "Aggression (AQ)", "Anger (STAXI)",
"Interest in coercion",
               "Alcohol consumption", "Sexual distress","Physical abuse",
"Physical neglect",
               "Emotional neglect", "Emotional abuse", "Sexual abuse")

# set a vector cointaining a grouping for the nodes
gr <- list("Psychological distress"=c(4:5),
           "Sexual function and distress"=c(1,2, 10),
           "Aggressive tendencies"=c(6:8),
           "Childhood maltreatment"=c(11:15),
           "Other"=c(3,9))

# Plot networks separately:
library(qgraph)

Layout <- qgraph::averageLayout(fit_Then, fit_Now, fit_No)
Max <- max(abs(c(getWmat(fit_Then), getWmat(fit_Now), getWmat(fit_No))))

pdf("No problemsUSE.pdf", width = 18, height = 10)
qNo <- plot(fit_No,
            layout = Layout,
            maximum = Max,
            edge.labels = TRUE,
            edge.label.cex = 0.7,
            details = TRUE,
            width = 7,
            height = 7,
            title = "No sexual problems",
            title.cex = 1.5,
            labels=names, vsize=6, cut=0, border.width=1.5, border.color="black",
            groups=gr, color=c('skyblue2', 'khaki1', 'salmon', 'darkseagreen2',
                               'antiquewhite3'),
            nodeNames = longnames,legend.cex=.8)
dev.off()
```



```
pdf("Problems did not persistUSE.pdf", width = 18, height = 10)
qNo <- plot(fit_No,
            layout = Layout,
            maximum = Max,
            edge.labels = TRUE,
            edge.label.cex = 0.7,
            details = TRUE,
            width = 7,
            height = 7,
            title = "No sexual problems",
            title.cex = 1.5,
            labels=names, vsize=6, cut=0, border.width=1.5, border.color="black",
            groups=gr, color=c('skyblue2', 'khaki1', 'salmon', 'darkseagreen2',
                                'antiquewhite3'),
            nodeNames = longnames,legend.cex=.8)
dev.off()
```



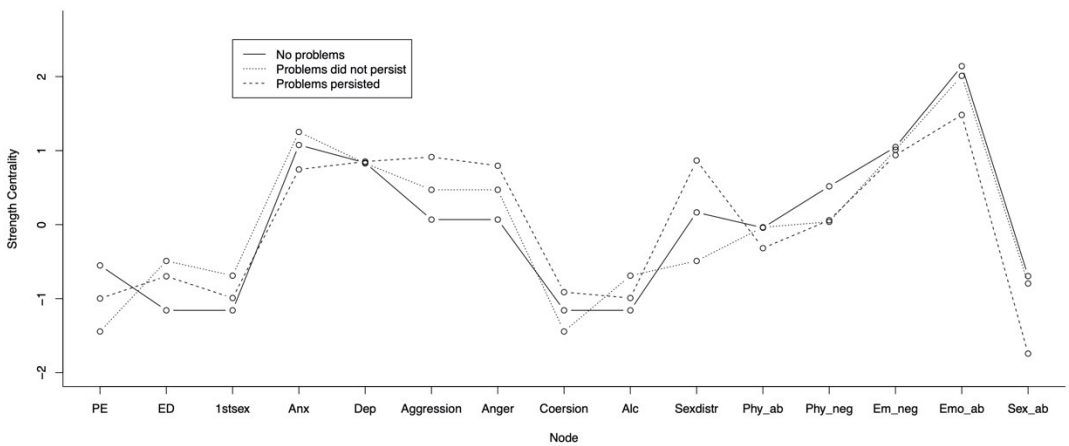

```
pdf("Problems persistedUSE.pdf", width = 18, height = 10)
qNo <- plot(fit_No,
            layout = Layout,
            maximum = Max,
            edge.labels = TRUE,
            edge.label.cex = 0.7,
            details = TRUE,
            width = 7,
            height = 7,
            title = "No sexual problems",
            title.cex = 1.5,
            labels=names, vsize=6, cut=0, border.width=1.5, border.color="black",
            groups=gr, color=c('skyblue2', 'khaki1', 'salmon', 'darkseagreen2',
                                'antiquewhite3'),
            nodeNames = longnames,legend.cex=.8)
dev.off()
```




```
pdf("Sexual dysfunction and aggressionUSE.pdf", height = 8, width=20)
layout(t(1:3), widths = c(2.5,2.5,3.5))

qNo <- plot(fit_No,
            layout = Layout,
            maximum = Max,
            details = TRUE,
            width = 15,
            height = 15,
            legend = FALSE,
            title = "No problems",
            title.cex = 1.5,
            labels=names,  vsize=10, cut=0, border.width=1.5,
border.color="black",
            groups=gr, color=c('skyblue2', 'khaki1', 'salmon', 'darkseagreen2',
'antiquewhite3'),
            nodeNames = longnames,legend.cex=.3)
qThen <- plot(fit_Then,
              layout = Layout,
              maximum = Max,
              details = TRUE,
              width = 15,
              height = 15,
              title = "Problems did not persist",
              title.cex = 1.5,
              legend=FALSE,
              labels=names,  vsize=10, cut=0, border.width=1.5,
border.color="black",
              groups=gr, color=c('skyblue2', 'khaki1', 'salmon', 'darkseagreen2',
'antiquewhite3'),
              nodeNames = longnames,legend.cex=.3)
qNow <- plot(fit_Now,
             layout = Layout,
             maximum = Max,
             details = TRUE,
             width = 15,
             height = 15,
             legend= TRUE,
             title = "Problems persisted",
             title.cex = 1.5,
             labels=names,  vsize=9, cut=0, border.width=1.5,
border.color="black",
             groups=gr, color=c('skyblue2', 'khaki1', 'salmon', 'darkseagreen2',
'antiquewhite3'),
             nodeNames = longnames,legend.cex=.8)
dev.off()
```

5 Network Centrality

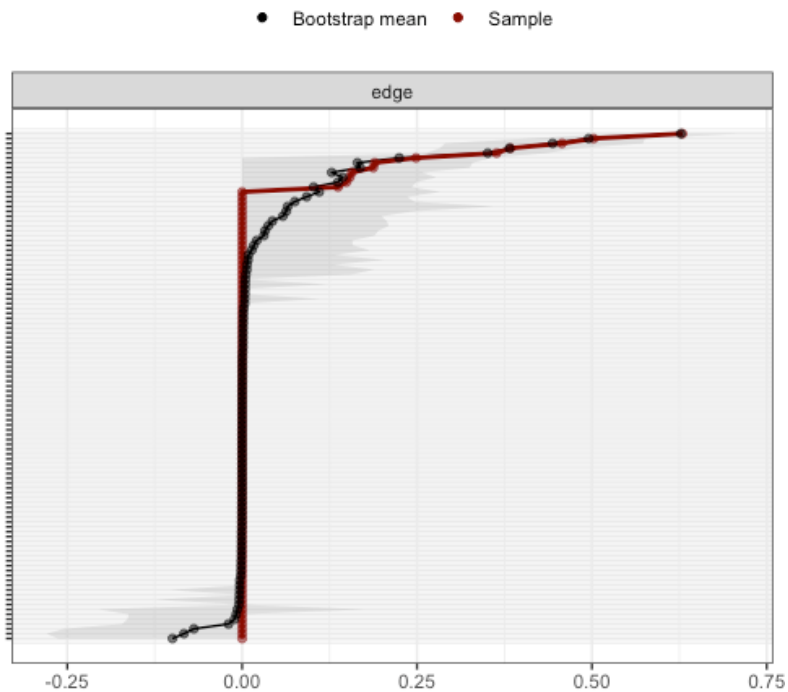
```
cenNo <- centralityTable(fit_No, standardized = FALSE)
cenThen <- centralityTable(fit_Then, standardized = FALSE)
cenNow <- centralityTable(fit_Now, standardized = FALSE)

pdf("Centrality_Network9.pdf", width = 15, height = 7)
layout(t(1:1))
plot(cenNo$value[31:45],
     type = "b",
     bty = "l",
     family = "sans",
     las = 1,
     lwd = 1,
     yaxs = "r",
     xlab = "Node",
     ylab = "Strength Centrality",
     axes = FALSE,
     frame.plot = TRUE,
     ylim = c(0,1.5))
axis(side = 1, labels = colnames(DataNo), at = c(1:15))
axis(side = 2, at = c(0,0.2,0.4,0.6,0.8,1,1.2,1.4,1.6))
lines(cenThen$value[31:45], type = "b", lty = "dotted")
lines(cenNow$value[31:45], type = "b", lty = "dashed")
legend(x = 2, y = 1.4, legend=c("No problems","Problems did not persist",
"Problems persisted"),
       lty=c("solid", "dotted", "dashed"))
dev.off()
```



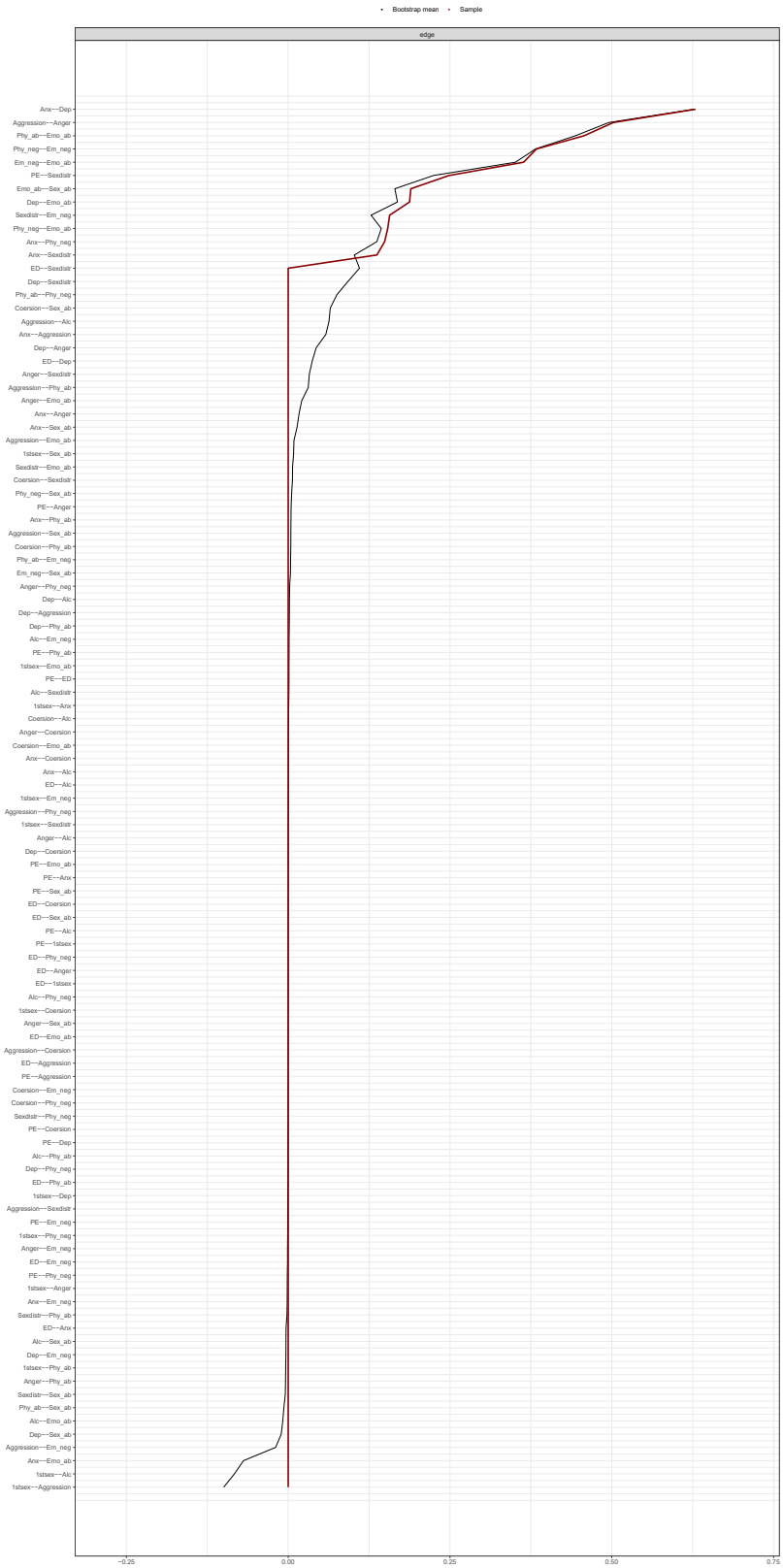
6 Network Accuracy and Stability

6.1 Bootstrapped edge-weights

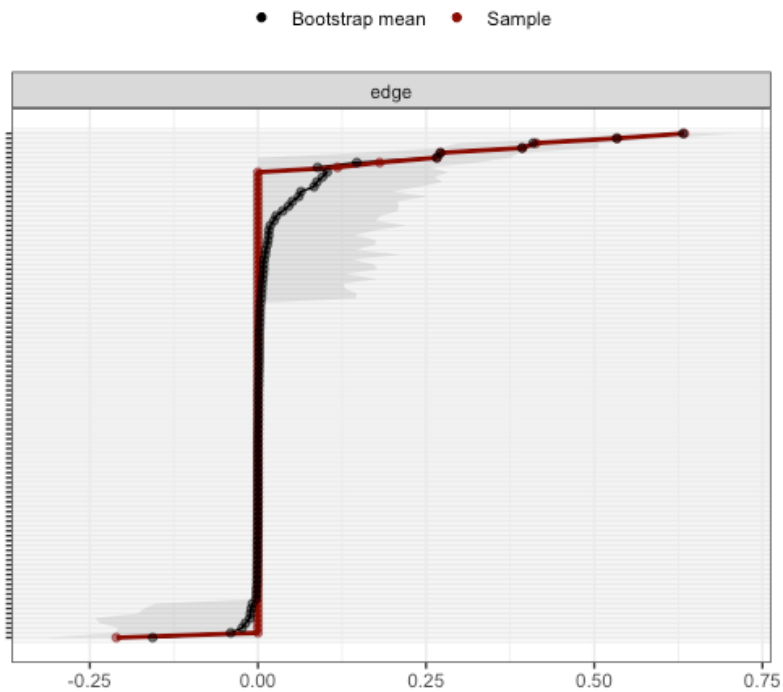
```
Library(bootnet)

# no problems
boot1_no <-bootnet(fit_No, nBoots = 2500, nCores = 4)

pdf("boot1_no_edges2.pdf", width = 15, height = 30)
plot(boot1_no, labels = FALSE, order = "sample")
dev.off()
```




```
# no problems group with labels (zoom in on the upper and lower ends of the plot):

pdf("boot1_no_edges2.pdf", width = 15, height = 30)
plot(boot1_no, labels = TRUE, order = "sample")
dev.off()
```


Bootstrap mean
Sample
edge
Anx—Dep
Aggression—Anger
Phy_ab—Emo_ab
Phy_neg—Em_neg
Em_neg—Emo_ab
PE—Sexdistr
Emo_ab—Sex_ab
Dep—Emo_ab
Sexdistr—Em_neg
Phy_neg—Emo_ab
Anx—Phy_neg
Anx—Sexdistr
ED—Sexdistr
Dep—Sexdistr
Phy_ab—Phy_neg
Coersion—Sex_ab
Aggression—Alc
Anx—Aggression
Dep—Anger
ED—Dep
Anger—Sexdistr
Aggression—Phy_ab
Anger—Emo_ab
Anx—Anger
Anx—Sex_ab
Aggression—Emo_ab
1stsex—Sex_ab
Sexdistr—Emo_ab
Coersion—Sexdistr
Phy_neg—Sex_ab
PE—Anger
Anx—Phy_ab
Aggression—Sex_ab
Coersion—Phy_ab
Phy_ab—Em_neg
Em_neg—Sex_ab
Anger—Phy_neg
Dep—Alc
Dep—Aggression
Dep—Phy_ab
Alc—Em_neg
PE—Phy_ab
1stsex—Emo_ab
PE—ED
Alc—Sexdistr
1stsex—Anx
Coersion—Alc
Anger—Coersion
Coersion—Emo_ab
Anx—Coersion
Anx—Alc
ED—Alc
1stsex—Em_neg
Aggression—Phy_neg
1stsex—Sexdistr
Anger—Alc
Dep—Coersion
PE—Emo_ab
PE—Anx
PE—Sex_ab
ED—Coersion
ED—Sex_ab
PE—Alc
PE—1stsex
ED—Phy_neg
ED—Anger
ED—1stsex
Alc—Phy_neg
1stsex—Coersion
Anger—Sex_ab
ED—Emo_ab
Aggression—Coersion
ED—Aggression
PE—Aggression
Coersion—Em_neg
Coersion—Phy_neg
Sexdistr—Phy_neg
PE—Coersion
PE—Dep
Alc—Phy_ab
Dep—Phy_neg
ED—Phy_ab
1stsex—Dep
Aggression—Sexdistr
PE—Em_neg
1stsex—Phy_neg
Anger—Em_neg
ED—Em_neg
PE—Phy_neg
1stsex—Anger
Anx—Em_neg
Sexdistr—Phy_ab
ED—Anx
Alc—Sex_ab
Dep—Em_neg
1stsex—Phy_ab
Anger—Phy_ab
Sexdistr—Sex_ab
Phy_ab—Sex_ab
Alc—Emo_ab
Dep—Sex_ab
Aggression—Em_neg
Anx—Emo_ab
1stsex—Alc
1stsex—Aggression
−0.25
0.00
0.25
0.50
0.75

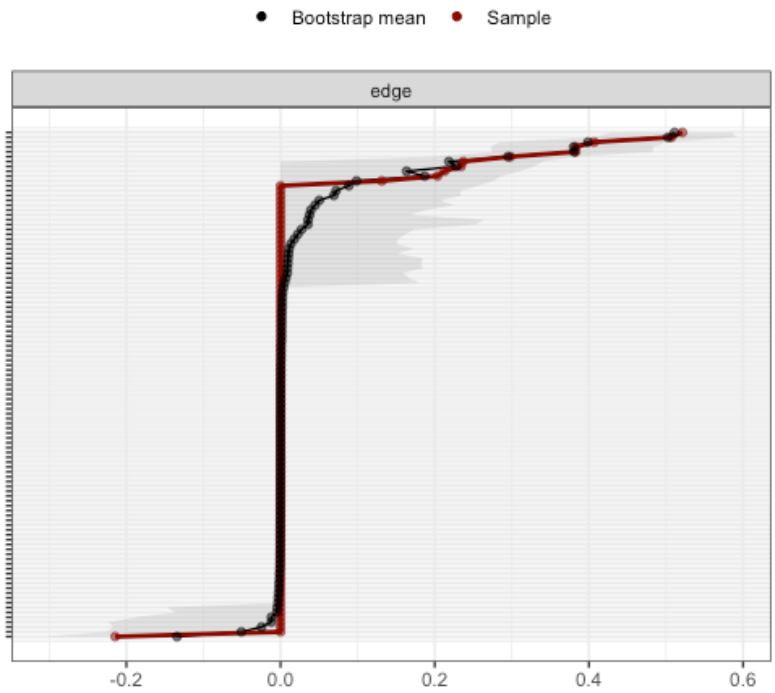
```
# problems did not persist
boot1_then <-bootnet(fit_Then, nBoots = 2500, nCores = 4)

pdf("boot1_then_edges2.pdf", width = 15, height = 30)
plot(boot1_then, labels = FALSE, order = "sample")
dev.off()
```



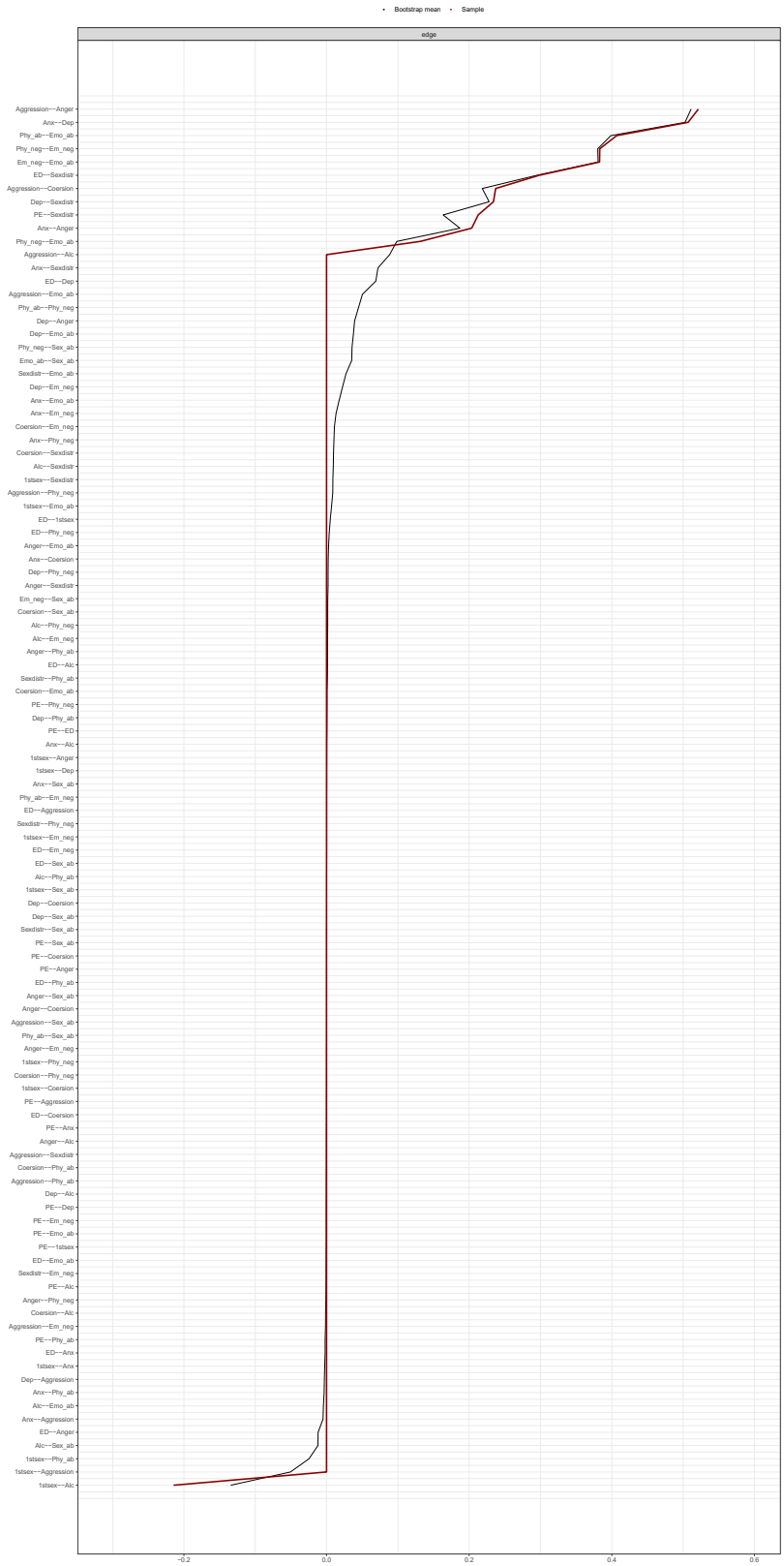

```
# problems did not persist group with labels (zoom in on the upper and lower ends
of the plot):

pdf("boot1_then_edges2.pdf", width = 15, height = 30)
plot(boot1_then, labels = TRUE, order = "sample")
dev.off()
```


Bootstrap mean
Sample
edge
Anx—Dep
Aggression—Anger
Phy_neg—Em_neg
Phy_ab—Emo_ab
Em_neg—Emo_ab
ED—Sexdistr
Emo_ab—Sex_ab
Anx—Emo_ab
PE—Sexdistr
Phy_neg—Emo_ab
Phy_neg—Sex_ab
ED—Dep
Anx—Anger
Aggression—Coersion
Dep—Sexdistr
Alc—Emo_ab
Aggression—Alc
Dep—Alc
Anx—Sexdistr
Coersion—Sexdistr
Phy_ab—Phy_neg
Dep—Emo_ab
Dep—Coersion
Phy_ab—Em_neg
Dep—Anger
Em_neg—Sex_ab
Aggression—Emo_ab
Anger—Alc
Anger—Sex_ab
Anx—Em_neg
Sexdistr—Phy_ab
Dep—Em_neg
Anx—Phy_neg
Aggression—Phy_ab
Sexdistr—Emo_ab
Alc—Sex_ab
Dep—Sex_ab
Sexdistr—Sex_ab
Coersion—Phy_neg
Anger—Coersion
Coersion—Em_neg
1stsex—Sex_ab
Dep—Aggression
ED—1stsex
PE—Anx
Anger—Sexdistr
Phy_ab—Sex_ab
1stsex—Anx
Anger—Phy_ab
Anx—Aggression
PE—Emo_ab
Aggression—Em_neg
Dep—Phy_neg
Anger—Phy_neg
Anx—Alc
Anx—Coersion
Coersion—Phy_ab
1stsex—Dep
1stsex—Em_neg
1stsex—Sexdistr
PE—Em_neg
ED—Emo_ab
ED—Phy_neg
ED—Aggression
Anger—Emo_ab
PE—Dep
PE—Phy_neg
PE—Phy_ab
PE—Coersion
ED—Phy_ab
ED—Coersion
ED—Alc
Coersion—Alc
Alc—Sexdistr
Sexdistr—Phy_neg
Alc—Phy_ab
Alc—Phy_neg
PE—1stsex
Anger—Em_neg
Coersion—Sex_ab
Aggression—Phy_neg
1stsex—Coersion
Dep—Phy_ab
PE—ED
PE—Alc
Aggression—Sexdistr
PE—Anger
1stsex—Phy_ab
PE—Aggression
1stsex—Anger
Sexdistr—Em_neg
Coersion—Emo_ab
ED—Em_neg
ED—Anger
1stsex—Emo_ab
Anx—Sex_ab
ED—Sex_ab
Anx—Phy_ab
ED—Anx
1stsex—Phy_neg
PE—Sex_ab
Aggression—Sex_ab
Alc—Em_neg
1stsex—Aggression
1stsex—Alc
−0.25
0.00
0.25
0.50
0.75

```
# problems persisted

boot1_now <-bootnet(fit_now, nBoots = 2500, nCores = 4)

pdf("boot1_now_edges2.pdf", width = 15, height = 30)
plot(boot1_now, labels = FALSE, order = "sample")
dev.off()
```

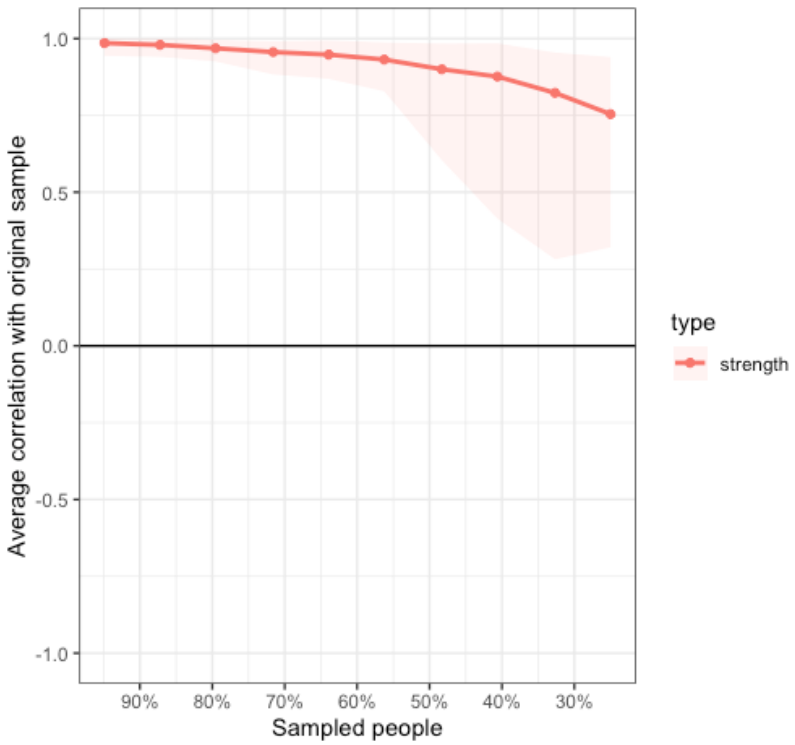



```
# problems persisted group with labels (zoom in on the upper and lower ends of the
plot):

pdf("boot1_now_edges2.pdf", width = 15, height = 30)
plot(boot1_now, labels = TRUE, order = "sample")
dev.off()
```


Bootstrap mean
Sample
edge
Aggression—Anger
Anx—Dep
Phy_ab—Emo_ab
Phy_neg—Em_neg
Em_neg—Emo_ab
ED—Sexdistr
Aggression—Coersion
Dep—Sexdistr
PE—Sexdistr
Anx—Anger
Phy_neg—Emo_ab
Aggression—Alc
Anx—Sexdistr
ED—Dep
Aggression—Emo_ab
Phy_ab—Phy_neg
Dep—Anger
Dep—Emo_ab
Phy_neg—Sex_ab
Emo_ab—Sex_ab
Sexdistr—Emo_ab
Dep—Em_neg
Anx—Emo_ab
Anx—Em_neg
Coersion—Em_neg
Anx—Phy_neg
Coersion—Sexdistr
Alc—Sexdistr
1stsex—Sexdistr
Aggression—Phy_neg
1stsex—Emo_ab
ED—1stsex
ED—Phy_neg
Anger—Emo_ab
Anx—Coersion
Dep—Phy_neg
Anger—Sexdistr
Em_neg—Sex_ab
Coersion—Sex_ab
Alc—Phy_neg
Alc—Em_neg
Anger—Phy_ab
ED—Alc
Sexdistr—Phy_ab
Coersion—Emo_ab
PE—Phy_neg
Dep—Phy_ab
PE—ED
Anx—Alc
1stsex—Anger
1stsex—Dep
Anx—Sex_ab
Phy_ab—Em_neg
ED—Aggression
Sexdistr—Phy_neg
1stsex—Em_neg
ED—Em_neg
ED—Sex_ab
Alc—Phy_ab
1stsex—Sex_ab
Dep—Coersion
Dep—Sex_ab
Sexdistr—Sex_ab
PE—Sex_ab
PE—Coersion
PE—Anger
ED—Phy_ab
Anger—Sex_ab
Anger—Coersion
Aggression—Sex_ab
Phy_ab—Sex_ab
Anger—Em_neg
1stsex—Phy_neg
Coersion—Phy_neg
1stsex—Coersion
PE—Aggression
ED—Coersion
PE—Anx
Anger—Alc
Aggression—Sexdistr
Coersion—Phy_ab
Aggression—Phy_ab
Dep—Alc
PE—Dep
PE—Em_neg
PE—Emo_ab
PE—1stsex
ED—Emo_ab
Sexdistr—Em_neg
PE—Alc
Anger—Phy_neg
Coersion—Alc
Aggression—Em_neg
PE—Phy_ab
ED—Anx
1stsex—Anx
Dep—Aggression
Anx—Phy_ab
Alc—Emo_ab
Anx—Aggression
ED—Anger
Alc—Sex_ab
1stsex—Phy_ab
1stsex—Aggression
1stsex—Alc
−0.2
0.0
0.2
0.4
0.6

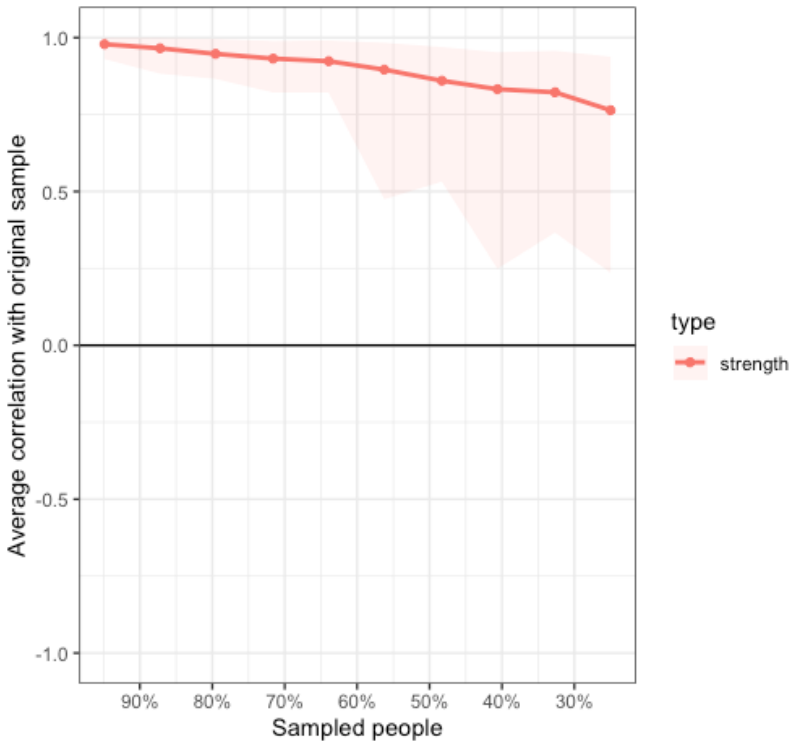
6.2. Centrality Stability

```
library(bootnet)

# Centrality Stability for no problems group:

boot2_No <- bootnet(fit_No, nBoots = 1000, nCores = 4,type = "case")
plot(boot2_No)
```




```
corStability(boot2_No)

## === Correlation Stability Analysis ===

## Sampling levels tested:
##    nPerson Drop%   n
## 1       88  75.0  86
## 2      115  67.3  88
## 3      143  59.4 105
## 4      170  51.7 111
## 5      198  43.8 111
## 6      225  36.1  99
## 7      252  28.4  93
## 8      280  20.5 109
## 9      307  12.8  95
## 10     334   5.1 103

## Maximum drop proportions to retain correlation of 0.7 in at least 95% of the
sample:

## edge: 0.75 (CS-coefficient is highest level tested)
##     - For more accuracy, run bootnet(…, caseMin = 0.673, caseMax = 1)

## strenght: 0.75 (CS-coefficient is highest level tested)
##     - For more accuracy, run bootnet(…, caseMin = 0.673, caseMax = 1)

## Accuracy can also be increased by increasing both 'nBoots' and 'caseN'
```

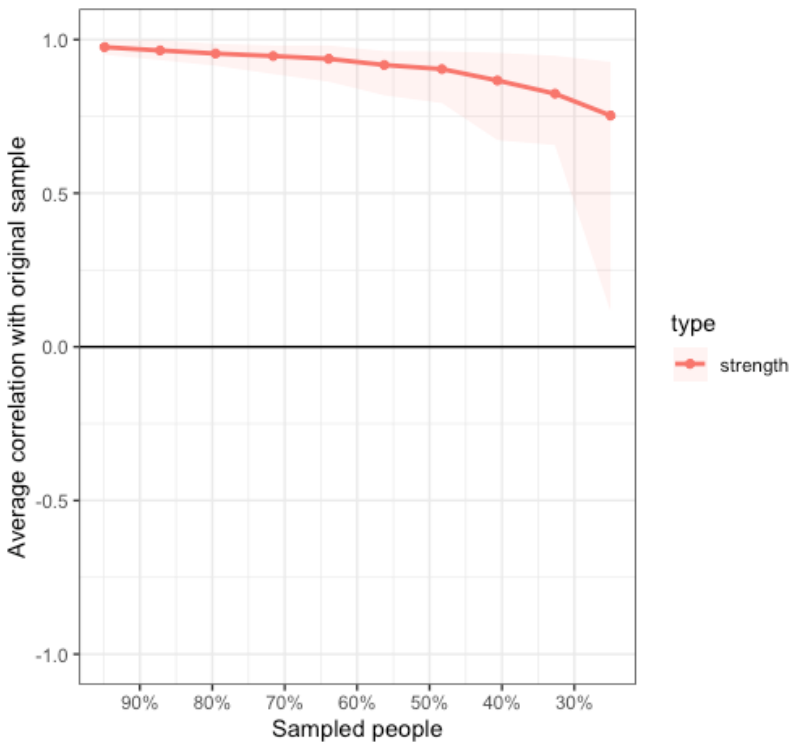
```
# Centrality Stability for problems did not persist group:

boot2_Then <- bootnet(fit_Then, nBoots = 1000, nCores = 4,type = "case")
plot(boot2_Then)
```




```
corStability(boot2_Then)
```

```
## === Correlation Stability Analysis ===

## Sampling levels tested:
##    nPerson Drop%   n
## 1       88  75.0  80
## 2      115  67.3  93
## 3      143  59.4  92
## 4      170  51.7  96
## 5      198  43.8 102
## 6      225  36.1 103
## 7      252  28.4 115
## 8      280  20.5 102
## 9      307  12.8 101
## 10     334   5.1 116

## Maximum drop proportions to retain correlation of 0.7 in at least 95% of the
sample:

## edge: 0.75 (CS-coefficient is highest level tested)
##     - For more accuracy, run bootnet(…, caseMin = 0.673, caseMax = 1)

## strenght: 0.75 (CS-coefficient is highest level tested)
##     - For more accuracy, run bootnet(…, caseMin = 0.673, caseMax = 1)

## Accuracy can also be increased by increasing both 'nBoots' and 'caseN'
```

```
# Centrality Stability for problems persisted group:

boot2_Now <- bootnet(fit_Now, nBoots = 1000, nCores = 4,type = "case")
plot(boot2_Now)
```

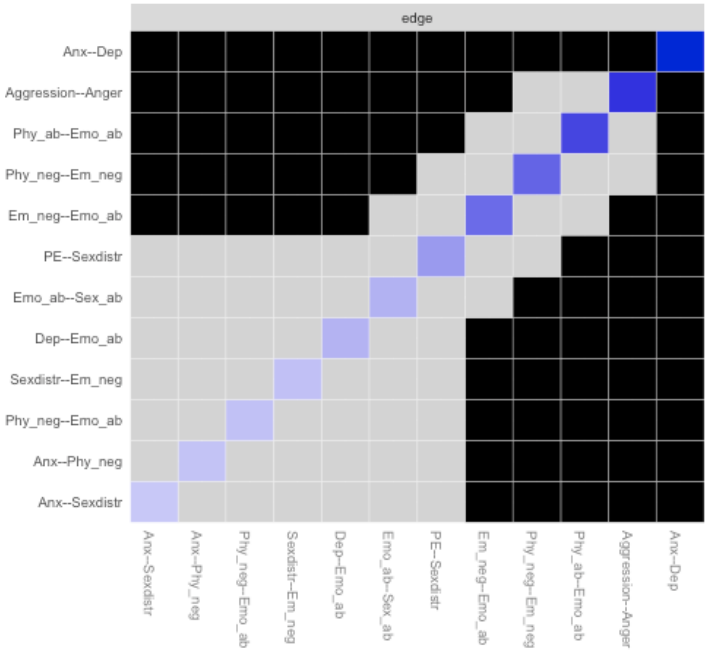



```
corStability(boot2_Now)


## === Correlation Stability Analysis ===

## Sampling levels tested:
##    nPerson Drop%   n
## 1       88  75.0  99
## 2      115  67.3 128
## 3      143  59.4  98
## 4      170  51.7 105
## 5      198  43.8 105
## 6      225  36.1  85
## 7      252  28.4  96
## 8      280  20.5 103
## 9      307  12.8  77
## 10     334   5.1 104

## Maximum drop proportions to retain correlation of 0.7 in at least 95% of the
sample:

## edge: 0.75 (CS-coefficient is highest level tested)
##     - For more accuracy, run bootnet(…, caseMin = 0.673, caseMax = 1)

## strenght: 0.75 (CS-coefficient is highest level tested)
##     - For more accuracy, run bootnet(…, caseMin = 0.673, caseMax = 1)

## Accuracy can also be increased by increasing both 'nBoots' and 'caseN'
```

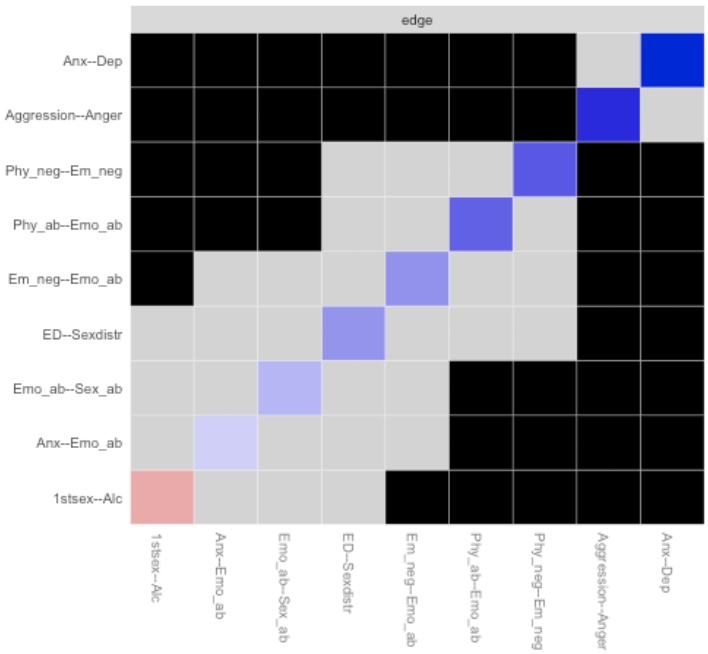
7 Network Stability

7.1 Testing for significant differences in edge-weights

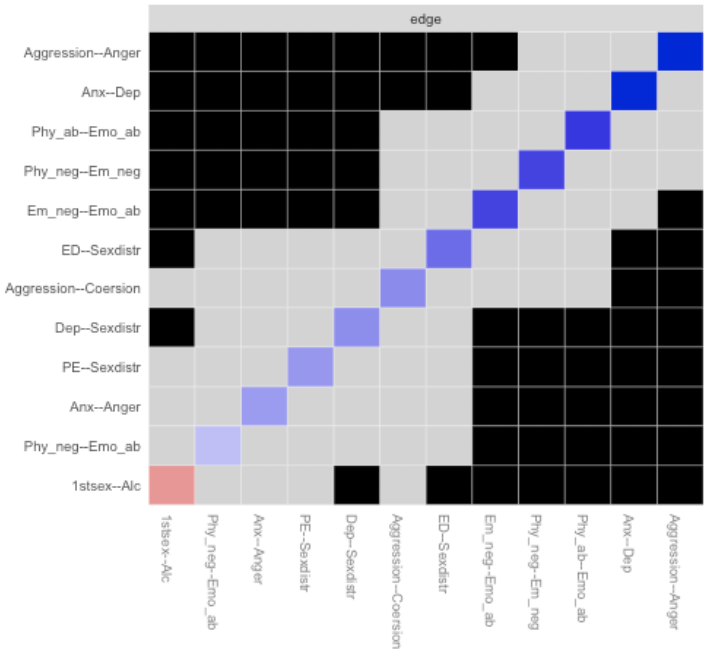
```
# Difference in edge weight (no problems group)

EdgeSigNo <- plot(boot1_no, "edge", plot = "difference", onlyNonZero = TRUE, order
= "sample")
```




```
# Difference in edge weight (problems did not persist group)

EdgeSigThen <- plot(boot1_Then, "edge", plot = "difference", onlyNonZero = TRUE,
order = "sample")
```

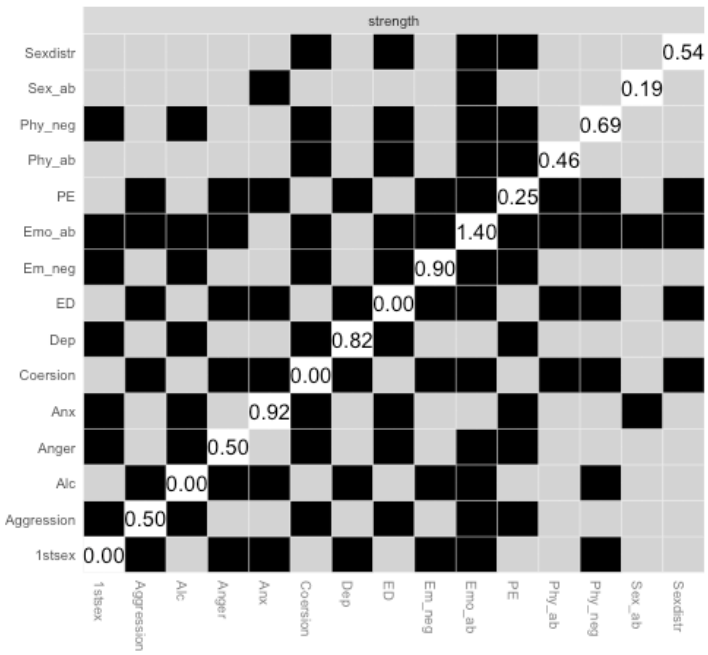


```
# Difference in edge weight (problems persisted group)

EdgeSigNow <- plot(boot1_Then, "edge", plot = "difference", onlyNonZero = TRUE,
order = "sample")
```

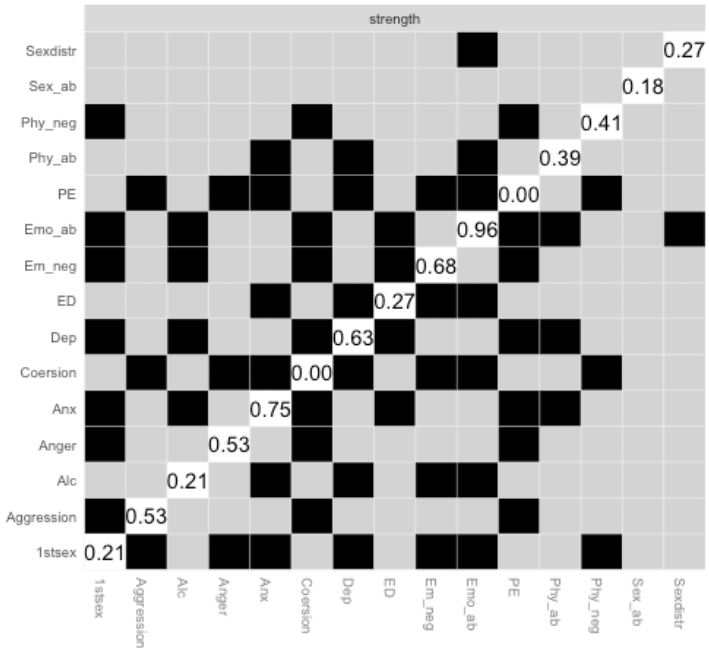


7.2 Testing for significant differences in node strength

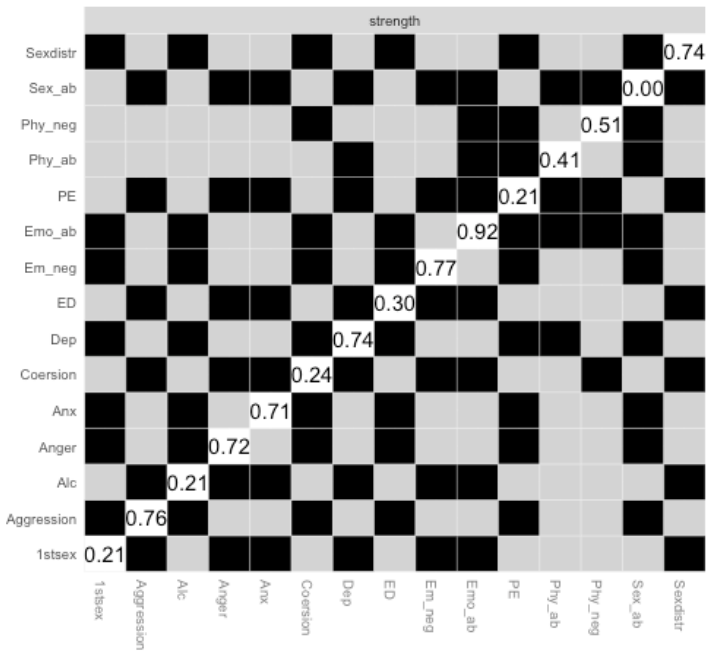
```
# Difference in node strength (no problems group)

StrengthSigNo <- plot(boot1_no, "strength")
```




```
# Difference in node strength (problems did not persist group)

StrengthSigThen <- plot(boot1_then, "strength")
```




```
# Difference in node strength (problems persisted group)
StrengthSigNow <- plot(boot1_now, "strength")
```



8 Network Comparison Test

```
library("devtools")
install_github("cvborkulo/NetworkComparisonTest")
library("NetworkComparisonTest")

# Network Comparison No-Then

NCTNoThen <- NCT(fit_No, fit_Then, gamma = 0.5, it = 1000, test.edges = TRUE,
                      progressbar=TRUE, test.centrality = TRUE, centrality =
               "strength",
                      p.adjust.methods = "holm")

# Difference in global strength p-value:
NCTNoTHen$glstrinv.real
## [1] 0.537271

NCTNoTHen$glstrinv.pval
## [1] 0.358

NCTNoTHen$glstrinv.sep
## [1] 3.558910 3.021639

# Maximum difference in edge weights:
NCTNoTHen$nwinv.real
## [1] 0.2660661

NCTNoTHen$nwinv.pval
## [1] 0.544

# Which edges significantly differ?
NCTNoTHen$einv.pvals[which(NCTNoTHen$einv.pvals[,3] < 0.05), ]
##     Var1          Var2          p-value
##     0 rows> (or 0-length row.names)

# Differences in strength centrality
NCTNoTHen$diffcen.real
##             strength
## PE          0.24863072
## ED          -0.26606611
## 1stsex      -0.21047232
## Anx         0.16323989
## Dep         0.18310438
## Aggression  -0.03167357
## Anger       -0.03167357
## Coersion    0.00000000
## Alc         -0.21047232
## Sexdistr    0.27633468
## Phy_ab      0.06414901
## Phy_neg     0.27318739
## Em_neg      0.21949862
## Emo_ab      0.38818909
## Sex_ab      0.00856615

NCTNoTHen$diffcen.pval
##             strength
## PE          1.000
## ED          1.000
## 1stsex      1.000
## Anx         1.000
## Dep         1.000
## Aggression  1.000
## Anger       1.000
## Coersion    1.000
## Alc         1.000
```

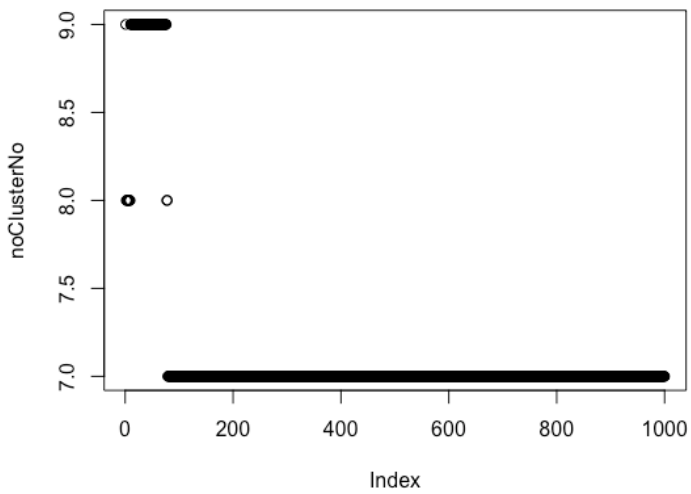
```
## Sexdistr    1.000
## Phy_ab      1.000
## Phy_neg     1.000
## Em_neg      0.345
## Emo_ab      1.000
## Sex_ab      1.000

# Network Comparison No-Then

NCTThenNow <- NCT(fit_Then, fit_Now, gamma = 0.5, it = 1000, test.edges = TRUE,
                      progressbar=TRUE, test.centrality = TRUE, centrality =
               "strength",
                      p.adjust.methods = "holm")

# Difference in global strength p-value:
NCTThenNow$glstrinv.real
## [1] 0.7107387

NCTThenNow$glstrinv.pval
## [1] 0.181

NCTThenNow$glstrinv.sep
## [1] 3.021639 3.732378

# Maximum difference in edge weights:
NCTThenNow$nwinv.real
## [1] 0.237078

NCTThenNow$nwinv.pval
## [1] 0.806

NCTThenNow$nwinv.sep
##      NULL

# Which edges significantly differ?
NCTThenNow$einv.pvals[which(NCTThenNow$einv.pvals[,3] < 0.05), ]
##      Var1           Var2           p-value
##      0 rows> (or 0-length row.names)

# Differences in strenght centrality
NCTThenNow$diffcen.real
##             strength
## PE          -0.212584666
## ED          -0.032288583
## 1stsex      -0.004077439
## Anx         0.041751056
## Dep         -0.107091862
## Aggression  -0.224217458
## Anger       -0.190665865
## Coersion    -0.237078013
## Alc         -0.004077439
## Sexdistr    -0.478930868
## Phy_ab      -0.013707844
## Phy_neg     -0.101076971
## Em_neg      -0.081147579
## Emo_ab      0.042780895
## Sex_ab      0.180935193

NCTThenNow$diffcen.pval
##             strength
## PE          1.00
## ED          1.00
## 1stsex      1.00
## Anx         1.00
## Dep         1.00
## Aggression  1.00
```

```
## Anger       1.00
## Coersion    1.00
## Alc         1.00
## Sexdistr    0.51
## Phy_ab      1.00
## Phy_neg     1.00
## Em_neg      1.00
## Emo_ab      1.00
## Sex_ab      1.00

# Network Comparison No-Then

NCTNoNow <- NCT(fit_No, fit_Now, gamma = 0.5, it = 1000, test.edges = TRUE,
                      progressbar=TRUE, test.centrality = TRUE, centrality =
               "strength",
                      p.adjust.methods = "holm")

# Difference in global strength p-value:
NCTNoNow$glstrinv.real
## [1] 0.1734677

NCTNoNow$glstrinv.pval
## [1] 0.745

NCTNoNow$glstrinv.sep
## [1] 3.558910 3.732378

# Maximum difference in edge weights:
NCTNoNow$nwinv.real
## [1] 0.2983547

NCTNoNow$nwinv.pval
## [1] 0.042

# Which edges significantly differ?
NCTNoNow$einv.pvals[which(NCTNoNow$einv.pvals[,3] < 0.05), ]
##     Var1          Var2          p-value
##     0 rows> (or 0-length row.names)

#Differences in strenght centrality
NCTNoNow$diffcen.real
##             strength
## PE          0.03604606
## ED          -0.29835469
## 1stsex      -0.21454976
## Anx         0.20499094
## Dep         0.07601252
## Aggression  -0.25589102
## Anger       -0.22233943
## Coersion    -0.23707801
## Alc         -0.21454976
## Sexdistr    -0.20259618
## Phy_ab      0.05044117
## Phy_neg     0.17211041
## Em_neg      0.13835104
## Emo_ab      0.43096999
## Sex_ab      0.18950134

NCTNoNow$diffcen.pval
##             strength
## PE          1.000
## ED          0.315
## 1stsex      1.000
## Anx         1.000
## Dep         1.000
## Aggression  1.000
```

```
## Anger       1.000
## Coersion    0.406
## Alc         1.000
## Sexdistr    1.000
## Phy_ab      1.000
## Phy_neg     1.000
## Em_neg      1.000
## Emo_ab      1.000
## Sex_ab      1.000
```

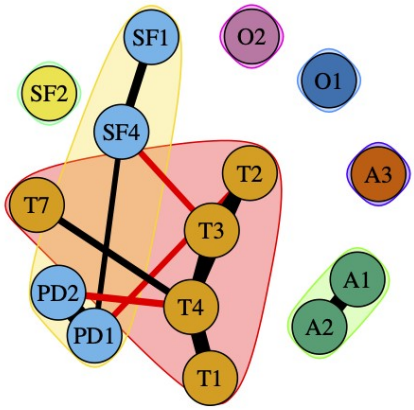
9 Network Communities

```
library(igraph)

# no problems group
NetworkNoIgraph <- as.igraph(qNo)

noClusterNo <- 0
for (i in 1:1000){
  communityWTNo <- cluster_walktrap(NetworkNoIgraph,
                                    weights = E(NetworkNoIgraph)$weight,
                                    steps = i,
                                    merges = TRUE,
                                    modularity = TRUE,
                                    membership = TRUE)
  noClusterNo[i] <- length(communityWTNo)
}

plot(noClusterNo)
```

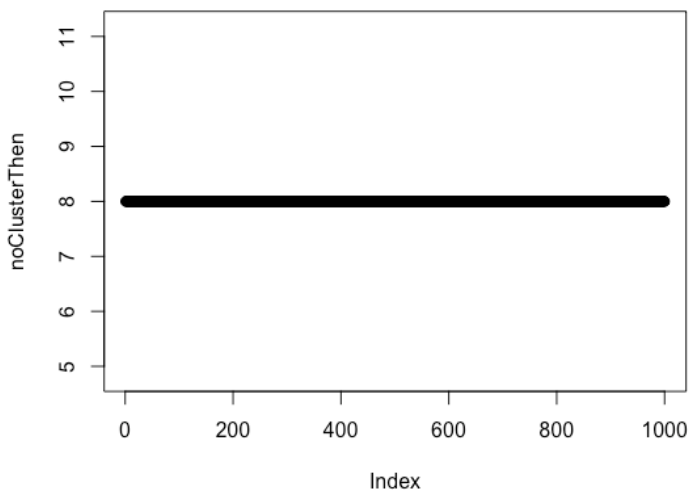



```
median(noClusterNo)
## [1] 7
mean(noClusterNo)
## [1] 7.146

communityWTPlotNo <- cluster_walktrap(NetworkNoIgraph,
                                      weights = E(NetworkNoIgraph)$weight,
                                      steps = 200,
                                      merges = TRUE,
                                      modularity = TRUE,
                                      membership = TRUE)
```

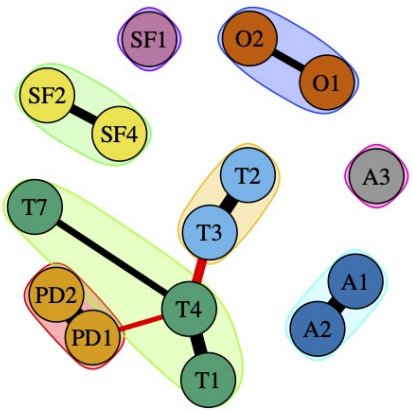
```
plot(communityWTPlotNo, NetworkNoIgraph, layout = qNo$layout)
```



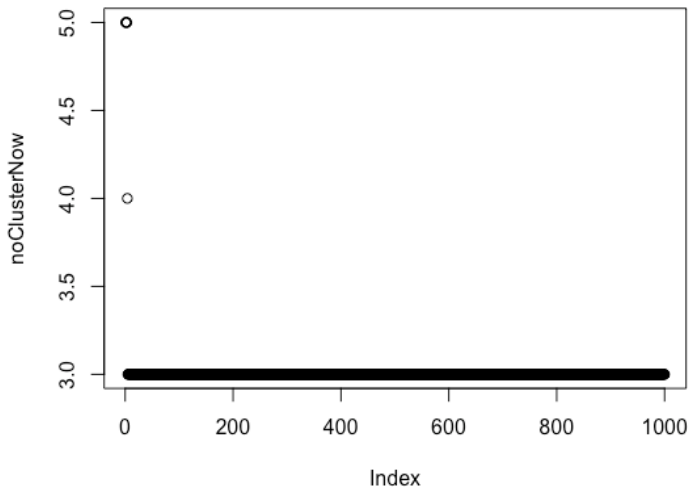

```
# problems did not persist group
NetworkThenIgraph <- as.igraph(qThen)

noClusterThen <- 0
for (i in 1:1000){
  communityWTThen <- cluster_walktrap(NetworkThenIgraph,
                                      weights = E(NetworkThenIgraph)$weight,
                                      steps = i,
                                      merges = TRUE,
                                      modularity = TRUE,
                                      membership = TRUE)
  noClusterThen[i] <- length(communityWTThen)
}

plot(noClusterThen)
```



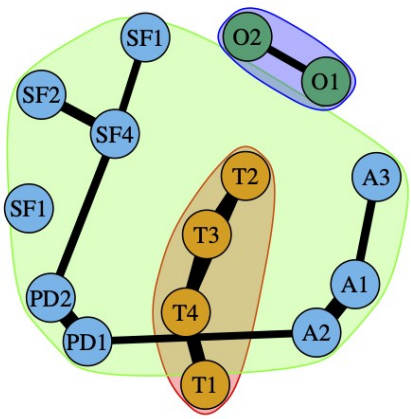
```
median(noClusterThen)
## [1] 8
mean(noClusterThen)
## [1] 8

communityWTPlotThen <- cluster_walktrap(NetworkThenIgraph,
                                        weights = E(NetworkThenIgraph)$weight,
                                        steps = 200,
                                        merges = TRUE,
                                        modularity = TRUE,
                                        membership = TRUE)
plot(communityWTPlotThen, NetworkThenIgraph, layout = qThen$layout)
```




```
# problems persisted group
NetworkNowIgraph <- as.igraph(qNow)

noClusterNow <- 0
for (i in 1:1000){
  communityWTNow <- cluster_walktrap(NetworkNowIgraph,
                                     weights = E(NetworkNowIgraph)$weight,
                                     steps = i,
                                     merges = TRUE,
                                     modularity = TRUE,
                                     membership = TRUE)
  noClusterNow[i] <- length(communityWTNow)
}

plot(noClusterNow)
```




```
median(noClusterNow)
## [1] 3
mean(noClusterNow)
## [1] 3.007

communityWTPlotNow <- cluster_walktrap(NetworkNowIgraph,
                                       weights = E(NetworkNowIgraph)$weight,
                                       steps = 200,
                                       merges = TRUE,
                                       modularity = TRUE,
                                       membership = TRUE)
plot(communityWTPlotNow, NetworkNowIgraph, layout = qNow$layout)
```



PRESSMEDDELANDE

En nätverksanalys om manlig sexuell funktion: jämförande av symptomnätverk hos män som upplevt varierande grader av sexuella dysfunktioner under första samlaget

Pro gradu-avhandling i psykologi

Fakulteten för humaniora, psykologi och teologi, Åbo Akademi

Nätverksteorin har under de senaste åren blivit populär inom psykologin. Tanken bakom denna teori är att psykiska sjukdomar uppstår som resultat av aktiveringar i så kallade symptomnätverk. I nätverk där symptom är nära besläktade med varandra, eller starkt kopplade till varandra, så ökar risken att symptom aktiverar varandra. Då tillräckligt många symptom är aktiverade kan en psykisk sjukdom uppkomma. Johannes Nylund tillämpade nätverksteorin i sin pro gradu-avhandling vid Åbo Akademi för att undersöka manliga sexuella dysfunktioner under det första samlaget. Resultaten tydde på att män som haft fortgående sexuella problem efter det första samlaget hade starkare kopplingar mellan aggressiva tendenser, psykologiska problem och nuvarande sexuella dysfunktioner.

Män som upplevt sexuella dysfunktioner under det första samlaget som fortsatt hade färre och större kluster av starkt kopplade variabler. En signifikant strukturell skillnad hittades även mellan män som upplevt fortgående problem efter första samlaget och män som inte upplevt några problem under första samlaget. Denna avhandling bidrog med att belysa de kopplingar som finns mellan att uppleva sexuella dysfunktioner under första samlaget och aggressivitet, psykologiska problem och nuvarande sexuella svårigheter.

Det data som användes i avhandlingen togs från en stor datainsamling utförd av Åbo Akademi 2006. Frågeformulärssvar från totalt 1056 män mellan åldrarna 18 och 46 användes som sampel. Deltagarna delades in i tre lika stora grupper baserat på om de upplevt problem under första samlaget eller ej, och huruvida problemen blivit bestående eller ej.

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