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The personal social support network of users of psychiatric services: a structural analysis

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IMPRESSUM

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PREAMBLE

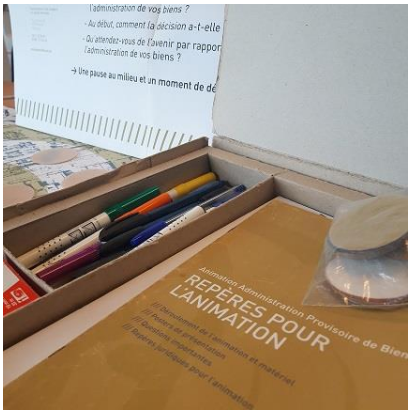
My interest in psychiatry arose from my encounters with the psychiatric service users with whom I collaborated through Psytoyens, the Belgian French-speaking federation of associations of mental health service users, which I helped to set up and which employed me for several years. Having no previous training in psychopathology, it was through my contact with them that I came to understand, as much as possible, what it means to live with mental disorders in an environment which is not always understanding. I had never been a care worker. My relationship with the people I met via Psytoyens was not a helping relationship, in which the carer is clearly distinct from the person being helped, but a collaborative relationship. That experience has strongly influenced my view of psychiatry and the work I present here.

I have included this preamble because my thesis also has a more direct connection with my work with Psytoyens. The aim of Psytoyens was (and still is) to collect the voices and experiences of service users in order to influence the organisation of services. At that time, we were interested in service users' experiences in relation to the legal and administrative arrangements that aim to protect people when they are considered unable to manage their own assets. We had designed a tool that allowed the users we met to identify the people who played a role in the administration of their assets and to tell us about their relationship with those people. This tool, which

uses discs to represent the people involved and concentric circles to represent their degree of closeness with the user, has much in common with the method developed in this work.

Two people contributed greatly to this tool and I would like to mention them here: Pascal Colson and Mattia Van Haver. Pascal Colson, founder of a users' association in Liège, then a member of the board and currently honorary president of Psytoyens, was the supervisor of this project. Together, we travelled throughout Wallonia to meet service users, using this tool. Mattia Van Haver, graphic designer and author of the graphic identity of Psytoyens, designed the tool on the basis of our exchanges (see picture below). This thesis owes much to both of them.





INTRODUCTION

Since the end of the 1990s, many Western countries have made it a priority to improve the care of people with severe mental disorders. In Great Britain, the National Service Framework for Mental Health has included “effective services for people with severe mental illness” as one of its objectives (Department of Health and Social Care, 1999). The United States established a reform that was specifically aimed at this target group (National Advisory Mental Health Council, 1993) and Italy published its “Progetto Obiettivo Tutela Salute Mentale” in 1999 with similar aims (Lora et al., 2007). More recently, at an international level, the World Health Organization's “Comprehensive mental health action plan 2013–2020” set “service coverage for severe mental disorders” as global target no. 2 (World Health Organization, 2013). Severe mental disorders pose a particular challenge to the organisation of mental health care, for several reasons. They are chronic disorders that bring about lasting and significant changes in people's lifestyles, among other things because they can alter people's cognitive and functional capacities. Moreover, people with severe mental disorders face significant prejudice from the general population, which limits their ability to play an active role in society. The lack of adherence to mental health care, either as a consequence of lack of insight or self-stigmatisation,

Severe mental disorders are a particular challenge for the organisation of mental health care: they are chronic disorders, affecting all aspects of life and requiring significant attention to the social integration of people.

is an additional difficulty, which has led health organisations to position themselves differently in terms of defining their values and on issues of constraint and user involvement. All these particularities mean that the care of people suffering from severe mental disorders is complex, involves a wide range of actors, and affects many dimensions of people's lives: physical, psychological, social and relational and in terms of citizenship.

We will begin by describing the population of people with severe mental disorders and difficulties these people face in relation to their health and integration into society. We will discuss the resources that these people can rely on, through their network of social relations, in personal and professional contexts. We will show that the structure of a person's network of social relations is likely to influence their access to those resources and should therefore be taken into consideration in order to improve the organisation of that person's care. At the end of this section, we will introduce the chapters of this dissertation.

PEOPLE WITH SEVERE MENTAL DISORDERS

Severe mental disorders are a group of conditions that includes moderate to severe depression, bipolar disorder, schizophrenia, and other psychotic disorders (World Health Organization, 2018). Although there is no precise definition, there are three common criteria: diagnosis, disability, and duration (Parabiaghi et al., 2006; Ruggeri et al., 2000; Schinnar et al., 1990; Slade et al., 1997; Zumstein & Riese, 2020). The three categories, which were first defined by the National Institute of Mental Health (NIMH, 1987), are operationalised in a variety of different ways. In many studies, these diagnostic criteria have led to a focus on organic psychosis and personality disorders (Ruggeri et al., 2000), while other studies have included all psychiatric diagnoses described in the *Diagnostic and Statistical Manual of Mental Disorders* (de Mooij et al., 2019). Disability is often measured using the Global Assessment of Functioning (GAF) scale, a person being considered disabled if their score is lower than or equal to 50 (Parabiaghi et al., 2006; Ruggeri et al., 2000), and sometimes using the HoNOS (Health of the Nation Outcome Scales) (Lora et al., 2007). Other studies use a set of criteria related to social functioning (disturbing social behaviour, impairment in activities of daily living and basic needs, impairment in work and non-work activities, limited ability to obtain assistance, etc.), which must be met in whole or in part for a person to be categorised as having a severe disorder (Schinnar et al., 1990; Zumstein &

Severe mental disorders are defined by the "three Ds": a psychiatric Diagnosis, a long Duration of psychiatric treatment, and Disabilities that affect social functioning.

Riese, 2020). Finally, the criterion of duration is often defined as a duration of two years or more of care by psychiatric services (Parabiaghi et al., 2006; Ruggeri et al., 2000; Zumstein & Riese, 2020). Some definitions also include the number of psychiatric hospitalisations in a given period (Schinnar et al., 1990).

Mirella Ruggeri's study gives an idea of the size of the population concerned: she used two definitions of severe mental disorders in London and Verona, one centred on psychosis, the other including all psychiatric diagnoses. According to the first definition, the population of psychiatric service users with severe mental disorders was estimated to be 0.25% in London and 0.13% in Verona. Using the second definition, the population of users with severe mental disorders was estimated to be 1.14% in Verona (Ruggeri et al., 2000). Another study, which used slightly different criteria for defining severe mental disorders, obtained similar results in Lombardy with 0.34% of the population found to be affected by severe mental disorders (Lora et al., 2007). A more recent study found that the prevalence of people with severe mental disorders ranged from 0.54% using broad disabil ity criteria (GAF < 70) to 0.1% using strict disability criteria (GAF < 50) (Martín-Pérez et al., 2019).

Mortality rates are much higher among service users with severe mental disorders than in the overall population. Systematic reviews have shown that their mortality rate, from all causes, is between 2 and 3.5 times higher than that of the general population (Chesney et al., 2014; Cuijpers & Smit, 2002; de Mooij et al., 2019; Laursen et al., 2007, 2012; Ösby et al., 2000; Ringen et al., 2014; Saha et al., 2007; E. R. Walker et al., 2015). They generally die between 10 and 20 years earlier than people with no history of mental disorders (de Mooij et al., 2019; Hjorthøj et al., 2017; Laursen et al., 2012; World Health Organization, 2016). An English study showed that, compared to the national population, all forms of mental disorder are associated with a significant number of years of potential life lost: 8.0 to 14.6 life years lost for men and 9.8 to 17.5 life years lost for women. The largest reductions were for men suffering from schizophrenia (14.6 years lost) and women with schizo-affective disorders (17.5 years lost) (Chang et al., 2011). Generally, life expectancy is about 60 years for men and about 68 years for women with severe mental disorders. It also seems that the gap is widening between the mortality rate of people with severe mental disorders and that of the general population (Ösby et al., 2000; Saha et al., 2007; World Health Organization, 2016). Several reviews have found higher mortality rates in recent studies than in those conducted two or three decades earlier, for a variety of mental disorders, not just schizophrenia (Saha et al., 2007; E. R. Walker et al., 2015). It seems that people with mental disorders have not benefited from the

People with severe mental disorders die 10 to 20 years earlier than the general population. And it doesn't get any better.

increase in life expectancy experienced by the general population in recent decades (E. R. Walker et al., 2015).

Suicide is a frequent cause of premature death for people with severe mental disorders. A meta-analysis found that the risk of suicide for people suffering from schizophrenia was 13 times higher than for the general population (Saha et al., 2007) and other studies have found that the risk is up to 22 times higher, particularly in the year of first admission to hospital (Nordentoft et al., 2013) and during the first days following discharge from hospital (Qin & Nordentoft, 2005). In about 50% of those who died by suicide, a mental disorder was present (World Health Organization, 2014). It seems, however, that most of the excess mortality of people with severe mental disorder is not due to suicide but to natural causes (Laursen et al., 2012): people suffering from severe mental disorders die from heart diseases and other chronic diseases (Colton & Manderscheid, 2011; E. R. Walker et al., 2015; Whiteford et al., 2013). Cardiovascular, respiratory, and metabolic diseases are the main illnesses suffered by people living with severe mental disorders, followed by cancer and infectious diseases (de Mooij et al., 2019; Olfson et al., 1998; Tenback et al., 2012). Several studies have shown that people with schizophrenia suffer from more physical health problems than the general population and have high rates of chronic medical conditions, such as cardiovascular disease and diabetes (Azad et al., 2016; Bahorik et al., 2017; Goodell et al., 2011; Hjorthøj et al., 2017; Laursen

People with severe mental disorders have a much higher risk of committing suicide and of suffering from chronic medical conditions than the general population.

et al., 2012; Suvisaari et al., 2016; E. R. Walker et al., 2015). There are several possible explanations for this: an unhealthy lifestyle (Dipasquale et al., 2013; Stubbs et al., 2016), heavy tobacco consumption (Lasser et al., 2000; Poirier et al., 2002), the use of alcohol and illegal substances (Toftdahl et al., 2016), and the side effects of second-generation antipsychotics (Hjorthøj et al., 2017; Leung et al., 2012; Young et al., 2015). Furthermore, physical health problems in people with severe mental disorders are often diagnosed late and treated insufficiently (Laursen et al., 2012). Premature death is also associated with more positive symptoms (Loas et al., 2008) and more severe symptoms of disorganisation (de Mooij et al., 2019).

Since the 1990s, the Global Burden of Disease study has been estimating years of life lost (YLLs), years lived with disability (YLDs), and disability-adjusted life-years (DALYs), the DALYs being calculated by adding up the years of life lived with disability (YLDs) and the years of life lost (YLLs). One DALY is equivalent to one healthy year of life lost to a disease. Mental disorders are among the diseases that generate the most disabilities. In 2010, mental and substance abuse disorders accounted for 183.9 million DALYs or 7.4% of DALYs worldwide. Overall, they were the fifth largest disorder category of global DALYs. Among the DALYs caused by mental and substance abuse disorders, depression accounts for 40.5%, anxiety disorders for 14.6%, illicit drug-related disorders for 10.9%, alcohol-related disorders for 9.6%,

Although having a low prevalence, severe mental disorders are among the diseases that generate the most disabilities. And the burden of mental and substance use disorders increases over time.

and schizophrenia for 7.4% (Whiteford et al., 2013). Mental and substance abuse disorders generate 0.5% of YLLs and 22.9% of YLDs. Thus, although mental disorders do not contribute directly to mortality (as we have seen above, people who suffer from them die from other causes), they generate many disabilities (Whiteford et al., 2013). In 2013, five mental disorders were among the largest contributors in terms of YLDs: major depression (second), anxiety disorders (seventh), schizophrenia (eleventh), dysthymia (sixteenth), and bipolar disorder (seventeenth) (Vos et al., 2015). The burden of mental and substance use disorders increased by 3.6% between 1990 and 2010 (Whiteford et al., 2013). Depressive disorders are among the ten diseases that increased the most in terms of DALYs between 1990 and 2019 (Vos et al., 2020). It should also be noted that, according to some, the burden of mental disorders is underestimated and actually accounts for 32.2% of YLDs (rather than 21.2%, the estimate provided by the Global Burden of Disease study in 2010) and 13% of DALYs (compared to 7.1%) (Vigo et al., 2016). The studies of global burden of disease look at all diseases and mental disorders, without distinguishing severe mental disorders from others. Schizophrenia, for example, is one of the disorders usually defined as a severe mental disorder. Although it is a disorder with a low prevalence, schizophrenia ranked twelfth among the most disabling disorders in 2016 (Charlson et al., 2018). This is probably explained by the fact that schizophrenia is associated with significant impairments in psychosocial functioning. People with schizophrenia are less likely to be employed, have difficulty keeping up with household chores, and are often dependent on family members or health professionals. Furthermore, the largest burden

from schizophrenia is presented by people aged 25 to 54, the age at which individuals are most likely to be economically productive (Charlson et al., 2018). The cost to society generated by mental disorders is, therefore, quite significant. The World Health Organization has estimated that the direct costs of schizophrenia in Western countries range from 1.6% to 2.6% of total health care expenditure and thus between 7% and 12% of the gross national product (Barbato et al., 1997). The indirect costs of mental disorders (reduced productivity and increased unemployment) are also important, as mental disorders affect people during their working lives. For example the indirect costs of mental disorders were estimated to be 48% of total costs in France in 2007 and 59% in England in 2010 (Hewlett & Moran, 2014).

THE CHALLENGE OF LIVING IN THE COMMUNITY

Since the 1960s, the organisation of care for people suffering from severe mental disorders in Western countries has gradually shifted from a system based on long-term hospital care to a set of services within the community (T. Becker & Kilian, 2006; Thornicroft & Bebbington, 1989a). This change is based both on the new possibilities for supporting service users in the community and on the increasingly widely recognised right of all people with mental disorders to live in the community, maintain their social contacts, and enjoy freedom of movement. More recently, the recovery movement has taken a step further in this direction by shifting the focus from symptom elimination to

People with severe mental disorders face difficulties with social integration and suffer the consequences of fragmented care.

disease management and inclusion in rewarding social roles (Anthony, 1993; Markowitz, 2001). This has had many positive consequences for psychiatric service users, but it has created difficulties for the social integration of users of psychiatric services (Hamden et al., 2011; Lamb & Bachrach, 2001). They struggle to find a meaningful place in the community: they have a particularly low employment rate and high residential instability, they suffer from loneliness and social isolation, and they are among the most marginalised and stigmatised in the community. This has also increased the fragmentation of care (Chami et al., 2017; Diminic et al., 2015; Enthoven, 2009; Stangt, 2009), with negative consequences for service users (Adair et al., 2005; Bachrach, 1981a; Burns et al., 2009). Many of them still make regular trips back and forth between the hospital and their homes, an indication of the difficulty of setting up an appropriate support system in the community. The length of stay in hospital remains significant, 39.4 days on average in Europe according to a recent study (Giacco et al., 2020), which is not without consequences for social integration (P. Smith et al., 2020).

People with severe mental disorders have a low employment rate (between 10 and 20%) and a high prevalence of homelessness (between 9 and 20%).

The employment rate among psychiatric service users is between 10 and 20%, which is much lower than the employment rate in the general population, which is 75–80%. They are six to seven times more likely to be unemployed and, when they work, they work fewer hours and are less well paid than the general population (Hewlett & Moran, 2014; Huxley &

Thornicroft, 2003; Kessler et al., 2008; Marwaha et al., 2007a; Marwaha & Johnson, 2004). Working is associated with many positive outcomes: social functioning, lower symptom levels, improved quality of life, and self-esteem (Granerud & Severinsson, 2006b; Howard et al., 2000; Marwaha et al., 2007a). There is also evidence that people with severe mental disorders want to work (Bates, 1996; Hatfield et al., 1992; Perkins & Rinaldi, 2002) and working is associated with many positive outcomes: social functioning, symptom levels, quality of life, and self-esteem (Marwaha et al., 2007b)

With regard to housing, the prevalence of homelessness among people with severe mental disorders is 15%, 20% among service users with schizophrenia, 17% among those with bipolar disorder, and 9% among those with depression (Folsom et al., 2005). They are also at much higher risk of living in inadequate housing and in socially marginalised neighbourhoods (Hansson et al., 2002; Newman, 1994). The likelihood of changing residence at least once within three years is twice as high for these users as for the general population (Lix et al., 2006). Changes in residence can have many negative consequences on continuity of treatment and health care and can cause social isolation and the loss of relationships that could offer support (Lix et al., 2006).

Moreover, half of people with severe mental disorders experience problems of loneliness or social isolation (Beebe, 2010; Borge et al., 1999; Buchanan, 1995; Clinton et al., 1998; Fortuna et al., 2019; Granerud & Severinsson, 2006b; Koenders, de Mooij, et al., 2017; Perese & Wolf, 2005; Wang et al., 2017; Yanos et al., 2010, 2012), compared to only one-third of the general population (Lauder et al., 2004). They often have difficulty making and maintaining new friendships (Boardman, 2011; Newlin et al., 2015; Sayce, 2001). A recent study, based on a cross-sectional national survey in England, found that loneliness was associated with all mental disorders, especially depression, with the association being even greater for people with multiple disorders (Meltzer et al., 2013). Moreover, loneliness is associated with a poorer quality of life, poorer social functioning and personal recovery, more severe psychiatric symptoms, and lower self-esteem (Bastiaansen et al., 2005; Ma et al., 2019; F. M. Pernice-Duca, 2008; Wang et al., 2018). People with severe mental disorders are among the most marginalised and stigmatised in the community (Killaspy et al., 2014; Webber et al., 2014). Many individuals suffering from mental health problems experience negative reactions from others (Granerud & Severinsson, 2006b), which leads to self-stigmatisation, limits social interaction, and presents a significant barrier to recovery (Perlick et al., 2001).

People with severe mental disorders are more affected by loneliness than the general population.

In their relationships with health care services, service users experience breakdowns in follow-up, often have to repeat their stories, do not have easy access to information, and have difficulty making their voices heard.

People with severe mental disorders also experience difficulties using health services. Qualitative analyses of their experiences show that they are regularly subjected to breaks in relationships, in particular due to staff turnover (Folker et al., 2019; Jones et al., 2009; Sweeney et al., 2016). They also experience relational ruptures when moving from one service to another or from one profession to another (Biringer et al., 2017; Folker et al., 2019). They are often frustrated by having to repeat their story over and over again and feel anonymous in a system where professionals do not know them (Folker et al., 2019; Jones et al., 2009; Sweeney et al., 2016). They often have to wait, without necessarily knowing why, at the risk of making their problems worse (Biringer et al., 2017) and making their care pathways highly unpredictable (Folker et al., 2019). They find it difficult to assert their own choices, and often have to take the initiative themselves to contact services (Biringer et al., 2017). They lack or do not have easy access to information about available services or intervention planning (Biringer et al., 2017; Folker et al., 2019; Sweeney et al., 2016). Due to a lack of resources or support, they also sometimes experience difficulties with the self-management of their care, such as attending appointments or being systematic in taking medication (Beebe, 2010). In short, they experience discontinuity of care (Adair et al., 2003).

Continuity of care is usually defined as the orderly and uninterrupted movement of patients through the various components of a health care system (Bachrach, 1981a). In the field of mental health, it refers primarily to coordination between services and the stability of the relationship between

caregiver and care receiver (Haggerty et al., 2003). Studies that have focused on continuity of care have found that a significant proportion of users of psychiatric services are frequently readmitted to hospital (Oyffe et al., 2009; Pfiffner et al., 2014). A recent European study showed that 35.5% of psychiatric service users were readmitted to an in-patient psychiatric unit at least once within one year. This rate is even higher in Belgium, where the present study was carried out (43.7%) (Giacco et al., 2020). A nationwide study in Belgium has also shown that a third had been hospitalised within the previous six months (Lorant et al., 2019). Readmissions are also most frequent in the 30-day period following hospitalisation (Durbin et al., 2006). This could be caused by psychiatric symptoms or by poor adherence to treatment, insufficient outpatient services, and insufficient collaboration with hospital services (Oyffe et al., 2009; Schrag et al., 2006). Moreover, the length of hospitalisation remains high in most European countries: 46.3 days in the UK and 36.6 days in Germany. Belgium, where this study was carried out, has the longest hospital stays: 54.9 days (Dimitri et al., 2018). This is not without consequences, as long periods of hospitalisation are significantly associated with a decrease in social integration. The longer the length of stay, the greater the risk of losing one's job or becoming homeless (P. Smith et al., 2020). Continuity between inpatient and outpatient services is all the more important as the first days following discharge are the most dangerous in terms of suicide (Qin & Nordentoft, 2005). Studies have indeed identified

Service users with severe mental disorders are often readmitted to hospital, experience difficulties in post-discharge follow-up, and drop out of outpatient services.

the lack of post-hospital follow-up as a dimension of continuity of care (Fontanella et al., 2014). A recent European study showed that the average gap between hospital discharge and subsequent outpatient contact ranged from 3.1 weeks in England to 7.1 weeks in Belgium (Nicaise, Giacco, et al., 2020). Several studies have also documented a lack of coordination between primary health and mental health services and between health and social services (Belling et al., 2011; Nicaise et al., 2013; Scharf et al., 2013). Without coordination between rehabilitation services and employment services on the one hand and psychiatric services on the other hand, psychiatric service users are less likely to maintain contact with those who are following them up (Drake et al., 1996; Mueser et al., 2003), and after fifteen months without follow-up, the clinical and social improvements associated with ambulatory care are largely lost (Audini et al., 1994). Conversely, being followed by the same multidisciplinary team, during and after hospitalisation, strongly reduced the average number of hospitalisations and the average number of days of hospitalisation over a twelve-month period (Juven-Wetzler et al., 2012). The presence of a case manager, considered an indicator of continuity, has been associated with a reduced burden on the family if the patient lives with relatives (Tessler & Gamache, 1994). A study, which measured continuity through pre-discharge contact between a patient and an outpatient provider, showed that those who had this pre-discharge contact were more likely to continue outpatient follow-up and had less difficulty coping with their symptoms (Olfson et al., 1998). Individuals who had more contact with the health care team and fewer “gaps” in their follow-

up experienced more positive changes in social functioning and had a lower rate of hospitalisation (Brekke et al., 1999).

Studies that focus specifically on the problems that people with severe disorders have living in the community have enabled us to identify the two biggest complaints users have in relation to life in the community (Beebe, 2010; Fortuna et al., 2019; Granerud & Severinsson, 2006b). Loneliness is the major complaint, whether it is spending long hours alone or the difficulty of fully participating in society. The other recurring complaint concerns the mental health system, in which users want their requests to be taken seriously (including those concerning loneliness) and to have their care organised in a coherent way and in accordance with their needs.

SOCIAL NETWORK RESOURCES FOR LIVING IN THE COMMUNITY

One way to address the difficulties faced by people with severe mental disorders is to improve their access to a variety of social resources that are available in the community in which they live so that they can play diverse social roles and access the support systems that enable them to manage their disorders and achieve their goals. That is why we were interested in the set of social relationships (with relatives and professionals) through which service users access those social resources, i.e. their social network. It is through their social relationships that service users can find help with a move, advice on how to make a decision, or information about treatments. It is through social relationships that they may be included in groups or take responsibility for an activity that gives meaning to their lives. The people with whom they are in contact, if they cooperate with one another, can offer them more adequate support. They can, for example, share their concerns about what the service user is going through and thus anticipate problems. They can act as mediators if the user comes into conflict with another person in his or her network. They can organise themselves to react quickly in a crisis situation.

Users of psychiatric services can obtain many resources through their social network: behavioural guidance, purpose and meaning in life, and social support.

Connections between members of the social network also foster consistency in support interventions.

The social network thus offers many resources that are often indispensable for building a balanced support system in the community. As we shall see in Chapter 2, the social network provides behavioural guidance through social comparison and provides purpose and meaning in life through social roles and group inclusion. It provides emotional support and professional opportunities through both strong and long-lasting relationships and more distant relationships. Regarding the organisation of mental health support, the social network also facilitates access to health care resources and enhances the coherence of interventions, for example by facilitating the coordination and circulation of information. All these resources promote self-esteem, social competence, self-efficacy, health promotion, adherence to treatment, and ultimately better health and social integration.

The size and composition of a social network and the structure of the relationships between the members of a social network influence access to the social resources mentioned above.

More specifically, the characteristics of a psychiatric service user's social network, such as its size or composition, influence the resources to which they have access. As we shall see in the next chapter, a larger network reduces the risk of mortality and is associated with less severe psychiatric symptoms. It is also associated with better quality of life, better social functioning, shorter and less acute hospitalisations, fewer emergency visits, and a reduced risk of re-hospitalisation. Regarding network composition, having a more diversified network with a greater number of friends is associated with less severe symptomatology, greater satisfaction with social relationships, increased

use of generalist and outpatient services, and reduced risk of relapse. Access to resources, however, is not only affected by the number and type of support persons, but also by the relationships between them. People who know and communicate with each other influence one another. That reciprocal influence is likely to impact the support they offer to others, how the delivery of the support is organised, and what role the person receiving the support will have. Thus, for a support person, being connected to other people who are supporting the same psychiatric service user means being able to have a more complete view of the user's situation and to adapt the support he or she offers to that offered by others. For service users, having support persons who are in contact with one another means greater clarity about who to turn to for what and greater stability in the support system. We should, therefore, be able to describe not only the size and composition of a service user's social support network, but also the relationships between the support persons, the web of connections between them or, put simply, the structure of the network. That should allow us to assess the resources to which the person has access, how the provision of those resources is organised, and what role the people involved, including the user, are likely to play.

Generally, being integrated into a cohesive group – a group in which many people are in contact with each other – allows us to develop trust, shared values, a community of ideas, and a sense of belonging with the other members of the group. In terms of information flow, a cohesive group is a group in which there are many opportunities to contact each other. In such a context, if a "hole" is created in the network, i.e. if a relationship between two people is broken, an alternative communication path will soon be found. In a fragmented network, the people an individual is in contact with do not know each other or do not interact with each other. They do not form a group whose members are in contact with each other. Relationships are, therefore, essentially between that individual and the people they are in contact with, without those people being in contact with each other. That central position gives the individual access to more diversified resources because of his or her connection to differentiated social worlds that are not influenced by one another. In a cohesive network, the constitution of a community of ideas shared by all members limits the diversity of ideas that can be accessed. In terms of information flow, occupying a central position within the network enables people to have more complete information more quickly. It also enables them to control the transmission of information within the network.

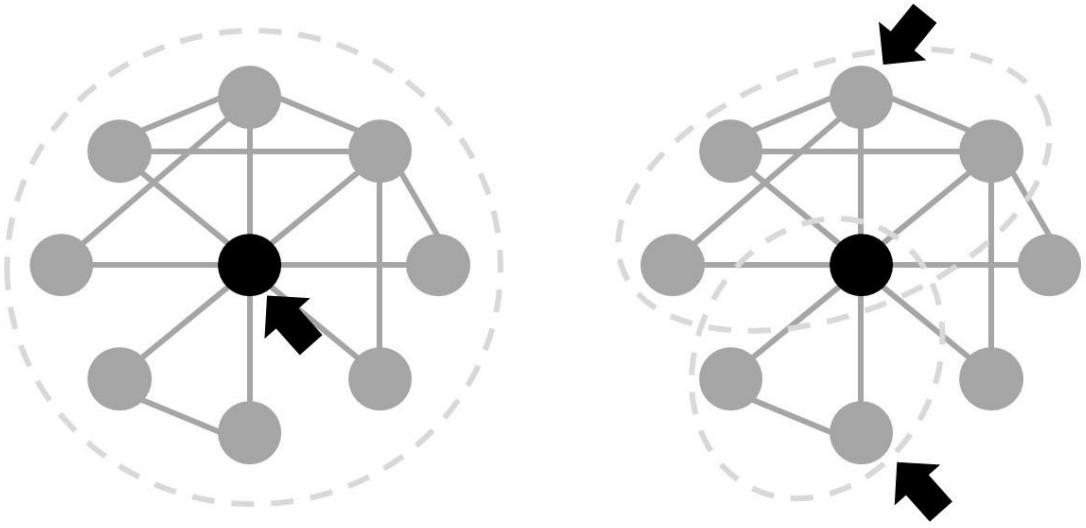
A cohesive network fosters trust, a sense of belonging, and relational stability.

A fragmented network gives a central person access to more diverse resources and control over the flow of information.

We can analyse the structure of the network at two levels: the structure of the network as a whole and the structural position of an individual within the network.

We were thus able to analyse the social support network of psychiatric service users at two levels: that of the focal person, the psychiatric service user, and that of the members of the focal person's network, the people supporting the psychiatric service user (see Figure 1). At both levels, whether a network is organised in a more or less cohesive or centralised way will have effects which we think are worth taking into account. At the level of the psychiatric service user, we analysed the structure of the whole network formed, around the user, by the people who support him or her (see left diagram in Figure 1). At this level, a cohesive network is a network within which the support persons will identify problematic situations sooner, communicate, and intervene more quickly. It is a network which provide reassuring coherence of support intervention. It is also a network that is likely to have more influence on the patient, to the benefit of adherence to treatment but also at the risk of exerting too much pressure on the service user and leading to service users dropping out of services. At the second level, we analysed the structural position of the people who are members of the psychiatric service user's support network (see right diagram in Figure 1). At this level, the logic is the same. A cohesive network means trust, a shared vision of the situation of the person to be supported, and an increase in the standards of support within the group, but also a potential risk of disempowerment due to the person knowing that others are present and ready to act.

Figure 1. The two levels of analysis of the social support network of psychiatric services users.



First level of analysis: the structure of the entire social support network around a psychiatric service user

Second level of analysis: the structural position of a support person within a psychiatric service user's social support

Legend. The black dot represents the psychiatric service user. The grey dots represent the people supporting the user.

Conversely, a less cohesive network, where the support person is in a central position, puts that person in a position from which they can coordinate the social support network, offers him/her a more global vision of the user's situation and a better understanding of problems than the other interveners, and, potentially, enables him/her to implement more adequate interventions.

The general hypothesis underlying this work is that the structure of relationships around a psychiatric service user is likely to have an impact on the user and on the support persons in two possible ways. We pay particular attention to the cohesion of the network, the general level of connectedness within the network, i.e. the presence or extent of ties among network members (Martí et al., 2017a). In a cohesive network, people have many ties with others and their ties are widely distributed; whereas, in a less cohesive network, people are less connected to others and their ties are concentrated on a limited number of people. Our hypothesis is that on the one hand, a strong cohesion of the network is likely to generate social control, resulting in an enhanced coherence of support for the service user through coordination of support or through the dissemination of support values. On the other hand, weak cohesion is likely to offer a structural autonomy resulting in more opportunities, promoting social integration of the service users and greater control by service users of the organisation of collaboration between support persons. We also hypothesise that how this variation in the cohesion of the network, and thus in the level of social control and autonomy, affects the person will depend on the person's situation. Whether they are likely to have greater need of coherence of support or of opportunities will depend on the severity of their situation. This hypothesis ties in with the work of Walter Leutz, although he described the processes of integration between

Depending on its level of cohesion, the social support network could generate social control or autonomy and opportunities, with various impacts for the user and the support persons.

The appropriate level of cohesion could depend on the severity of the service user's situation.

services and not collaboration around a user. He showed that it is more appropriate to integrate services with a specific population in mind rather than to do so for everyone (Leutz, 1999).

Although there is a large amount of sociological and social network analysis (SNA) literature which allows us to support the above statements, there has been little research on the social support networks of users suffering from severe psychiatric disorders. What we have just outlined are, therefore, essentially hypotheses (see Chapter 2). While there are many studies focusing on the size and composition of networks, there have been very few studies devoted to the structure of relationships within the social support network of psychiatric patients. Moreover, with a few exceptions, those studies have focused on a limited number of indicators, often only density, and they have not addressed the diverse potential effects of the network structure or whether it promotes a coherence of support or enhanced opportunities. Furthermore, to our knowledge, there are no studies analysing the link between the support offered by support persons to users of psychiatric services and the structure of the networks in which they are embedded.

We wanted, therefore, to describe the structure of the social support network of psychiatric users and how it relates to the social support users are likely to have access to. To this end, we related various indicators of the structure of the network to two types of variable, the first at the level of the psychiatric service user, i.e. the continuity of care perceived by the user, or

in other words the consistency of the provision of support, and the second at the level of the support persons within a user's network, i.e. the level of importance of the support given by the different support persons in his or her network, from the user's point of view. The first level of analysis allows us to identify the structural elements of the social support network that promote a coherent support system around service users. The second level of analysis allows us to identify the specific role that individual support persons can play in this support system. The combination of those two perspectives makes it possible to open up research perspectives that are aimed, ultimately, at equipping mental health professionals to organise the various resources around service users in order to give them the support they need to function in the community.

THE CHAPTERS

This work is organised into five chapters. The first aims to present the existing literature on the social support networks of psychiatric patients. In it, we discuss the models that associate the characteristics of the social support network of psychiatric patients with health and detail the resources that the social support network can offer. We then describe the social support network of psychiatric patients in terms of size, composition, and structure, in comparison with that of the general population. We describe the state of knowledge of the impact of the characteristics of the social support network on health, quality of life, social functioning, and service use. Finally, we discuss the types of interventions that can modify the social

support network and we conclude with the case for considering the structural dimension of the study of social support networks.

In the second chapter, we provide more methodological information about the Morpheus study and how we collected data on the social support network of 380 service users recruited in outpatient and inpatient services in Belgium. We detail how we selected and interviewed the users and the questions we asked. We pay particular attention to the use we made of the sociogram, for which we drew inspiration from the tools developed by Bernie Hogan and Claire Bidart, based on the original work of Jacob Moreno in the 1930s. We detail the “name generators”, i.e. the questions leading the interviewees to identify the supporting persons, the “name interpreters”, i.e. the questions aimed at collecting information on the support persons, and the “dyads interpreters”, i.e. the questions aimed at identifying the relationships between the support persons.

In the third chapter, we describe the social support network of the 380 service users using several network metrics describing the size, composition, and structure of relationships. We highlight the diversity of existing indicators and assess whether they vary according to the socio-demographic and clinical characteristics typically used to describe the situation of psychiatric users. We carried out several analyses relating network metrics to the psychosocial characteristics of users: residential status, level of education, psychiatric history, and psychosocial functioning. The aim was to arrive at an overview of the variation in users’ networks according to their

personal characteristics. We also show that these networks are also socially patterned.

In the fourth chapter, we discuss continuity of care in relation to the structure of the user's network. For users with severe mental disorders, living in the community requires a coherent support system that is adapted to their needs. Such a system involves consistency between the support provided by the members of their social support network. Continuity of care is an important indicator of this. Continuity of care, however, has never specifically been studied in relation to the structure of the network. The relationships between the people providing support, however, offer a good insight into the possibilities of coordination between actors and, therefore, of continuity of care. Moreover, as we explain in the second chapter, network interventions are essentially focused on social isolation and the few interventions that seek to bring caregivers together do not take into account those network characteristics that may or may not improve coordination and continuity of care. We set out to investigate the association between network structure and continuity of care and hypothesised that it would depend on the severity of the user's situation and on his/her living arrangements.

In the fifth chapter, we explore the contribution of members of the user network to the support users receive. Little is known about what determines the support offered by a support person and even less is known about the interdependence of different support persons in relation

to the support they offer to service users. It is indeed possible, as we discuss in the second chapter, that the number of other support persons within a user's network a support person is in contact with will have an impact on the support that that person will offer. We, therefore, wanted to study the impact of the structure of the network not on an outcome at the level of the users (such as perception of continuity of care, which is described in the fourth chapter), but at the level of the support persons who are part of the network. This approach is unprecedented in the analysis of psychiatric patients' social networks and is likely to provide valuable indications for the development of interventions. In this chapter, therefore, we explore how the pattern of relationships between support persons is associated with the importance of the support provided by each support person to a service user.

1. THE PERSONAL SOCIAL NETWORK OF PSYCHIATRIC SERVICE USERS: LITERATURE REVIEW

In this chapter, we provide a review of the literature on the personal social support networks of psychiatric service users, with particular attention to the structure of the relationships between network members. First, we focus on the terms most commonly used in studies of social relationships. We then discuss the resources that social relationships provide access to and the models that link social relationships to health. We then specifically describe the social support networks of psychiatric service users, focusing on three main characteristics: their size (the number of network members), their composition (the types and diversity of network members) and their structure (the relationships between network members). We also compare psychiatric service users' networks with the general population based on those characteristics. We review the literature that associates those three characteristics of the psychiatric service user network with different user outcomes: health, quality of life, social functioning, and use of mental health services. We then review the types of network interventions and conclude

with a discussion of the value of studying the structure of relationships between members of the personal social support network of psychiatric service users.

SOCIAL RELATIONSHIPS, THE SOCIAL NETWORK AND HEALTH.

Our identity, our history, and our memories are inextricably linked to the relationships we develop with our fellow human beings (Sluzki, 2010). Through a multitude of interactions, we exchange and cooperate, support and compete, becoming interdependent (Crossley et al., 2015). Those social relationships determine our lives to a great extent. They influence our behaviour and ideas. Even our most personal actions are influenced by our social relationships and have consequences for our health and well-being.

The first indications of this date back to Durkheim's work on suicide (Durkheim, 1897). Durkheim pointed out that the lack of social exchanges within a community or, conversely, the suffocating social weight of the community, could have an impact on a very personal behaviour: suicide. Later, anthropologists would become interested in the relationships of individuals outside the social institutions they had usually studied (family, social class, village, etc.) They would observe that behaviours such as marriage, taking up employment, and political activity are influenced by social ties and are not always related to the social groups usually thought of as structuring a community (Barnes, 1954; Bott, 1957). Later still, a social

epidemiology study found that people with a weak social network were twice as likely to die within nine years of the follow-up study as subjects with a more robust social network (Berkman, 1984; Berkman & Syme, 1979).

Following on from these studies, the social network research community has now established this important premise: social relationships and interactions are a key element in determining our actions, our well-being, and our health. They do so by influencing the resources we have access to. They can offer us opportunities and they can also constrain us (Berkman et al., 2000; Perry et al., 2018). Social relationships influence our ideas, our values, and the information we receive. The characteristics of our social relationships are decisive in that respect. The number of social contacts we have has a significant impact on our quality of life and on our level of access to social support. Regarding social contacts, it is commonly accepted that "more is better" (Vaux, 1990), but recent studies have shown that, once a network reaches a certain size, the effort required to maintain it becomes prohibitive (T. Becker et al., 1998). The nature of our relationships is also influential. For example, people with whom we have less intimate, more distant relationships are more likely to provide access to specific resources, such as employment opportunities (Granovetter M., 1973). In other words, there are resources that we access more easily (and appropriately) through acquaintances than through our mothers. The ties between the people with whom we have relationships are also influential.

Social relationships and interactions determine our action, our well-being and our health by influencing the resources we have access to.

For example, we know that when people in a specific network have a lot of contacts with each other, they will be more likely to share the same ideas, attitudes, and resources (Coleman, 1988). If this is the case within our network of relationships, we will be more likely to be influenced by those ideas or attitudes and to adopt them as our own.

While social relationships and the effects they have on people are the focus of much of the literature, not all studies use the same vocabulary – far from it. Many different terms have been used to describe different aspects of social relationships. Those terms are not always clearly differentiated. We will begin, therefore, by defining the most common terms in the literature as well as those that we will use.

Terms and definitions

When it comes to social relations, the scientific literature uses a wide range of terms: social isolation, loneliness, social integration, social capital, social support, and social network are the most common terms (Mann et al., 2017). Social isolation and loneliness are similar but not identical terms (K. J. Smith & Victor, 2019). Social isolation is the objective experience of being alone (Hawkley & Cacioppo, 2010), regardless of the subjective feeling it generates. Loneliness, on the other hand, is perceived social isolation (Hawkley & Cacioppo, 2010). Social isolation can be defined as a limited quality and quantity of social relationships with other people at

Loneliness is the subjective feeling of social isolation, which is its objective situation.

the different levels at which human interaction takes place (individual, group, community, and larger social environment) (Mann et al., 2017). It describes the extent of a person's social relationships with others, for example how few friends they have or how likely they are to date, compared to the general population (Perese & Wolf, 2005; Wang et al., 2017). Loneliness, on the other hand, refers to a painful subjective emotional state associated with a lack of desired social relationships (Ma et al., 2019; Perese & Wolf, 2005). It can be defined as a state of negative affectivity that accompanies the perception that one's social needs are not being met by the quantity or quality of one's social relationships (Mann et al., 2017).

Social integration refers to having meaningful activities and collaborating with other people (Granerud & Severinsson, 2006a) through, for example, participation in work, socialising, housing, and citizenship (Tsai et al., 2012). It can be defined as the degree to which an individual's social network is of adequate size and includes multiple social roles (eg., as friend, family member, or co-worker) and the extent to which an individual engages in mutual exchange, or reciprocity, in social relationships (Thoits, 2011; Ware et al., 2007; Y. L. I. Wong et al., 2011; Y.-L. I. Wong et al., 2010). Social capital is the sum of the resources, actual or virtual, that an individual or group accrues by virtue of possessing a durable network of more or less institutionalised relationships involving mutual acquaintance and recognition (Bourdieu, 1980). Ronald Burt linked this notion to the structure of the social network by discussing the advantages that individuals

Social integration refers to participation in society whether through production or consumption.

within groups have because of their location in the social structure (Burt, 2000). Farhana Mann's definition of social capital has the advantage of taking into account both social position and network structure: a series of resources that individuals earn as a result of their membership of social networks, and the features of those networks that facilitate individual or collective action (Mann et al., 2017; McKenzie et al., 2002). As described in the work of Ronald Burt and Mark Granovetter, it is also possible to distinguish various types of social capital according to the types of social contacts and the types of resources they offer. Close bonds with family members or within groups with a strong collective identity typically provide emotional and instrumental support. Weaker ties with people who do not know each other offer other types of resources, such as greater access to and control of information (Mann et al., 2017). This leads us to another popular categorisation: “bonding social capital”, i.e. resources resulting from the links within a group or community. “Bridging social capital” refers to the links between social groups (Putman, 2000).

Social support, or more precisely perceived social support, is the self-rated adequacy of the social resources available to a person (Ma et al., 2019; Perese & Wolf, 2005). The degree to which an individual’s social needs are satisfied through interactions with others is one of the oldest definitions (Syrotuik & D’Arcy, 1984) of social support.

Table 1. Concepts and definitions related to social relationships.

Concept	Definition
Social isolation	A limited quality and quantity of social relations with other people at the different levels at which human interaction takes place.
Loneliness	A state of negative affectivity accompanying the perception that one's social needs are not being met by the quantity or the quality of one's social relationships.
Social integration	The degree to which an individual's social network is of adequate size and the individual has multiple social roles (e.g., friend, family member, or co-worker) and the extent to which an individual engages in mutual exchange, or reciprocity, in social relationships.
Social capital	A series of resources that individuals earn as a result of their membership in social networks, and the features of those networks that facilitate individual or collective activity.
Social support	The self-rated adequacy of the social resources available from the friends, family, and acquaintances that surround individuals.
Social network	The set of social relationships through which a person accesses social resources and the set of linkages between the people involved.

Social support has also been defined more objectively as the resources available from an individual's friends, family, and acquaintances (Barrera Jr.,

1986). As in the case of social isolation, there is a more subjective dimension (perception) that can be distinguished from the more objective dimension (actual availability of resources). Only perceived support, however, has been regarded as consistently linked to health (Haber et al., 2007).

The social network, finally, is the network of a given person's social connections (Sluzki, 2010). It is the set of social relationships through which a person accesses social resources and develops and maintains his or her personal and social identity (Pinto, 2006) and the set of linkages between the people involved (J. C. Mitchell, 1969). The social network has often been associated and sometimes confused with the social resources it offers, particularly social support.

Social network and social support are sometimes seen as two sides of the same coin. The social network is the "container" and the social support is the "content". It is in this perspective that some authors consider that the social network includes a transactional component (the content) and a structural component (the container) (Y. L. I. Wong et al., 2011). Qualitative and quantitative aspects are other terms used to describe the same phenomenon (Bengtsson-Tops & Hansson, 2001a). First, the transactional component (or qualitative aspect) refers to the content of the exchanges, i.e. what passes through the channels of the social network: ideas, advice, information, social norms, collective identity, etc. This transactional

Social network and social support are two sides of the same coin. The social network is the "container" and the social support is the "content".

component is often called social support or perceived social support. Second, the structural component (or quantitative aspect) is the container of what is exchanged, the set of relational channels between people. This "container" is described in relation to structural characteristics: network size (the number of social contacts), network composition (the type and diversity of social contacts regarding function, social status, reciprocity, and frequency of contact), and network structure (the relationships between the members of the network). This component is often called the social network stricto sensu, or even structural social support.

These definitions all refer to the presence of social relationships in a person's life, in more or less adequate quantities, and/or to the resources made available through that set of (more or less satisfactory) relations. They are often used interchangeably in scientific literature (Haines et al., 2002). Some studies use the term "social support" when focusing on the structural dimensions of social relationships. Other studies use the term "social network" when focusing on the resources to which people have access through their networks of relationships. The size of the social network (the number of social contacts) and the diversity of the social network are often used as indicators of social integration, social isolation, and social support (Marsden, 1987; Pescosolido & Georgianna, 1989).

Table 2. Differences between the concepts of social support and social network.

Social support	**Social network**
Resources accessible through social contacts	Number and diversity of social contacts, structure of links between social contacts
Content of the exchanges	Container of what is exchanged
Transactional component	Structural component
Qualitative aspect	Quantitative aspect
Subjective perception	Objectively measurable
Perceived social support	Structural social support

Models linking social relationships and health

Even after clarifying these terms and definitions and identifying the overlap between them, it is not easy to identify how our social relationships can influence our health and well-being. How can the different concepts defined above be linked together theoretically to describe the mechanisms by which our social relationships influence us and our health and well-being? Thankfully, several authors have attempted to develop models that

articulate the different dimensions of our social relationships and their effects on our health and well-being (Berkman et al., 2000; House, Landis, et al., 1988; Israel, 1982; Pescosolido, 1991; Thoits, 2011). Most of these models describe three levels that are related to each other (see Figure 2).

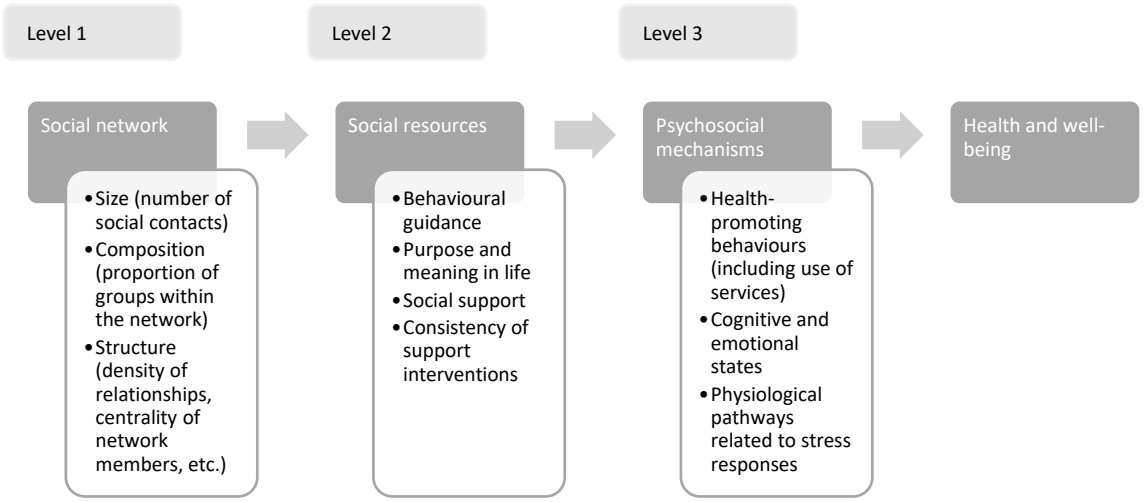
(1) At the first level is the personal social network. In these models, both the general characteristics of the network (number of social contacts, proportion of family members, density of relationships, etc.) and the characteristics of the relationships between the focal person and the members of his or her network (reciprocity, frequency of contact, etc.) (Berkman et al., 2000; House, Landis, et al., 1988) are likely to have an impact on health through the resources to which the network gives access.

(2) At the second level are the resources that our relationships make available to us: social support, behavioural guidance, purpose and meaning in life, etc. (this is developed further in the following point on the resources made available by the social network). These resources are mediating pathways by which networks influence health status and well-being (Berkman et al., 2000). Some authors describe this level as the relational content of the network (House, Landis, et al., 1988). Other authors distinguish the content that circulates within the network (e.g. beliefs, ideas, and attitudes to health and care) from the functions of the network (information, support, regulation, etc.) (Pescosolido, 1991).

(3) The third level, finally, is that of psychosocial mechanisms, determined by the resources of our networks, which have a direct impact on our health and well-being (Berkman et al., 2000; House, Landis, et al., 1988; Pescosolido, 1991; Thoits, 2011). Some authors speak of micro biopsychosocial mediating mechanisms (House, Landis, et al., 1988), others of biological and psychological pathways (Berkman et al., 2000). Lisa Berkman identifies three types of mechanisms: health-promoting or health-damaging behaviours (tobacco and alcohol consumption, physical activity, use of services, care adherence, etc.), cognitive and emotional states (self-esteem, social competence, self-efficacy, affect, etc.), and physiological pathways related to stress responses (immune system function, cardiovascular reactivity, etc.) (Berkman et al., 2000).

We will devote most of the following section to the first level, the characteristics of the personal social network (size, composition, and structure) specifically for people living with severe mental disorders in order to describe their networks and determine the impact of networks on key outcomes for psychiatric patients (health, quality of life and social functioning, use of services). Before that, however, we will describe the second level and how it determines the third level: the resources made available by the network and the mediating pathways by which the network influences health status and well-being. That will allow us, when discussing the literature that associates network characteristics and patient outcomes, to be aware of the mechanisms that it may be based on.

Figure 2. Social network/health model, adapted from Lisa Berkman (L.F. Berkman et al., 2000)



THE RESOURCES MADE AVAILABLE BY THE SOCIAL NETWORK.

Based on the work of the authors mentioned above, who developed models that articulate the different dimensions of our social relationships and their effects on our health and well-being (Berkman et al., 2000; House, Landis, et al., 1988; Pescosolido, 1991; Thoits, 2011), we can identify four resources made available by social networks: behavioural guidance, purpose and meaning in life, social support, and consistency of support interventions.

Behavioural guidance

The social network is likely to offer behavioural guidance. The network, through various processes detailed below, allows us to adapt our behaviour to that of our reference groups. The first process involves "network externalities" (DiMaggio & Garip, 2012). An externality is an effect produced by an activity that has an influence on other actors, without any counterpart or compensation. In the study of networks, the adoption of a behaviour by a person is considered an externality if it is influenced by the adoption of that same behaviour by a significant number of people around them. For example, the more people that are registered on an online social network, the more attractive that network will be. The more people around us divorce, the more people become socially

Our social network guides our behaviour: the actions of others around us make certain behaviours more advantageous, more accessible, or more desirable.

available and the more attractive divorce becomes (DiMaggio & Garip, 2012). The second process of influencing people's behaviour through personal social networks is called “social learning”. The adoption of a practice is promoted by access to information or assistance from members of the network. The support of peers within the network and the observation of their experience is likely to facilitate access to new behaviours and reduce the perceived risk of adopting them (DiMaggio & Garip, 2012).

The third process is the “normative influence” or “social influence”, i.e. the influence on the adoption of a behaviour of the existence of positive or negative sanctions by the members of our network (DiMaggio & Garip, 2012). This social influence can be direct or indirect. Indirect social influence is self-conformity to social norms, such as the behaviours to adopt as a patient or the responsibilities to assume as a parent. It is not an imposition, but rather a process of comparing with others and adapting. We assess whether our behaviours are appropriate through observation, without having explicit discussions about it. This is how we can acquire healthy habits and attitudes in relation to healthcare (use of medical services, compliance with treatment, self-care in relation to health issues, etc.). Indirect social influence can also have a negative impact on our behaviours, depending on what is valued in our social network (smoking, driving under the influence of drugs or alcohol, etc.). Direct social influence (or social control) corresponds to direct suggestions or impositions in terms of behaviour. Members of a person's network may encourage them to adopt certain behaviours, seek to

persuade them, remind them of certain things, etc. Social influence can also be formal, i.e. supported by official rules controlled by specific social organisations. Social influence can have diametrically opposite effects: it can lead to the adoption of valued behaviours within the group, but it can also generate rejection or resistance to change when the influence is perceived as intrusive or domineering (Berkman et al., 2000; House, Landis, et al., 1988; Thoits, 2011).

For users of psychiatric services, help-seeking, adherence to care, and continuity of relationships with professional services are fragile processes. As we will see later, the influence of the social network can be a determining factor in directing people in distress to mental health services and maintaining links with them.

Purpose and meaning in life

The second resource that the social network offers is purpose and meaning in life by promoting social participation and social engagement. Social participation takes the form of gathering with friends, taking part in collective sports or cultural events, getting involved in a religious organisation or in the local community, etc. That participation requires the mobilisation and development of social ties. Through these opportunities for social engagement, we strengthen our social roles, such as our family,

A social network is also a set of responsibilities and benefits that give us a sense of worth, belonging, and attachment and a sense of identity.

professional, and community roles, i.e. our position in the social structure. Reciprocal rights and obligations are associated with social roles. The role of an employee, for example, will entail the obligation to assume certain tasks and behave in accordance with the values promoted by their employer. It will also entail financial rewards and a certain social value linked to the usefulness or recognition that is associated with that function. These social roles make us feel that we have the attention of others, that we are important to them, and that we are useful. These social roles connect us to others through a set of reciprocal responsibilities and benefits. This gives us a sense of worth, belonging, and attachment, and a sense of identity. Our social network provides us with the framework and context that allow us to perform the social roles that give meaning to our lives (Berkman et al., 2000; House, Landis, et al., 1988; Thoits, 2011).

As far as users of psychiatric services are concerned, the literature on psychiatric rehabilitation and recovery emphasises the importance of valued social roles in raising self-esteem, helping to decrease symptoms, and helping users to persevere through difficult times (Deegan, 2005; Hunt & Stein, 2012; Wolfensberger, 1983).

Social support

Social support is another resource offered by the personal social network. Social support is usually divided into several types: emotional, instrumental, and informational support (House, 1981; Y. L. I. Wong et al., 2011).

Emotional support refers to demonstrations of love, care, intimacy, sympathy, understanding, or empathy: the things that make us feel valuable and reassure us of our worth. Instrumental support refers to help, aid, and assistance in all practical aspects of life. This can be help with household chores, giving or lending money, or, when needed, helping with a move. Informational support is related to the provision of advice or information that may help solve problems. This category also includes appraisal support: help with decision-making, giving appropriate feedback, or help deciding which course of action to take (Berkman et al., 2000; Thoits, 2011). Social support is often associated with closer, more intimate relationships. This is certainly the case for emotional support. But other types of support, especially material and informational support, are also likely to be provided by people who are less close to the individual, such as neighbours, colleagues, and friends of friends.

While it is well established that social support has positive consequences for physical health, longevity, and psychological well-being (Thoits, 2011), the mechanisms by which it acts are less obvious. The debate is still ongoing between proponents of the “stress-buffering effect”, who emphasise the protective effect of social support in stressful situations, and proponents of the “main effect”, who emphasise the permanent benefits that social support offers. It is the perception of the support, however, that seems to have the greatest impact on health, rather than the support itself, suggesting that social support could produce effects and influence people by sustaining

self-esteem, a sense of mattering to others, and perceived control over obstacles (Thoits, 2011).

Our social network provides us with emotional, instrumental, and informational support, but also determines the consistency of support interventions, through the relationships between the people who support us.

The social network is not only likely to provide social support, but also determines the consistency of support interventions. The structure of the relationships between support persons is likely to have a very significant impact on the support that is offered. The support received by a person in a network in which no one knows each other and everyone offers support independently of each other will be very different from the support received in a network in which everyone knows each other and coordinates with each other. The nature and extent of the relationships between support persons can, for example, influence the social norms that are diffused within the person's network and determine how his or her support persons will behave towards him or her. The relationships between support persons can also influence the flow of information between them and the concerted actions (coordination) that they are likely to carry out. In the field of health care organisation, in which continuity of care is an important issue, the relationships between the support persons within a person's social network make it possible to coordinate interventions and offer care that is tailored to that individual's needs, thanks to a better understanding of the person's needs (Bachrach, 1981a; Digel et al., 2013; Haggerty et al., 2003; Johnson et al., 1997). Mary Dozier describes how the people supporting a psychiatric

service user (Dozier et al., 1987) are likely to be impacted by the structure of that user's network, which thus influences the coherence of interventions. Interacting with other support persons allows them to confirm their impression of a situation and thus gain confidence in the care provided. Strong interactions, however, can lead support persons to be unwilling to question the group's assumptions about the person's situation. The involvement of service users in the coordination and consistency of the interventions from which they benefit can also be influenced by their network: a very dense network may be seen by users as alienating or suffocating, whereas a moderately dense network leaves them more room for manoeuvre (Dozier et al., 1987).

These three resources are provided by our social network, i.e. the social relations we have with other people and the relations those people have with each other. As we describe above, these resources are mediating pathways that influence our actions, health, and well-being through various psychosocial mechanisms, such as health-promoting behaviours and cognitive and emotional states. Having described the possible influence of personal social networks on the general population, we will focus, in the following section, on the specific situation of people with severe mental disorders.

THE PERSONAL SOCIAL NETWORK OF PEOPLE WITH SEVERE MENTAL DISORDERS

Psychiatric service users seem to be in a more unfavourable situation, compared to the general population, in terms of social relationships. As we developed in the introduction, loneliness and social isolation is an important issue for people with severe mental disorders (Borge et al., 1999; Buchanan, 1995; Clinton et al., 1998; Killaspy et al., 2014; Koenders, de Mooij, et al., 2017; Meltzer et al., 2013; Perese & Wolf, 2005; Wang et al., 2017; Webber et al., 2014; Yanos et al., 2010, 2012). Moreover, loneliness has negative consequences for people with severe mental disorders (Ma et al., 2019). It is associated with poorer quality of life (Bastiaansen et al., 2005) and slower personal recovery (F. Pernice-Duca, 2010). A recent review of the literature also showed that people with depression who perceive their social support as poorer have more severe psychiatric symptoms, poorer social functioning and personal recovery, and lower self-esteem and are less empowered (Ma et al., 2019; Wang et al., 2018).

People with severe mental disorders also have difficulties in their relationships with health services. As we also discussed in the introduction, they experience breaks in relationships with the health professionals who accompany them and experience their care pathway as highly predictable (Folker et al., 2019; Jones et al., 2009; Sweeney et al., 2016). These people are still often readmitted to hospital (Lorant et al., 2019; Oyffe et al., 2009; Pfiffner et al., 2014) and have difficulties in accessing coordinated post-

hospital follow-up, while the continuity of care can have a positive impact on people with severe mental disorders. A large body of studies has established a positive relationship between continuity of care and social functioning, quality of life, and a decrease in psychiatric hospitalisations (Puntis et al., 2014).

The personal social networks of psychiatric service users are of interest for the following reasons: loneliness and social isolation are related to the quantity and quality of social contacts, social integration is related to the diversity of social contacts in the personal social network, and continuity of care is related to the connections between the personal social network members. In the following section, we look more closely at the different characteristics of their networks (size, composition, and structure) and how they differ from the networks encountered in the general population.

Network size

The characteristic most studied in the scientific literature is the size of the personal social network, i.e. the number of individuals who make up the user's social network. There is great diversity in the size of the networks of people with severe mental disorders but, on average, they have a network size of about twelve people. A recent literature review (Palumbo et al., 2015) identified an average of 11.7 individuals in the network of psychiatric service users. Two other literature reviews, one focused on psychosis (Klug, 2005)

and the other focused on people with severe mental disorders (Albert et al., 1998), identified an average network size of thirteen.

We have some information on how the sociodemographic characteristics of psychiatric service users relate to the size of their networks. For example, among users with severe mental disorders, women have larger networks (Evert et al., 2003; Koenders, de Mooij, et al., 2017; Thorup et al., 2006), whereas men have more friends (Koenders, de Mooij, et al., 2017). A larger network is also associated with younger individuals (Macdonald et al., 1998), people with higher levels of education (Goldberg et al., 2003a), and people who live in an urban environment (Sörgaard et al., 2001). These results, however, should be put into perspective, as other studies have found no link between sociodemographic factors, such as age, gender, and income, and social networks (Bengtsson-Tops & Hansson, 2001a).

People with severe mental disorders have smaller social networks than the general population.

Extensive literature has highlighted the fact that people with severe mental disorders have smaller social networks than the general population (Albert et al., 1998; Anderson et al., 2015; Beels et al., 1984; Brugha et al., 1993; Buchanan, 1995; Cohen & Sokolovsky, 1978; Dickinson et al., 2002; Dozier et al., 1987; D. H. Erickson et al., 1998; Gayer-Anderson & Morgan, 2013; Goldberg et al., 2003a; Hamilton et al., 1989; Hammer, 1981; Horan et al., 2006a; Koenders, de Mooij, et al., 2017; MacDonald et al., 2004; Meeks & Murrell, 1994; Palumbo et al., 2015; Pattison & Pattison, 1981; Pinto, 2006; Segal & Holschuh, 1991;

Sokolovsky et al., 1978; Tolsdorf, 1976; Visentini et al., 2018; Walsh et al., 2011; Y. L. I. Wong et al., 2011). It is not easy to make comparisons given the variety of methods used. More specifically, the name generators used, i.e. the questions were asked in order to identify and list the members of their network, largely determined the size of the network. A recent literature review (Palumbo et al., 2015) identified a wide variety in the average size, ranging from 4.6 to 44.9, of the networks of service users suffering from psychosis. A previous literature review compared studies that used the same tools (Albert et al., 1998) and found that the social network of the general population is composed of an average of 25 people and that of people with mental disorders varies between 4.5 and 16. Other studies have used a control group as a point of comparison. One found an important difference in network size between the general population (19.4) and people with long-term depressive disorders (3.5) and between the general population and people experiencing an acute depressive episode (7.2) (Brugha et al., 1993). Another study found that the social networks of service users with severe mental disorders were 2.5 times smaller than those of the control group (Koenders, de Mooij, et al., 2017).

Network composition

Regarding the composition of a psychiatric service user's network, studies generally describe the proportion of family members, the proportion of friends, and the proportion of mental health professionals. There is great diversity in the composition of the networks, but family members are generally the largest group, followed by friends and professionals. Palumbo's literature review shows that family is more present (43.1%) than friends (26.5%) in the network of service users suffering from psychosis, although there is significant variation from one study to another (Palumbo et al., 2015). Another study, focusing on people with severe mental disorders, mentions 38.6% family members and 42.9% friends and acquaintances (Y. L. I. Wong et al., 2011). This study also counts an average of 19.5% of service staff in psychiatric service user networks (Y. L. I. Wong et al., 2011). Other studies distinguish health care providers from other people met in the care setting. For example, Holmes-Eber identifies 46% relatives, 36% friends, 17% professionals and 23% people met in a mental health-related context (Holmes-Eber & Riger, 1990). Pernice-Duca identified 34.5% families, 21.6% friends, 32.3% professionals, and 11.6% other patients (F. M. Pernice-Duca, 2008). The diversity of the figures should be attributed to the definition of the categories. Some studies distinguish between acquaintances and friends; others do not.

Compared to the general population, the social networks of people with severe mental disorders tend to include a larger proportion of family members and a lower proportion of friends.

Some studies distinguish between friends outside psychiatry and friends met in the context of care; others do not.

Compared to the general population, the social networks of people with severe mental disorders tend to include a larger proportion of family members and a lower proportion of friends. They also contain a larger number of other psychiatric service users and mental health professionals (Albert et al., 1998; Anderson et al., 2015; Bengtsson-Tops & Hansson, 2001a; Borge et al., 1999; Cohen & Sokolovsky, 1978; Cresswell et al., 1992; Crotty et al., 2015; Dozier et al., 1987; Froland et al., 1979; Goering et al., 1992; Greenblatt et al., 1982; Hamilton et al., 1989; Hirschberg, 1988; Klug, 2005; Koenders, de Mooij, et al., 2017; Palumbo et al., 2015; M. T. Rivera et al., 2010; Segal & Holschuh, 1991; Y. L. I. Wong et al., 2011). A study by Koenders and colleagues showed that the networks of psychiatric service users cared for in the community included 31% family members on average (vs 22% in the general population), and 55% acquaintances (vs 62% in the general population). In Paloma's review, the average number of friends was found to be 3.4, much lower than the figures reported for the general population (10.6 for men and 7.6 for women) (Palumbo et al., 2015); the number of family members was similar for people with mental disorders and the general population. What appears to differentiate psychiatric service users from the general population is their lower number of friends (D. H. Erickson et al., 1989).

The relationships of people with severe mental disorders are less reciprocal and more dependent on relatives or health professionals.

The relationships of people with severe mental disorders are less reciprocal and more dependent on relatives or health professionals (Beels, 1981; Bengtsson-Tops & Hansson, 2001a; Cohen & Sokolovsky, 1978; Cresswell et al., 1992; Crotty et al., 2015; Greenblatt et al., 1982; Pattison et al., 1979; Sandhu et al., 2015). Yin-Ling Wong reported that the prevalence of reciprocity was lower than that of provision of support. She also pointed out that reciprocity is more often encountered in relations with family members than with other members of the network, such as friends or service staff (Y. L. I. Wong et al., 2011). Compared to the general population, psychiatric service users have more relationships in which they are the recipients of support than in which they are the providers of support (Buchanan, 1995; Sullivan & Poertner, 1989).The preponderance of mutual exchange with family members, however, is not specific to psychiatric service users (Plickert et al., 2007). Other studies have also shown that, in psychiatric users' networks, there is less multiplexity, which is defined as links having more than one context, for example someone being both a colleague and a kayaking partner (Albert et al., 1998; T. Becker et al., 1997; Lipton et al., 1981). Network multiplexity was most highly associated with demographic variables such as being a member of an ethnic minority, being less educated, never having been married, and living with family (Goldberg et al., 2003a). In terms of relational intensity, i.e. the degree of closeness of the relationships in the networks (Simmons, 1994), which is often assessed on the basis of the regularity of contacts (Lipton et al., 1981; Y. L. I. Wong et al., 2011), psychiatric service

users are deemed to interact less with their network members (Koenders, de Mooij, et al., 2017; Maulik et al., 2009; Simmons, 1994; Y. L. I. Wong et al., 2011). The social networks of psychiatric service users also include fewer people who can help in a crisis (Macdonald et al., 2000).

Network structure

We also studied the pattern of the relationships between people supporting a service user with a severe mental disorder (i.e. the structure of the person's network). There is an extensive literature that examines the structural characteristics of personal networks in the general population (Bidart & Charbonneau, 2011; Perry et al., 2018), but there have been few studies examining these characteristics in the population of psychiatric service users. The measurement most commonly used in this regard is density, which is the proportion of pairs of members of the psychiatric service user's network who know each other. Results vary but the density is generally high: 40% (Corrigan & Phelan, 2004), 47% (Y. L. I. Wong et al., 2011), 51% (Dozier et al., 1987), 60% (Carpentier & White, 2002a), 67% (Goldberg et al., 2003a), and even 73% (Horan et al., 2006a). It has not been possible, however, to associate density with demographic variables (Goldberg et al., 2003a).

The network of people with severe mental disorders seems to be more dense and composed of less distinct subset within the network, but there is not enough evidence to affirm this.

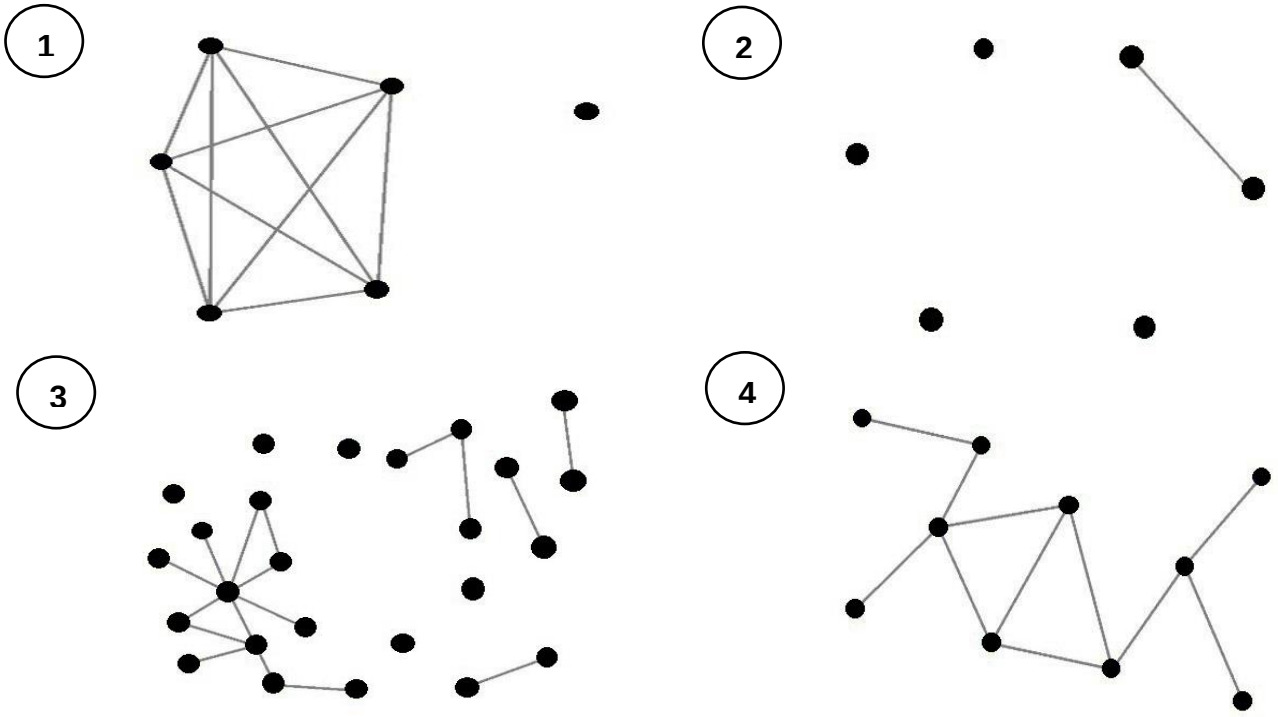
Another structural characteristic used to describe the networks of psychiatric service users relates to the presence of clusters within the networks and the number of clusters. A cluster has been defined as a group of people who are strongly connected to one another (Hammer, 1981). Within a person's network, clusters will thus generally have common characteristics, play a common role, or meet in a particular context: family, work, sports clubs, etc. (Morin & Seidman, 1986). This definition is not very precise, however, as it encompasses both the notion of the "component" (a subset of network members that is disconnected from other subsets in the network) and that of the "clique" (a subset of network members that are all connected to each other). Some of the literature on the social networks of psychiatric patients discusses clusters and indicates that psychiatric patients have a low number of clusters, often only one (Cohen & Sokolovsky, 1978; Gottlieb & Coppard, 1987; Hammer, 1981; Morin & Seidman, 1986; Pinto, 2006; Simmons, 1994). Very few studies, however, have actually measured the number of clusters within the networks of psychiatric service users. A study in the 1980s (Cohen & Kochanowicz, 1989) counted 1.64 clusters, defined as the number of subunits of a network in which three or more network members are linked to each other, and 0.81 large clusters, defined as the number of clusters containing five or more members. Another structural characteristic has been used in some studies (Cohen & Kochanowicz, 1989; Lipton et al., 1981): the degree, i.e. the average number of linkages each person has with others in the respondent's network (excluding linkages with the respondent). In Cohen’s study, each person supporting a psychiatric service user had contact, on average, with 3.61

other support persons (Cohen & Kochanowicz, 1989). In the more recent literature on the social network of psychiatric patients, however, density is the only measure of network structure that is mentioned. A recent study took a different approach to this question (de Souza et al., 2016). Rather than describing the average characteristics of psychiatric users' networks, they constituted a network of relationships between the types of support persons within the users' networks and analysed their structure. They were able to show that the types of support persons that have the most contact with other types of support persons within users' networks are general practitioners, nurses, and psychiatrists. This is more a description of the structure of collaboration between services than of the structure of users' personal social networks.

In order to make the different terms presented above more understandable, we present four networks below that were collected from users of psychiatric services (see figure 3). For the sake of clarity, the user is not shown here. Users are by definition connected to all the members of their network. These networks display very different patterns. Network 1 and Network 2, despite their similar size, have different numbers of relationships between the support persons (i.e. density). Network 3 and Network 4, have different numbers of components: Network 4 has only one compared to ten for network 3. While Network 2 and Network 3 have a similar number of isolates, Network 3 has a much larger number of components.

This comparison has its limitations, however, as the studies did not use the same collection methods. Furthermore, there are few studies that have actually made this comparison and those that have are rather old (Pattison et al., 1975; Sokolovsky et al., 1978; Tolsdorf, 1976). Pattisson et al (Pattison et al., 1975) reported that the networks of psychotic individuals were much more interconnected that those of either neurotic individuals or individuals without psychiatric disorders. Tolsdorf reported a density of 63% for schizophrenic service users and 53% for people hospitalised in services other than psychiatric services (Tolsdorf, 1976). That result is probably related to the smaller network size of the users' social networks, density being negatively correlated to size. It is also probably due to the fact that, at that time, psychiatric users were more often institutionalised (living in 24-hour supervised facilities) than they are today (Dozier et al., 1987). Regarding the clusters, some studies estimate the number of clusters within networks in the general population to be 5 or 6 (M. Hammer, 1981; Killworth and Bernard, 1974; Pinto, 2006; Simmons, 1994), whereas psychiatric patients are reputed to have 1 or 2, but no formal comparative study could be found.

Figure 3. Four personal social networks of psychiatric service users showing four different patterns in terms of network structure.



	Density (*)	Number of components (**)	Number of isolates (***)
Network #1	High	2	1
Network #2	Low	5	4
Network #3	Medium	10	5
Network #4	Medium	1	0

(*) Density = proportion of pairs of members of the user's network that are connected to each other.
(**) Component = subset of network members that is disconnected from other subsets in the network.
(***) Isolate = component composed of a single network member.

Conclusion

Based on this review of the literature on the social networks of people with severe mental disorders and the comparison between those networks and those encountered in the general population, we can say that psychiatric service users are clearly at a disadvantage. Their networks are smaller than those of the general population. They are less diverse, with a higher proportion of family members and fewer friends. Their networks contain a greater proportion of mental health professionals and people encountered in psychiatry. These networks are less reciprocal: people are more supported than supportive and are more often dependent on family members or professionals. There is also less multiplexity in the networks of psychiatric service users, i.e. fewer people taking on several roles or functions in relation to the person.

In terms of structure, results are more variable. There have been fewer studies devoted to the relationships between members of the psychiatric service user's network (and they are often old). They used few structural indicators: the density of the relationships between network members was often the only indicator. Nevertheless, it appears that the density of relationships between the members of psychiatric service users' networks is greater than in those of the general population. There are also fewer distinct groups within their networks.

THE EFFECT OF THE PERSONAL SOCIAL NETWORK ON PEOPLE WITH SEVERE MENTAL DISORDERS

Numerous studies have examined the links between the characteristics of the personal social networks of psychiatric service users and various health outcomes. Those studies have focused on health issues (including mortality and psychiatric symptomatology), quality of life (including satisfaction with social relationships and social functioning), and access to resources (including social support and use of services). We will address these three types of outcome by looking at the network characteristics already mentioned above: size, composition, and structure.

A recurring difficulty in this literature is determining the direction of causality. Does a large network improve a person's social functioning, or does more optimal social functioning allow a person to increase the size of his or her network? Does a small network promote multiple hospitalisations or do multiple hospitalisations reduce the size of the network? Theoretically, both are possible. As we have seen above, a large network provides us with more resources, and those resources will influence our behaviour and, for example, increase our self-esteem or social skills. Conversely, our social skills are crucial to maintaining and developing our social relationships and thus increasing the size of our network. As we will see in more detail below, this logic is also applicable to the links between the social network and hospitalisation. The lack of resources in the community can lead people to resort to hospitalisation more often. Conversely, repeated hospitalisation

can cause a person to have difficulty with social relationships, whether due to shame and stigmatisation or simply because of the withdrawal from their usual social life that hospitalisation entails. By looking at the evolution over time of psychiatric service users' networks in relation to the health outcomes mentioned above, longitudinal studies can give us some indications. In the following section, we will highlight them one by one before considering the lessons we can learn from them.

Health

In the general population, social isolation is associated with increased risk of early mortality (Brummett et al., 2001; Holt-Lunstad et al., 2015; Moen et al., 1989). A landmark study by Lisa Berkman found that having fewer connections reduces a person's life expectancy by nine years. The social connections were estimated using a social network index based on four types of connection: marriage, contact with close friends and relatives, church membership, and membership of other organisations (Berkman, 1984). A meta-analytic review found that social isolation, loneliness, and living alone corresponded to an average increase in the likelihood of mortality of 29%, 26%, and 32%, respectively (Holt-Lunstad et al., 2015). Individuals with smaller social networks have a higher risk of mortality and that risk is not attributable to confounding effects such as socio-demographic status or psychological distress (Brummett et al., 2001).

For people with severe mental disorders, a *larger network size is associated with less severe psychiatric symptoms.*

For people with severe mental disorders, the size of the network is related more to psychiatric symptomatology than to mortality. A larger network size is associated with less severe psychiatric symptoms (Angell & Test, 2002; Bengtsson-Tops & Hansson, 2001a; Brunt & Hansson, 2002; Degnan et al., 2018; Escobar et al., 1983; Goldberg et al., 2003a; Hamilton et al., 1989; Koenders, de Mooij, et al., 2017; Randolph, 1998; Sörgaard et al., 2001; Thorup et al., 2006; Y. L. I. Wong et al., 2011). This is particularly the case for people with more pronounced negative and general psychiatric symptoms, but not for positive symptoms (Angell & Test, 2002; Brekke et al., 1993; Brunt & Hansson, 2002; Goldberg et al., 2003a; Hamilton et al., 1989; Liddle, 1987; Sörgaard et al., 2001; Thorup et al., 2006). A longitudinal study showed that small networks, at entry and after two years, were associated with high negative symptom scores (Thorup et al., 2006). Negative symptoms like a lack of energy, apathy, asociality, or anhedonia may indeed diminish people's capacity to take initiative and to interact socially. Another longitudinal study found no association between the increase in positive symptoms over six months and the size of a network (Angell & Test, 2002). A recent meta-analysis confirmed this by showing that smaller social network size was moderately associated with more severe overall psychiatric symptoms and negative symptoms, but not with more severe positive symptoms (Degnan et al., 2018). That meta-analysis identified only three longitudinal studies (Angell & Test, 2002; Howard et al., 2000; Thorup et al., 2006). Large social networks are also likely to have a positive impact on psychiatric rehabilitation and accelerate the recovery process (Corrigan & Phelan, 2004; B. A. M. Cullen et al., 2017).

Regarding the composition of the network, having a greater number of friends has been associated with lower depressive symptomatology (Degnan et al., 2018; Fiori et al., 2006; Ueno, 2005) and better prognosis for users suffering from psychosis (D. H. Erickson et al., 1989). The number of friends in support network was also associated with recovery (Corrigan & Phelan, 2004). Users with the most severe psychiatric symptoms report fewer natural social relationships (D. H. Erickson et al., 1989; Macdonald et al., 2000; Meeks & Murrell, 1994; Neeleman & Power, 1994; Tsai et al., 2012). Similarly, a longitudinal study found that more severe disorganised symptoms were a predictor of a reduced family network, and more negative symptoms were a predictor of a reduced friend ship network (Thorup et al., 2006). Moreover, professional support is positively associated with more pronounced depressive symptoms (Corrigan & Phelan, 2004). This could suggest that people with more professionals in their networks are likely to be more depressed or, conversely, that people with more severe disorders have more difficulty maintaining supportive social relationships and rely more on professionals. Another longitudinal study found an association between an increase in positive symptoms over a period of six months and a decrease in reciprocity in a user's network (Angell & Test, 2002).

For people with severe mental disorders, having a greater number of friends has been associated less severe psychiatric symptoms.

The density of relationships within psychiatric service users' networks (i.e. the number of effective relationships between network members compared to the number of possible relationships) is the structural dimension that has

been studied the most. Most studies have found a higher density of relationships within the networks of users with more severe mental disorders (Hirsch, 1979; Mueller, 1980; Pattison et al., 1975; Stokes, 1983). A more recent study found a positive association between network density and the severity of positive symptoms, but not the severity of negative symptoms (Horan et al., 2006a). The association between density and severity may have been due to the greater number, of long-term hospitalised patients among the most symptomatic users. Other studies have found the inverse relationship: low density has been found to be associated with more severe disease (Craven et al., 1973; Hammer, 1963). Finally, some studies have found that the relationship between network cohesion and user outcomes is curvilinear (Dozier et al., 1987; Goldberg et al., 2003a). Thus, people with a moderately dense network are less symptomatic than people who have a network where no one knows each other or a network where everyone is in contact with each other. Psychiatric diagnoses and demographic variables, however, were not related to density (Goldberg et al., 2003a).

Most studies have found a higher density of relationships within the networks of users with more severe mental disorders.

Quality of life, psychosocial functioning and satisfaction with relationships

A few other outcomes are regularly studied in relation to the social network of psychiatric service users: quality of life, satisfaction with social relationships, and social functioning. There appears to be a clear association

between satisfaction with social contacts and perceived quality of life for people with severe mental disorders. A longitudinal study has indeed shown that increased satisfaction with social contacts is related to greater improvement in subjective quality of life (Bengtsson-Tops & Hansson, 2001a). The network and the resources it provides, however, also have an impact on those outcomes (Degnan et al., 2018; Lam & Rosenheck, 1999; Renwick et al., 2017; Sörgaard et al., 2001).

The strongest results concern quality of life, that is, a person's own subjective evaluation of his or her life situation (Skantze et al., 1992). Numerous studies have highlighted the fact that people living with severe mental disorders who report having a broad social network also report a higher quality of life (T. Becker et al., 1998; Bengtsson-Tops & Hansson, 2001a; Brunt & Hansson, 2002; Cechnicki et al., 2008; Cohen et al., 1997; Corrigan & Phelan, 2004; Goldberg et al., 2003a; Hansson et al., 2002; Lam & Rosenheck, 1999; Palumbo et al., 2015; Pinto, 2006; Sibitz et al., 2011). For example, a study conducted in inpatient settings and supported-community settings showed that a better subjective quality of life was associated with a larger social network, as assessed by the Interview Schedule for Social Interaction (Brunt & Hansson, 2002; Henderson et al., 1980). Some studies, however, have questioned this association. One study showed that a smaller social network contributes to less empowerment and more stigma, which results in depression and reduced quality of life, but that it has no direct effect on

People with severe mental disorders who report having a broad social network also report a higher quality of life.

quality of life (Sibitz et al., 2011). Another study found no association between patients' overall perception of their quality of life and their overall standard of living (of which the social network is one of the three dimensions) (Skantze et al., 1992). Yet another study found a curvilinear relationship between quality of life and network size with a decrease in quality of life when networks had twenty or more social contacts (T. Becker et al., 1998). This led Amy Degnan, in a recent literature review (Degnan et al., 2018), to suggest that there might be an ideal size for a network in relation to the improvement of quality of life. As others have pointed out before her (Albert et al., 1998; Dozier et al., 1987), a large network can offer many resources, but it can also come with many expectations and constraints, create stress, and require a lot of investment to maintain. A moderately sized network is probably more easily manageable, while still providing access to sufficient resources (Degnan et al., 2018). Few other characteristics of psychiatric service users' social networks have been studied in relation to quality of life. Two studies have sought to describe the link between quality of life and the density of relationships within a user's network but could not confirm the expected association (Cohen et al., 1997; Goldberg et al., 2003a).

A smaller social network is also associated with poor psychosocial functioning (Brugha et al., 1993; Horan et al., 2006a; Howard et al., 2000; Sörgaard et al., 2001; Thorup et al., 2006). For example, one study found that network size was associated with

A smaller social network and close ties with family members are associated with poor psychosocial functioning.

the Global Assessment of Functioning (GAF) scale score (Endicott et al., 1976), with a greater number of contacts being associated with higher levels of functioning (Sörgaard et al., 2001). Two longitudinal studies have also found an association between having a greater number of social contacts and improved social functioning at the cross-sectional level, but no significant temporal relationship (Degnan et al., 2018; Howard et al., 2000; Thorup et al., 2006). The impact of network composition on social functioning is less clear. One study found that a higher percentage of family members in a user's network was associated with a lower Social Adjustment Scale (SAS) score (Horan et al., 2006a). Close ties with family members are associated with reduced social functioning and risk of relapse for people with severe mental disorders, even those who continue to take psychotropic medication (Vaughn & Leff, 1976). Another study found similar results; community and work bonding were found to have significant positive effects on personal and community adjustment, while family bonding had no significant effect (Grusky et al., 1985). Another study, however, produced the opposite result: it found a negative association between the proportion of close relatives in a person's network and deficits in their social functioning (Brugha et al., 1993).

Satisfaction with social relationships is also positively related to the size of the social network (T. Becker et al., 1998; Bengtsson-Tops & Hansson, 2001a; Furukawa et al., 1999; Goldberg et al., 2003a; Renwick et al., 2017; Rosenfield & Wenzel, 1997; Y. L. I. Wong et al., 2011; YAU et al., 2005). Those with the largest social circles were most satisfied with the support they received (Renwick et al., 2017). Another study associated a larger network with greater satisfaction with social activities and relationships (Goldberg et al., 2003a). Satisfaction with social relationships also appears to be positively associated with the number of contacts with family members (Corrigan & Phelan, 2004; Sörgaard et al., 2001) and sometimes with the number of friends (Renwick et al., 2017). One study also found that, for patients suffering from severe mental disorders, having larger numbers of family members, friends, and acquaintances in their networks was related to higher satisfaction with social relationships (Koenders, de Mooij, et al., 2017). Another study, however, found no association between satisfaction and network composition, suggesting that the number and frequency of contacts is the most important factor in increasing satisfaction, regardless of the nature of those contacts (Y. L. I. Wong et al., 2011). On the other hand, the same study found a positive association between the intensity of contact and reciprocity of support and the level of satisfaction with social relationships (Y. L. I. Wong et al., 2011). Finally, a greater number of interconnections between the members of a user's network is also

Satisfaction with social relationships is positively related to the size of the social network with the number of interconnections between network members.

associated with higher satisfaction with social relations (Albert et al., 1998; Corrigan & Phelan, 2004; Lehman et al., 2002; Y. L. I. Wong et al., 2011).

Access to support and use of services

The characteristics of our personal social network can influence the support we receive, our access to supportive resources, and the steps we take to access care services. Several studies have shown that a large social network is associated with increased access to social support in the general population (Haines et al., 2002; Martí et al., 2017a; Seeman & Berkman, 1988; Vaux, 1985; Wellman & Gulia, 1999). The size of the network is positively associated with both perceived and received social support (Haines & Hurlbert, 1992; Vaux, 1990; Wellman, 1992). A greater number of support people increases the availability of instrumental and emotional support (Seeman & Berkman, 1988). A larger network is also likely to be less vulnerable to exhaustion in relation to the provision of support (Vaux, 1990). It also appears that a diversified network offers more support of all types, in the general population (N. Lin et al., 1999; Wellman & Gulia, 1999). Diversified networks seem particularly useful for making information and instrumental assistance available (N. Lin & Dumin, 1986; Vaux, 1990). The literature has also shown that families are important providers of support (Antonucci & Jackson, 1990; Haines et al., 2002; M. E. Walker et al., 1994; Wellman & Wortley, 1990). According to Granoverter,

In the general population, a large and diversified social network is associated with increased access to social support of all types.

"strong ties have greater motivation to be of assistance and are typically more easily available" (Granovetter, 1983). Weaker links with more heterogeneous alters, however, offer more diverse information (Granovetter M., 1973). The role of the network structure, and in particular its density, in the provision of social support has also been studied (Haines et al., 2002; Stokes, 1983; M. E. Walker et al., 1994; Wellman & Frank, 2001; Wellman & Gulia, 1999; Wellman & Wortley, 1990). Strong ties are characteristic of dense networks, which is probably why individuals who are embedded in dense networks receive more support in both routine and crisis situations (Granovetter, 1983; Marsden, 1987; Smith-Lovin & McPherson, 1993; M. E. Walker et al., 1994; Wellman & Frank, 2001; Wellman & Gulia, 1999; Wellman & Wortley, 1990).

In the field of mental health, research on access to support has tended to focus on the use of services, access to care, and help-seeking processes. The social network of a service user may influence whether that person is hospitalised or not (Hammer, 1963; Perrucci & Targ, 1982) or whether the person reintegrates adequately into the community after hospitalisation (Grusky et al., 1985; Holmes-Eber & Riger, 1990). Results, however, have varied. For example, some studies show that social networks support entry into formal care, but others have found that social networks delay and undermine the use of formal health services (Pescosolido, Wright, Alegría, et al., 1998). As we will see later on, the impact of social networks will depend on some of their characteristics (size, composition, etc.) but also on the type of services whose use is being studied (inpatient or outpatient

services). To explain this, authors have examined the mechanisms by which social relationships influence service use. Several hypotheses support the idea that social resources are associated with less use (Golding & Wells, 1990). The network is likely to buffer the experience of stress, making the use of professional care less useful. The network also offers a variety of competing and parallel services that can act as a substitute for professional services. In particular, they can provide information, mobilise self-help resources, and contribute to avoiding social isolation (T. Becker et al., 1997; Gourash, 1978; Pescosolido, Wright, Alegría, et al., 1998). Other hypotheses suggest that the use of services is greater under the influence of the social network (Mechanic, 1995; Zola, 1973). The main such hypothesis is that the members of a person's network screen the person's problems and refer them to professionals (Gourash, 1978). This is particularly true of friends in a user's social network, who refer to mental health services more than family since they are less likely to offer concrete services themselves (Albert et al., 1998; Horwitz, 2002). A final hypothesis is that the network, particularly if there is a high level of cohesion among its members, disseminates values, norms, and attitudes related to whether a person should seek formal assistance. Depending on the content of the values and norms disseminated, the network may support the use of services or, on the contrary, limit it (Freidson, 1988; Gourash, 1978; Kadushin, 1966).

Social network is likely to buffer the experience of stress, act as a substitute for professional help but also screen the person's problems and refer them to professionals.

Most studies have found a negative association between the size of the personal social network of psychiatric service users and their use of inpatient psychiatric services. A larger network is associated with shorter and less acute hospitalisations (Albert et al., 1998; T. Becker et al., 1997; Faccincani et al., 1990; Fraser et al., 1985; Golding & Wells, 1990; Grusky et al., 1985; Lidberg & Liljenberg, 1995, 1995; Lipton et al., 1981; J. C. Mitchell, 1969; Perrucci & Targ, 1982; Pescosolido, Wright, Alegría, et al., 1998; Pescosolido & Boyer, 2010; Sherbourne, 1988; Sokolovsky et al., 1978). A larger network is also associated with fewer emergency visits (Lidberg & Liljenberg, 1995) and a reduced risk of re-hospitalisation (Fraser et al., 1985; Norman et al., 2005a; Renwick et al., 2017). A longitudinal study showed that greater social support predicted fewer psychiatric hospitalisations over three years (Norman et al., 2005a). Some studies, however, do not confirm the association between network size and use of inpatient services: Richard Golberg found that the number of admissions had no association with social network size (Goldberg et al., 2003a), and Mary Dozier could not linearly associate the size of a network with time spent in hospital (Dozier et al., 1987). Another study found that higher scores on a composite social network index were associated with use of inpatient psychiatric services in local hospitals (Kang et al., 2007). Interestingly, the size of the network of family support persons also has an impact on the use of services: users were hospitalised less if their support persons included more people who provided emotional support and more

A larger network is associated with shorter and less acute hospitalisations and increases access to outpatient services and the amount of time they are used for.

social interaction (Jed, 1989). In contrast to the use of inpatient services, the size of the social network increases access to outpatient services and the amount of time they are used for, and supports residential stability (T. Becker et al., 1997; Bengtsson-Tops & Hansson, 2001a; Grusky et al., 1985; Jed, 1989; Kadushin, 1966; Lipton et al., 1981; Maulik et al., 2009; J. C. Mitchell, 1969; Perrucci & Targ, 1982; Pescosolido & Boyer, 2010). The number of non-hospital services used by users also grew as the social network increased in size (T. Becker et al., 1997).

The deterioration of the users' network following hospitalisation also emerges in the literature. Hospitalisations, especially if they are long and numerous, can lead to the disconnection of users from some members of their network. Patients admitted for the first time appear to have larger networks than those who have been hospitalised multiple times (Buchanan, 1995; Lipton et al., 1981). The multiplication of hospital stays can also make a user's social network less stable over time (Holmes-Eber & Riger, 1990). Not all studies, however, suggest a decrease in network size following first contact with psychiatric services. One longitudinal study showed an increase in network size two years after first contact with a psychiatric service (from 7.6 individuals to 8.2) (Thorup et al., 2006). Another longitudinal study found no significant difference over fifteen months (from 8.8 individuals to 8.7) (Horan et al., 2006a). It seems that user networks deteriorate in relation to the development of disorders, prior to the initiation of the first treatments

Hospitalisations, especially if they are long and numerous, can lead to the disconnection of users from some members of their network.

(Jeppesen et al., 2008; Thorup et al., 2006). A longer duration of untreated psychosis is associated with a weaker prior social network (Kalla et al., 2002). It also appears that poor diffuse social support, but not poor close social support, is associated with a longer duration of untreated disorder (Peralta et al., 2005; Reininghaus et al., 2008). The two possible causalities are not, however, mutually exclusive. It seems quite credible that the social network diminishes both before and after the onset of a disorder (Gayer-Anderson & Morgan, 2013).

Regarding the link between network composition and service use, a higher proportion of relatives in the network (as opposed to friends) is associated with a higher use of inpatient services, more acute episodes, longer hospital stays, and, conversely, with a lower use of outpatient services (Albert et al., 1998; T. Becker et al., 1997; Grusky et al., 1985; Holmes-Eber & Riger, 1990; Lipton et al., 1981; Mesch & Fishman, 1994; M. E. Mitchell, 1989; Perrucci & Targ, 1982). Other studies have found the opposite: their results show an association between a higher number of relatives and a reduced use of more formal mental health or specialised psychiatric services (Maulik et al., 2009). Having contact with more friends is associated with greater use of generalist services (Maulik et al., 2009) and, conversely, the duration of untreated psychosis is significantly longer for those who have no friends at treatment entry (Renwick et al., 2017). Moreover, being in contact with people who are

a higher proportion of relatives in the network (as opposed to friends) is associated with a higher use of inpatient services, more acute episodes, longer hospital stays, and, conversely, with a lower use of outpatient services.

medically trained also fosters access to health services (Kadushin, 1966; Perry & Pescosolido, 2015).

The presence of intimate relationships is likely to have positive effects on support (T. Becker et al., 1997; Fiori et al., 2006; N. Lin et al., 1999; Nelson et al., 1992a), reducing the risk of relapse (Renwick et al., 2017) and increasing the use of outpatient services (Sherbourne, 1988). People with intimate social relationships are four times more likely to use mental health services (Kouzis et al., 2000). For people with non-psychotic disorders, having people to discuss personal issues with is associated with a greater number of psychotherapy sessions attended (Albert et al., 1998; J. C. Mitchell, 1969). For homeless people, the number of family members they feel close to is associated with outpatient service use (Lam & Rosenheck, 1999). It is more difficult to draw conclusions about the effects of a higher proportion of mental health professionals on service utilisation. For some, a larger number of professionals increases the risk of hospitalisation (Albert et al., 1998; Holmes-Eber & Riger, 1990; Kent & Yellowlees, 1995); for others it decreases that risk (Fraser et al., 1985). Other characteristics of relationships within the social network have also been studied in relation to the use of psychiatric services. Lower multiplexity (links associated with multiple social domains or activities) and lower reciprocity of support (where the user is both support and supported) are associated with increased service utilisation (Albert et al., 1998; T. Becker et al., 1997; Lipton et al., 1981). Finally, network composition is also subject to change during the course of psychiatric treatment. In a context of long and multiple hospitalisations,

mental health professionals and other service users tend to replace family and friends (Goering et al., 1992). Frequent hospitalisations are associated with a higher percentage of people encountered in the context of mental health care (Holmes-Eber & Riger, 1990). A longitudinal study even showed that the size of a patient's network does not decrease over time, but that more distant relationships (such as extended family) decrease in importance and people encountered within mental health services increase in importance (Horan et al., 2006a).

The few studies that have addressed the structure of the relationships between the people supporting a service user have essentially studied network density. We know that strong ties are a characteristic of dense networks. Based on studies of the general population, a dense network should promote support in routine and crisis situations (Haines et al., 2002; Wellman & Gulia, 1999). The studies mentioned above in relation to the presence of intimate relationships (Albert et al., 1998; Kouzis et al., 2000; Lam & Rosenheck, 1999; J. C. Mitchell, 1969; Renwick et al., 2017; Sherbourne, 1988), suggest that network density should increase the use of outpatient services. Few studies, however, have confirmed this. One study found that cohesive networks are associated with successful referral to and maintenance of linkages with mental health services. In a less cohesive network, the onset and development of problem behaviours are less easily recognised (Carpentier & White, 2002a). Other studies found no association between

The association between network density and either social support or hospitalisations in unclear.

network density and either social support (Gayer-Anderson & Morgan, 2013) or hospitalisations (Goldberg et al., 2003a; Lipton et al., 1981). One study, however, found an association between moderate density and fewer hospital days (Dozier et al., 1987). Very high or very low density was associated with more time spent in hospital. The authors suggest that a moderate density may be optimal, providing a context that allows for mutual support without putting excessive pressure on individuals (Albert et al., 1998; Dozier et al., 1987).

Direction of causality

As we have seen, there have been few longitudinal studies that have attempted to link changes in network characteristics with health outcomes. Of those that have, not all have been able to demonstrate an association between the two. One study found an association between increased social contact and improved social functioning at the cross-sectional level but found no significant temporal relationship between the two (Howard et al., 2000). The study found strong associations between social network characteristics (size and number of interactions) and GAF disability scores (social functioning) at time 1 and time 2, i.e. at the cross-sectional level. It was not possible, however, to associate GAF disability at time 2 with network variables at time 1, controlled with GAF disability at time 1. In other words, a person's social network influenced his or her social functioning at that time but did not influence it over time. The authors do suggest, however, that the two may influence one another: GAF disability may affect social networks

and also be affected by social networks. The authors were unable to determine in which direction was the influence (Howard et al., 2000). Another recent study found changes in the social network over time but could not find much evidence of a relationship between the social network and the exploratory variables. The strongest predictor of social networks and support was baseline living status (Renwick et al., 2017).

Other studies have been able to find temporal relationships between network characteristics and health outcomes. The direction of those relationships, however, differs depending on the study. One study found that networks had a positive impact on the evolution of health indicators. It found that the level of social support was predictive of the level of positive symptoms three years after initiation of treatment and of the number of hospital admissions over those three years (Norman et al., 2005a). However, social support was evaluated here using the social relationships' section of the WQL-P scale (M. Becker et al., 1993), rated by a provider, and not the size of the network, evaluated by the user. Another study found, conversely, that psychiatric symptomatology had an impact on the evolution of the size and composition of a network (Thorup et al., 2006). In that study, more severe disorganised symptoms were predictors of a reduced family network at two-year follow-up and more severe negative symptoms were predictors of a reduced friendship network at two-year follow-up.

The deterioration of users' networks following hospitalisations has been discussed above. Some studies have shown that multiple hospitalisations

weaken a user's network and reduce its size (Buchanan, 1995; Holmes-Eber & Riger, 1990; Lipton et al., 1981). Other studies have shown, however, that the size of a network decreases significantly before hospitalisation and that, after hospitalisation, relatives in the network are replaced by health professionals, but that there is no decrease in the overall size of the network (Gayer-Anderson & Morgan, 2013; Horan et al., 2006a; Jeppesen et al., 2008; Thorup et al., 2006). This gives us no indication that it is the size of the network itself that promotes hospitalisation. A number of hypotheses have been put forward with regard to this. Some support the idea that the network encourages the use of health care, whereas others maintain that the network keeps people away from health care (T. Becker et al., 1997; Golding & Wells, 1990; Gourash, 1978; Kadushin, 1966; Pescosolido, Wright, Alegría, et al., 1998).

Another way to find indications of the direction of causality is to look at interventions that seek to change the network and see if they influence outcomes. A recent literature review of randomized controlled trial studies on this topic has made it possible to take stock of this question (Ma et al., 2019), but it presents several difficulties. One problem is that interventions have not always been able to increase the size of users' networks, which is the starting point when considering the direction of causality. Another is that user network assessment tools such as Pattison's Social Network Scale (Pattison et al., 1975) and the Social Network Schedule (SNS) (Dunn et al., 1990) are sometimes presented as a composite score and do not specifically identify increases in network size. Furthermore, the interventions use

network characteristics as the main outcome but also collect other data of interest: quality of life, social function, symptomatology, etc. Those other outcomes do not necessarily vary in accordance with the size of the network following the intervention and, even if they do, those variations are not easily attributable to the change in network size as the analyses were not carried out from this perspective. A study by James Rivera (J. J. Rivera et al., 2007), which compared three types of interventions, found that a consumer assist case management programme significantly increased social contacts between base line and twelve months, whereas this was not the case for the two control interventions (standard case management and clinic-based care). Other patient characteristics were also measured and several improved over time: severity of symptomatology, satisfaction with health care, subjective daily activities, subjective social relations, etc. Those improvements, however, were not specific to the intervention that led to the increase in network size, so it is impossible to draw conclusions from them. In a study by Emanuela Terzian (Terzian et al., 2013), an improvement in the network was noted following the implementation of an experimental scheme offering individual support in finding social activities. An improvement of the network was defined as an increase in the number, frequency, importance or closeness of relationships. The networks of users who had received the experimental treatment improved by 39.9% and the networks of users who received routine treatment improved by 25%. The authors also found that, at the same time, users experienced clinical improvement. They were unable to conclude, however, that the change in the social network was the cause of that improvement. The authors are

cautious and merely state that: “Our results suggest that improving social networking produces beneficial effects in patients with a better clinical prognosis, hence in this sense, a good clinical prognosis might anticipate a good response in terms of social network improvement”(Terzian et al., 2013).

Conclusion

The second part of this literature review has been devoted to the links between various characteristics of psychiatric patients’ social networks in terms of size, composition, structure, and user outcomes. The first lesson we can draw from this part of the literature review is that having a larger network always seems to be beneficial, at all levels. A larger network reduces the risk of mortality and is associated with less severe negative symptoms (although positive symptoms are not associated with the network size). A larger network appears to be positively associated with psychiatric rehabilitation and a faster recovery process. People living with severe mental disorders who have larger networks also report a better quality of life, greater satisfaction with social relationships, and better social functioning. Network size is also positively associated with perceived and received social support. A larger network is associated with shorter and less acute hospitalisations, fewer emergency visits, and a reduced risk of rehospitalisation. Finally, people with larger networks also

having a larger network always, having a more diverse network with a greater number of friends seems to be beneficial, at all levels. Contact with family has a positive effect on satisfaction with social relationships.

use more outpatient services and use them for longer. To put it mildly, if there's one thing that matters, it's the size of the network.

As far as composition is concerned, it appears that having a more diverse network with a greater number of friends has positive effects. A greater number of friends is associated with less severe symptomatology and greater satisfaction with social relationships. Having a greater number of friends and trusted intimate relationships is also associated with service use: their presence in the psychiatric service user's network increases the use of generalist and outpatient services, reduces the duration of untreated psychosis, and reduces the risk of relapse. Ties with families, on the other hand, are associated with reduced social functioning. A greater proportion of family members in the network (as opposed to friends) is also associated with higher use of inpatient services, more acute episodes, and longer hospital stays. This could be attributed to poor mental functioning, a cause of long-term hospitalisation, which also makes it difficult to maintain friendships (Holmes-Eber & Riger, 1990). Contact with family, however, has a positive effect on satisfaction with social relationships. The impact of professionals in the networks of psychiatric service users is less clear. For some, a larger number of professionals increases the risk of hospitalisation; for others it decreases that risk.

There are far fewer studies on the structure of the networks of users with severe mental disorders. We still know little about this. It seems that greater density of relationships between the members of a user's network is associated with greater severity of the disorder, but also with greater satisfaction with social relationships. One study also found that denser networks are associated with effective referral to mental health services and with the maintenance of links with those services. Finally, two studies found that average density, neither too high (everyone knows each other) nor too low (no one knows each other) was associated with less severe symptomatology and fewer hospital days. In those studies, moderate density was found to be most appropriate, providing a context that allowed for mutual support while not putting excessive pressure on individuals. The number of studies currently available on the subject is, however, too small to draw conclusions.

Greater density of relationships between the members of a user's network is associated with greater severity of the disorder, but also with greater satisfaction with social relationships.

THE NETWORK INTERVENTIONS

In view of the difficulties experienced by people with severe mental disorders in the community and the important resources that their social support networks can provide, many programmes have been developed to improve their networks. There is extensive literature describing these arrangements, usually referred to as “network intervention”. In that literature, however, this term is used to describe two quite different types

of interventions (Hunter et al., 2019). It is necessary to distinguish between these.

First, there is literature that focuses on interventions that aim to promote health. In that context, network data is used to design interventions that will influence the health behaviours of the target audience. The network data used usually contain information about a set of people (the target audience) and the relationships between them: for example, students in the same class and their friendships. This type of network data is usually referred to as "whole-network" data. Interventions use this data to identify certain key actors and make changes in the network and thus influence health behaviours (Hunter et al., 2019, 2019). We will call these interventions "public health interventions". The other use of the term "network interventions" in the literature refers to interventions that seek to improve social support or decrease social isolation, for example, among people with severe mental disorders, a category of the population that is particularly susceptible to social isolation (Ma et al., 2019; Pinto, 2006; Sluzki, 2010). These interventions usually aim to provide people with new opportunities for socialisation in order to increase their social resources. In this framework, the object of the intervention is not a "whole network" in which a large number of people are linked, but the personal network, specific to each individual, made up of the people who support him or her and the relationships they have with each other. This is what is usually called an ego-network: a network centred on a focal person (ego), in this case, the person who feels the need to broaden his or her social resources. These

interventions do not usually use network data to design their interventions and determine where and how to intervene in a network. Instead, they use network data to identify the expected outcomes of interventions. Most aim to increase the number of support persons, i.e. the size of a person's network (Terzian et al., 2013). We will call these interventions “social isolation interventions”.

The network interventions that we call here « public health interventions » are intervention design to influence health behaviours of a target audience, based on network data.

These two types of “network intervention” have different objectives and the concrete interventions carried out within these two frameworks are described in the literature using different categories. The first type of network intervention, the “public health intervention”, which relies on network data to influence health behaviours, is usually classified according to the characteristics of the network in which it will intervene. There are three main categories of public health interventions: (1) identifying alters that have a specific position in the network and designing interventions that target them, (2) adding or removing alters, and (3) modifying the connections between alters (Hunter et al., 2019; Valente, 2012).

(1) The first category uses network data to identify persons or groups that have a specific position in the network. These may be people who have a high degree of centrality (who are in contact with many other people in the network under study) or who perform a specific function. They

may be members of very dense groups within the network (who have lots of contact with each other), mutually exclusive groups, or groups that have great homogeneity or heterogeneity of function. On the basis of these data, the intervention may entrust these persons or groups with a specific mission related to the objective (Buller et al., 1999; Campbell et al., 2008; Hunter et al., 2019). The most common intervention of this type is the use of opinion leaders. Snowball methods, which rely on key people to cascade information so that it becomes viral, could also fall into this category (Valente, 2012). Another strategy is to provide training in behavioural change techniques to community members, who will then inform and sensitise their peers.

(2) The second category adds individuals to the network and/or removes individuals from it. A classic strategy is to add people to the network in such a way that they bridge disconnected groups. It is also possible to remove from the network people who have a specific position, for example, in order to stop the spread of a disease (Hunter et al., 2019; Valente, 2012). Network measures can be used to identify optimal individuals to add or remove.

(3) The third category modifies the connections between the members of a network. This can involve adding or removing links or reorganising sets of links. Network data can help to design such interventions. If analysis has shown that two groups have no contact with each other, the intervention can seek to connect them, for example, to facilitate the

diffusion of an innovation. The classic “rewiring” intervention consists of a teacher regularly changing his pupils' places in a class to create different dynamics or to allow links to develop between pupils who belong to different groups (Valente, 2012).

The network interventions that we call here « social isolation interventions » are intervention design to improve social support or decrease social isolation within a population that is weakened in this respect.

The second type of intervention, the “social isolation intervention”, which seeks to increase people's social resources by increasing the size of their personal social network, is usually described in the literature according to the programme of care or psychosocial support intervention being evaluated, without the specific modality of modifying the personal network being mentioned (Andersson, 1998; Biegel et al., 1984; Cox, 2005; Froland et al., 1979; Heaney & Israel, 1997; Mann et al., 2017; Tracy, 1994). For example, David Biegel (Biegel et al., 1984) identified seven types of network intervention: clinical treatment, family caretaker enhancement, case management, neighbourhood helping, volunteer linking, mutual help/self-help, and community empowerment. These interventions are aimed at improving the social integration and social functioning of users, but none of them are designed using network data.

Some authors (G. D. Erickson, 1984; Heaney & Israel, 1997), however, have used categories similar to those used for public health interventions to distinguish between (1) interventions that support relationship skills and

sustain existing relationships, (2) interventions that add new social relationships, and (3) interventions that bring together and connect network members.

(1) The first category of social isolation intervention is interventions that focus on the person or his or her family in order to strengthen the person's capacity to develop and maintain relationships with others. These can be interventions that aim to reduce "maladaptive" cognitions, increase social skills, or improve the self-management of mental disorders. These interventions may target cognitive biases in order to change the way people view their social relationships. They can aim to change a behaviour, to increase the ability to converse, for example, or to interpret the reactions of others. They may include psychotherapeutic support, clinical treatment, or social skills training. They may also be family-centred interventions, such as family psychoeducation (Ma et al., 2019; Mann et al., 2017). These interventions improve people's interpersonal skills and, thus, have an influence on the person's social network, but they do not directly seek to influence the characteristics of the person's network by adding people or modifying the links between people.

(2) Most social isolation interventions fall into the second category: programmes that aim to increase the size of users' social support networks. A large proportion of the interventions in this category are group interventions: support groups or therapeutic groups, organised

and facilitated by professionals. These groups can have a therapeutic and/or psychoeducational vocation. This type of group has been shown to be beneficial because it increases the social network and improves quality of life (Perese & Wolf, 2005). There are also psychosocial clubs, which are places for meetings and activities without constraints and without therapeutic objectives. These places are often co-organised by users and professionals. They do not offer care as such, but allow the people who frequent them to increase their social skills and develop new relationships in a protected environment (Perese et al., 2003). There are also strategies for connecting with peers or volunteers who are willing to give their time to, for example, share hobbies. These are called befriending strategies or the natural neighbour or natural helper approach (Biegel et al., 1994; G. D. Erickson, 1984; Perese & Wolf, 2005).

(3) The third category consists of interventions that seek to reorganise the network of a person with a mental disorder in order to improve collaboration or solve problems. Unlike the previous category, which seeks to modify the composition of the network by adding members to the network, with attention paid to possible gaps, the interventions in this category seek to bring together the members already present in the users' network and to modify the links between them. These interventions often take the form of network meetings (G. D. Erickson, 1984; Tracy, 1994) organised in relation to a particular user's situation, which bring together family members, friends, and formal and informal support persons. The goal is to bring together different services or

sources of support that are usually disconnected, in order to ensure consistent treatment. The different supports may be distant, be in conflict, have contradictory ideas of what to do, or may not be aware of a problem. Services can also be delivered more efficiently when people are in communication with one another (Biegel et al., 1995). There are many interventions of this type, e.g.: “inter-systems conferences” (Trimble, 1980), "team problem-solving" (Curtis, 1974), “screening-linking-planning conferences” (Garrison, 1974), and “combined family and service network interventions” (G. D. Erickson, 1975). The case manager is likely to be the organiser of such network meetings, but case management can itself also be considered a network intervention. As an element of the multidimensional support offered by the case manager, it can support the person in relationships with others. It can also support the modification of relationships within the person's network. It can encourage certain members of the network to take on new roles or encourage a distance between the user and certain members of the network to avoid conflicts. It can also put people who offer the same type of support in contact with each other to promote exchanges and thus prevent caregiver burnout (Biegel et al., 1995).

Table 3. Differences between types of network interventions.

		"Public Health Interventions"	**"Social isolation interventions"**
Objective of the interventions		Promote health, influence health behaviours	Improve social support and decrease social isolation
Level of interventions		"Whole network" or the set of relationships within an identified group of individuals	"Ego-network" or the network of relationships of a particular person (ego)
Use of network data		The intervention is designed based on a description of the network on which it will take place.	The modification of network characteristics (often size) is the expected outcome of the intervention.
Types of Interventions	(1) Give skills or a specific role to a network member	Identify people who have a specific structural position in the network and give them a particular role in an intervention	Improve relationship skills of ego and his/her relatives and sustain existing relationships
	(2) Modify the number of network members	Add people to create a bridge between two subgroups within the network or remove alters to stop the diffusion of something	Organise social activities that add new relationships, in order to increase the resources made available to ego via his/her network
	(3) Modify connections between network members	Modify connections between network members or groups of members to facilitate communication or support the dissemination of something	Organise meetings and other events that bring together and connect network members in order to improve collaboration or solve problems

In the field of mental health, network interventions which pursue the objective of improving the situation of people suffering from severe mental disorders are called “social isolation interventions”. We are not aware of any interventions that use network data to intervene specifically on the size, composition, or structure of the personal networks of psychiatric patients in order to increase their social resources. Social isolation interventions influence a person's network and offer significant benefits by increasing, modifying, or improving the social resources to which that individual has access. They do not, however, specify the specific change they bring about in the patient network. For example, an intervention may set up a “befriending” system, which may increase the size of the person's network, but the intervention is carried out without prior assessment of the person's network to identify how many people need to be added to the network and what roles they should play. An intervention may implement “network meetings”, which may increase the density of the network by creating relationships between all the user’s support persons, but again, this intervention is carried out without prior assessment of the person's network to identify where in the network it would be most appropriate to add relationships. Rogiero Pinto describes an intervention process that begins with the systematic identification of the members of the network of the person concerned and their role in relation to the person, followed by the elaboration of intervention objectives and the choice of an intervention (Pinto, 2006). Although the process begins with a description of the network,

« Social isolation interventions » do not usually use network data to identify the specific change they should bring about in the patient network.

however, data on the composition or structure of the network are not used to determine the intervention.

Do network interventions need to specify what changes are being made in the user's network to provide greater benefits to the user? This will depend on the specific situation of each person, but it is probably preferable to add people at a particular position in a network. New people could, for example, be added to bridge parts of the network that are disconnected or weakly connected (Burt, 2005; Valente, 2012). Furthermore, interventions that aim to increase the coherence of the activity of different support persons would greatly benefit from network data that would make it possible to identify the people who should be invited to a network meeting or the links that should be developed between support persons, taking into account the structure of existing relationships. Of course, if we are only interested in interventions that increase the size of the network, sticking with the idea that bigger is always better, an advanced description of the network does not seem useful. As we will see below, however, apart from the size of the network, the structure of the network is likely to strongly influence the resources that users are likely to access through it. Moreover, to intervene in the structure, it is necessary to describe it and adapt the intervention to the specific situation of each person.

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CONCLUSION: STRUCTURE MATTERS (SHOULD MATTER)

Users with severe mental disorders are in an unfavourable situation in relation to their social network. They have smaller and more family-centred networks compared to the general population, whereas larger networks with more friends would benefit them in terms of symptomatology, recovery, quality of life, social functioning, social support, decreased hospitalisation, and use of outpatient services. This justifies our interest in the network of users suffering from severe mental disorders. While, however, we are beginning to get a good sense of the importance of the network size of people with severe mental disorders, we know little about the influence of network structure, i.e. the particular shape of the relationships between the people who support a user. Very few studies have looked at this, and those that have looked at it have focused primarily on one indicator: the density of relationships between support persons. Recent developments in social network analysis, however, have given us the opportunity to look at many other characteristics: the position of the various actors within the network, the existence of groups that are more or less disconnected from each other, and the specific position of the user within his or her own network.

Although we know little about the impact of the structure, we do have theoretical reasons to believe that it has an impact. The three types of resources offered by the social network mentioned above (behavioural guidance, purpose and meaning in life, social support including consistency of support interventions) are potentially determined by the structure of the network, not just its size. Behavioural guidance is a product of social influence. Social influence is mainly determined by the cohesion of the network, i.e. the extent of the relationships between support persons. The more people share them, the stronger behavioural norms will be and the less contested they will be within the network. A very cohesive network will allow this to happen. Purpose and meaning in life are influenced by inclusion within groups and by the social roles that people assume, which allot them reciprocal benefits and obligations. The structure of the network is also likely to reflect this, through the different communities to which the person may belong. Social support is also determined by the structure of the network. More specifically, types of support are likely to be offered depending on the user's proximity to the support person and the position of that support person in the user's network. A person who is close to the user and who is positioned in a dense part of the user's network will probably offer different support from an acquaintance who has little contact with the other members of the user's network. The former is more likely to offer emotional or tangible material support, whereas the latter may provide access to information that the user may not otherwise have access to. Finally, the

The resources offered by the social network are potentially determined by the structure of the network.

consistency of support interventions also depends on the structure of the network. The extent of the relationships between support persons can influence the social norms regarding support that are diffused within the person's network. Furthermore, the consistency of a support intervention is determined by people's ability to take action in a coherent manner and, therefore, by the possibility of interaction.

When the structure of the service user network does have an effect, effects can work in different, sometimes opposite, directions. That is why we are interested in addressing this issue. Thus, for example, cohesion in the user's network – defined as the propensity of members be connected to each other, which creates trust, mutual obligations, and a community of ideas – facilitates the flow of information and makes rapid and coordinated interventions possible (Dozier et al., 1987). A cohesive network can influence the user, through social control, facilitating behavioural acquisition and adherence to shared social norms (Berkman et al., 2000; House, Landis, et al., 1988). A cohesive network, however, is also a network where it is more difficult to think differently from others, as ideas on how to act gradually converge. A cohesive network is, therefore, likely to put more pressure on its members and also on the user, risking breaks in contact and generating problems of continuity of care. In a fragmented network, on the other hand, the user is in contact with individuals or groups that are not connected to each other. Fragmentation favours access to a greater variety of social situations and

When the structure of the service user network does have an effect, effects can work in different, sometimes opposite, directions.

social ties and, consequently, to a variety of resources and opportunities. Furthermore, network fragmentation gives the user greater autonomy and limits external constraints, giving him or her the opportunity to take more responsibility for coordinating his or her own suppo rt system (Burt, 2004; Granovetter M., 1973; Martí et al., 2017a). In a fragmented network, however, coordinated action is more difficult to organise. It is more difficult for support persons to exchange concerns and reach a common decision. If a relationship breaks down, it is less likely that others will intervene to support a reconciliation. Put simply, how cohesive a network is will determine the extent to which it can offer the user more or less autonomy and diversity of opportunities. It can also determine whether users are offered more or less social control and rapid and coordinated interventions. Intervening in a user's network, therefore, means weighing up, with the user, what is best for him or her: more or less diversity of resources, more or less coordinated interventions.

How cohesive a network is will determine the extent to which it can offer the user more or less autonomy and diversity of opportunities and more or less social control and coordinated interventions.

Network interventions, as currently envisaged in the field of psychiatry, do not allow such questions to be asked. These interventions aim to increase people's social skills, increase the size of their network, and/or bring their network members together. These interventions do not, however, develop prior analyses of the users' network in order to determine where and how to increase the size of the network or who to link and bring together. We do, however, have the example of other interventions in other areas that seek

more specifically to add/remove people within a network or to change the relationships between them. Although their objectives are not the same, adapting their methods to the obje ctives of psychiatric interventions would undoubtedly make it possible to design more personalised interventions that are more specific to the needs of each user.

The aim of our work here is to study the social network of psychiatric service users in order to eventually make the development of network-centred interventions possible. We will approach this question from three different angles:

(1) We first wish to describe the networks of users with severe mental disorders using a variety of indicators of the structure of their networks. The objective will be to highlight the diversity of existing indicators and see whether they vary according to the sociodemographic and clinical characteristics typically used to describe the situation of psychiatric service users.

(2) We then wish to study the characteristics of the social network of psychiatric service users in relation to users' perception of the continuity of their care. As we have seen, the use of services is an important outcome that is studied in relation to users' social networks. Continuity of care has never specifically been studied in relation to the structure of the network, but examining the relationships between the people providing support is a good way of becoming aware of the potential for

coordinating actors and thereby encouraging continuity of care. Moreover, network interventions mainly focus on social isolation and the few interventions that seek to bring the support persons together do not take into account the network characteristics that may or may not improve coordination and continuity of care.

(3) Finally, we would also like to study the determinants of the support offered by a particular support person to a user. It is possible, as we have seen, that the number of other support persons within a user's network a person is in contact with will have an impact on the support that that person will offer. That is why we wish to study the impact of the structure of the network not on an outcome at the level of psychiatric service users (such as perception of the continuity of the self), but at the level of the support persons who are part of the network. This approach is unprecedented in the analysis of psychiatric patients' social networks and is likely to provide valuable indications for the development of future interventions.

2. THE MORPHEUS PROJECT: METHOD

The aim of the "Morpheus" project was to collect the social support network of users with severe mental disorders. It took place between 2013 and 2015. Inspired by recent developments in ego-network surveys in the domain of human services (Borgatti et al., 2009; Crossley et al., 2015; Perry et al., 2018), we developed a cross sectional ego-network survey as well as a specific collection tool for ego-networks. In this chapter we will explain what an egocentric network is and describe the collection tool we have developed to collect them. In particular, we will detail the choices we made to arrive at this collection tool. Then we will detail the collection protocol. We will specify the design of the study, the selection criteria for the service users surveyed, the sampling, and the procedures for contacting the users.

EGOCENTRIC NETWORKS AND HOW TO COLLECT THEM

An egocentric network (or simply ego-network) consists of a single actor (ego) and the individuals that ego is connected to (alters) and all the links between those alters (Everett & Borgatti, 2005a). Egocentric networks are not the same as sociocentric networks or "whole networks", which are networks made up of a finite set of actors and the relationships between

them. They are two very different types of network and they are studied in very different ways. The study of a sociocentric network focuses on a specific environment, with precise limits in space and time (pupils in a class, monks in a monastery, patients in a hospital ward, etc.). The object of the study is the relationships within that environment. In practice, each person within the environment will be questioned about his or her relationships with others. The analysis will focus on the association of the characteristics of the sociocentric network formed by the set of relationships between the members of the network (and in particular the specific place of certain types of members) with the characteristics of the members.

An ego-network is the set of relationships of a specific individual (ego) and the relationships between the members of the network (alters) of this individual.

The study of ego-networks focuses on the specific social context of a person. The object of study here is not the relationships within a specific environment, but the relationships of a certain type of person. What constitutes the framework of the study are the characteristics of a population and not the characteristics of an environment: students of a certain age group, regardless of their school, psychiatric users with a certain history of care, regardless of where they are hospitalised, etc. The focus of the study is on the characteristics of a population and not on the characteristics of an environment. In practice, a sample of this population will be questioned about their social relationships and the relationships between them. It is the focal person (ego) who provides the information on the relationships between the members of his or her network (alters); the latter will not be

questioned. Unlike in sociocentric networks, alters can belong to very diverse contexts. They are part of the network from the moment they are cited by ego as being part of his or her network, regardless of the context to which they belong. The analysis will focus, among other things, on the characteristics of the personal networks of individuals in relation to the characteristics of those individuals. It is also possible to select a number of egos from a larger population and, depending on the quality of the sample, to generalise the results to the target population.

Table 4. Comparison of sociocentric and egocentric research designs (adapted from Perry, Pescosolido and Borgatti, 2018).

Sociocentric network	**Egocentric network**
Focuses on a specific environment	Focuses on the specific social context of a person
Focuses on one domain or context, such as a natural group	Can elicit alters from many domains or contexts
Captures the node's position	Captures the node's position, but is limited to direct ties
No sampling at node level, only at whole network level	Sampling at node level
No generalisability at node and dyad level	Generalisability at node and dyad level
Aided data collection, reducing recall errors	Unaided data collection, vulnerable to recall errors

In the Morpheus project, we are interested in the organisation of care for a particular population, people with severe mental disorders, rather than the organisation of a particular context, such as a psychiatric ward, for example. We also seek to include in the analysis all the social resources of the people concerned and not only those acting in a particular context. Ego-networks are therefore the appropriate research design. Our interest in the ego-network rather than the sociocentric network also allows us to select a number of people suffering from severe mental disorder in a variety of different care settings and to generalise from the analysis of these networks. So, as part of the Morpheus project, we considered the social support networks of psychiatric service users to be ego-networks: ego is the service user, alters are the members of his/her social support network, i.e. the people who support him/her, and the ties between alters are the information exchange relationships between the support persons.

The three phases of the collection of an egocentric network: mame generators, name interpreters and dyad interpreters.

In practice, we collected the data with the participant-aided sociogram technique developed by Bernie Hogan and colleagues (Hogan et al., 2007), which we adapted for use with service users suffering from severe mental disorders using Bidart's two-stage name generator (Bidart & Charbonneau, 2011). The data collection was made up of three sections. First, we used a name generator, a question that allows the identification of significant people (alters) with whom the respondent (ego) has supportive contacts. We used a two-step name generator including one generic question that allows the respondent

to draw up a list of people spontaneously identified as offering social support in two different social contexts, supplemented by questions about four specific domains of social support: finances and administration, housing, place of living, activities and relationships, and health. The name generation phase is followed by the name interpretation phase. Name interpreters are used to collect information about alters: the roles of alters depend on the social context of informal relationships (e.g. father, daughter, friend) or on the context of professional care (e.g. psychiatrist, nurse, social worker). For each alter, the respondent was also asked to specify a series of contact characteristics, such as regularity of contacts with the alter and reciprocity of support. Finally, we used a dyad interpreter to identify the relationships between the alters to the extent that ego is aware of them. The dyad interpreter is based on Hogan's bullseye target technique of network visualisation (Hogan et al., 2007). Ego, i.e. the respondent, is pictured in the centre of a four-circle target. The respondent places all alters on target circles according to the level of support they provide in his/her view. The respondent was asked to place supporters closer to or further from him or her according to the importance that he or she attached to the support offered by each alter. Alters in the first circle provided essential support, whereas alters placed in the outer circle offered the least important support. Then, the respondent was asked to draw links between the alters who exchange information about him or her. The information exchanged could, for example, be medical information exchanged between health professionals or information exchanged between family members and health professionals that facilitates coordination. The final result is a

sociogram, i.e. a network graph representing the actors who are members of the social support network of the respondent, and the ties that exist between them in the respondent's view. We will present the three sections of egocentric network collection in detail below and explain the reasons for the choices we have made.

Name generators

Name generators are questions that allow the respondent to draw up a list of people depending on the type of relationship being researched. The aim of the Morpheus project was to identify the people who service users considered supportive in different areas of their lives, including both family members and professionals. Several types of name generators can be found in the literature (Bailey & Marsden, 1999; Bearman & Parigi, 2004; Bidart & Charbonneau, 2011; Carrington et al., 2005; Crossley et al., 2015; Krackhardt, 1987; Marin & Hampton, 2007; McCallister & Fischer, 1978; Neal, 2008; Perry et al., 2018; Wasserman, 1994). First, there are name generators based on interactions. These are questions that identify people that the respondent has seen in the past week or month or with whom they have developed a specific type of interaction. These name generators have the disadvantage of excluding people the respondent does not see often or with whom they do not share the type of interactions in question. This type of name generator is not suitable for our purpose because the

Name generators are questions that allows the respondent to draw up a list of people with certain characteristics, depending on the question asked.

people who provide significant support may have limited interactions with the user. Moreover, this type of name generator is more suitable for measuring the degree of social isolation, or inversely, the degree of sociability in the social support network. The second type of name generator is based on the identification of significant people (friends, close relatives, etc.) and the importance of their links with the respondent. Questions of this type are blurred and can be interpreted very differently from one person to another: everyone has their own definition of friendship. They also have the disadvantage of being limited to the strongest links. Weak links, however, can also be resource-generating. The last name generator is based on supportive exchanges. This type of name generator typically identifies the individuals who have offered some type of support in the past few months or who are likely to support the respondent in the future in certain types of situations. The main difficulty of these name generators is accuracy and reliability. Since contacts that have existed in the past have to be identified, the data becomes less reliable. When it comes to identifying who is likely to provide support in the future, the disadvantage of these name generators is that it may be feelings of loneliness that are measured rather than the effective social support network.

For our purposes, we chose the third type of name generator because it focuses on the supportive exchanges between ego and alters, which is what we are looking for. This type of name generator also has the advantage of being less likely to be interpreted differently by different respondents (Bailey & Marsden, 1999; Bearman & Parigi, 2004; Marin & Hampton, 2007;

McCallister & Fischer, 1978). We limited the problem of recall by using several complementary name generators and limited the problem of projection into the future by combining name generators oriented towards the past with others oriented towards the future. We applied Bidart's two-step method in order to help users to remember their actual alters from different fields (Bidart & Charbonneau, 2011). In the first stage, the respondent was presented with various social contexts (e.g., family, friends, professional, community context). This stimulated the respondent's memory by systematically exploring each context and identifying people within each of the contexts. In the second stage, the respondent answered further questions relating to the support offered by the people in the first list that was drawn up. If new names appeared, they were added to the list. The name-generating function was thus constantly activated (Bidart & Charbonneau, 2011).

We used a name generator based on supportive exchange, inspired by Bidard's two-step method, combining a general name generator with a stage focused on the social context and a stage focused on domains of support.

The question we used as a name generator was: "Who are the people who currently support you in the different aspects of your life, both professionals and other people?". The word "currently" was specified during the interviews. It refers to people who can be mobilised to support the respondent, even if they do not support him or her right now. They are the people who have supported the respondent in the past and are still likely to support him or her in the future. Given that the objective of the tool

was to identify the patient's resources and how to act on them (diversification, coordination, etc.), the question we asked concerned the support that the respondent was likely to receive in the future. Support that the person had been able to benefit from in the past but which they would no longer make use of in the future were excluded. We could not, however, focus solely on the support that respondents expected to receive. Obtaining professional support often involves an application process or administrative procedures. In our experience, service users often cite professionals according to their needs, without taking such constraints into account. That is why we only identified alters that were likely to offer support in the future who had already been activated in the past.

This name generator, however, is still constrained by the limits of the respondent's memory. It is not easy to remember all the people who are likely to support us. It appears that respondents are better able to remember people with whom they are in frequent contact. It is important to take this factor into account when dealing with psychiatric patients who may have cognitive problems. It is also extremely difficult to capture all the dimensions of social support with a single name generator. So, as in the first stage of Claire Bidart's two-step method (Bidart & Charbonneau, 2011), we asked respondents to think of two social contexts in which the respondent might meet people: psycho-medico-social services and informal relationships. To differentiate between the two contexts, we used repositionable adhesive paper in two different colours, as in the participant-aided sociogram (Hogan et al., 2007). We did not offer the respondent as many different contexts as

Claire Bidart (Bidart & Charbonneau, 2011), considering that these two contexts are the most significant in the lives of most psychiatric users. During the interview, however, the interviewers encouraged respondents to take family members and friends into account as well as all informal resources such as colleagues, neighbours, a priest, etc. Then, in a second stage, four specific domains of support in which people are likely to need support were investigated, in order to help the user to remember as many supportive people as possible. During this stage, new alters could be added to the list by the respondent. In the area of mental health, it is particularly important to ensure that people also identify people that they may have ambiguous feeling about: those who exercise control while providing support (e.g., a financial manager who pays the bills, but with whom daily expenses must be negotiated, a parent who helps clean the house but gives invasive advice) or people who provide crucial assistance on a one-off basis (for example, with crisis management or moving). The four domains of support were: (1) administration and finance ("Who can help you in managing your money (invoices, budget, etc.) and administrative matters (filling out documents, classification, etc.)?"), (2) the management of the home (“Who can support you in relation to the management of domestic tasks, moving house, or taking care of your things if necessary?"), (3) activities and relationships ("Who can support you in meeting people and finding activities or something to do during the day?"), and (4) health care ("Who can support you in managing your physical and mental health (medications, hospitalisations, crisis situations, anxieties,

The four domains of support: administration and finance, place of living, activities and relationships, health care.

consumption, etc.?"). These are the four domains of support included in social support scales such as the Inventory of Socially Supportive Behaviors (ISSB) (Stokes & Wilson, 1984), the Multidimensional Scale of Perceived Social Support (Zimet et al., 1988), and the Social Support Network Questionnaire (SSNQ) (Gee & Rhodes, 2008).

Practically, we presented these four domains of support in different forms so that they could be easily understood by people with different levels of cognitive ability. In addition to the questions presented above, we associated each name generator with a list of practical situations and a series of icons representing some of those situations (see Figure 4)

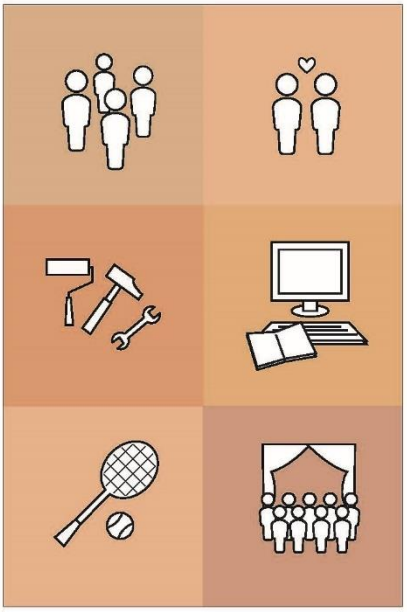
So, for example, the fact sheet for the name generator related to the management of the home contains questions about who can help the respondent to find housing if needed, host them, help to take care of the respondent's belongings or loved ones when they are not there, look after their young children, help them with shopping and making food, housekeeping, laundry, moving around, etc. This list is associated with six icons relating to family care, shopping, home maintenance, body care, meals, and travel. The four fact sheets are constructed in the same way. The interviewers have the option of using these fact sheets in different ways depending on the cognitive ability of the person being interviewed. They can give them the fact sheet to read or review each item orally. They can also use the icons.

Figure 4. The four fact sheets associated with the four domains of support used during the collection of social support networks, Morpheus study, Belgium 2014–2015

ACTIVITÉS & RELATIONS

Qui peut me soutenir pour.... ?

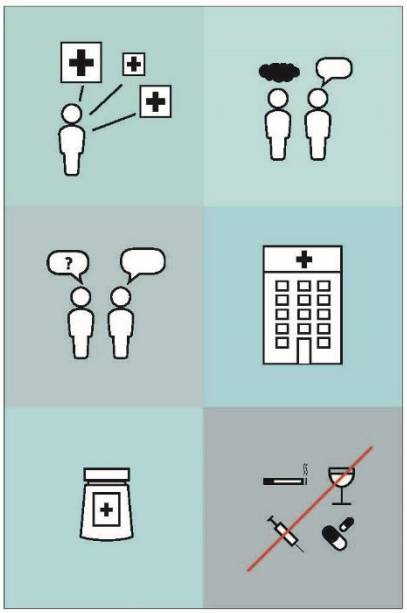
- Rencontrer des gens, voir des amis
- Entretenir des relations positives avec ma famille, avec un compagnon / une compagne,...
- Apprendre des choses (me former, me cultiver, être informé, accéder à internet)
- Trouver et aller à des activités de loisirs, sportives ou culturelles
- Trouver et garder un travail ou un bénévolat



SOINS DE SANTÉ

Qui peut me soutenir pour.... ?

- Gérer mon traitement
- Etre informé sur mes soins et sur mes problèmes de santé
- M'orienter vers les soins adéquats
- Me donner son avis sur ma situation actuelle
- Faire face aux situations de crise
- Gérer ma consommation d'alcool ou de drogues
- Faire face à de la tristesse ou à des angoisses
- Faire face à des difficultés avec mes pensées ou avec des voix



Name interpreters

Along with name generators, name interpreters identify different groups of alters to describe the composition of the ego network. There are two types of name interpreters. In the first type, the question is asked at the level of each alter. This form of name interpreter is used to collect qualitative data, such as the context in which the ego meets the alter (friends, family, work, professional support), the function of the alter (doctor, psychologist, nurse, caregiver), the service to which that alter is attached (in the case of a professional), and the domain of support (see above), or categorical data such as frequency of contact, the duration of the relationship, or closeness. The second type is used when the answer to the question is binary. In this case, it is possible to ask the question at the network level. For example, to identify supporters in crisis situations, we only needed to ask once: "who are the people who support you in a crisis situation?". The respondent could then identify the alters involved. We used this form of name interpreter to collect reciprocity of support, crisis support, relational difficulties, and much more. Collecting this type of information is very time-consuming, especially using the first type of name interpreter, which involves asking a question systematically about each alter. This second type of name interpreter may be preferable but some particularly important and regularly collected data, such as the context of meetings and closeness, cannot be collected in this way.

Name interpreters are questions put to ego to obtain information about the alters, i.e. the people cited by ego as members of his or her network.

There are methods that facilitate the collection of such information. One way of collecting this type of information more quickly is the "social network grid" (Tracy & Whittaker, 1990). This method consists of constructing an array in which each row represents an alter and each column corresponds to a variable that we want to collect. A caption indicates the different possible responses for each variable to the respondent. For example, for the variable "closeness": 1 = not very close, 2 = somewhat close, 3 = very close. The respondent must then indicate the number that corresponds to how close he or she feels to each of the alters. Visual representation techniques that are carried out by the respondents themselves can also be useful. Since the ground-breaking work of Jakob Moreno, who came up with the term "sociogram" (Moreno, 1934), such techniques have been widely disseminated and diversified. They usually involve noting the different alters on pieces of paper (the simplest is to use post-it notes) and then placing them on a map. It is also possible to note alters directly on the map, but this removes the possibility of changing your mind and moving the paper notes. The first of these visual representations facilitates the collection of qualitative variables, such as the area of support and the context of meetings. The map on which the post-it notes are placed is divided into several parts. This technique is usually called a “field map”. The map is usually divided into four fields, but can be divided into up to seven fields (Tracy & Whittaker, 1990). For example, the fields can be family, relatives, formal contacts, school, and friends/neighbours (Samuelsson et al., 1996), or family, friends, community, and work/study (Sluzki, 2010), or family, friends, work, and neighbours/hobbies/others (Ryan et al., 2014). The aim

of this technique can be twofold: to collect information about the alters and to ensure that the respondent does not forget anyone by proposing different meeting contexts. This is in line with the objective of Claire Bidart's two-step method and our use of the four areas of support (see above). In the second mode of visual representation, the map is not divided into several equal and non-hierarchical parts, but into several concentric circles with the respondent represented in the centre. This device enables the collection of categorical variables, but is most often used to collect closeness. The respondent places or writes the different alters in the different concentric circles, more or less close to the centre according to the degree of closeness. Since Mary Northway's original "target sociograms" in the 1940s, different tools have been developed: the "Hierachical Mapping Technique" (Antonucci, 1986), the "participant-aided sociogram" (Hogan et al., 2007), the "genosociogram" (von der Lippe, 2015), and many others (Heath et al., 2009; Hersberger, 2003; Ryan, 2018; Tubaro et al., 2016). In some cases, the alters represented by the various concentric circles are described: for example, hard to imagine life without them, not that close but still important, haven't mentioned yet but important enough to be placed in the network (Antonucci, 1986). Tools have also been developed that combine the field map and hierarchical mapping. Another way to collect information about alters easily is to directly distinguish certain types of alter when the name list is being drawn up. It is possible for the respondent to make several lists of alters according to certain characteristics and use several colours of paper or pen to draw up the list of alters. Hogan used this technique to distinguish alters whose respondent was "somewhat close" to the

respondent from those who were “very close” to the respondent (Hogan et al., 2007). There are also mapping tools, such as Net-Map, which do not use concentric circles or field divisions: they simply use the placement of alters on a sheet to identify the relationships between them (Schiffer & Hauck, 2010). This is more in line, however, with the objective of dyad interpreters, which we will discuss in the next section.

We collected the name interpreters using three tools: (1) two lists of post-it notes dedicated to two different social contexts, (2) a grid associated with each post-it note allowing information to be ticked and (3) the concentric circles of the hierachical mapping system.

In our situation, we have combined these different techniques to create a tool that is easy to use in the field by the interviewers and easily understood by service users, which promotes a good relationship with the respondent and enables the collection of the information that is needed. We have collected name interpreters in three different ways. First, respondents were asked to complete two separate post-it lists displayed on a sheet using the method developed by Hogan (Hogan et al., 2007). Unlike Hogan, however, we did not distinguish two levels of closeness, but two social contexts (Bidart & Charbonneau, 2011): the context of social services or health and mental health care services on the one hand, and on the other, the context of family and/or friends, the neighbourhood, or the context of professional or leisure activities. It is important to encourage respondents to take the two categories of alter into consideration. Most of the interviews were conducted in a health care setting, so there may have been a tendency among respondents to limit themselves to professional support obtained

through care services. Moreover, the distinction between professional and non-professional alters provides very important data that is often used in the scientific literature to describe the social support networks of psychiatric patients. We know that the proportion of professionals in a patient's network is likely to have an impact on his or her use of health services and on symptomatology. We asked the respondent to indicate qualitative data describing the alter, such as his or her function (doctor, psychologist, nurse) and the service to which he or she is attached (in the case of a professional), directly on the post-it note.

Then, we adapted the "social network grid" device to collect regularity of contacts, reciprocity of support, and domains of support. Rather than proposing a separate grid, we introduced a small grid to the right of each post-it note. This grid contained the possible answers for each of these three variables. Thus, for the variable "area of support", the grid containing F for "finance and administration", L for “housing” (“lieu de vie” in French), A for "activities and relationships", and S for health care (“santé” in French). The respondent then had to draw circles round the letters corresponding to the areas of support associated with each alter. This method greatly facilitated data collection. Reciprocity of support was a name interpreter of the second type, so it was possible to ask the question for all the alters at once. As the support domain was used as a name generator, we could circle the letter as we asked questions. Only regularity of contact required the question to be asked specifically for each alter. This system of small grids, attached to each post-it, also allows the interviewers who use the device to engage in a

dialogue with the responding patient. In order to foster the link with the respondent, it is important that the interview takes the form of a discussion about the role of each of the alters, from the respondent's point of view. A list of repetitive questions may pose problems of concentration and interest to psychiatric patients who respond. The grid system makes it possible to follow the thread of the conversation and to circle particular letters as the information emerges.

In Figure 5, we see how an alter has been identified, by name, function (social worker), and the service where she works (a community mental health team). On the right-hand side is a grid where it has been indicated with an "F" that she offers support in the area of "finance and administration" and with an "M" that she meets the person on a monthly basis.

Finally, we used the concentric circles of the hierarchical mapping system (Hogan et al., 2007) to collect the degree of closeness (see Figure 6). A bullseye map was presented to the respondent. The respondent was represented in the centre, surrounded by four concentric circles representing the degree of closeness. Respondents were asked to place people more or less close to them depending on the importance they attached to their support.

Figure 5. Collection tool based on the participant-aided sociogram technique developed by Hogan et al., name generator and the name interpreter collection phase, Morpheus study, Belgium 2014–2015.

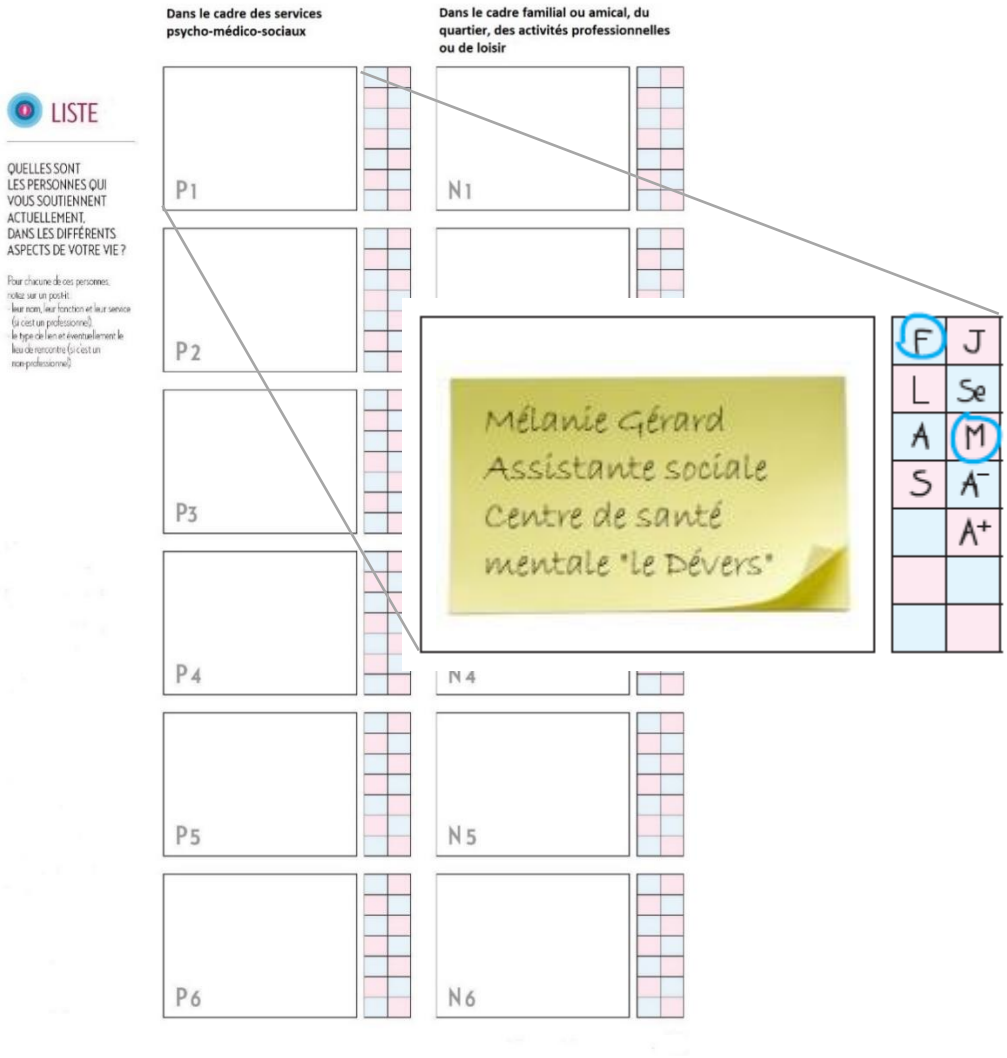
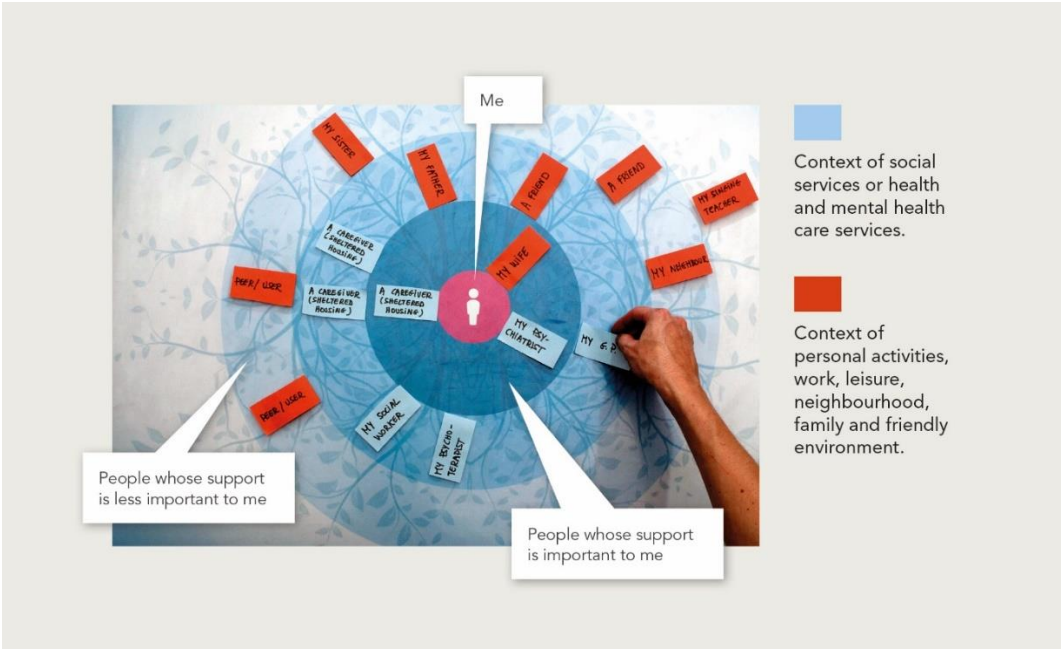


Figure 6. Collection tool based on the participant-aided sociogram technique developed by Hogan et al., phase collecting data on the level of support provided by each alter, Morpheus Study, Belgium 2014–2015.



We chose this support-oriented question rather than one more directly related to closeness in order to avoid conflicts of loyalty, which can be significant among psychiatric service users. There are great advantages to using the hierarchical mapping system to collect degree of closeness. For example, it makes it possible to take people into account who are not very supportive and towards whom the respondents are ambivalent, but who nevertheless play a role in the person's life. During the interview, we could encourage the respondent to note these people anyway, arguing that it would be possible to reposition them in the next phase. This system also

allows the respondent to judge the relative importance he or she attaches to each member of their network.

Dyad interpreters

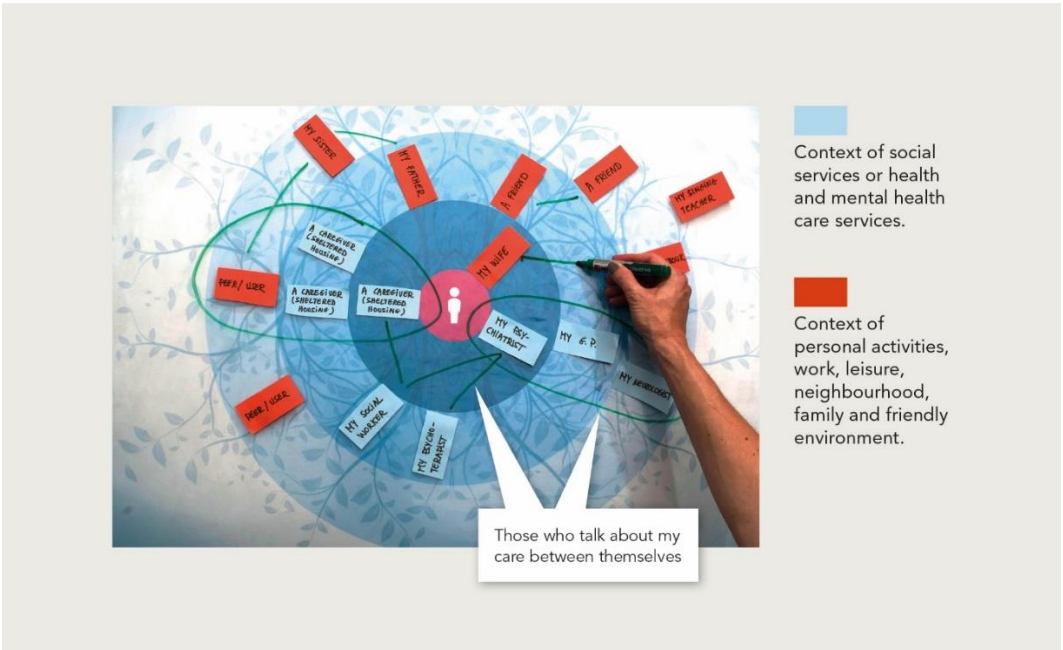
The last information that must be collected in order to build a social support network relates to the relationships between the alters, which makes it possible to study the coordination between the alters. As part of the ego-network collection, the links that are collected are considered reciprocal. The person describing his or her own network must determine whether the different alters are in contact with each other. The person does not always know about this relationship and is even less likely to know if the relationship is reciprocal or not. Here, the respondent is thus generally asked whether a relationship is present or not and not, for example, in what direction the information flows between the two alters.

Dyad interpreters are questions that aim to allow the respondent to identify the relationships between the people they have previously identified as members of their social support network.

In this study, we asked the question "Who exchanges information about you, regarding the support they give you". We consider the exchange of information to be an estimator of coordination. Moreover, this question allows us to take into consideration the coordination between professionals as well as between professionals and non-professionals and between non-professionals. The practical disadvantage in terms of data collection, however, is the same as that with

name-interpreters. If a patient must be asked about the relationships between all these alters, that may require a lot of questions to be asked. If a person has 15 people in their network (which is the average for psychiatric patients), 105 questions must be asked about the existence of a relationship between two alters.

Figure 7. Collection tool based on the participant-aided sociogram technique developed by Hogan et al., dyad interpreter collection phase, Morpheus Study, Belgium 2014–2015



Again, the mapping system provides the solution (see Figure 7). At the end of the previous step, all members of the respondent's personal network

were positioned on the different concentric circles of the map, depending on the degree of closeness stated by the respondent. In this context, it was much simpler to collect information exchange links. We only needed to ask the respondent to connect, with a pen, all the people who exchange information about him or her. This information is limited by the fact that the collection of relationships between alters depends on what the ego knows about them. According to previous studies, however, ego's reports are rather accurate. Green et al. report that egos accurately report information about alters (H. D. Green et al., 2013) and Adams & Moody report an agreement of 80% between different egos about alter-alter social ties (Adams & Moody, 2007).

THE SAMPLING DESIGN AND PATIENT SELECTION

The study was carried out in three Belgian areas of 250,000 inhabitants each: one metropolitan area (east of Brussels), one post-industrial, underprivileged area (La Louvière-Manage), and one semi-rural area with a largely service economy (Namur). Those three areas were included in the nationwide reform aimed at setting up networks of services in order to improve continuity of care for users with psychiatric disorders (Lorant, Nazroo, Nicaise, & The Title107 Study Group, 2017; Nicaise et al., 2014). We conducted this survey with 380 service users with severe mental disorders (Ruggeri et al., 2000; Schinnar et al., 1990). Users with severe mental disorders are defined with three criteria, the 3 Ds: (1) having a psychiatric **d**iagnosis; (2) having **d**isabilities in at least three of the following social skills:

obtaining help; meeting basic needs; social functioning; finding and keeping a job; managing non-professional activities; (3) having an illness or treatment **d**uration of at least two years, including at least one hospitalisation. As our main concern is the organisation of care around people with severe mental disorders, we focused on service users, people who are already supported by mental health care services.

Sampling

We calculated the sample size using the HoNOS, a scale of psycho-social functioning that has also been used in other research carried out on the same population in Belgium by other members of our "Mental Health Service Research" research group. We took into account the HoNOS standard deviation from the feasibility study conducted within the framework of the Belgian psychiatric reform (Gurnet et al., 2014). We did not aim to make inferences by geographical area, although we collected networks in three distinct areas.

The sampling design was clustered and stratified. As we were unable to access service users directly, the selection was made through mental health care services (=clusters). Different services, however, may care for different groups of patients and this clustering has a design effect that decreases the overall variance: 10 randomly selected patients will display a higher variance on the HONOS than 10 patients selected from, say, 2 services. We calculated this design effect using the intra-class variation of HoNOS between services,

based on data from the feasibility study of the Belgian psychiatric reform. We also carried out two types of stratification, a design effect that has the opposite effect of increasing the variance. The first was by the type of service (home treatment team, psychiatric hospital, sheltered housing, nursing home, psychiatric service in general hospital, community mental health team, day care centre and primary care centre). The second stratification was performed in relation to the patient social integration using the SIX scale (users living in 24-hour-supervised accommodation, users living in collective housing, and users living in regular housing). As well as taking budgetary constraints into account, these different operations led us to establish a sample size of 375 individuals to be distributed across the three geographical zones. We then distributed them among the types of services, as shown in Table 5. This allocation was carried out using an optimal allocation method, relating the weight of the type of service to the total number of users to the standard deviation of the HoNOS for the type of service in question.

Table 5. Stratification of service users chosen for interview, according to the type of service through which users were contacted, Morpheus Study, Belgium 2014–2015

Type of service	No. of users chosen for interview	No. of services through which users were contacted
Home treatment team	69	6
Psychiatric hospital	156	24
Sheltered housing	36	6
Nursing home	18	3
Psychiatric service in general hospital	12	3
Community mental health team	36	12
Day care centre	18	6
Primary care centre	30	12
Total	375	72

Recruitment

Services users were recruited in two stages. First, we selected in- and outpatient services in each area. The services were identified from the directory of all available mental health and primary care services in each catchment area. The services were then randomly selected, in proportion to the size of the service, from among all the services present in the territory of the three participating sites. An average of 24 services was selected per area, distributed by type of service according to the stratification mentioned above (home treatment team, psychiatric hospital, sheltered housing, nursing home, psychiatric service in general hospital, community mental health team, day care centre, primary care centre). Then, service staff were asked to select users with severe mental disorders, who were identified using the criteria outlined above, from three strata: users living in 24-hour-supervised accommodation (25%), users living in collective housing (15%), and users living in regular housing (55%). For some services, the type of accommodation is given (e.g. sheltered housing or psychiatric care homes). The distribution between the three types of housing was the responsibility of each area-specific coordinator. Moreover, various practical modalities for random selection were developed, depending on the functioning of each type of service. For residential services (psychiatric hospitals, nursing homes, psychiatric services in general hospitals), a list of users was drawn up, from which a random selection was carried out. For day centres and sheltered housing, the random selection was made among the users present in the service on a randomly decided day. For home treatment teams, community

mental health teams, and primary care centres that meet users in their homes or in consultation, participation in the research was offered to users as they were met by the care team. Of the 594 people contacted, 380 agreed to participate in the study (see Figure 8). Those who refused did so for two main reasons: either because of their mental health was poor at the time of the interview or because of their relationship with the clinician who attempted to recruit them for the study.

Figure 8. Sampling design, Morpheus study, Belgium 2014–2015

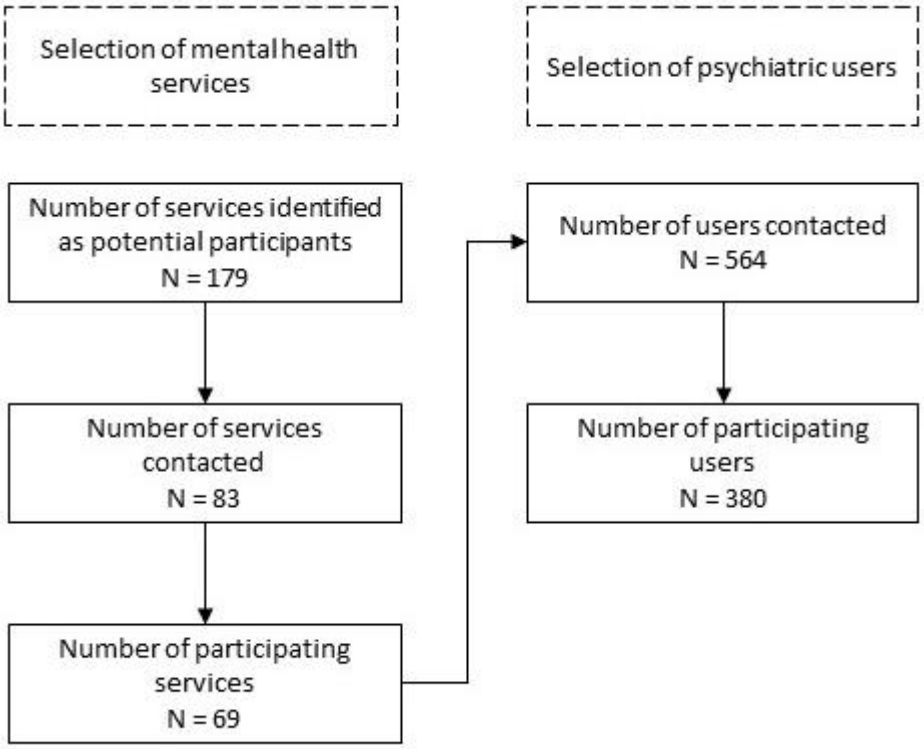


Table 6. Distribution of users interviewed by type of service and number of services involved and differences from the planned stratification, Morpheus Study, Belgium 2014–2015

Type of services	No. of users interviewed	No. of services through which users have been interviewed
Home treatment team	58 (-11)	6 (=)
Psychiatric hospital	167 (+11)	24 (=)
Sheltered housing	46 (+10)	9 (+3)
Nursing home	19 (-1)	3 (=)
Psychiatric service in general	21 (+9)	6 (+3)
Community mental health team	27 (-9)	9 (-3)
Day care centre	23 (+5)	6 (=)
Primary care centre	19 (-11)	6 (-6)
Total	380 (+5)	60 (-3)

Although hospital services are represented slightly more than we had expected, we were generally able to achieve the planned stratification. The main differences between the planned stratification and the data collection were at the level of the home treatment teams and primary care centres. In the case of the home treatment teams, this is explained by the fact that these types of teams were established by the psychiatric reform of the early

2010s, so they were in the process of being set up at the time of the data collection. In the case of the primary care centres, it was getting in touch with the users themselves that caused difficulty. Most of the mentally ill users followed by these centres are not followed by psychiatric services; they are rather distrustful of them and do not necessarily recognise themselves in psychiatry's definition of their disorders. We were also able to broadly comply with our second stratification in relation to the "housing" item of the SIX scale: 29.4% of the users we met were living in 24-hour-supervised accommodation (compared to 25% in the planned stratification), 19.2% were living in collective housing (compared to 15% expected), and 51.5% were living in regular housing (vs. 55% expected).

Finally, in the last stage of the collection, we asked each service user we interviewed to identify his or her main care provider, someone who knows his or her support network well, and to give us written permission to contact this professional to allow him or her to talk to us without violating professional secrecy. During the meeting with the professional in question, we collected the social support network of the user concerned, this time from the point of view of the professionals, using the same tools as were used for the user. We collected other psycho-medical information, such as the severity of the user's psycho-social functioning (see below). For the 380 service users we met, we were able to interview 346 professionals. A few users refused to refer us to their main care provider, but most of the missing data is due to the refusal of health professionals to discuss the user's

situation with us, for reasons of confidentiality, despite the user's permission.

Data collection procedure

The data collection took place between 2014 and 2015. Interviews lasted one hour on average and were carried out face-to-face by nine trained interviewers with professional qualifications related to mental health care. The interviews were arranged by an area-specific coordinator who had the task of contacting and recruiting the services, presenting the research, and monitoring the selection procedure. The interviews mostly took place in residential or outpatient care facilities and sometimes at home.

Measures

We collected the social support networks of psychiatric service users in the form of a sociogram, based on the methodology developed in the first part of this chapter. We obtained information about the support persons of each service user we met, about the characteristics of the support persons (name, role, service), about the relationships between the support persons and the service user (importance of the support, type of support, frequency of contact), and about the relationships between the support persons. We collected this information directly from service users. We also collected, as explained above, the social support networks of service users as described by a professional designated by each service user, using the same collection tool. From this information, we calculated a series of network indicators, at

the level of the whole network of service users (at ego level) and at the level of the support persons within the network of service users (at alter level). The indicators computed at ego level are developed in the third chapter. Those computed at alter level are developed in the fifth chapter.

We measured the service user's perception of continuity of care, which we analyse in Chapter 4 using the Alberta Continuity of Service Scale – Mental Health (ACSS-MH) (Adair et al., 2005; Joyce et al., 2010), a scale widely used in the literature (Digel et al., 2013; Uijen, Heinst, Schellevis, van den Bosch, et al., 2012; Vandyk et al., 2016). The ACSS-MH is one of the scales that appeared in the early 2000s as an alternative to measures of continuity that were considered too objective and unidimensional (Adair et al., 2003; Rose et al., 2009; Ware et al., 2003). The old measures often focused on the continuity of the relationship with one stakeholder or another or on the modalities of transition between institutions when more and more stakeholders are involved in the follow-up of patients at the same time. Several authors have also pointed out that, in order to assess continuity of care, it is necessary to have information about patients' needs and the evolution of those needs, given that information about the regularity or persistence of contacts alone is not enough; they have highlighted the multi-dimensional nature of continuity of care (Bachrach, 1981a; Belling et al., 2011; Crawford et al., 2004; Digel et al., 2013; Haggerty et al., 2003; Hautala-Jylhä et al., 2005; Jones et al., 2009; Rose et al., 2011; Ware et al., 1999). The ACSS-MH was developed in this context on the basis of a set of dimensions of continuity extracted from 305 theoretical and empirical articles and 36

interviews with patients suffering from severe and persistent mental disorders (Adair et al., 2005; Joyce et al., 2010). It consists of 32 items that patients judge on a 5-point Likert scale. It is composed of three sub-scales. (1) The coherence of the health system or, conversely, the perception of discontinuity between services, is assessed using items such as: "I can meet quickly with my primary care provider when I need to", "I do not feel involved in decisions about my care", and "I had to repeat my story every time I needed help". (2) The relationship with the care providers, i.e. the reliability and consistency of the relationship with the referral workers and the care team, is assessed using items such as: "my main care provider is not only interested in my symptoms", "my care is regularly reviewed", and "my psychiatrist can admit me to hospital if I need it". (3) Adaptability of care, i.e. the experience of services adapting to one's needs, corresponds to items such as "my appointments may be more frequent when I am not feeling well", "I get a phone call to confirm an appointment or to find out why I missed an appointment", and "if I have a problem, I can get help even in the middle of the night".

The importance of the support received, from the service user's perspective, used in the analyses in Chapter 5, was an ordinal measure corresponding to the concentric circle in which each alter was placed: very important (first circle, coded as 1) to least important (fourth circle, coded as 4) (See Figure 6).

With regard to clinical status and use of services, we collected the first contact with an in- or outpatient psychiatric service, the number of hospitalisations, and the severity of psychosocial functioning. Severity of psychosocial functioning was measured using the Health of the Nation Outcomes Scale (HoNOS) (J. Wing et al., 1999; J. K. Wing et al., 1998). The HoNOS includes 12 items that address the severity of several psychosocial problems with a score ranging from 0 (no problem) to 4 (severe problem). Some items allowed us to judge the severity of psychiatric symptomatology, such as item No. 6, which addresses problems related to hallucinations and delusions, and item No. 7, which is related to depressed mood.

Social integration was measured using the Objective Social Outcome Index (SIX), which is composed of four items (Priebe et al., 2008) relating to housing, employment, family status, and social relationships. The SIX allowed us to distinguish people living in the community (independent housing and sheltered housing) from people living in 24-hour-supervised accommodation. Finally, we collected socio-demographic information such as gender, age, country of birth, nationality, level of education, and income. All data were collected from service users with the exception of HoNOS, which was completed by a professional.

3. THE PERSONAL SOCIAL NETWORK OF PSYCHIATRIC SERVICE USERS

Wyngaerden, F., Tempels, M., Feys, J-L., Dubois, V., Lorant, V., The personal social network of psychiatric service users. International Journal of Social Psychiatry. 2020; 66(7):682-692. DOI: 10.1177/0020764020927447

ABTRACT

Background. For psychiatric service users, the personal social network offers resources such as behavioural guidance, social support, and coherence of care delivery. So far, most research on the subject has assessed the availability of these resources using size and composition measures. However, the availability of network resources also depends on the cohesion of the relationships between network members, a topic that is rarely addressed in the literature.

Aims. In this article, we aim to describe the cohesion of psychiatric service users' networks.

Method. We carried out a personal network survey and collected data on the social networks of 380 service users recruited in outpatient and inpatient services in Belgium. We used an ego-network mapping technique. The data were analysed using several structural metrics describing size, composition, and cohesion. We carried out ANOVA in relation to residential status, level of education, psychiatric history, and psychosocial functioning and analysed three cohesion indicators (density, fragmentation, and centralisation) with regression analyses.

Results. Personal social networks were small and not very cohesive. Most were composed of a dense subgroup as well as several isolated network members. The analyses revealed that highly educated psychiatric service users had more fragmented networks, while users living in independent accommodation had less dense networks. Density and fragmentation were not associated with the severity of psychosocial functioning, whereas centralisation was.

Conclusions. The low level of cohesion may indicate that service users aim to access multiple and diverse social resources and that better-off service users are more successful at doing so. On the whole, however, these personal social networks were fragile, because they contained a high number of isolated alters. Finally, it could be beneficial for professionals to pay special attention to the central persons within the networks of psychiatric service users.

INTRODUCTION

The personal social network, i.e. the set of a person's social ties and the web of relationships that link them (Perry et al., 2018), is of paramount importance for psychiatric service users. Social networks provide behavioural guidance through social comparison, explicit encouragement, and pressure and provide purpose and meaning in life through social roles and group inclusion. They provide emotional support and professional opportunities through both strong and long-lasting relationships and more distant relationships (Berkman et al., 2000; Cobb, 1976; Thoits, 1995). For psychiatric service users, social networks also facilitate access to healthcare resources, coping, and adaptation (Cobb, 1976; Sluzki, 2010). They influence the coherence of interventions by facilitating the circulation of information and by placing some support providers in a more central coordinating position and they help providers to offer care that is tailored to each individual's needs (Bachrach, 1981b; Digel et al., 2013; Haggerty et al., 2003). Their social networks also help service users to manage their own disorders and disabilities (Palumbo et al., 2015; Pinto, 2006; Sluzki, 2010).

So far, most research has assessed the availability of these resources for psychiatric services users according to the size and composition of social networks, on the assumption that it is beneficial to have more social contacts (Beels et al., 1984; Gayer-Anderson & Morgan, 2013). Regarding the size of a network, a larger social network has been associated with fewer negative symptoms (Degnan et al., 2018; Kawachi & Berkman, 2001; Santini

et al., 2015), with a reduction in the number and duration of hospitalisations (Albert et al., 1998; Holmes-Eber & Riger, 1990; Lipton et al., 1981), and with better recovery attitudes and less internalised stigma (B. A. M. Cullen et al., 2017). Regarding the composition of a network, the presence of intimate relationships has been shown to have a positive effect on support (Fiori et al., 2006; N. Lin et al., 1999; Nelson et al., 1992a). Being in contact with people who are medically trained fosters access to health services (Kadushin, 1966; Perry & Pescosolido, 2015). The diversity of a network can also be beneficial, as more diverse connections provide access to a wider range of information, experience, skills, and support.

The resources attached to a social network depend not only on size and composition, however, but also on the relationships between the members of a social network (S. Lin et al., 2019). For example, a consultant psychiatrist and a general practitioner who are in contact with each other are more likely to arrange effective hospitalisation in the event of a crisis. In this regard, the cohesion of a social network is one key resource to be taken into consideration. Network cohesion – defined as the propensity of members be connected to each other, which creates trust, mutual obligations, and a community of ideas – facilitate the flow of information and enable rapid and coordinated interventions (Dozier et al., 1987). A cohesive network could influence the user, facilitating behavioural acquisition and adherence to shared social norms (Berkman et al., 2000; House, Landis, et al., 1988). In a fragmented network, however, the user is in contact with individuals or groups that are not connected to each other. Fragmentation favours access

to a greater variety of social situations and social ties and, consequently, to a variety of resources. Furthermore, network fragmentation gives the user greater autonomy and limits external constraints, giving him or her the opportunity to take more responsibility for coordinating his or her own support system (Burt, 2004; Granovetter M., 1973; Martí et al., 2017a).

However, there have been relatively few studies on the cohesion of psychiatric service users' networks. The few studies that have been carried out have tended to focus on a limited number of indicators (mainly density). The most recent review of the literature on psychiatric service users' social networks (in this case devoted to early psychosis) found only three articles using cohesion measures (Gayer-Anderson & Morgan, 2013). Two other more recent reviews, one focusing on psychosis (Palumbo et al., 2015) and the other on chronic depression (Visentini et al., 2018), did not mention cohesion. It appears that higher density is associated with social network satisfaction (Corrigan & Phelan, 2004; Y. L. I. Wong et al., 2011), although there seems to be no association with social support (Gayer-Anderson & Morgan, 2013). In terms of service use, high density has been associated with seeking help and maintaining contact (Carpentier & White, 2002b), but moderate density has been associated with fewer days of psychiatric hospitalisation (Dozier et al., 1987), density does not appear to be associated with numbers of hospitalisations (Lipton et al., 1981). Finally, moderate density has also been associated with fewer psychiatric symptoms (Goldberg et al., 2003b). The studies available on the subject are limited and their inconsistency makes it difficult to draw any conclusions.

Network cohesion is an important dimension of the social network of psychiatric service users – one that is currently little studied or that has only been studied using a limited number of indicators. This is why we aim to describe, in this paper, the cohesion of the social network using a wide variety of indicators and identifying the socio-demographic and clinical factors that influence the features of a network, taking into account the fact that service users' social networks are likely to vary according to their socio-demographic characteristics and clinical status (Eklund & Hansson, 2007).

METHOD

Design

Inspired by recent developments in ego-network surveys in the field of human services (Borgatti et al., 2009; Crossley et al., 2015; Perry et al., 2018), we developed a cross-sectional ego-network survey, using the sociogram technique (Hogan et al., 2007) and a two-stage name generator (Bidart & Charbonneau, 2011). We combined a broad question ("who are the people who support you?") with an exploration of the support obtained in four specific areas: finances, housing, activities, and health. The respondent then placed each supporter on Hogan's bullseye map and drew links between people to identify those whom he or she believed exchanged information ("who exchanges information about you?"). The information exchanged could, for example, be medical information exchanged between health

professionals or information exchanged between family and health professionals that facilitates coordination.

We conducted this survey in Belgium with 380 service users with severe mental illnesses (Ruggeri et al., 2000; Schinnar et al., 1990), a group of service users who were at risk of rehospitalisation (Adair et al., 2005; Wiersma, 2006). The study was carried out in three Belgian districts of 250,000 inhabitants each. The full survey and sampling design has been presented elsewhere (Wyngaerden et al., 2019).

Measures

We computed several indicators describing size, composition, and cohesion. All indicators have been calculated with the R Igraph and Egor packages. These indicators are presented and explained in Table 7. We calculated the size of the network and several indicators of composition. Network cohesion was measured using density and fragmentation indicators. Several indicators calculated from the presence in the networks of components, cliques, and isolates were also calculated: the size of the largest component, the percentage of alters in the largest component, the size of the largest clique, the average size of components, and the number of cliques of maximum size. A centralised network is another way to foster cohesion with a small number of key alters but with more connections. We computed the degree centralisation and the betweenness centralisation (Freeman et al., 1979). Finally, homophily is another indicator of cohesion in relation to the

attributes of the node: it indicates how likely information flows within (homophily) different groups of alters (professionals, relatives, type of services, etc.) or between (heterophily) different groups of alters. To assess homophily within a group, we used the EI Index (Krackhardt & Stern, 1988).

Table 7 : Definition of the main measures used to describe the social networks collected, in terms of siz<e, composition, and cohesion, Morpheus Study, Belgium 2014–2015.

Size and composition measures	**Definition**
Network size	Number of alters supporting ego
Diversity of professional services	Number of different professional services (community mental health teams, psychiatric wards, sheltered housing, etc.) to which the alters supporting ego are attached
Diversity of professional functions	Number of different professional functions (psychiatrist, nurse, social worker, etc.) among the alters supporting ego
Diversity of types of alters	Number of types of alters (mental health services, health services, social services, justice, generic services, and non-professionals) among the alters supporting ego

Cohesion measures	Definition
Density	Proportion of effective ties among all possible ties between alters
Fragmentation	Proportion of pairs of alters that are not connected to each other directly or indirectly
Component	Subset of alters that is disconnected from other subsets in ego's network
Clique	Subset of alters that are all connected to each other (maximum density subnetwork)
Isolates	Alter which is not in contact with any other alter in ego's network
Degree centrality	Number of other alters with which an alter is in contact within ego's network
Degree centralisation	Sum of the differences in degree centrality between the most central alter and the others, divided by the largest sum of differences that can exist in a network of the same size
Betweenness centrality	Number of times an alter is a crossing point along the shortest path between two other alters
Betweenness centralisation	Sum of the differences in betweenness centrality between the most central alter and the others, divided by the largest sum of differences that can exist in a network of the same size
Average Degree	Average number of other alters with which all ego's alters are in contact
Homophily	Number of links between different alters (according to a specific characteristic) minus the number of links between similar alters, divided by the total number of alters (range from -1 to 1)

Social networks may differ between socio-demographic groups and according to clinical status. We therefore described the networks according to patient socio-demographics and clinical status. For socio-demographics, we considered residential status and level of education (Bidart et al., 2018). For clinical status, we considered first contact with an in- or outpatient psychiatric service and psychosocial functioning (HoNOS) (J. K. Wing et al., 1998). All data were collected from service users, with the exception of HoNOS, which was completed by a professional. Each user designated a professional who knew him or her well so that they could fill in the scale (Wyngaerden et al., 2019).

Analysis

We carried out an analysis of the variance (ANOVA) of the different characteristics of the service users' networks described above in relation to four variables that were likely to affect network cohesion: residential status, level of education, severity of psycho-social functioning, and length of psychiatric history. We then carried out linear regression analyses of three network characteristics that we regressed on socio-demographic and personal characteristics of the service users mentioned above. These three network characteristics were selected because they had low to moderate correlations with each other and captured different aspects of network cohesion: density (a widely-used measure of interconnection between alters), number of components (as a source of diversity of resources

provided by the network) and centralisation (as cohesion is also created by the coordinating role of a limited number of highly connected alters).

RESULTS

The psychiatric service users we met were, on average, 45.4 years old (std=11.6) and just under half were women. Half of our sample had independent living arrangements and 22% had completed higher education. Service users had, on average, 14 years of psychiatric history, during which they had been hospitalised an average of 7 times (see Table 8). They had a moderate score of 11.6/48 on the HoNOS scale (proxy for psychosocial functioning). A third of them had substance use problems and 40% suffered from hallucinations and delusions.

Table 8: Clinical features and Socio-demographic characteristics of severely mentally ill users of psychiatric services, Morpheus Study, Belgium 2014–2015: mean and std (n=380).

Clinical Features	**Mean or %**	**Std**
Health and social functioning (HoNOS, score 0 to 48)	11.6	6.7
Use of drugs or alcohol (%)	35.0	
Hallucinations or delusions (%)	40.0	
Depressed mood (%)	82.0	
Anxiety (%)	34.0	

Duration of psychiatric path (number of years)	14.4	14.2
Number of hospitalizations	7.0	6.5
Socio-demographic characteristics		
Social integration (SIX, score 0 to 6)	2.3	1.43
Elementary school or less (%)	15.8	
Lower secondary education (%)	31.0	
Upper secondary education (%)	31.3	
Higher education (%)	21.9	
Living in 24-hour supervized institution (%)	29.4	
Living in sheltered housing (%)	19.2	
Living in individual housing (%)	26.8	
Living as a member of a couple or family (%)	24.7	
Female (%)	47.0	
Age (years)	45.4	11.6
Belgian nationality (%)	90.0	

Table 9 : Structure of social support networks of severely mentally ill service users, Morpheus Study, Belgium 2014–2015: mean and std (n=380).

Size and composition measures	**Mean**	**Std**
Support persons (no.) (i.e. network size)	12.1	5.2
Professionals (no.)	7.5	3.5
Mental health services (no.)	5.3	3.2
Health services (no.)	0.9	1.0
Social services (no.)	0.9	1.1
Justice (no.)	0.1	0.3
Generic services (no.)	0.2	0.7
Non- professionals (no.)	4.6	3.2
Diversity of professional services (no.)	3.9	1.9
Diversity of professional functions (no.)	5.8	2.0
Diversity of types of alters[1] (no.)	3.4	0.9
Cohesion measures		
Density (%)	22.2	17.9
Fragmentation (%)	65.3	27.0
Components (no.)	5.3	3.0
Components (excluding isolates) (no.)	1.8	1.1
Cliques of maximum size (no.)	1.6	1.5
Isolates (no.)	3.5	2.8

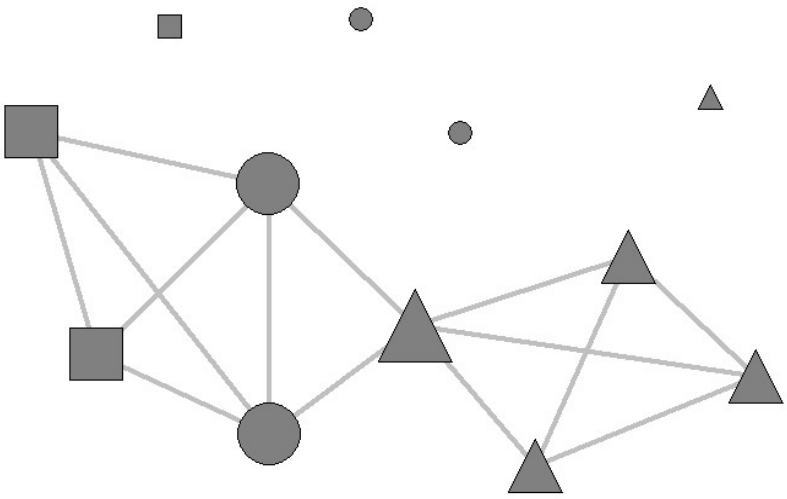
Size of the largest component (no.)	6.4	3.6
Alters in largest component (%)	53.7	23.1
Size of the largest clique (no.)	4.3	2.5
Average size of component (no.)	2.9	2.2
Cliques of maximum size (no.)	1.6	1.4
Degree centralization (%)	22.6	12.0
Betweenness centralization (%)	11.3	14.8
Average Degree (no.)	2.3	2.0
Homophily between professionals and non- professionals (ranges from -1 to 1)	-0.3	0.8
Homophily between types of alters[1] (ranges from -1 to 1)	0.2	0.7

[1] The types of alters used here are: professionals from mental health services, health services, social services, justice, generic services, and non-professionals.

On average, users had a small network (12), composed mainly of professionals (7.5). Most of the professionals (5.3) were from mental health services and most of the non-professionals were family members (2.8). The average network was not very cohesive: density and centralisation were low, while fragmentation was high. Only 22% of all pairs of alters were directly connected to each other (density) and 65% of them were not connected to each other either directly or indirectly (fragmentation).

The average network was composed of a relatively large and dense subgroup and several isolated alters. The networks had an average of 5.3 components (sub-networks that were completely disconnected from each other), but only 1.8 components were made up of several alters (3.5 components were made up of a single alter). The largest component averaged 6.4 alters and comprised 53.7% of all alters.

Figure 9. A typical personal social network of a psychiatric service user. Morpheus Study. Belgium 2014–2015.



Points. *Supporters cited by the user (alters).* ***Point size.*** *Number of ties with other alters (degree).* ***Shape of points.*** *Round: mental health services; square: health services; triangle:* non-professionals*.* ***Lines.*** *Ties of information exchange relationships between alters cited by the user.*

Figure 9 illustrates a typical ego network. This network (ego is not represented) contained 12 alters, most of which were professionals who worked in mental health services. Its overall density is quite low (21%) and its fragmentation (57%) is due to the high number of isolates (4). This service user has one single component (excluding isolates) of 8 alters that are highly connected with each other and 66 % of the alters are in this component.

The variance analysis indicated that network size and composition were associated with socio-demographic measurements. Living in the community and having a higher level of education were associated with more diverse networks, with fewer mental health professionals, and with more non-professionals. A community-oriented residential status was associated with fewer mental health professionals (F-test=58.4; p=<.0001) but with more general health services (F-test=31.5; p=<.0001) and more non-professionals (F-test=3.09; p=0.03). A higher level of education was associated with more generic services (F-test=4.4; p=<.0001) and more friends (F-test=7.25; p=<.0001). Regarding the diversity of a network, living in the community was associated with more types of services in the network (F-test=22; p=<.0001) and with a greater diversity of the five categories of alters (mental health, health, social services, justice, generic services, and non-professionals) (F-test=8.7; p=<.0001). This was also the case for level of education (F-test=4.8; p=<.0001 - F-test=4.8; p=<.0001).

Table 10. Structure of social networks of severely mentally ill service users according to their residential status. Morpheus Study. Belgium 2014–2015 (n=380).

	24-hour supervised institution	Sheltered housing	Individual independent housing	Independent housing as a member of a couple or family	F value
Size and composition measures					
Support persons (no.) (i.e. network size)	12.7	12.1	11.8	11.7	0.7
Professionals (no.)	8.7	7.7	6.8	6.6	8.6 ***
Mental health services (no.)	8.1	6.1	4.8	4.6	58.4 ***
Health services (no.)	0.3	1.1	1.2	1.3	31.5 ***
Social services (no.)	0.9	0.9	1.2	0.9	0.5
Justice (no.)	0.1	0.1	0.1	0.1	0.7
Generic services (no.)	0.2	0.3	0.3	0.3	0.9
Non-professionals (no.)	4.0	4.3	5.1	5.1	3.1 *
Family members (no.)	2.5	2.1	2.9	3.4	4.4 **
Friends (no.)	0.8	1.3	1.7	1.1	6.6 **
Diversity of professional services (no.)	2.7	4.4	4.4	4.3	6.6 ***
Diversity of professional functions (no.)	6.5	6.1	5.4	5.2	8.7 ***
Diversity of types of alters[1] (no.)	3.0	3.6	3.5	3.6	14.5 ***

Cohesion measures					
Density (%)	0.3	0.2	0.2	0.2	15.3 ***
Fragmentation (%)	0.5	0.7	0.7	0.7	10.7 ***
Components (no.)	4.7	5.5	5.7	5.6	2.8 *
Components (excluding isolates) (no.)	1.7	1.8	2	1.7	1.7
Cliques of maximum size (no.)	1.7	1.8	1.6	1.5	0.7
Isolates (no.)	3.0	3.7	3.8	3.9	2.1
Size of the largest component (no.)	7.8	6.1	5.6	5.7	9 ***
Alters in largest component (%)	0.6	0.5	0.5	0.5	9.7 ***
Size of the largest clique (no.)	5.7	4.0	3.7	3.7	16.5
Average size of component (no.)	3.8	2.6	2.5	2.6	8.8 ***
Cliques of maximum size (no.)	1.7	1.8	1.6	1.5	0.7
Degree centralization (%)	0.2	0.2	0.2	0.2	0.8
Betweenness centralization (%)	0.1	0.1	0.1	0.1	0.8
Average degree (no.)	3.4	2.0	1.7	1.8	20.5 ***
Homophily between professionals and non-professionals (ranges from -1 to 1)	-0.2	-0.4	-0.3	-0.2	1.4
Homophily between types of alters[1] (ranges from -1 to 1)	0.3	0.3	0.1	0.1	2.8 *

[1] The types of alters used here are: professionals from mental health services, health services, social services, Justice, generic services, and non-professionals.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 11. Structure of social networks of severely mentally ill users of psychiatric services according to their level of education. Morpheus Study. Belgium 2014–2015 (n=380).

	Elementary school or less	Lower secondary education	Upper secondary education	Higher education	F value
Size and composition measures					
Support persons (no.) (i.e. network size)	10.6	12.2	12.0	13.0	2.3
Professionals (no.)	6.6	7.9	7.5	7.5	1.7
Mental health services (no.)	5.3	6.5	6.2	5.5	3.8
Health services (no.)	0.8	0.9	1	1.1	1.2
Social services (no.)	1.0	0.9	0.7	1.0	1.1
Justice (no.)	0.1	0.1	0.1	0.1	1.8
Generic services (no.)	0.1	0.2	0.2	0.5	4.4 ***
Non-professionals (no.)	4.0	4.3	4.5	5.5	3.1 *
Family members (no.)	2.6	2.6	2.8	2.9	0.3
Friends (no.)	0.9	1.1	1.1	1.9	7.2
Diversity of professional services (no.)	3.5	3.6	3.8	4.5	4.8 ***
Diversity of professional functions (no.)	5.2	6.0	5.8	5.7	2.0
Diversity of types of alters[1] (no.)	3.3	3.2	3.3	3.7	4.8 ***

Cohesion measures					
Density (%)	0.2	0.2	0.2	0.2	3.8 *
Fragmentation (%)	0.5	0.6	0.7	0.7	4.9 ***
Components (no.)	4.3	5.0	5.4	6.3	6.1 ***
Components (excluding isolates) (no.)	1.6	1.8	1.9	1.8	0.8
Isolates (no.)	2.6	3.2	3.5	4.6	6.1 ***
Size of the largest component (no.)	4	4.6	4.6	4	1.4
Alters in largest component (%)	0.6	0.6	0.5	0.5	4 ***
Size of the largest clique (no.)	3.9	4.6	4.6	4.1	1.4
Average size of component (no.)	3.7	3.3	2.7	2.4	4.9***
Cliques of maximum size (no.)	1.8	1.8	1.5	1.6	0.8
Degree centralization (%)	0.3	0.2	0.2	0.2	2.7
Betweenness centralization (%)	0.2	0.1	0.1	0.1	4.6 ***
Average degree (no.)	2.3	2.6	2.4	1.9	1.9
Homophily between professionals and non-professionals (ranges from -1 to 1)	-0.2	-0.3	-0.4	-0.2	1.7
Homophily between types of alters[1] (ranges from -1 to 1)	0.3	0.2	0.1	0.2	0.7

[1] The types of alters used here are: professionals from mental health services, health services, social services, Justice, generic services, and non-professionals.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Density and fragmentation were both associated with residential status (F-test=15.3; p=<.0001- F-test=10.7; p=<.0001) and with level of education (F-test=3.8; p=0,01- F-test=4.9; p=<.0001), but in opposite ways. Density was higher among service users living in the community or who had a higher level of education. The opposite was true for fragmentation. Betweenness centralisation varied according to level of education (F-test=4.6 p=<.0001).

We also examined whether the characteristics of the networks varied according to clinical status (see Supplementary Tables 13 and 14). There were few significant results. The number of non-professionals decreased with greater severity of psychosocial functioning (F-test=3.4; p=0.03). The betweenness centralisation shows a small but very significant variation in the averages of the three categories of severity (F-test=4.7; p=<.0001). The size of the network (F-test=3,1; p=0. 046) increased with a longer psychiatric history. The other associations that were identified did not have a clear direction.

We have also carried out linear regression analyses of three network characteristics that we regressed on socio-demographic and personal characteristics, controlled for age and gender. The socio-demographic and personal characteristics are all included in all three different models, corresponding to the three network characteristics. In the first model (density), lower level of education and living in a supervised institution were associated with higher density. Service users with a lower level of education and people living in a 24-hour supervised institution had a lower number of

components (model 2). This was also the case in model 3: betweenness had a ∩-shape relationship with the severity of psychosocial functioning: the highest value for centralisation was for users with an intermediate level of psychosocial functioning. However, severity of psychosocial functioning, psychiatric history, gender, and age showed no correlation with density and the number of components.

Table 12. Linear regression analysis of three network characteristics on socio-demographic and personal characteristics of the users, Morpheus Study. Belgium 2014–2015 (n=380): average marginal effects (AME).

	Model 1: Network density (average marginal effect) [1]		Model 2: Number of components (average marginal effect) [1]		Model 3: Betweeness centralization (average marginal effect) [1]	
	AME (Std error)	T-Value	AME (std error)	T-Value	AME (std error)	T-Value
Level of education						
Elementary school or less	23.95 (2.44)	2.14 *	4.37 (0.4)	-3.84 ***	16.14 (2.05)	1,89
Lower secondary education	24.21 (1.73)	2.60 **	4.98 (0.28)	-3.15 **	10.4 (1.45)	-0.27
Upper secondary education	22.45 (1.73)	2.01 *	6.43 (0.29)	-2.18 *	8.85 (1.45)	-0.96
Higher education	17.03 (2.09)		6.43 (0.35)		11.02 (1.76)	
Residential Status						
24-hour supervized institution	31.98 (1.84)	4.61 ***	4.62 (0.30)	-2.29 *	13.31 (1.54)	0.91
Sheltered housing	17.54 (2.21)	0.5	5.53 (0.37)	-0.3	10.09 (1.85)	-0.42
Individual independent housing	19.07 (1.87)	0	5.41 (0.31)	-0.6	11.86 (1.57)	0.3
Independent housing as a member of couple or family	19.07 (2.08)		5.68 (0.34)		11.17 (1.74)	
Severity of psycho-social functioning						
Honos score below 11	21.63 (1.7)	0.61	5.73 (0.28)	0.77	9.77 (1.43)	0.07
Honos score between 11 and 17	23.93 (1.71)	1.59	4.78 (0.28)	-1.64	15.4 (1.43)	2.92 **
Honos score higher than 17	20.18 (1.68)		5.42 (0.28)		9.63 (1.42)	
Time since first contact with psychiatry						
Less than 5 years	22.42 (1.56)	0.5	5.27 (0.26)	-0.47	11.75 (1.31)	0.01
Between 5 and 15 years	22.05 (1.86)	0.3	5.2 (0.31)	-0.6	11.33 (1.56)	-0.18
More than 15 years	21.27 (1.73)		5.45 (0.29)		11.73 (1.45)	

[1] All three models include all variables in the table, controlled for age and gender. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

DISCUSSION

The social networks of these psychiatric service users were, on average, small; they contained a majority of professionals and were not very cohesive. They had low density and low centralisation and were highly fragmented. But these patients also had, on average, a large and cohesive subgroup that was disconnected from several isolated alters. This suggests that fragmentation is mainly based on a large set of isolated alters, rather than on several disconnected subgroups. Cohesion, in fact, remains important, but within a subgroup of the network rather than within the network as a whole.

This general pattern, however, differed according to educational level and living arrangements. Highly educated psychiatric service users had more fragmented networks, while users living in independent accommodation had networks that were less dense. The high density of the networks of people living in supervised housing can be explained by the large team of professionals who interact with each other in this context. The higher fragmentation and the higher number of components in the networks of those with higher educational levels deserves some attention. Fragmentation provides access to a greater diversity of sources of support and greater autonomy for the user in coordinating his or her own network (Burt, 2004, 2009; Granovetter M., 1973). More highly educated people may have access to a more diverse set of social resources (Bidart et al., 2018). More highly educated patients may also require less coordination between

alters, as they may be less socially vulnerable and may thus be better placed to navigate the mental health care system.

Density and fragmentation were not associated with the severity of psychosocial functioning, whereas centralisation was. However, another study has argued that people with poorer cognitive and functional health are less able to maintain a more fragmented and therefore more energy-consuming network (Cornwell, 2009). In the field of mental health, coordination between professionals is partly responsible for the structure of the support network; these results might suggest that the organisation of the support network around users is not consistently based on patients' clinical status (i.e. the severity of psychosocial functioning). This is consistent with another study (conducted in the same geographical area) that showed that client-centred orientation was the factor that contributed least to the quality of professional collaboration (Nicaise, Grard, et al., 2020).

Individuals with moderate severity were more likely to have higher betweenness centralisation. One possible explanation for this is that it is easier to increase centralisation since it involves diversifying the relationships of one alter, whereas increasing density would involve a higher number of alters. In addition, the HoNOS, the scale used to measure the severity of psychosocial functioning, uses a relatively limited time window (two weeks) to assess severity (J. K. Wing et al., 1998). It is possible that in such a short period of time only the position of a limited number of alters within the network may be modified.

Consistency with previous studies

The size of psychiatric service users' networks documented in the literature is consistent with what we found. In previous studies, in which the size varied from 3 (Holmes-Eber & Riger, 1990) to 25 (Koenders, de, et al., 2017), with an average of 13 (Albert et al., 1998; Goldberg et al., 2003b; Palumbo et al., 2015; Sweet et al., 2018; Y. L. I. Wong et al., 2011), depending on the collection methods used. In the literature, however, the percentage of professionals is usually much lower (Corrigan & Phelan, 2004; Y. L. I. Wong et al., 2011). Other studies have found that mental health professionals made up 20% (Meeks & Murrell, 1994), 17% (Holmes-Eber & Riger, 1990), or even 1.7% (Carpentier & White, 2002b) of networks. The difference may be due to name-generators that emphasise either professional or informal resources. The average density of the networks collected in this study is also different from that in the literature. Density in our networks was lower than in previous studies. Most studies report a density of between 50 and 60% (Dozier et al., 1987; Goldberg et al., 2003b; Horan et al., 2006b). This could be related to the context in which service users were encountered: a health system that focuses heavily on professional support and psychiatric hospitals (rather than community resources) and in which collaboration is problematic at different levels (between hospital and ambulatory services, general services and specialised services, etc.) (Nicaise et al., 2013). This may imply that a move towards community care is required, not only to avoid institutionalisation within psychiatric hospitals, but also to avoid the institutionalisation of social networks.

How do our results compare with previous typologies of personal social networks within the general population? In a recent study, Bidart and colleagues proposed a typology of social networks based on their structural characteristics (Bidart et al., 2018). The average network we found was similar to Bidart's "dispersed" type of network.. The type of network described by Bidart et al., like our average network, has a low centralisation (evaluated by betweenness in Bidart's model), high fragmentation (modularity in Bidart's model), and low density. In this type of network, few relationships are developed between alters, due to the ego dissociating its relationships into individuals or small groups (Bidart et al., 2018). In Bidart's study, more dispersed networks were associated with the highest levels of education and with living alone. According to Bidart's interpretation, this implies that the people with the most resources have a broader and more diversified social environment (Bidart et al., 2018). This is consistent with our results, which show that the most fragmented networks are those of service users living in the community who have a high level of education. However, Bidart's "dispersed network" type had many components made up of more than one alter, whereas our average network contained one such component and had a large number of isolates. This may be due to the smaller size of our networks and the lower diversity of the network members in our population. It also implies, however, as mentioned above, that fragmentation is related to a high number of isolates. Without these isolates, the networks of psychiatric service users would be denser and would thus correspond to a centred or dense type of network, which Bidart associated with less privileged people.

Limits

In Belgium, the only source of information available to describe psychiatric service users' social networks and their use of services is the service users themselves. There is no centralised information system. Given that service users with severe mental disorders may suffer from delusions and hallucinations, it is possible that the data we have collected is inaccurate. This should, however, have a limited impact on our findings. We have met many service users who have expressed delusional ideas. Only one user, however, mentioned a character from their delusions on the sociogram as someone who supports them. It seems to us that the collection device itself keeps delusions at bay because the questions are rooted in practical aspects of the person's life. It is also possible that users forgot to mention certain alters or were unaware of some exchanges between alters, while overestimating other exchanges. Exchanges between professionals all require the consent of the user, but that may not always be how things happen in practice. Elsewhere (Wyngaerden et al., 2019), Kappa coefficients indicated quite a good level of agreement between users' reports and main clinicians' reports of users' social support networks. Other studies, moreover, have shown such collection methods to be reliable. According to Green et al., information about alters is accurately reported by the ego (C. A. Green et al., 2013). Another study showed an 80% agreement between different egos about the same alter-alter social ties (Adams & Moody, 2007).

Another limitation is related to the cross-sectional design, which is vulnerable to reversed causation and unobserved confounders (e.g. the relationship with the health professional who propose to the user to participate in the study). We were also interested in describing the cohesion of relationships within service users' networks. We did not take the content of those relationships into consideration, although it could also have a significant impact. Finally, the sample of users interviewed is not representative of the population of service users with severe mental disorders. It seems to us, however, that our samples correspond quite well to the Belgian population of service users suffering from severe mental disorders. The average HoNOS score in our sample is quite close to that found in another Belgian study of a similar population (respectively 11.6, std=6.5 and 12.5, std=6.5) (Lorant, Nazroo, Nicaise, & Title107 Study Group, 2017).

Conclusion

In conclusion, our study highlights the variety of size, composition, and structure indicators that can be used to describe the social networks of service users with severe mental disorders. We have shown that a variety of cohesion indicators can allow us to give a more nuanced picture of the social networks of service users than if we limit ourselves to size or composition. This picture can be useful for decision-makers, service users, and professionals alike. For decision-makers, the significant professionalisation of users' networks suggests that 60% of users' networks are, in some way,

funded by public money, even for people with a higher level of education. Moreover, this professionalisation is likely to increase, given the structural weakness of the networks, which are dense, offer little diversity of resources, and are made up of isolated people with whom it is difficult to coordinate. From the users' point of view, the limited number of components indicates that users participate in a limited number of social circles and therefore have limited social roles (Burt, 2004, 2005; Dozier et al., 1987; Granovetter M., 1973). This is important information for professionals, both in the development of social support programmes (Sheridan et al., 2018) and in relation to the support provided by ACT teams. The association between centralisation and the severity of psycho-social functioning should also be of interest to professionals, as it points to the importance of developing the central role of a professional, e.g. in case-management. It would be useful if professionals could describe the networks of the users they support using the measurements used here and act accordingly. All this highlights the value of developing research that uses cohesion measurements in association with composition measurements in an effort to understand in more detail what social networks offer users and to provide support that could enable them to live meaningful lives in the community.

Supplementary table 13. Structure of social networks of severely mentally ill service users according to severity of their psychosocial functioning (HoNOS). Morpheus Study. Belgium 2014–2015 (n=380).

	Severity of psychosocial functioning			
	Low[1]	**Average[1]**	**Strong[1]**	**F Value**
Size and composition measures				
Support persons (no.) (i.e. network size)	13	12.1	11.5	2.7
Professionals (no.)	7.7	7.7	7.3	0.4
Mental health services (no.)	6.1	6.3	5.9	1.4
Health services (no.)	1.0	0.9	0.9	0.2
Social services (no.)	1	0.8	0.9	0.6
Justice (no.)	0.1	0.1	0.1	0.1
Generic services (no.)	0.3	0.3	0.2	1
Non-professionals (no.)	5.3	4.5	4.1	4.4 *
Family members (no.)	3.0	2.8	2.5	1.7
Friends (no.)	1.4	1.2	1.1	1
Diversity of professional services (no.)	4.2	3.7	3.7	2.6
Diversity of professional functions (no.)	6.1	5.9	5.6	2.2
Diversity of types of alters[2] (no.)	3.5	3.3	3.3	2.3

Cohesion measures				
Density (%)	0.2	0.2	0.2	1.1
Fragmentation (%)	0.7	0.6	0.7	4.3 *
Components (no.)	5.8	4.8	5.4	2.7
Components (excluding isolates) (no.)	2	1.7	1.7	4.5 *
Isolates (no.)	3.7	3.1	3.7	1.6
Size of the largest component (no.)	6.4	7.1	5.8	3.5 *
Alters in largest component (%)	0.5	0.6	0.5	4.6 *
Size of the largest clique (no.)	4.7	4.4	4.1	1.6
Average size of component (no.)	3	3.4	2.5	4.3 *
Cliques of maximum size (no.)	1.6	1.8	1.6	0.8
Degree centralization (%)	0.2	0.2	0.2	1.6
Betweenness centralization (%)	0.1	0.1	0.1	4.7 ***
Average degree (no.)	2.4	2.5	2.1	0.8
Homophily between professionals and non-professionals (ranges from -1 to 1)	-0.4	-0.2	-0.3	1.3
Homophily between types of alters[2] (ranges from -1 to 1)	0.2	0.2	0.1	1.4

[1] According to the HoNOS score: low = below 11. average = between 11 and 17. high = 18 and higher.

[2] The types of alters used here are: professionals from mental health services. health services. social services. justice. generic services. and non-professionals.

* p < 0.05; ** p < 0.01; *** p < 0.001

Supplementary table 14. Structure of social networks of severely mentally ill service users according to the length of time since first contact with psychiatry. Morpheus Study. Belgium 2014–2015 (n=380).

	Length of time since first contact with psychiatry			
	Less than 5 years	**Between 5 and 15 years**	**More than 15 years**	**F value**
Size and composition measures				
Support persons (no.) (i.e. network size)	11.2	12.8	12.2	3.1 *
Professionals (no.)	7.0	7.6	7.9	2.4
Mental health services (no.)	5.4	6.4	6.2	4.9
Health services (no.)	0.9	0.8	1.1	2.7
Social services (no.)	0.9	0.8	1.0	0.4
Justice (no.)	0.1	0.1	0.1	1.8
Generic services (no.)	0.3	0.2	0.2	1.2
Non-professionals (no.)	4.2	5.1	4.5	2.4
Family members (no.)	2.9	3.2	2.9	4.0 *
Friends (no.)	1.2	1.4	1.2	1.3

Diversity of professional services (no.)	3.9	3.7	4.0	0.7
Diversity of professional functions (no.)	5.6	5.8	6.0	1.6
Diversity of types of alters[1] (no.)	3.3	3.3	3.5	1.3
Cohesion measures				
Density (%)	0.2	0.2	0.2	0.7
Fragmentation (%)	0.6	0.6	0.7	0.9
Components (no.)	5.2	5.2	5.6	0.5
Components (excluding isolates) (no.)	1.6	2	1.8	5.2**
Cliques of maximum size (no.)	1.5	1.7	1.7	0.6
Isolates (no.)	3.6	3.3	3.7	0.9
Size of the largest component (no.)	6	6.8	6.4	1.4
Alters in largest component (%)	0.5	0.5	0.5	1
Size of the largest clique (no.)	4.0	4.8	4.4	3.2
Average size of component (no.)	2.9	3.2	2.8	0.8
Degree centralization (%)	0.2	0.2	0.2	0.6
Betweenness centralization (%)	0.1	0.1	0.1	0.3
Average degree (no.)	2.1	2.5	2.3	1.5
Homophily between professionals and non-professionals (ranges from -1 to 1)	-0.3	-0.3	-0.3	0.1

Homophily between types of alters[1] (ranges from -1 to 1)	0.1	0.3	0.2	1.6

[1] The types of alters used here are: professionals from mental health services, health services, social services, justice, generic services, and non-professionals.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

APPENDIX: FOUR SOCIAL SUPPORT NETWORKS OF USERS WITH SEVERE MENTAL DISORDERS

In this appendix, we present four social support networks from the 380 we collected. In order to select four structurally differentiated networks, we performed a factorial principal component analysis on several network characteristics : density, size (number of alters), number of components (subgroups) of three or more alters, degree centralisation, and betweenness centralisation.

The first two factors (retained by the scree-plot method) explain 72% of the variance (respectively Factor 1, 41% and Factor 2 31%). These two factors are essentially structured around size and density. This allowed us to identify four groups of networks. The first group consists of the large, low-density networks, the second consists of the large, high-density networks, the third

consists of small, low-density networks, and the fourth consists of small, high-density networks.

In the following graphs, the supporting persons are represented by points (circles, triangles, or squares) and the information exchange links are represented by lines between these points or by circles around the people who all exchange information with one another. For ease of reading, the service user is not represented; he or she would have been represented in the centre with links to all the members of the network.

Figure 10: Legends for the graphic representations of the social support networks presented below.

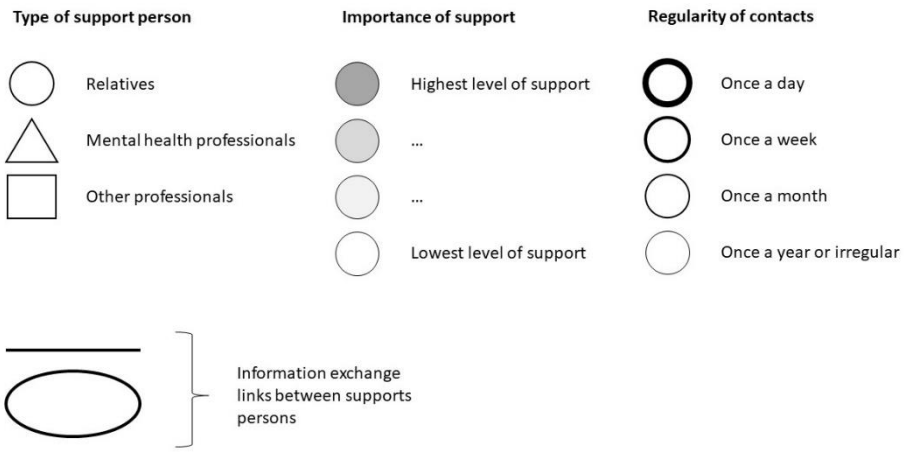
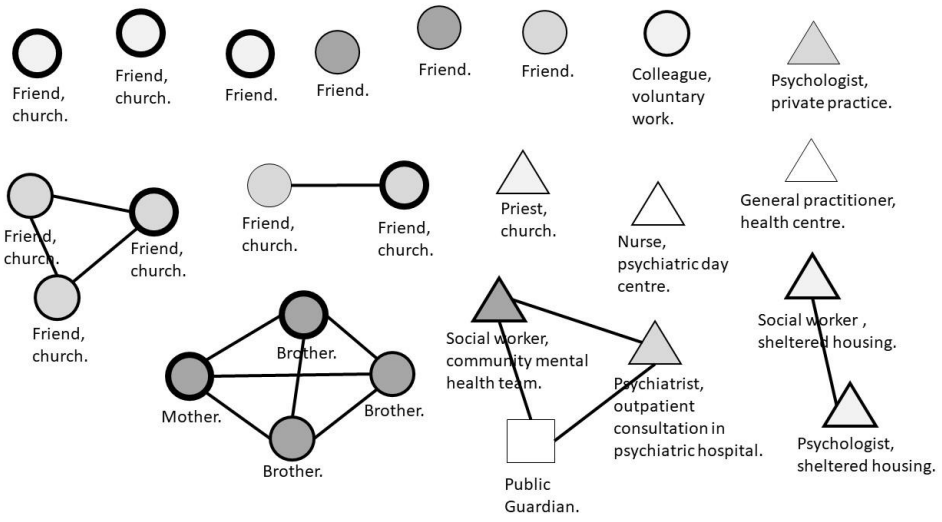


Figure 11: the social support network of a severely mentally ill service user from the group of large, low-density networks, Morpheus Study, Belgium 2014–2015



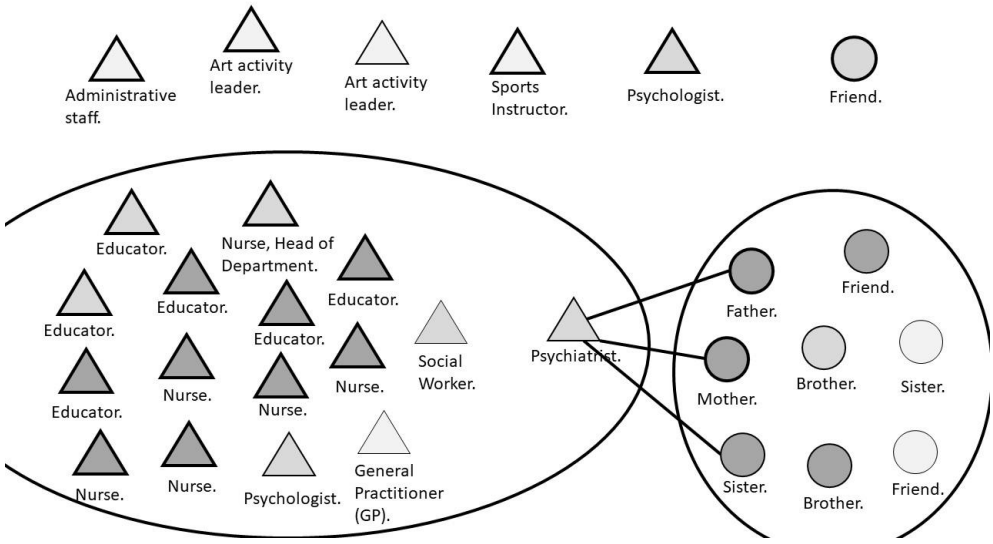
Philippe-Eugène, whose network is presented above, was 30 years old at the time of our meeting. He was born in 1984 in Rwanda and is a Belgian national. He currently receives income from a disability allowance and was not able to tell us what his highest educational qualification was.

His first contact with psychiatry was eight years ago and he has been hospitalised three times. He has low severity of psychosocial functioning with a HoNOS of 2 (the average of our sample is 11.6, out of a theoretical maximum of 48).

At the time of the interview, Philippe-Eugène was living in sheltered housing. He attends a psychiatric day centre, consults a psychiatrist as an outpatient, and is supported by a social worker from a community mental health team. He is also consulting a private psychologist. A church is of particular importance in the social support network: 8 people from the network are associated with this church. Philippe-Eugène also has a large number of friends and is involved in voluntary work.

In terms of structure, Philippe-Eugène's network is large (25 people) and is made up of several disconnected sub-networks, some centred on the family, some centred on the church, and others centred on health professionals. These different social worlds are not, however, connected to each other.

Figure 12 : the social support network of a severely mentally ill service user from the group of large, high-density networks, Morpheus Study, Belgium 2014–2015



Adrien-Charles, whose network is presented above, was 26 years old at the time of our meeting. He was born in 1988 in the Democratic Republic of Congo and is a Belgian national. His highest qualification is from lower secondary education and he currently receives income from a disability allowance.

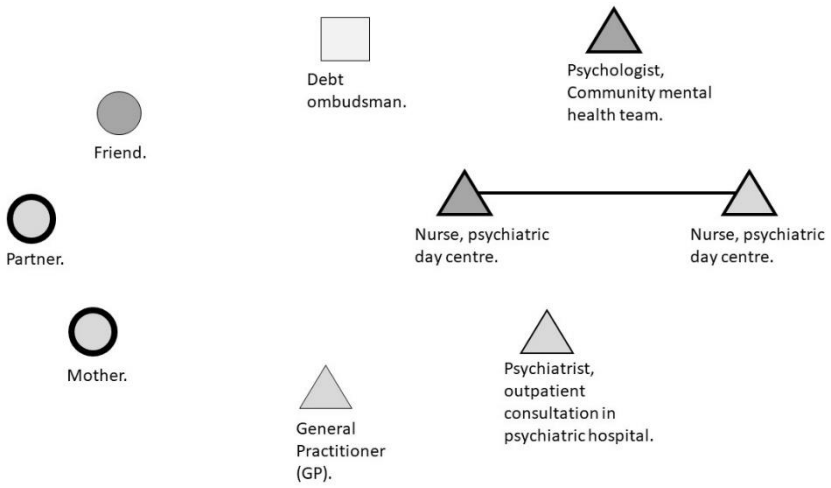
His first contact with psychiatry was ten years ago and he has been hospitalised five times. He has average severity of psychosocial functioning, with a HoNOS of 9 (the average of our sample is 11.6, out of a theoretical maximum of 48).

At the time of our meeting, Adrien-Charles was hospitalised in a long-term ward. All the professionals represented in the network above are employed by the psychiatric hospital where he is staying. Most of them are affiliated with the long-term ward where he is currently staying; two workers (a psychologist and a social worker) are connected to the ward where he was previously staying (in the same hospital), and the art activity leader and the sports instructor are affiliated with the hospital's activity centre.

Adrien-Charles' network is important, with 30 people mentioned, and quite dense, with many relationships between these 30 people. His network is essentially centred around two groups: that of the psychiatric hospital where he stayed and that of friends and family. These two groups are very interconnected except for a few professionals and a friend who are not connected to either group. One person, the psychiatrist, plays a central role

in ensuring the connection between the hospital professionals and the relatives.

Figure 13: the social support network of a severely mentally ill service user from the group of small, low-density networks, Morpheus Study, Belgium 2014–2015

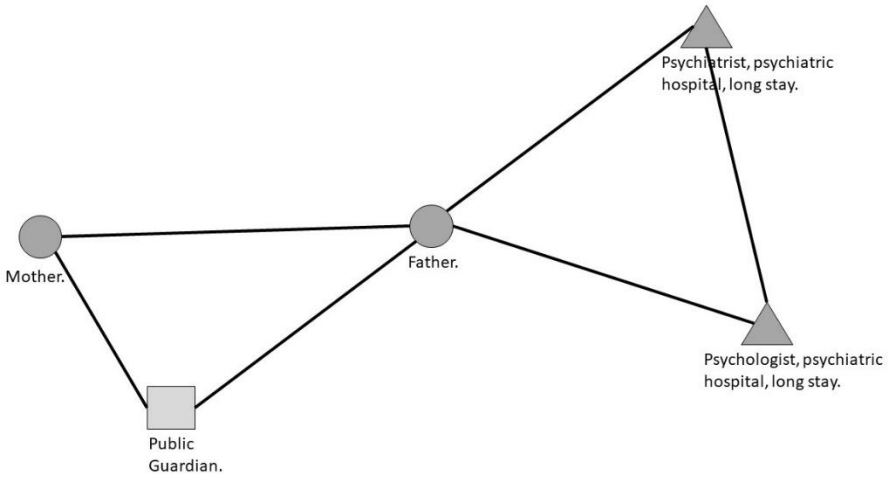


Pauline-Adélaïde, whose network is presented above, was 44 years old at the time of our meeting. She was born in 1970 in Belgium and is a Belgian national. Her highest qualification is from upper secondary education and she currently receives income from health and disability insurance

Her first contact with psychiatry was eight years ago and she has been hospitalised four times. She has low severity of psychosocial functioning with a HoNOS of 3 (the average of our sample is 11.6, out of a theoretical maximum of 48).

Pauline-Adélaïde lives in independent housing with her partner. Her network, however, is quite limited. It includes only three non-professionals and no people linked to activities outside psychiatry. There are also very few links between the members of her network: only the two people associated with the psychiatric day centre she attends are connected to each other.

Figure 14: the social support network of a severely mentally ill service user from the group of small, high-density networks, Morpheus Study, Belgium 2014–2015



Georges-Edgar, whose network is presented above, is a 24-year-old man at the time of our meeting. He was born in 1990 in Belgium and is of Belgian-Moroccan nationality. His highest qualification is from lower secondary education and he currently receives income from the public welfare centre.

His first contact with psychiatry was four years ago and he has been hospitalised five times. He has average severity of psychosocial functioning with a HoNOS of 9 (the average of our sample is 11.6, out of a theoretical maximum of 48).

At the time of our meeting, Georges-Edgar was hospitalised in a long-term ward. His network is very small, consisting only of a few professionals and his parents. His father is in the most central position as he is the one who ensures the circulation of information within the network, for example, between the hospital workers and the public guardian responsible for financial management.

4. SOCIAL SUPPORT NETWORK AND CONTINUITY OF CARE: AN EGO-NETWORK STUDY OF PSYCHIATRIC SERVICE USERS.

Wyngaerden, F., Nicaise, P., Dubois, V., Lorant, V., Social support network and continuity of care: an ego-network study of psychiatric service users. *Soc Psychiatry Psychiatr Epidemiol* 54, 725–735 (2019). https://doi.org/10.1007/s00127-019-01660-7

ABSTRACT

Purpose. For severely mentally ill (SMI) users, continuity of care requires consistency between the support provided by the members of their social support network. However, we know little about their network cohesion and its association with continuity of care. We set out to investigate this association and hypothesised that it would depend on the severity of the user's situation and on his/her living arrangements.

Methods. We conducted face-to-face interviews with 380 SMI users recruited in outpatient and inpatient mental health services in three areas in Belgium. Data regarding users' social networks were collected using an

ego-network mapping technique and analysed with Social Network Analysis. The cohesion indicators were density (frequency of connections between network members), centralisation (having a small number of central people), and egobetweenness (the user's centrality in his/her own network). Participants' perception of continuity of care was measured by the Alberta Continuity of Services Scale.

Results. Results show that cohesion indicators were associated with continuity of care only for users with high-severity problems, regardless of their living arrangements. The numbers of network members, professionals, and services in the network were all negatively associated with continuity of care for all users.

Conclusions. Satisfactory continuity of care requires fewer professionals or services in a user's network and a dense network for users with the most severe problems. This implies that those providing care must not only be able to increase cohesion within a network, but also to adapt their interventions to support the transition to a different, individualised network structure when severity decreases.

INTRODUCTION

Over several decades, the organisation of care for severely mentally ill people (Ruggeri et al., 2000; Schinnar et al., 1990) has shifted from a system based on long-term hospital care to a set of services in the community. This

has had many positive consequences for users (Provan & Milward, 1994; Thornicroft et al., 1999; Thornicroft & Bebbington, 1989b) but has also increased the fragmentation of care and users' social integration is still an issue (Durbin et al., 2006; Enthoven, 2009; Stangt, 2009). Nowadays, one challenge is to help users improve continuity of care once they have come into contact with the healthcare system (Adair et al., 2003; Bachrach, 1981b; Dozier et al., 1987; Haggerty et al., 2003). By continuity of care we mean is the degree to which a series of discrete healthcare events is experienced as coherent, connected, and consistent with the user's medical needs and personal context (Haggerty et al., 2003).

The social support network of a user is of strategic importance for continuity of care. The social support network comprises all the people who support a user including health professionals, relatives, friends and colleagues. It offers resources and care interventions whose coherence and connectedness are key elements in improving continuity of care (Berkman et al., 2000; Pescosolido, Wright, Alegria, et al., 1998; Y. L. I. Wong et al., 2011). The support provided by the social network reduces the number of inpatient admissions and improves access to services. Conversely, a lack of social support is associated with back-and-forth visits between the hospital and the community and increased use of inpatient services (Bracke et al., 2008; Corrigan & Phelan, 2004; Duncan-Jones, 1981; Y. L. I. Wong et al., 2011; Wu et al., 2011). However, research has highlighted the weaknesses of psychiatric service users' social support networks. Compared to the general population, psychiatric service users have smaller (Albert et al.,

1998; Furukawa et al., 1999; Hamilton et al., 1989; Lipton et al., 1981; Pattison et al., 1979; Y. L. I. Wong et al., 2011) and less diversified networks (Cohen & Sokolovsky, 1978; Klug, 2005; Palumbo et al., 2015). This puts them in an unfavourable position, as the size and diversity of their networks are negatively associated with quality of life and positively associated with inpatient services use (Albert et al., 1998; Bengtsson-Tops & Hansson, 2001b; Brunt & Hansson, 2002; Corrigan & Phelan, 2004; Holmes-Eber & Riger, 1990; Klug, 2005; Lam & Rosenheck, 1999; Lipton et al., 1981; M. E. Mitchell, 1989; Palumbo et al., 2015). Beyond size and composition, there is a dearth of research about the cohesion of psychiatric service users' social support networks. Network cohesion is the extent and form of interaction between members of a network (Martí et al., 2017b): in a cohesive network, people have many ties with others and their ties are widely distributed; whereas in a less cohesive network, people are less connected to others and their ties are concentrated on a limited number of people (Moody & Coleman, 2015). Only a few studies have been carried out on this topic and the results are not conclusive (Beels, 1981; Corrigan & Phelan, 2004; Dozier et al., 1987; Goldberg et al., 2003c; Hirsch, 1979; Mueller, 1980; Pattison et al., 1975; Simmons, 1994; Stokes, 1983; Y. L. I. Wong et al., 2011). Compared to the general population, users with mental disorders have a higher social support network cohesion (Beels, 1981; Dozier et al., 1987; Simmons, 1994). However, the association between network cohesion and inpatient services use (a proxy for continuity of care) is inconsistent. Some studies found an association between moderate cohesion and an increase in hospital days (Dozier et al., 1987), but other studies did not (Goldberg et al., 2003c). In

addition, to our knowledge, no study has specifically examined the relationship between network cohesion and continuity of care. Yet cohesion is a key characteristic for studying continuity of care. Studying relationships between members of a user's network makes it possible to understand how information circulates within it and to evaluate how those providing care (relatives and clinicians) coordinate with each other, coordination being one of the means of achieving continuity of care (Haggerty et al., 2003), e.g. by identifying and resolving points of friction between services (Leutz, 1999).

There are two competing assumptions about the effect of network cohesion on users' continuity of care. The "coordination assumption" assumes that network cohesion facilitates the flow of information, favours coordination, facilitates decision-making during crisis episodes (Birkel & Reppucci, 1983; Dozier et al., 1987; Pinto, 2006), increases the social influence of those providing care on the user, and therefore improves continuity of care (Freidson, 1988; Hammer, 1981; Morin & Seidman, 1986; Simmons, 1994). However, according to the "structural autonomy assumption", network cohesion generates pressure on the user. As most individuals whom the user knows also know other members of his or her network, they can push the user to act in a certain way. This can creates a risk of dropping out of care if the network presses the user too hard to adhere to care (Dozier et al., 1987). Furthermore, a high level of cohesion would reduce the autonomy of the user in his/her network. He/she would then have less scope to make choices and to coordinate his/her own care network (Burt, 2005, 2009). This could limit the continuity of care, given that, in the community, the user is his/her

own care coordinator in many situations: transmitting information, putting people in touch, ensuring consistency of intervention, and contacting new people to meet new needs (Jowsey et al., 2016).

Given these competing theoretical frameworks and inconsistencies in the literature, this study aims to investigate the association between network cohesion and continuity of care. We first hypothesised, based on the "coordination assumption", that network cohesion would improve the continuity of care for the most severely affected users and those living in 24-hour-supervised accommodation. Users with more severe conditions, who are less able to take care of themselves and more likely to experience a crisis episode, will need a more cohesive service set that provides more effective protection and continuity of care (Leutz, 1999). In addition, 24-hour-supervised accommodation would offer a more cohesive network, as in that configuration, most health professionals are likely to know each other. Secondly, we hypothesised, based on the "structural autonomy assumption", that network cohesion would reduce continuity of care for users with less severe disorders and for those living in the community. Higher cohesion, for users with a greater capacity for autonomy and able to coordinate their own networks, would have a counterproductive effect by generating control and limiting their autonomy. Living in the community with the support of a multitude of services requires users to ensure, for the most part, the coordination of their own networks, which overly strong network cohesion could harm.

METHOD

Design

We developed a cross sectional ego-network survey that is inspired by recent developments in the field (Crossley et al., 2015; Perry et al., 2018). Ego-networks are networks consisting of a single actor (ego) together with the individuals ego is connected to (alters) and all the links among those alters (Everett & Borgatti, 2005b). Social support networks of psychiatric service users are ego-networks: ego is the service user, alters are the members of his/her social support network, and the ties are the information exchange relationships between the network members.

Setting and participants

We conducted this survey in Belgium with 380 users with severe mental illness (SMI) (Ruggeri et al., 2007; Schinnar et al., 1990). SMI users were identified by three criteria: (1) having a psychiatric diagnosis; (2) having difficulties in at least three of the following social skills: obtaining help; meeting basic needs; social functioning; finding and keeping a job; managing non-professional activities; (3) having illness or treatment duration of at least two years, including at least one hospitalisation (Wiersma, 2006). SMI users are known to relapse and to be at risk of rehospitalisation and adverse events (Adair et al., 2005; Babalola et al., 2014; Burns et al., 2013; Juven-Wetzler et al., 2012; McConnell & Perry, 2016; Wiersma, 2006).

The study was carried out in three Belgian areas of 250,000 inhabitants each: one metropolitan area (east of Brussels), one post-industrial, underprivileged area (La Louvière-Manage), and one semi-rural area with a largely service economy (Namur). Those three areas were included in the nationwide reform that aims to set up networks of services in order to improve continuity of care for users with psychiatric disorders (Lorant, Nazroo, Nicaise, & Title107 Study Group, 2017; Nicaise et al., 2014).

Data collection

Interviews lasted one hour on average and were delivered face-to-face by seven trained interviewers with professional qualifications related to mental health care. The interviews were arranged by an area-specific coordinator who had the task of contacting and recruiting the services, presenting the research, and monitoring the selection procedure. The interviews mostly took place in residential or outpatient care facilities and sometimes at home. The interview comprised 42 questions arranged in four sections (network data, socio-demographics, outcomes, and service use). The data collection took place between 2014 and 2015.

Users were recruited in two stages. First, we selected in- and outpatient services in each area. The services were drawn at random from the directory of all mental health and primary care services available in the area. Second, services staff were asked to select SMI people, identified according to the criteria outlined above, from three strata: users living in 24-hour-supervised

accommodation, users living in collective housing, and users living in regular housing. 380 of the 594 people contacted agreed to participate in the study (see Figure 8). Those who refused did so for two main reasons: either because of their poor mental health state at the time of the interview or because of a poor relationship with the clinician who attempted to recruit them for the study.

Table 15. Distribution of users interviewed by type of service and number of services involved, Morpheus Study, Belgium 2014–2015

Type of services	Number of users interviewed	Number of services through which users have been interviewed
Home treatment team	58	6
Psychiatric hospital	167	24
Sheltered housing	46	9
Nursing home	19	3
Psychiatric service in general	21	6
Community mental health team	27	9
Day centre	23	6
Primary care centre	19	6
Total	380	69

We collected the data using the participant-aided sociogram technique developed by Bernie Hogan and colleagues (Hogan et al., 2007; Schiffer & Hauck, 2010), which we adapted to SMI people using Bidart's two-stage name generator (Bidart & Charbonneau, 2011). In the first stage, we used a broad question designed to allow respondents to name members of their social support networks (hereinafter, name generator): "who are the people who support you?" This question was supplemented by probing different social contexts in which the respondent might meet people: psycho-medico-social services and informal relationships. To differentiate the two contexts, we used repositionable adhesive papers in two different colours, as in the participant-aided sociogram technique (Hogan et al., 2007). During the interview, the interviewers encouraged respondents to take into account family members and friends as well as all informal resources such as colleagues, neighbours, a priest, etc. In the second stage, the same question investigated specific support in four particular domains: finances, housing, activities, and health. Pictures were used to probe these four domains and to assist respondents with potential cognitive difficulties (Bidart & Charbonneau, 2011). During this stage, new alters could be added to the list by the respondent. After these two stages, the respondent placed alters on the bullseye map from Hogan's technique (Figure 6), using the repositionable adhesive paper. The respondent was then asked to trace links on the bullseye map to identify those alters he or she believed exchanged information ("who exchanges information about you?"). The two-step Bidart's method has the advantage of being more systematic and more likely to help users to remember their actual alters from different fields (Bidart &

Charbonneau, 2011). The visual design facilitates users focus. The bullseye map technique for collecting the links between alters makes the question easier to answer than if we had to ask the same question for each alter, i.e. (n*n-1)/2.

At the end of each interview, we asked the user to refer us to a mental health professional he/she saw as his/her main clinician. Information on the user's social support network from a professional point of view was obtained from the main clinician, using the same interview technique.

Measurements

As far as the independent variables were concerned, we measured continuity of care using the Alberta Continuity of Service Scale – Mental Health (ACSS-MH) (Adair et al., 2005; Joyce et al., 2010), a scale widely used in the literature (Digel et al., 2013; Uijen, Heinst, Schellevis, van, et al., 2012; Vandyk et al., 2016). The scale includes 32 items that describe users' experience of services, their perception of system fragmentation, the quality of relations with the people who support them, and the adaptability and flexibility of care (Adair et al., 2005; Joyce et al., 2010).

Regarding the dependent variables, we computed several indicators from the information collected with the sociogram describing network cohesion: network density, betweenness centralisation, and egobetweenness. Network density is the degree of interconnectedness of network members, and ranges from 0 (low density) to 1 (high density) (Dozier et al., 1987). A

high density indicates a network where numerous members are linked to each other. An alter is considered central (according to the betweenness centrality) when he/she is often in an intermediate position between two other alters. So, a highly centralised network implies that an alter is more central than the others and is thus well positioned to control the flow of information within the network. Finally, egobetweenness is the extent of the user's centrality in his/her own network. It is calculated as the frequency with which ego falls in the path between pairs of network members. The first two indicators of cohesion are related to the "coordination assumption", as density and centrality are two ways to achieve coordination in a network. The third indicator, egobetweenness, is related to the "structural autonomy assumption", since it is an indicator of the extent to which a user is well positioned to control the information circulating about him/her and thus coordinate his/her own network. In addition to these cohesion indicators, we computed several indicators on network composition: number of network members, number of professionals in the user's network, and number of services used.

Other dependent variables were collected from users: their age, sex, nationality, country of birth, first contact with an in- or outpatient psychiatric service, number of hospitalisations, social integration, and psychosocial functioning. Social integration, i.e. reducing dependency on professional support in relation to social participation (Tsai et al., 2012; Ware et al., 2007), was measured by the Objective Social Outcome Index (SIX), which is composed of four items (Priebe et al., 2008) relating to

housing, employment, family status, and social relationships. The SIX allowed us to distinguish people living in the community (independent housing and sheltered housing) from people living in 24-hour-supervised accommodation. The severity of psychosocial functioning problems (J. Wing et al., 1999; J. K. Wing et al., 1998) was measured by the Health of the Nation outcomes scale (HoNOS). This scale, composed of 17 items, was filled in by the mental health professional considered by the user to be the main clinician (see above). The HoNOS includes 12 items that address the severity of several psychosocial problems with a score ranging from 0 (no problem) to 4 (severe problem). In particular, one item (No. 6) addresses problems related to hallucinations and delusions. We considered that users who received a score of 2 or more had hallucinations or delusions. Similarly, we considered that users who were rated 2 or more at item No. 7 had depressed mood or anxiety (see Table 16).

Statistical analysis

We computed the correlation between the social network indicators, in terms of network composition (number of members, number of types of professionals, and number of services) and cohesion (density, centralisation, and egobetweenness). We then performed a linear regression between the perception of continuity of care and all those network indicators. We controlled for socio-demographic characteristics (age and sex), social integration (SIX), and clinical features (duration of psychiatric history since the first contact with an in- or outpatient psychiatric service, number of

hospitalisations, and severity of psychosocial functioning problems), but taking into account each social network indicator, as those network indicators are strongly correlated with each other. We divided our sample into three groups of identical size according to their HoNOS scores (tertiles). Users in the first group had a HoNOS score ranging from 1 to 10 (low severity), users in the second group had a score from 11 to 18 (moderate severity), and users in the third group had a score higher than 18 (high severity). We then performed regressions on the three groups of users. We also performed regressions on two groups of users according to their type of accommodation: those living in 24-hour-supervised accommodation and those living in the community. Finally, to ascertain the reliability of our ego-network data, Kappa coefficients were also computed to assess the agreement between users' reports and main clinicians' reports of users' social support networks.

RESULTS

The sample was well balanced across genders and had an average age of 45.4 (std=11.6). Most users were born in Belgium and had a rather low level of social integration (SIX score=2.3 out of 6); 50% had independent living arrangements. Users had moderately average psychosocial functioning (HoNOS score of 11.6/48); a third had substance use problems; depressed moods and hallucinations and delusions were quite common. On average, they had had 7 hospitalisations and 15 years of psychiatric history (Table 15).

The user's ego-network was composed of mean of 12.1 members (std=5.2), most of whom (7.4, std=3.4) were professionals associated with 4 services (std=2) (see Table 16). Regarding network cohesion, users' social support networks were dense (mean=22.1%, std=17) with rather low centralisation (mean=10%, std=13). The user him/herself was central, on average, in his/her own network, with an average egobetweenness of 18.3% (std=18.7).

Table 16. Clinical features and structure of social support networks of severely mentally ill users, Morpheus Study, Belgium 2014–2015: mean and std (n=380).

Network cohesion	**Percentage or**	**Std**
Density (%)	21.6	17.1
Centralisation (%)	10.1	13
Egobetweenness (%)	18.3	18.7
Network composition		
Network members (number	12.1	5.2
Professionals (number)	7.4	3.4
Services (number)	4	2
Clinical Features		
Perceived continuity of care (ACSS-MH, score 0–160)	115.2	14.7

Health and social functioning (HoNOS,	11.6	6.7
Use of drugs or alcohol (%)	35	
Hallucinations or delusions (%)	40	
Depressed mood (%)	82	
Anxiety (%)	34	
Duration of psychiatric path (number of	179.5	170.1
Number of hospitalisations	7	6.5
Socio-demographic characteristics		
Social integration (SIX, score 0 to 6)	2.3	1.43
Living in independent housing (%)	50	
Female (%)	47	
Age (years)	45.4	11.6
Belgian nationality (%)	90	
Born in Belgium (%)	80	

Most of these cohesion variables correlated with each other (see Table 17). Density and centralisation were positively associated with each other and egobetweenness was positively associated with density and negatively with centralisation. These variables were also associated with the network composition variables: the larger the network, the lower the egobetweenness. Density was negatively related to the number of members

in the network and to the number of services, whereas centralisation was not associated with any compositional variable.

We found no association between cohesion variables (density, centralisation, and egobetweenness) and continuity of care. However, for users with more severe disorders, continuity of care increased with the density of their social network. Such an association did not exist in the low-severity group. There was no association between cohesion and continuity, either for users living in the community or for those living in 24-hour-supervised accommodation.

The three variables of network composition were all associated, negatively, with continuity of care: the number of network members, the number of professionals, and the number of services in the network. This remained true after controlling for individual characteristics. The results were somewhat different when we differentiated users according to the severity of their psychosocial functioning problems. For users in the high-severity group, higher continuity of care was associated with a smaller number of services, while for users with low severity, higher continuity of care was associated with a smaller number of professionals. In addition, when we differentiated living situations, the number of professionals and the number of services were negatively associated with continuity of care for people living in 24-hour-supervised accommodation, whereas only the number of services was negatively associated with continuity of care for people living in the community.

Table 17. Matrix of correlation between the variables of structures of the network of social support of the users (Pearson correlation coefficients), Morpheus project, 2014-2015, Belgium (N=380).

	V1	V2	V3	V4	V5	V6
Network cohesion						
Density (V1)		0.37 ***	0.13 ***	-0.15 ***	0.06	-0.38 ***
Centralisation (V2)			-0.23 ***	-0.05	-0.02	-0.05
Egobetweenness (V3)				-0.59 ***	-0.46 ***	-0.26 ***
Network composition						
Network members (number) (V4)					0.79 ***	0.37 ***
Professionals (number) (V5)						0.38 ***
Services (number) (V6)						

* p < 0.10; ** p < 0.05; *** p < 0.01

Table 18. Regression on Alberta Continuity of Services Scale (ACSS-MH), by level of severity (HoNOS) and by type of housing, Morpheus project, 2014–2015, Belgium

			Low severity (HoNOS below 11, N = 108)		High severity (HoNOS above 18, N = 101)		Living in 24/24 supervised services		Living in the community	
Covariates	Model 1[A]	Model 2[B]	Model 1[A]	Model 2[B]	Model 1[A]	Model 2[B]	Model 1[A]	Model 2[B]	Model 1[A]	Model 2[B]
Network cohesion										
Density	0.06		-0.09		0.27 ***	0.32 ***	0.07		0.05	
Centralisation	0.03		0.03		-0.05		-0.07		0.07	
Egobetweenness	0.01		-0.04		-0.07		-0.03		0.01	
Network composition										
Network members (number)	-0.13 ***	-0.12 **	-0.13		-0.07		0.20 **	-0.15	-0.10 *	
Professionals (number)	-0.13 **	-0.12 **	-0.20 **	-0.22 **	-0.03		-0.18 *	-0.20 *	-0.09	
Services (number)	-0.15 ***	-0.14 **	-0.04		-0.28 ***	-0.33 ***	-0.23 **	-0.23 *	-0.11 *	-0.13 **
Individual characteristics										
Severity (HoNOS)	-0.15 **							0.14		-0.21 ***
Duration of psychiatric path	0.01		0.13		-0.09			-0.03		-0.01
Number of hospitalisations	0.04		-0.13		0.13			0.08		0.04
Socio-demographic characteristics										
Social integration (SIX)	0.04		0.19		-0.25 **			-0.04		0.00
Female (ref=male)	-0.16 ***		-0.25 **		-0.05			-0.20		-0.14 **
Age	0.06		0.05		0.24 **			0.06		0.06

* p < 0.10; ** p < 0.05; *** p < 0.01; A t-test bivariate; B t-test multivariate, controlled for individual characteristics only.

Finally, large Kappa coefficients were found, showing substantial agreement between users and professionals regarding the presence of different types of psychiatric services in users' social support networks (outpatient care, day care centre, supported housing, nursing home). Agreement between the user and his/her main clinician was lower as to the presence of inpatient services and assertive community treatment (ACT) teams in users' social support networks, but this is not surprising given that there is no central recording of users' hospitalisations in Belgium and that ACT teams are still uncommon. The lowest level of agreement was about relatives and self-help services, which may seem logical, as not all information about the user's personal life is accessible to health professionals.

DISCUSSION

Main findings

This study is the first to investigate the association between network cohesion and continuity of care for users with severe mental illness. Our hypotheses were that, (1) based on the "coordination assumption", ego-network cohesion will improve the continuity of care for the most severely affected users and those living in in 24-hour-supervised accommodation, whereas (2) it lessens the continuity of care for users with less severe disorders and those living in the community, based on the "structural autonomy assumption".

The social support networks we collected were composed of an average of 12.1 members and the density of information exchange relationships was 22%. No cohesion indicators were associated with higher continuity of care for the whole sample. For users with the most severe problems, however, density was more positively associated with continuity of care than for users with less severe problems. Concerning the correlation analysis, the two variables associated with coordination (density and centrality) were oppositely correlated with the variable associated with structural autonomy (egobetweenness). In addition to this main result, we found that continuity of care decreased with the size of the network, the number of professionals, and the number of services in the network, even when controlling for individual characteristics.

Consistency with the literature

The first hypothesis, that cohesion is related to the continuity of care for the most severely affected users, was partly supported. People less able to take care of themselves and more likely to experience a crisis probably need a more cohesive service set, providing protection and coordination. The second hypothesis, however, was not supported: no cohesion indicators were associated with continuity of care for users with less severe problems. One reason is that severity is negatively related to continuity of care. It could be that for users with low severity the structural features of their support networks do not matter that much, whether dense or centralised. Another possible explanation is that for less severely affected users, many network

structures exist – as there are many ways for a user to organise his/her life – and that none of those structures are specifically associated with continuity of care. Finally, it is also possible that for these users the content of social support relations matter more than the structure of the relations. Eliott Freidson suggests that the probability of using a physician also depends on the content of exchanges within the network (Freidson, 1988). He describes a lower-social-class referral system, which is characterised by strong cohesiveness and mutually reinforcing interaction. People living in this context will be less likely to seek professional care, because it is unfamiliar to their social group. Charles Kadushin reached a similar conclusion in relation to referral to a psychotherapist in urban higher classes (Kadushin, 1966). This suggests to us that we also need to identify the content of exchanges between members of a user's network. For example, cohesion within a group that values professional care could have an entirely different effect from cohesion within a subgroup that only values informal support. The correlation analyses also showed that the two assumptions, coordination and structural autonomy, are compatible. It seems possible to achieve coordination and structural autonomy at the same time, depending on how coordination is organised, through density or through centralisation. A density-supported coordination appears to be compatible with structural autonomy.

Some of our descriptive results are consistent with the literature, while others are not. Our result for mean network members (12.1) is consistent with the literature (Albert et al., 1998; Furukawa et al., 1999). This is not the

case for density and centralisation, indicators for which we have fewer studies (Dozier et al., 1987). Other studies have shown greater density(Y. L. I. Wong et al., 2011) (Goldberg et al., 2003c).

Finally, it should also be mentioned that most of the studies describing the size of psychiatric service users' social networks found a positive link between the size of networks and quality of life, social support, and psychiatric hospitalisation (Albert et al., 1998; Brunt & Hansson, 2002; Corrigan & Phelan, 2004; Palumbo et al., 2015). Our results go in the opposite direction, size being negatively associated with continuity of care, probably because it is easier to coordinate a small number of actors.

Limitations

First, the social networks and health care use were self-reported, as there is no centralised registration system in Belgium. Thus, we cannot rule out the possibility that the reporting of some information was incomplete. SMI users may have altered perceptions of reality and this is a risk we need to consider. It seems to us, however, that this has had a limited impact on our study. On several occasions during the interviews, users were delirious. Only once, however, was a person from the user's delusion cited as part of the social support network. It seems to us that the very practical and everyday aspect of the questions asked keeps the delusions away. In addition, according to previous studies, ego's report are rather accurate. Green et al. report that egos do accurately report information about alters (H. D. Green et al., 2013)

and Adams & Moody report an agreement of 80% between different egos about alter-alter social ties (Adams & Moody, 2007).

Secondly, our cross-sectional design is vulnerable to unobserved confounders (i.e. clinical alliance with the health professional who proposed the study) and reversed causation. Also, we chose to focus on the structure of relationships within user's network. This tells us nothing about the content of relations, which, as we have seen above, may be important. Thus, additional research is needed: longitudinal studies and studies collecting information about the content of relationships as well as studies on the impact on users' network structures of coordination mechanisms that could increase the density of relationships, such as case management or coordination meetings.

Finally, our sample was not a random sample from the general population of psychiatric users. Comparison of our sample with previous studies, however, suggests that our sample matches quite well the general Belgian population of users with psychiatric disorders: our mean Alberta Continuity of Services Scale (115.5, std=14.7) is similar to that of another study conducted in Belgium in the same period with a much larger group of users (115.6, std=14.1). This is also the case for the HoNOS, a proxy of psychosocial functioning severity (respectively 11.6, std=6.5 and 12.5, std=6.5) (Lorant, Nazroo, Nicaise, & Title107 Study Group, 2017).

Conclusion

In conclusion: our study shows that network cohesion has a positive association with continuity of care for those users with the most severe problems. The number of professionals and the number of services in the network, on the other hand, has a negative association with continuity of care, regardless of the situation of the user. These findings could be taken into account in clinical and organisational practice, with caution, however, giving the limitations. First, the number of services or professionals supporting an individual user could be reduced. Density of relations in a network, on the other hand, should only be encouraged for people in severe situations. However, this implies that caregivers must not only be able to increase the density of relationships within a network, but also to adapt their interventions to provide a different, individualised network structure when the severity decreases.

5. WHO IS THERE? THE SOCIAL SUPPORT NETWORKS OF USERS OF PSYCHIATRIC SERVICES: A MULTI-LEVEL ANALYSIS

Wyngaerden, F., Vacca, R., Dubois, V., Lorant, V., Who is there? The social support networks of users of psychiatric services: a multi-level analysis (*under review*)

ABSTRACT

Background. For psychiatric service users suffering from severe mental disorders, the social support provided by personal social networks is essential for living a meaningful life within the community. Little is known, however, about the individual, relational, and contextual factors that influence the provision of support to people with severe mental disorders. Yet, social support is the product of individual and collective factors: the provision of support by an individual does not depend only on the support and supported person but also on the other support persons and their relationships. This article seeks to investigate how characteristics of service

users with severe mental disorders, their social contacts, and the pattern of relationships between those contacts influence the distribution and provision of social support to people with severe mental disorders.

Methods. We collected personal network data relating to 380 psychiatric service users from a random sample of health care providers in Belgium. We computed various measures of the structure of those neworks and of the position of support persons within those networks. We conducted a multilevel analysis of the importance of the support provided by each support persons.

Results. The results show that the more central a support person was in the network of a service user, the more important his or her support was considered to be by the service user. Also, the denser the network in which a support person was embedded, the less important was the support he or she offers, but only for hospitalised service users.

Conclusions. These finding highlight the collective dimension of social support. We discuss the implications for the organisation of mental health care.

INTRODUCTION

For users of psychiatric services who have severe mental disorders, social support is a key element for living a meaningful life in the community (Turner

& Brown, 2010). It provides access to emotional, material and cognitive support, including help in managing the disease and limiting the consequences of stressful situations (Sluzki, 2010; Achat et al., 1998; Gourash, 1978; Cobb, 1976). It helps to reduces symptoms (Norman et al., 2005b; Bell et al., 1982), avoid multiple inpatients admission (Albert et al., 1998) and improve access to services (Y. L. I. Wong et al., 2011). Furthermore, inadequate social support is associated with greater mortality, suicidal ideation, dementia, and depression (Sripada et al., 2015; House, Umberson, & Landis, 1988, Holt-Lunstad 2010).

These users access social support mainly through their personal social networks, that is the web of social relationships (Berkman et al., 2000) whose size, composition (ie. Relatives and professionals) and structure influence the delivery of support. Indeed, individuals with a larger network report a greater level of perceived adequacy of social support (Haines et al., 2002). In terms of composition, we know that the presence of intimate relationships affects support positively (N. Lin et al., 1999) and that relationships with life partners, friends or peers are more supportive than those with family and professionals (Nelson et al., 1992b; Parks & Pilisuk, 1984). Also, the presence of people who are aware of the person's mental health problems is predictive of a broader array of perceived support functions (Perry, 2011). Regarding the network structure, a cohesive network, where a large number of members know each other, has been traditionally considered likely to offer more support, even if the actual evidence is rather contradictory (Dozier et al., 1987; Kadushin, 1983;

Marsden & Hurlbert, 1988; Martí et al., 2017a; Pescosolido & Georgianna, 1989; Thoits, 1982)

Several studies have described the characteristics of the social support networks of patients with mental disorders but focused mainly on their association with service utilization or symptomatology, rather than the delivery of support. Moreover, previous studies have mainly investigated the effect of the whole network on the support provided. From the patient perspective, social support, however, is a collective outcome: the delivery of support does not depend only on the network of the supported person (here called “ego”) or on the characteristics of the person providing support (here called “alter”). It also depends on how an alter is embedded in the personal network of the ego he is supporting. In other words, the support of a specific alter for an ego is not independent of the support of other alters for that ego. When an alter is connected to many other alters, he is more likely to provide support than if he is disconnected from those other alters (Wellman & Frank, 2001). For example, a study of the general population found that the more an alter has ties to other alters of an ego, the more likely alter and ego are to exchange support on labour and housing issues (Martí et al., 2017c). Another way to illustrate this interdependence of alters has to do with the composition of alters: alters included in a network composed of similar others are more likely to be supportive than alters connected to dissimilar ones (Lazarsfeld & Merton, 1954; Marsden, 1988; Martí et al., 2017c; Wellman & Gulia, 1999).

However, few studies have actually examined the interdependence of alters' social support delivery for psychiatric patients. Social support has been analysed from the perspective of ego, ignoring the different roles different alters play in supporting ego. The structure of the network is likely to influence the delivery of support by each alter in three different ways. At the alter level, having many ties with other alters of ego (hereafter centrality) would provide that alter with more and better information, possibly a better understanding of ego needs and the possibility of an effective reaction in the event of a crisis. As a consequence, we might expect central alters to be more supportive than less central alters. The homophily of an alter's relationships matters as well: an alter connected to other similar alters reinforces the investment both in relation to ego and in relation to the other alters with whom he is more likely to share common values and obligations. We can therefore expect people with homophilic relationships to offer more support. At the ego level, the presence or extent of ties among alters (hereafter "network cohesion") (Martí et al., 2017a), raises support standards and increases the pressure of the group to provide support. Thus, an alter embedded in a cohesive network might offer more support because of the social control or the influence from the other alters (Dozier et al., 1987).

As a result, we aim explore how the pattern of relationships between alters is associated with the importance of the support provided by each alter to an ego. We ask three questions: (1) is an alter in a central position more supportive? (2) is an alter with homophilic relationships more supportive?

(3) Is an alter embedded in a cohesive network likely to offer more support to a user than one who is part of a sparse network?

This question is important from a health services and community health perspective. It may help to explain why certain type of alters may offer inconsistent levels of social support for patients with severe disorders, depending on the network structure. In addition, in the current context of community care, such a study will help design interventions to support specific alters in their endeavour to help patients with severe mental disorders carry on with their lives in the community.

METHOD

Design

Inspired by recent developments in ego-network surveys in the domain of human services (Borgatti et al., 2009; Crossley et al., 2015), we developed a cross sectional ego-network survey. Ego network consists of a single actor (ego) together with the individuals that ego is connected to (alters) and all the links between those alters (Everett & Borgatti, 2005a). Data were collected with the participant-aided sociogram technique developed by Bernie Hogan and colleagues (D. Krackhardt 1987; Wasserman 1994; Carrington, Scott, and Wasserman 2005; Hogan, Carrasco, and Wellman 2007; Neal 2008; Schiffer and Hauck 2010) and a two-stage name generator (Bidart & Charbonneau, 2011). First, we asked, "who are the people who

support you?"; then we explored the support in four specific domains (finances, housing, activities, and health). After these two stages, the respondent placed alters on a bullseye map, using the repositionable adhesive paper. The bullseye map had four concentric circles, with the respondent represented at the centre. The respondent was asked to place supporters more or less close to him or her according to the importance that he or she attached to the support offered by each alter. Alters in the first circle provided essential support, whereas alters placed in the last circle offered the least important support. He or she was then asked to trace links on the bullseye map to identify alters who exchange information ("who exchanges information about you?").

Participants

We conducted this survey with a stratified clustered sample of 380 users of psychiatric services who has severe mental illness (Ruggeri et al., 2007; Schinnar et al., 1990) in three Belgian districts: one metropolitan area (east of Brussels), one post-industrial, underprivileged area (La Louvière-Manage), and one area with a largely service economy (Namur). In each area we recruited in- and outpatient services. The services were drawn at random from the directory of all available mental health and primary care services in the catchment area. Services were asked to select severely mentally ill (SMI) people from three strata: users living in a supervised structure 24 hours a day, users living in collective housing, and users living in regular housing. The interviews took place in residential or outpatient care and sometimes at

home. The full survey and sampling design has been presented elsewhere (Wyngaerden et al., 2019).

Measures

The dependent variable, the importance of the support received, from ego's perspective, was an ordinal measure corresponding to the concentric circle in which each alter was placed: very important (first circle, coded as 1) to least important (fourth circle, coded as 4) (See Figure 6).The participant-aided sociogram technique also uses concentric circles of this kind to collect similar information about the ego and alter relationship (closeness) (Hogan 2007).

The independent variables were operationalised with 2 groups of variables at alter level and at ego's network level. Variables at the alter level are used to answer the first two questions, while variables at the network level are used to answer the third question. At the alter level, each alter may support ego according to his centrality in ego's network. Centrality was measured by degree centrality and betweenness centrality. Degree centrality is the number of ties to other alters, which shows the extent of an alter's access to information. Betweenness centrality, for its part, counts the number of times an alter is a crossing point along the shortest path between two other alters. This measure highlights the possibility of controlling the flow of information that an alter in a position of intermediary between other alters has.

Still at the alter level, we calculated the percentage of alter-alter ties that each alter has within the group to which he belongs. We considered three groups: relatives and friends, mental health and other professionals (including professionals from general health services, social services, the justice system, and generic non-health services). If this percentage exceeds 50%, the alter concerned has more relationships with people who resemble him than with people who are different from him and therefore has predominantly homophile relationships. At the network level, we computed 3 indices of the structure of the relationships between the alters, allowing us to describe the cohesion of the network. The density, i.e. the number of ties between alters divided by the total number of possible ties, is the most commonly used measure of network cohesion in the network literature. The fragmentation, i.e. the proportion of alters that are not connected to each other directly or indirectly, is somehow the opposite of density, with the difference that it also takes into account the indirect connections between alters, through other alters. The degree centralization, finally, is the difference in degree centrality (number of alter-alter contacts) between the most central alter and the other alters, divided by the largest sum of differences that can exist in a network of the same size (Freeman et al., 1979). In other words, the fewer and more central actors there are, the more centralized the network as a whole is considered to be. We can consider centralization as another way of giving shape to the cohesion of a network, not with a large number of relationships between all the alters, but with an alter that has connections with a large number of other alters.

We also calculated various indices useful as control variables. At the network level, we computed 3 indices of composition: the network size, the proportion of professionals in the support network and the number of different types of services involved. These variables are interesting to introduce in statistical models given the importance of potential collinearity between size and composition variables and structure variables. At the alter level, we know that alters belong to one of the three categories mentioned above (relatives and friends, mental health and other professionals), which is also likely to influence the support perceived by the user. Other variables were collected at the ego level: age, psychiatric history (number of years since first contact with an outpatient or inpatient psychiatric service) and psychosocial functioning (HoNOSscale). All data were collected from service users, with the exception of psychosocial functioning, data on which was provided by a professional. Each user designated a professional who knew him or her well so that they could fill in the scale (Wyngaerden et al., 2019).

Statistical analysis

We first tabulated the different characteristics of the service users' networks in relation to the importance of the support, with an F-test for statistical significance. We then carried out a multilevel multinomial analysis of the importance of the support provided by each alter. They are cumulative logit models that predicts the odds of a lower categories (but higher support level) as opposed to higher categories. Those considered the most supportive are placed in the support circle coded 1 where the least

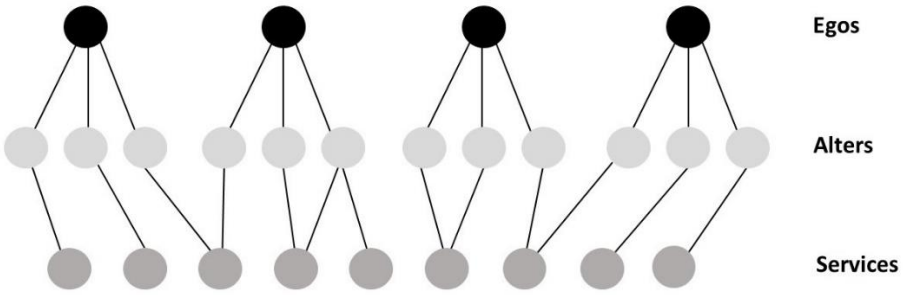
supportive are placed in the support circle coded 4. Thus, our models predict the odds of an alter being in support circles 1 as opposed to 2, 3 or 4; in support circles 1 or 2 as opposed to support circles 3 or 4; etc.

We have chosen a multilevel multinomial analysis because in ego networks, alters are not independent of each other and some egos have recruited in similar types of services. We have here a multi-level data structure: the relationship between ego and alter is clustered within two types of context at a higher level, the ego network on the one hand and the service to which alters belong on the other hand. Unlike most studies of the subject, which have used a multi-level hierarchical model with only one level of clustering (Gelman & Hill, 2006; Snijders & Bosker, 2011), we have a two level to take into account (ego and alter's service) et the possibility for an alter to belong to the network of several egos, which brings us to a non-hierarchical multilevel model (Vacca et al., 2019). To take into account the level of clustering of the alter within the ego network, we have introduced into the model the unique ego identifier, as a random intercept. Then, to take into account the level of clustering for the services to which each alter is linked, we associated each alter with a unique identifier for its service. Of the 2849 professional alters, only 226 (8%) could not be associated with a service. We associated them with a service identifier specific to each one. As most of these alters (56%) were independent practitioners (psychiatrists, psychologists and general practitioners consulting privately, or lawyers, public guardian and probation officer), this was an adequate solution. The other alters were human services unrelated to psychiatric care

(housekeeper, social taxi, sports club, library...). For relatives, we have assigned a unique identifier to each extended family, considering that, like the professionals in a service, they are more likely to know each other and to exchange about the user. We have attached a unique identifier to each friend, as we cannot assume that they know each other. This unique "service" identifier was also added to a non-hierarchical multinomial model, as a random intercept considering that each alter is clustered within a service in addition to being clustered within an ego's network (see Figure 10).

We also had to consider the possibility for an alter to be included in the network of several egos. Indeed, it happens that the same carer supports several users. Among the user networks we collected, this frequently happens for users who use the same services. This situation must be taken into account in the model, which can no longer be strictly hierarchical. We have therefore sought to identify the alters that are cited by multiple egos, in order to give each alter a unique identifier, independently of the egos with which it is associated. We identified the 4602 alter citations corresponding to 3808 unique alters. 327 alters were in fact cited 1199 times. However, it was not possible to identify with certainty the identity of the alters behind 448 citations (9.7% of the 4602 citations). For the purposes of the analysis, these 448 citations were also considered as unique alters. We thus introduced the unique identifier alter to our non-hierarchical multinomial model, as a random intercept.

Figure 15. Structure of the non-hierarchical multilevel model, Morpheus Study, Belgium 2014–2015



On that basis, we built 2 models. In the first model, we included separately the individual characteristics of the alters, i.e. their centrality (in terms of degree and betweenness), their membership in an alter group (mental health professionals, other professionals, relatives and friends) and the percentage of their relationships that are within their own group ; then the characteristics of the ego network, i.e. density, degree centralization and fragmentation; and finally the control variables, i.e. the ego characteristics (age, social functioning and psychiatric history) and the composition indices of the ego-network in which alters are embedded: the network size, the proportion of professionals in the support network and the number of different types of services involved. The objective of this first model is to identify the significant variables in order to integrate them in the 2nd model which integrates all of them.

However, many of the indices used, whether at the alter or network level, are likely to be determined by hospitalization status. For example, a hospitalized patient has contact with a larger number of professionals as a consequence of the hospitalization and those professionals are likely to know each other, which makes the network denser. In addition, the professionals of the hospital are more likely to be considered as supportive as hospitalized people are, at that time, vulnerable and in need of support. We therefore also stratified the previous analysis according to hospitalization status at the time of the interview. We created two groups among the service users we met. The first, composed of 179 users, brings together those who were interviewed within a hospital psychiatric services and the second, composed of 201 users, brings together those who were met outside the hospital and who were not hospitalized at the time. We then carried out the same multilevel multinomial analysis as in the second model for each of the two groups.

RESULTS

The users we met were, on average, 45.4 years old (std=11.6) and had, on average, 12 years of psychiatric history. They had a moderate score of 12.8/48 on the HoNOS scale (proxy for psychosocial functioning). 46.98% of them were hospitalized at the time of the interview. The average user had a small network (12) with low density (only 22% of all pairs of alters were directly connected to each other) and high degree of fragmentation (65% of all pairs of alters were not connected to any other alters, directly or

indirectly). More descriptive results are available elsewhere (Wyngaerden et al., 2020).

Most alters were located in the categories providing the most important levels of social support (levels 1 or 2); a few were mentioned in the least important category (4.4% in level 4 of social support). Alters were either providers of mental health services (43.7%) or relatives and friends (38.1%); they had an average of 2.6 ties to other alters. Alters were, on average, 1.2 times a broker of two other alters and were mostly related to the same type of alters (63.9%).

Providers of mental health services and family and friends were most often assigned to level 1; those working in general health services, social services, the justice system, and generic non-health services had a more uniform distribution across the levels of support. The centrality of alters was higher for alters providing more important social support than for those providing less important social support. In the highest level of support (level 1), alters had on average 3.09 contacts; this decreased to 1.13 for the lowest level of support (level 4). In addition, the percentage of homophilic relationships was higher (68.4%) for the most supportive alters and was lowest for the least supportive alters (41.7%). The analysis also shows that level 1 alters, offering the most support to ego, were more often involved in denser and less fragmented networks, with more professionals but with fewer different types of services, than alters offering less support.

Table 19. Clinical features and characteristics of social support networks of severely mentally ill service users, Morpheus Study, Belgium 2014–2015: mean (or %) and std (n=380).

	Mean or %	std	Min.	Max.
Patient characteristics				
Age (years)	45.4	11.7	19.0	78.0
Social functioning (Honos)	12.8	7.3	0.0	36.0
Psychiatric history (years)	11.7	11.0	0.2	64.0
Hospitalised at the time of the interview (%)	47.0			
Composition of patient network				
Network size (no.)	12.1	5.2	2.0	42.0
Professionals (%)	64.6	17.4	18.2	100.0
Types of services (no.)	3.9	1.9	1.0	11.0
Structure of patient network				
Network density (%)	22.2	17.9	0.0	100.0
Network degree centralization (%)	22.6	12.0	0.0	66.7
Network fragmentation (%)	65.3	27.0	0.0	100.0

Table 20. Description of alters in the ego's social support network, type of alters, centrality and homophily, by importance of support, Belgium 2014–2015 (N = 4602).

	Total	Importance of support					
		Perceived support, level 1 (highest)	Perceived support, level 2	Perceived support, level 3	Perceived support, level 4 (lowest)	F Value / Khi-2	
Number of alters : % (no.)	100 (4602)	50.7 (2326)	31.9 (1464)	13.0 (596)	4.4 (200)		
Alter characteristics							
Alters from mental health services: % (no.)	43.7 (2013)	50.7	34.0	12.1	3.2	182.1	***
Alters from general health services: % (no.)	7.8 (359)	35.0	39.5	17.6	7.8		
Alters from social services and justice: % (no.)	8.2 (379)	38.5	30.2	21.5	9.8		
Relatives and friends: % (no.)	38.1 (1754)	57.9	27.9	10.3	3.8		
Alters from generic non-health services: % (no.)	2.1(97)	26.8	39.2	30.9	3.1		
Alter structural position in ego network							
Alter degree: mean no. (std)	2.6 (3.2)	3.1	2.1	1.6	1.1	52.5	***
Alter betweenness: mean no. (std)	1.1 (5.2)	1.5	1.0	0.5	0.4	8.0	***
Relationship within same group: mean % (std)	63.9 (46.0)	68.4	65.2	51.2	41.7	39.4	***
Characteristics of the network in which alter is embedded							
Network size: mean no. (std)	14.3 (6.3)[1]	14.3	14.5	14.7	13.2	3.1	*
Professionals: mean % (std)	61.9 (16.7)[1]	62.5	62.1	60.3	58.3	6.0	***
Types of services: mean no. (std)	4.2 (2.1)[1]	4.0	4.3	4.5	4.2	12.0	***
Network density: mean % (std)	20.9 (16.2)[1]	22.3	20.5	17.6	16.4	19.7	***
Network degree centralization: mean % (std)	22.6 (11.2)[1]	22.8	22.6	22.2	21.8	0.7	
Network fragmentation: mean % (std)	66.3 (25.3)[1]	65.0	66.1	69.5	72.6	9.3	***

(1) These averages have as denominator the number of alters and not the number of egos. They are different from the averages presented in Table 19.

*p < 0.05 **p <0.01 ***p<0.001

In building our non-hierachical multilevel model, it became apparent that it was not possible to introduce in our model both the unique identifier of the alters and the unique identifier of the services: as the alters are nested within the services, it is difficult to separate their influence on the model from that of the services. We have therefore introduced the two variables independently, in order to compare their respective influences. The table 21 shows a reduction of deviance from 9882.38 to 9777.53 to the benefit of the model including the service identifier as a random effect. Consequently, we used the servcie identifier as a random intercept in the following analyses. Indeed, if some alters are cited by several egos, it is often related to the fact that the egos are supported by the same service. The introduction of the service identifier in the model is therefore likely to take into account duplicate citations of alters.

Table 21. Difference between a model including the unique identifier of alter and a model including the unique identifier of service as variance component, Morpheus Study, Belgium 2014–2015 (n=380).

	Model I		**Model II**	
	Coeff.	s.e.	Coeff.	s.e.
Variance components				
Ego	0.70014	0.08960	0.7698	0.1056
Alter	0.07135	0.07158		
Service			0.8221	0.1342
-2logLikelihood	9882.38		9777.53	

The results of multilevel multinomial regression are provided in Table 22. Model 1 model social support per block of covariates and model 2 includes all covariates. From the first model, at the alter level characteristics, we can note that the more central an alter is (in terms of degree or betweenness), the more it offers support to ego. The percentage of relationship within the same group, or homophilic relationships with other alters, gives no significant results. Regarding the network level characteristics, only the density of relationships in the network in which an alter is involved has a positive influence on the support offered by this alter to ego. Regarding control variables, it appears that an alter involved in a network composed of a greater number of professionals or a smaller number of types of services is more likely to offer more support to ego. Moreover, being a relative or friend also puts an alter in a better position to support ego. In contrast, none of the ego characteristics (age, social functioning, psychiatric history) seem to determine the support offered by an alter to ego. The second model includes all covariates. It is above all the centrality of the alters that influences the support offered. The more central an alter is, the more support it offers to ego. In this model, the structure of the network in which an alter is involved seems to have no influence on the support provided. Regarding the composition of the network, the higher the percentage of professionals and the fewer different types of services in the network in which an alter is involved, the more that alter supports ego.

Table 22. Multi-level analysis of structure of social networks and clinical features of severely mentally ill service users according to the perceived levels of support. Morpheus Study. Belgium 2014–2015 (n=380).

	Model I[1]			Model II		
	Patients, network and alter characteristics			All characteristics		
Covariate	Coeff.	p value	s.e.	Coeff.	p value	s.e.
Alter characteristics						
Alter degree (nbre)	0.169	<.0001	0.023	0.19	<.0001	0.022
Alter betweeness (nbre)	0.045	<.0001	0.011	0.044	<.0001	0.011
Relationship within the same group (%)	0.208	0.078	0.118			
Mental health services	0.058	0.7462	0.181	0.067	0.7068	0.177
Relatives and friends	0.9	<.0001	0.158	0.96	<.0001	0.156
Structure of patient network						
Network density (%)	2.632	0.0002	0.696	-0.622	0.2446	0.534
Network centralization (%)	-0.19	0.7780	0.674			
Network fragmentation (%)	0.657	0.1715	0.48			
Composition of patient network						
Network size (no.)	0.005	0.6835	0.013			
Professionnels (%)	1.169	0.0044	0.410	1.615	0.0005	0.438
Types of services (no.)	-0.144	<.0001	0.036	-0.124	0.0018	0.04
Patient characteristics						
Age (years)	0.006	0.2317	0.005			

Social functionning (HoNOS)	0.011	0.1840	0.008			
Psyciatric history (years)	-0.005	0.3565	0.006			
Random intercept						
Ego	0.688	<.0001	0.102	0.958	<.0001	0.146
Service	0.855	<.0001	0.147	0.652	<.0001	0.145

[1] This column presents 4 blocks of variables introduced separately in the model. The random interept mentioned in this column is related to the 4th block

*p < 0.05 **P <0.01 ***P<0.001

In the stratified analysis, degree centrality had a greater impact on the importance of the support provided to non-hospitalized patients than on that provided to hospitalized patients. Whether an alter was a relative or a friend was slightly less important when the patient was not hospitalized. The percentage of professionals in the patient network was positively associated with the importance of the support provided for hospitalized patients, while the association was not significant for non-hospitalized patients.

However, stratified analysis according to hospitalisation status provides us with additional insights. A higher percentage of professionals in the users' network is associated with more support from the members of these networks, but only for people in hospital. Fewer services in the user network are associated with more support from network members whether in or out of hospital, but the association is more important and more significant for those in hospital. Moreover, the density of relationships within the network is negatively associated, albeit weakly significant, with the support offered

by network members. The denser the network in which an alter is embedded, the less support he or she offers.

Table 23. Multi-level analysis of structure of social networks and clinical features of severely mentally ill service users according to the perceived levels of support, by hospitalisation status at the time of the interview. Morpheus Study. Belgium 2014

	All patients, network and alter characteristics, by hospitalisation status at the time of the interview					
	Hospitalised (n=179)			Out of hospital (n=201)		
Covariate	Coeff.	p value	s.e.	Coeff.	p value	s.e.
Alter characteristics						
Alter degree (nbre)	0.087	<.0001	0.018	0.195	<.0001	0.031
Alter betweeness (nbre)	0.028	0.01096	0.011	0.032	0.0932	0.019
Mental health services	0.176	0.5345	0.283	0.076	0.6562	0.17
Relatives and friends	1.149	<.0001	0.276	0.656	<.0001	0.162
III Structure of patient network						
Network density (%)	-0,892	0.0374	0.428	-0.0008	0.9988	0.536
II Composition of patient network						
Professionnels (%)	2.235	<.0001	0.366	0.606	0.0918	0.359
Types of services (no.)	-0.104	<.0001	0.026	-0.093	0.0012	0.029

Random intercept						
Ego	0.938	<.0001	0.201	0.906	<.0001	0.218
Service	0.602	<.0001	0.211	0.95	<.0001	0.238

*p < 0.05 **P <0.01 ***P<0.001

DISCUSSION

This study investigated the interdependence of the support provided by alters to a patient with severe mental disorder. The main results of these analyses are as follows: first, the more central an alter is in the egonetwork of a patient, the more his support is considered as important by the patient. Second, homophilic relationships has no impact on support. Thirdly, the denser the network in which an alter is embedded, the less support he or she offers, but only for hospitalised patients.

Interpretation

Our first main result allows us to answer in the affirmative to our first question: “is an alter in a central position more supportive?” This supports the idea that a central position within the network of a user gives a comparative advantage to the alter, allowing him or her to offer more support to the user, probably thanks to a quicker and more complete access to information, a more comprehensive view of the user's situation, a better understanding of ego needs and potentially faster and more adequate interventions. This central alter is also in a structural position that allows

him/her to coordinate the support interventions of the other alters. This is consistent with the literature which shows that when an alter is connected to many other alters, he is more likely to provide support than if he is disconnected from those other alters (Wellman & Frank, 2001; Martí et al., 2017), but there is no literature specific to mental health that has addressed this issue. However, case-management, a widely disseminated practice, illustrated such role of central alter (Burns et al., 2007; D. Cullen et al., 1997; Dieterich et al., 2017; Marshall & Lockwood, 2011; Stein & Test, 1980). Case management coordinates services, distributes responsibilities across the different alters and facilitates information sharing (Thornicroft, 1991). Still on the level of the structural position of an alter within the ego network, our second main result leads us to answer our second question in the negative: “is an alter with homophilic relationships more supportive?” The fact of being connected especially with people in the same category has no impact. What seems to be important for an alter to give support is to have a lot of contacts, not especially to have contact with similar ones.

Our third question is about the influence of the general structure of the user's network on the support offered by the alters (and not the specific position of these alters in the network): “Is an alter embedded in a cohesive network likely to offer more support to a user than one who is part of a sparse network?”. On the whole, the overall structure of the network does not affect the important of the support provided by each alter. Yet, for hospitalized persons, the importance of support decreased as density of relationships within the network increased. This result is a priori

contradictory with another of our results that shows that, for hospitalized persons, a higher percentage of professionals in the users' network is associated with more support from the members of these networks. Indeed, more professionals in an inpatient context is likely to lead to a denser network, as these professionals generally work in teams.

There is no study similar to ours, focused on psychiatric service users, to which we could refer. However, some studies focusing more globally on the structure of the network of psychiatric users can provide us with elements of interpretation (Carpentier & White, 2002; Corrigan & Phelan, 2004; Dozier et al., 1987; Goldberg et al., 2003; Horan et al., 2006; Wong et al., 2011). Cohesive networks have the potential to mobilize more helping resources, among other things because it makes it easier for the alters to become aware of the importance of the problem (Carpentier & White, 2002) and offers the possibility for them to check his or her impression with others (Dozier et al., 1987). There is evidence of this outside the field of mental health : individuals who are embedded in dense networks receive more support in routine and crisis situations (Granovetter, 1983; Marsden, 1987; Smith-Lovin & McPherson, 1993; M. E. Walker et al., 1994; M. H. Walker, 2015; Wellman & Frank, 2001; Wellman & Gulia, 1999; Wellman & Wortley, 1990). However, a dense network could have a negative influence on the support offered by the members of the users network. A high density may favour the dilution of responsibility, leading alters to believe that others would be as good to offer support (Dozier et al., 1987). A dense network could also have consequences on the perception of the user who, rather

than being supported, may feel constrained. A dense network limits interpersonal distance and ensures that the user's reality is almost entirely shared, without the user being able to control possible distortions in the information that circulates about him or her (Dozier et al., 1987). Therefore, if during hospitalisation a large number of professionals make everyone feel more supportive, by improving the standards of support within the network, a very dense network, essentially organised around hospital resources, is likely to reduce the perception of support by the user and even cause a rupture with the services (Dozier et al., 1987).

Limits

This study has two limitations. First the network were described by the users themselves because there is no centralised information system in Belgium which allows us to describe the social support network of users in an objective way. As the users we meet may suffer from delusions and hallucinations, it is possible that the data we collected were not always totally accurate. This should, however, have a limited impact on our findings. Among the psychiatric service users we met, several of them expressed delusions, but only one person mentioned in the list of support persons a person from his delusion. The very process of data collection, based on very concrete questions, rooted in everyday life, seems to keep delusions at bay. At the same time, users may not remember all of the support persons, be unaware of certain exchanges between others, or assume the existence of relationships between some of them. Elsewhere (Wyngaerden et al., 2019),

Kappa coefficients indicated quite a good level of agreement between users' reports and main clinicians' reports of users' social support networks. In addition, other studies have shown that the collection methods of egocentric networks used here are reliable. Indeed, it seems that the information reported by ego about its alters is generally accurated.(C. A. Green et al., 2013). Adams & Mondy were able to highlight an 80% agreement between different egos about the same alter-alter social ties (Adams & Moody, 2007).

Secondly, the cross-sectional design is vulnerable to reversed causation and unobserved confounders (e.g. the relationship with the health professional who propose to the user to participate in the study). Furthermore, our study focuses on the structure of relations between the members of the network of users. We did not focus on the nature of the social interactions that occur within user's network. However, this element can influence the impact of the network structure on various outcomes (M. H. Walker, 2015). Finally, our sample of service users suffering from severe mental disorders is not representative of this category of users in the Belgian population. However, the characteristics of our sample are similar to those of other larger samples of the same population in Belgium. The average HoNOS score in our sample is quite close to that found in another Belgian study of a similar population (respectively 11.6, std=6.5 and 12.5, std=6.5) (Lorant, Nazroo, Nicaise, & The Title107 Study Group, 2017).

Perspectives

These results can be useful for decision-makers, service users, and professionals alike. From an organisational point of view, these results point to the need to recognise and support people who are in a central position within the network of psychiatric service users. It would be useful to support the development of individual or team case management practices. It would be interesting to support family carers, who are often little recognised for their informal coordination work. Concerning the clinical relationship between caregiver and patient, it would be useful if professionals could describe the networks of the users they support using the measurements used here and act accordingly. This would enable them to identify the people considered to be the most supportive as well as those with whom it would be interesting to coordinate with. From the user's point of view, such a process would allow them to put forward their point of view and become involved in the organisation of their care. Furthermore, the ambiguous results associated with the density of relationships within the network for hospitalised patients should lead professionals to be particularly attentive to the potential consequences that communication between alters may have on ego.

CONCLUSION

In this work, we have sought to highlight the impact of the structure of the social support networks of psychiatric users on the social resources they can access in order to function in the community. Our general hypothesis was that the structure of the network of relationships between the people supporting a user is likely to have an impact in two ways. On the one hand, strong cohesion in a network (i.e. the presence of ties between network members) is likely to offer the user coherent support through social control and by making rapid and adequate interventions possible. On the other hand, weak cohesion is likely to offer the user greater autonomy and more opportunities. In other words, network cohesion is not necessarily positive. While it facilitates collective interventions, it is also likely to limit the autonomy of service users and to deprive them of the diversity of resources that can be offered by more peripheral members of their support network.

Strong cohesion of a person's network is likely to offer him or her coherence of support whereas a weak cohesion should offer him or her autonomy of action and opportunities.

We also hypothesised that whether variation in the cohesion of the network offers more or less coherent support and more or fewer opportunities will depend on the severity of the user's situation and on his or her care and living situation. A service user's support system will be organised differently depending on whether the person is likely to experience numerous crises

and put himself or herself in danger, or is engaged in a process of recovery. In the first case, coherence of support is likely to be prioritised, whereas in the second situation, broader opportunities and autonomy of action are likely to be the priority. For the most vulnerable people, cohesion offers the possibility of quality care that is adapted to their situation, whereas for least vulnerable people, a less cohesive network offers the possibility of more autonomy. This question has important implications for the organisation of the support systems of psychiatric users, i.e. the ways in which family members, health and social workers, and all of the user's resources collaborate in order to offer a set of coherent services, capable of supporting the person in his or her objectives and promoting his or her social integration. This is an important issue, given that users complain that they are confused by care pathways that are often unpredictable and marked by frequent relational ruptures, and because of the potentially dramatic consequences in terms of suicide or users dropping out of services.

As part of this work, the aim of the study of the social support network is to improve the organisation of care in support of users of psychiatric services.

It is with the aim of improving the organisation of the support systems of psychiatric users in mind that we have investigated the impact of network cohesion on continuity of care, i.e. the coherence of a user's care system. We have also looked at the social support as perceived by the users of psychiatric services from a particular angle: the level of support provided by each person who supports a user, according to his or her position in the network and his or her interactions with others. These two complementary

perspectives should give us a fairly complete picture of how the structure of the relationships between support persons influences a user's support system, both in terms of its overall coherence and to the part that each of the support persons play in it.

RESULTS AND INTERPRETATION

We began by describing the social support networks of the 380 psychiatric service users. As in other studies on the same type of population, the size of their networks was small: 12 people on average. We found two notable differences, however, between our sample and those reported on in the scientific literature on the subject. The networks in our sample contain more professionals than those in other studies on similar populations. This could also be related to the context in which psychiatric service users were encountered: a health system that focuses heavily on professional support and psychiatric hospitals (rather than community resources). In 2018, Belgium was the European country with the highest number of psychiatric beds: 135.22 beds per 100,000 inhabitants. The European average (of 28 countries) is 67.99 per 100,000 inhabitants (Eurostat). Moreover, a recent European study has shown that lengths of stay are greatest in Belgium, which has an average of 54.9 days, whereas Germany has an average of 36.6 days and Italy has an average of 17.9 days (Dimitri et al., 2018; Giacco et al., 2020). The second difference is that the

The psychiatric service users we encountered had networks that contained more professionals and yet were less dense than those usually found in the scientific literature.

networks are less dense and more fragmented than in other studies on similar populations, which may be surprising given that they contain a high proportion of professionals. One explanation may be that, within the Belgian mental health system, collaboration is particularly problematic at different levels (between hospital and ambulatory services, general services and specialised services, etc.) (Nicaise et al., 2013). Another explanation, however, is that these patients' networks contained, on average, a large and cohesive subgroup that was disconnected from several isolated alters. This suggests that, in our sample, fragmentation mainly occurs when there is a large set of isolated alters, rather than several disconnected subgroups.

The most fragmented networks are those of service users living in the community or who have a high level of education.

But severity of psychosocial functioning is not associated with any structural features of the network.

Next, we analysed the sociodemographic and personal characteristics of the users. We found that density was lower in the networks of users with a higher level of education than in those of users with a lower level of education. The most fragmented networks are those of service users living in the community and those who have a high level of education. This is a situation that is also found in the general population: people with more resources have broader and more diversified social environments (Bidart et al., 2018). Fragmentation provides access to a greater variety of sources of support and greater autonomy for the user in coordinating his or her own network (Burt, 2004, 2009; Granovetter M., 1973). Another interpretation is that more highly educated psychiatric service users may require less

coordination between alters, as they may be less socially vulnerable and thus better placed to navigate the mental health care system. It should also be noted that people living in 24-hour supervised services have denser networks. This seems logical given that those services have a set or carers who work as a team, which explains the density of relationships within the support network. Neither density nor fragmentation is associated with the severity of psychosocial functioning. We might have expected the organisation of support to be based on users' clinical status (i.e. the severity of psychosocial functioning). This finding, however, is consistent with another study (conducted in the same geographical area) that found that client-centred orientation was the factor that contributed least to the quality of professional collaboration (Nicaise, Grard, et al., 2020).

Network density was positively associated with continuity of care, but only for people with the most severe difficulties.

Our study of the association between network cohesion and continuity of care was based on a hypothesis that is consistent with our general hypothesis on the dual effect of network cohesion: that strong cohesion offers coherence of support through social control, and weak cohesion offers autonomy and opportunities. A highly cohesive network is, therefore, likely to increase the continuity of care perceived by users who depend greatly on coherence of support delivery; the most severely affected users and those living in 24-hour-supervised accommodation. People in less severe situations, however, would not benefit as much from cohesion and could, on the contrary, see it as a constraint that is ill-adapted to their situation. In this respect, our main

finding was that the density of relationships within the networks of users of psychiatric services was positively associated with continuity of care, but only for those users with particularly severe psychosocial functioning. No cohesion indicators were associated with continuity of care, however, for users with less severe problems. One possible explanation is that, for less severely affected users, many network structures exist as there are many ways for the user to organise his or her life, and none of those structures are specifically associated with continuity of care. It is also possible that the structure of the network is of less importance to these users and that severity has an influence on continuity regardless of the structure. The content of the relationships (e.g. trust) might also have a significant impact on continuity of care for users with less severe difficulties.

The more central a support person is in a user's network*, the more important his or her support is considered by the user.*

For hospitalised patients, and only for them, the denser, t*he denser the network in which a support person is embedded, the less support he or she offers.*

Finally, we investigated the interdependence of the persons providing support (alters) and psychiatric service users (ego). We sought to identify the association between the structural position of support persons in a psychiatric service user's network and the importance of the support they offered, as perceived by the user. We found that a central alter provides more support than a less central alter. This suggests that a central position within the network of a service user gives a comparative advantage to the support person, allowing him or her to offer more adequate support to the user and putting him or her in a position to coordinate the

interventions of the other support persons. The second important finding is that, for hospitalised patients, and only for them, the denser the network in which an alter is embedded, the less support he or she offers. At first sight, this finding appears to contradict another of our findings, according to which, for hospitalised persons, a higher percentage of professionals in the users' network is associated with more support from the members of those networks. In an inpatient context, a greater number of professionals is likely to lead to a denser network, as the professionals in those services generally work in teams, which reduces the value of each individual professional. This finding also implies that, at least for hospitalised people, a high level of cohesion in the network is not compatible with a high level of support offered by the alters. If a small number of alters offering a high level of support is desired, a low-density network is preferable.

The network structure's influence on service user's outcomes varies according to the severity of users' psychosocial situations and their living situations

These findings give us some indications in relation to our main hypothesis, which was that whether the variation in the network's cohesion offers more or less coherence of support and more or fewer opportunities would depend on the severity of a users' situation and on his or her living situation. Two findings suggest that this could be the case. Firstly, the density of the social support network is associated with perceived continuity of care, but only for users in the most severe situations. A user's situation may be such that rapid intervention in crisis situations and a shared vision among carers favour more appropriate interventions. This does not seem to be the case,

however, for every service user and it is not the case for service users with less severe difficulties. We were unable to identify any network characteristics associated with continuity for these services users. We can assume that, for service users, social support networks meet other needs, aside from offering coherence of support. These might include greater autonomy and more opportunities to develop their social integration. Perhaps, a specific balance in a moderately dense network may guarantee a certain level of social control and sufficient autonomy. More research is needed to clarify this. The other interesting finding is that members of a social support network tend to offer less support to the user when the network is dense, but only if the service user is hospitalised. Contrary to the previous finding, the finding here was that density has a negative impact on the support offered by members of the network. It is possible that a high level of density increases the risk of disempowerment due to the alters knowing that others are present and ready to act. This could be the case here. This seems, however, only to be the case when the person is hospitalised. Outside the hospital, we have no indication of the impact of the network structure on the support offered by the support persons. In this situation, density could contribute to the diffusion of support value, which increases the level of support provided by all support persons. More research is needed to clarify this.

Those findings lead us to believe that the network structure does not have the same influence in all situations and that the severity of the user's psycho-social situation in particular influences the relationship between the

network structure and user outcomes. Of course, these are the first findings on a subject which has been explored very little up until now. Further research is needed to clarify the influence of network structure. These findings do, however, put the importance of density into perspective. Density helps to spread common values, generate trust, and improve coherence of interventions affecting service users. On the other hand, the density of relationships within the support network of a service user also implies a lot of exchange about the user that the latter does not necessarily control. This can be stifling and lead to breakdowns in care. As we have already seen above, a less dense network, containing structural gaps, offers other types of resources and more diverse views on the service user's situation. Peripheral people within the network are more likely to offer new ideas and perspectives than the closest people. Disagreements between supporters can be stimulating and lead to original solutions. Like all people, users appreciate being able to compartmentalise, to be different from one social group to another, and not having to tell everything to everyone. Moreover, density is very costly: it implies maintaining many contacts and sharing a lot of information, which requires time and organisation.

All this is consistent with the idea that density is not positive for everyone or at every step in the care pathway and that density may be more beneficial for people in more severe situations who have greater support needs. As we will develop further in the perspectives section, this encourages us to think of the service user's support network as a dimension on which can be acted on within the framework of clinical support and which, like the other

dimensions of support, must be individualised to correspond to the specific needs of each person. This seems all the more necessary as the networks of the service users we interviewed are rather vulnerable: small networks, composed of few different social circles and a large number of professionals are a priori not the most favourable conditions for supporting the social integration of psychiatric users.

This integration of network analysis into clinical practice, as an element for enabling the individualisation of care, seems to us all the more necessary because of the conflict among mental health professionals in French-speaking Belgium between two visions of collaboration around the user. Some advocate a dense network around people, with workers who can act as sentinels in the event of a crisis; the aim is to limit the risks taken by users and to ensure their protection, even if it means limiting their life prospects. Others advocate a looser network, in order not to deprive people of opportunities to build and develop independently of psychiatry; the challenge is then to make the most of the redundancies or interstices in the network, even if it means limiting or complicating the user's access to the care they might need. Advocates of the dense network approach say that it is irresponsible not to think in a precise way about care circuits for each type of problem, given that any crisis has unalterable consequences for users. Advocates of the looser network approach sat that it is dangerous to specify the modalities of collaboration between services in advance because of the risk of creating systematic trajectories for all users. There is thus a conflict between continuity of care provided by professionals, supported by a dense

network of collaboration, and continuity provided by the user (or his or her relatives), whereby increased opportunities are generated by a looser network. Both perspectives are likely to be positive and beneficial for some users, but they will never be so for all users at any point in their journey. The real danger would be to choose one option a priori. One of the conclusions of this work is not that a dense or centralised network should be favoured in general, but rather that we need to individualise care (and in particular interventions in users' networks) and think about ways of organising care that will provide enough options: we should offer dense networks to some and looser networks to others. None of this indicates what would be most beneficial in this or that type of situation, but it does point to the need to focus on the structure of the network as an object of clinical reflection, in order to promote the individualisation of care for each user.

LIMITATIONS

This study has two groups of limitations, methodological and paradigmatic: the data are self- reported, the design is cross-sectional, the sample may not be representative. From a theoretical point of view, this dissertation had a focus on the structure of the network and not on the content of the support. There is no centralised source of information in Belgium that can be used to describe the use of services by service users. The only source of information at our disposal is the users themselves and this is why we used an ego-network design. This can lead to a number of potential difficulties. The user might not be aware of the communication between the carers. Even if users

should legally be aware of any exchange of information about them, it is more than likely that this is not always the case. Yet, as mentioned by others, the egonetwork is designed to capture the perception that ego has about alter-alter ties of alters ego know quite well (McCarty et al., 2019). It is also possible that some service users assume that there is communication between some carers which may not necessarily exist or that users forget certain information. Another risk is that the information provided by users may be influenced by the delusions or hallucinations from which they suffer. We believe, however, that this should have a limited impact on data quality. While service users are indeed likely to be unaware of some of the interactions around and about them, they are probably the people with the most comprehensive view of their own network, particularly with regard to informal support, which health professionals are less likely to know about. In our fourth chapter (Wyngaerden et al., 2019), we show that there is a good level of agreement. The differences between users' reports and main clinicians' reports mainly concern relatives, peers, and general health services. Moreover, studies have shown such collection methods to be reliable. According to Green et al., information about alters is accurately reported by the ego (C. A. Green et al., 2013). Another study found that there was 80% agreement between different egos about the same alter-alter social ties (Adams & Moody, 2007). Finally, in our experience, the impact of psychiatric symptoms on data quality is very limited. We have met many service users who have expressed delusional ideas. Only one user, however, mentioned a character from their delusions on the sociogram as someone who supports them. The very process of data collection, which is

based on very concrete questions and rooted in everyday life, seems to keep delusions at bay.

The cross-sectional design of the study also makes it vulnerable to reversed causation and unobserved confounders. The health professional who recommended users for participation in the study is likely to be influential. Their relationship may be a determining factor in the user's willingness to participate and may also influence his or her responses, since the data also relate to the service that brought the user into contact with the researchers. The interviews were conducted by nine different researchers and the recruitment of the services that selected the users and put them in contact with the researchers was carried out by three different people. The relationship those people have with the service users and with the services is also likely to have influenced the process of contact with the service users.

Another limitation of our study is that it focuses on the structural dimension of the users' social support network, i.e. on the presence or absence of relationships between support persons and the structure of the relationships between them. We did not focus on the content and context of the social relationships within users' networks. The same network structure can have quite different effects, however, depending on whether or not the person's social environment legitimises the way he or she assumes his or her social roles. This can change the impact of personal network density on self-esteem and self-efficacy, for example (M. H. Walker, 2015). With regard to our research questions, information on the content of

the exchanges (shared values, for example) or the context in which they appear could also help us interpret our results. In “self-affirming social environments” (M. H. Walker, 2015), for example, the cohesion of the network, which can support the person in seeking and adhering to care, could have a greater impact on continuity of care. Similarly, with regard to support persons within the network of a service user, an environment that validates a support person’s perception of the service user’s situation is likely to increase the impact of that person’s centrality on the support offered to the service user.

We did not, moreover, look at service users' experience, motivation, or view of their support network structure, and we did not explore how service users are likely to act on their own networks. It is, therefore, important to specify that, although we have applied a structural perspective in this study, focused on the organisation of care between support persons, this does not mean that we think that the organisation of support persons among themselves is the only means of acting on the support networks of service users. The service users themselves are, of course, the main driving force behind the construction and evolution of their own support networks, through the multitude of decisions they take, more or less explicitly: to go to a service, to move, to change doctor, not to call a friend back, to join a gym, to follow the suggestions of a social worker, etc. Describing this process of construction and evolution of the social support network through the actions of the service user would also have helped to more precisely identify what determines the user’s perception of continuity of care.

Finally, the sample of users interviewed may unrepresent the population of service users with severe mental disorders. If we compare it with the situation in other countries, our sample includes a much larger number of people hospitalised in psychiatric wards. In a recent European study (P. Smith et al., 2020), 3.4% of people with severe mental disorders included in the sample lived in 24-hour-supervised facilities (housing status on the SIX scale), compared to 29.4% of the people in our sample. This difference is very significant. As we have seen above, however, Belgium is a very hospital-centric country, with the highest number of psychiatric beds in Europe and very lengthy hospital stays (Dimitri et al., 2018). The proportion of people living in 24-hour supervised facilities in our sample, therefore, may be close to the proportion in the population of services users with severe mental disorders. We constructed a sample that was as representative as possible, but the data available on this population were too limited to guarantee this, given that Belgium does not have a centralised system for information about all psychiatric service users. Moreover, for practical reasons detailed in the methodological chapter, we ended up seeing more patients than expected in the hospital and fewer who were being cared for by home treatment teams and primary care services: we met 49% of the service users in the context of hospital services, whereas in the feasibility study for the Belgian psychiatric reform (Gurnet et al., 2014), which served as a reference point for constructing our sample, 38% of the sample were met in the context of hospital services. As Belgian mental health care is very hospital-centred, this does not seem to us to be of great concern and we still think that that our samples correspond quite well to the Belgian population of service users

suffering from severe mental disorders. Furthermore, the average HoNOS score in our sample is close to that found in another Belgian study of a similar population (respectively 11.6, std=6.5 and 12.5, std=6.5) (Lorant, Nazroo, Nicaise, & Title107 Study Group, 2017). It is however a concern that we met few service users via primary care services: users of those services are often more distant from psychiatric services and have little trust in them. This leads us to believe that we only have access to part of the population of people with severe mental disorders: those who are known to psychiatric services and under their care and not those mainly cared by general health services.

PERSPECTIVES

Research perspective #1: Set up longitudinal studies to study changes in the structure of the network over time.

We will conclude by discussing the implications of this thesis for research and for the organisation of mental health care. First of all, we need longitudinal studies to complement this cross-sectional study : how the structure of the social support networks of psychiatric service users with severe mental disorders changes over time. We need to understand how changes in the composition of the networks or in the structural position of the alters within the networks influence social integration, psychosocial functioning, continuity of care, delivery of support, etc. And, conversely, we need to understand how changes in social integration, psychosocial functioning, continuity of care, etc. influence the composition and structure of social networks. This is

essential for drawing conclusions that will help to guide the organisation of care and interventions in users' networks. Setting up longitudinal studies is one way of achieving a better understanding of the direction of causality. They are not, however, a panacea. Yet, while longitudinal studies can control for fixed effects, not be better than cross-sectional study in terms of causality as both the exposure and the outcomes are observed in the same time. An alternative approach would be to implement experimental designs that test the impact of induced change on users' support networks.

Research perspective #2: Take into account the content of the exchanges in the analysis, notably by developing new indicators that combine measures of structure and composition or use qualitative data.

It would also be interesting to consider the content of the exchanges within the network, i.e. the transactional aspect of the network, and not only the structural aspect. Eliott Freidson suggests that help-seeking behaviour is influenced not only on the cohesion of the relationships within the network, but also by the content of the relationships, in particular beliefs about the value of seeking help that are shared within the network (Freidson, 1988). He describes a lower-social-class referral system, which is characterised by strong cohesiveness and mutually reinforcing interaction. People living in this context are less likely to seek professional or specialised care because it is unfamiliar to their social group. Charles Kadushin reached a similar conclusion in relation to the referral of urban people from higher social classes to psychotherapists (Kadushin, 1966). Cohesion within a group that values professional care could have an entirely different effect from cohesion within a subgroup that

only values informal support. In a social environment that supports self-affirmation, a dense network will have the effect of increasing the individual's ability to assume his or her social roles. Conversely, in an environment that does not support self-affirmation, a dense network is likely to create constraints that weigh heavily on the individual (M. H. Walker, 2015). All of this points to the importance of taking into account information on the content of exchanges within services users' networks which may influence the association between the network structure and the support offered by the alters or the continuity of care: the context of the relationships, the content of the exchanges (shared values), and the consistency between the values of the person being supported and those of the members of his or her network.

Research perspective #3 : Take into account the specific roles of supporting persons, notably by developing new indicators that combine measures of structure and composition or use qualitative data.

Aside from the content of the exchanges, we could also focus on the specific roles played by the members of the service users' support networks. In our work, we have usually distinguished three main groups: mental health professionals, other professionals (social and health), and friends and family. We could, however, have identified many more specific groups of roles in our analyses. For example, types of professionals could have included psychiatrist, psychologist, nurse, social worker, general practitioner, pharmacist, childcare, priest, or local police officer. Relatives could have been broken down into parents, uncles, aunts, children, nephews, nieces, cousins, lovers

or ex-lovers, neighbours, work colleagues, and relations linked to an activity (sport, leisure, etc.). Taking the specific roles of the support persons into account would provide additional elements to help us understand why some carers are likely to take a central place. Certain strong relationships, such as couples, are more likely to have a central position as they are potentially in contact with the person's different social circles. Parents and children are also more likely to coordinate support, due to social norms such as filial duty. These different roles could also be analysed in association with information on the strength of the relationship, regularity of contact, geographical distance, etc.

In order to take these dimensions into account, we could develop new indicators that combine measures of network structure, network composition, and the content of relationships would be particularly useful. For example, a central alter who shares the ego's vision of care could be more supportive. It is also possible that a dense network will have an even more positive impact on continuity of care if the values shared within the network support the use of mental health services. It is also possible that a central person in a network will offer more support if he or she has plays a specific role in supporting the person. Alternatively, we could explore the most peripheral support persons within the service user's network: isolated people who are not in contact with other support persons, those who are in contact with only one other support person through whom they are connected to the rest of the user's network, and those who form a small group of two or three supporters disconnected from the rest of the network.

It would be interesting to identify the characteristics (type of support, type of role, regularity of contact, etc.) of the people with a specific position in the structure of the user's network. Indeed, as mentioned above, peripheral people are likely to offer a different type of support from those who are strongly connected to other supporters within the network.

We could also look at the presence or absence of links between support persons according to their characteristics or the characteristics of their relationship with the service user they support. What are the characteristics of the people who are very often linked within the service users' networks that have been collected? What are the characteristics of those who are rarely in contact with each other? It could be, for example, that people are more likely to be in contact if they are part of the same care department, if they offer similar types of support, or if they are seen by the service user as offering support of equal importance. They may have more or less contact with each other depending on the geographical distance between them and the duration of their relationship with the service user.

Research perspective #4: To analyse the presence or absence of relationships between support persons in relation to their characteristics.

We could also use qualitative data in a complementary way. Qualitative data would make it possible to better understand the mechanisms by which the structure of the network influences the user and the people who support him or her,

Research perspective #5: Use qualitative data to describe the context of exchanges and how users act on their own networks.

particularly by describing the content of the exchanges and the context in which those relationships exist. Qualitative data would also allow us to describe the process of tie formation and evolution of the social support network through the actions of the service user and supporting persons.

Research perspective #6: To study the influence of characteristics of support persons on the support offered to the service users.

Another interesting research perspective would be the collection and analysis of the characteristics of the support persons: their age, gender, and socio-economic status. These characteristics could influence the structure of the network and the support offered to service users. Links between support persons could be associated with age groups, for example. The relationship between a support person and a service user could be influenced by differences in age or generational differences. Gender is also likely to have an influence on support. Among children supporting a parent, for example, a supportive role is likely to be influenced by gender. The interaction between age and gender is another dimension that could be considered.

Research perspective #7: Establishing a typology of social support networks to explore the variety of structural indicators and the associations between them.

At present, despite the analyses proposed here, we still know little about the structure of the social support network and so far, studies have only used a few indicators of the network structure. In Chapter 3, we presented the variety of indicators of network structure that can be used, but not all of them are used in the following chapters. Establishing a typology of social

support networks would be an interesting way of exploring the different structural indicators, the associations between them, and their association with services user outcomes. Many of these structural indicators are associated with each other. For example, density is likely to decrease in accordance with network size and the centrality of the user in his or her own network decreases in accordance with his or her network's level of centralisation. A typology would make it possible to identify different types of network structure using a set of significant measures, taking into account the associations between them. It would then be possible to use this typology to identify groups of service users and analyse the impact of network structure on the support offered by the alters or on continuity of care.

Research perspective #8: To analyse the differences in perception between the user and his or her reference caregiver about his or her social support network.

Several other projects could still be developed based on the data collected in the Morpheus project. As discussed in the methodology section in Chapter 2, each user identified a reference health professional who was familiar with his or her network. In this way, we were able to obtain information, in particular, about the severity of their psychosocial functioning. Using the sociogram, we also collected the patient's social support network from the point of view of this reference caregiver. This enabled us to carry out an analysis of the extent to which the user and the health professional differed in their view of the composition of the network, as briefly presented in Chapter 4. We could, however, take this analysis

further, and identify the differences between the perceptions of the two parties more precisely.

Research perspective #9: "Piling up" the social support network of many service users to give a picture of the network of collaboration between services.

Other research carried out at our research institute has studied the association between the continuity of care perceived by users and the form of the network of collaboration between the services to which they have access in a given area (Lorant, Nazroo, Nicaise, & Title107 Study Group, 2017). That research did not look at users' personal support networks, as this study has done (Wyngaerden et al., 2019), but to the relations between services, declared by the services. However, social network data at user level could also contribute to an analysis at service level. By "piling up" personal networks, we could identify the services that are most often cited in a given area and the collaborative relationships that are most often cited. This would give us a picture of the network of collaboration between services. This is another way of answering our research question about the association between network structure and continuity of care, but at the service level rather than at the user level. It would also be interesting, in this analysis of the relationships between services by "piling up" networks of service users, to distinguish between the three geographical areas of data collection. It is possible that the organisation between services that emerged in this analysis would differ according to the collaboration modalities specific to a geographical area.

We can also draw some lessons from these findings for those responsible for organising the health system and for health professionals. First, it is important to note the high proportion of professionals in users' networks. This is undesirable, both from the point of view of the financing of the mental health system and because of the diversity of the social resources needed by users to support their social integration. Moreover, if we combine this high proportion of professionals with the low average density of the networks we observed, we are left with a rather negative picture of the coordination of care. The importance in respondents' perception of the central persons within their network gives us an indication of what approaches should be pursued at the level of the organisation of the health care system. The case management function and Assertive Community Treatment (ACT) mobile teams are still in their early stages in Belgium and these teams are not bound by a specific model of organisation, such as the ACT model. Supporting functions such as these, which can take a central position in users' networks, could be a useful approach. Family and friends can also be central in a user's network. It is also important, therefore, to recognise the status of carers to enable family members to play a positive role in the organisation of care for users, as has just been implemented in Belgium.

Organisation of mental health care perspective #1: Supporting the central persons in users' networks *through case management services and measures to enhance the role of family carers.*

Organisation of mental health care perspective #2: Identifying the central people in the user's network to work with and determining the appropriate density for the network according to the user's situation should be routine clinical practice.

Health professionals involved in caring for users are also likely to be interested in our main findings. Firstly, the finding that the most central supporters in the network are also the most supportive is very interesting. Identifying these people and giving them a particular role in user support could be beneficial. Our results concerning the density of the network are also likely to be of interest to health professionals. Health professionals often express deep concern about the organisation of collaboration around users. There is disagreement, however, between those who consider strong network density to be more beneficial and those who favour weak network density. The former believe that the latter provide insufficient support to users, because they do not build sufficiently dense support networks around them. The latter believe that the former lock users into a network of collaboration which is too tight and deprives them of their freedom of choice. Our results, which show that a dense network is likely to have positive effects, but not for all users, add nuance to this debate. A dense social support network is likely to have a positive influence on perception of continuity of care, but only for users in the most severe situations. Members of a social support network tend to offer less support to a user when the network is dense, but only when the user is hospitalised. Health professionals should, therefore, consider the structure of networks on a case-by-case basis, taking into account the severity of the user's situation and the place of care. In the context of service user support, it is likely that

a choice must be made between prioritising overall density in a service user's support network and prioritising the collaborative support provided by a few central actors. It seems difficult to have a network which is both very dense and composed of actors that offer a lot of support. That choice also depends on the person's situation.

Organisation of mental health care perspective #3: Develop a variety of clinical interventions based on network data: the number or type of support persons, the specific position of support persons within the network, and the presence or absence of connections between support persons.

This suggests that it would be helpful for mental health professionals who support psychiatric users to develop interventions in users' social support networks. While our findings do not tell us precisely how to intervene in users' networks, we can nonetheless conclude that it is worthwhile to develop individualised interventions in the network structure, developed specifically for each psychiatric user according to his or her particular situation (i.e. the particular form of his or her network and his or her life goals). This is based on our findings on density: density does not always have the same effect: its effect differs according to each individual's situation. Interventions should not, therefore, seek to modify the density of users' networks in the same way in all situations. Furthermore, as we have already seen in Chapter 2, interventions in users' social support networks are potentially very diverse. They may aim (1) to develop skills or give a specific role to a support person, (2) to modify the number or type of support persons, or (3) to modify the connections between support persons.

The first step in such individualised interventions is to compile information on the composition and structure of the user's social support network. We should, therefore, develop tools for mapping the social support networks of psychiatric users; this will enable us to design individualised interventions. This is what mental health professionals have done by reappropriating the sociogram, the social support network collection tool used in this study. Without waiting for research results, mental health professionals have used the information collected via the sociogram to improve the support provided to mental health service users. They report their interest in using sociograms to identify not only users' social resources, but also concrete opportunities to mobilise those resources in support of the user. The sociogram also allows us to look at the user in the context of his or her everyday life: his or her reality, exchanges, and modalities of contact with others. On the basis of the evaluation of the user's resources, they can also assess, with the user, whether the available resources (care services or informal support) are sufficient to meet the user's objectives and identify any additional services that may need to be mobilised. The sociogram is also of interest to mental health professionals because it describes the information exchange relations between the support persons and the organisation of their coordination. In practice, this makes it possible to identify the people with whom health professionals can collaborate to ensure continuity of support, particularly when a change in the support

Organisation of mental health care perspective #4: Develop tools for mapping the social support networks of psychiatric users, which will enable us to design individualised interventions.

network is announced (e.g. during a transition from one service to another). The use of the sociogram also allows the user to form an image of his or her support network and an opinion on what kind of support network he or she wants. Constructing a sociogram is likely to mobilise the patient psychologically and help him or her to establish recovery objectives. For both professionals and psychiatric service users, the sociogram also makes it possible to describe the diversity of social contexts in which the user is present and the social roles he or she assumes, an indication of his or her social integration. This makes it possible to identify the extent of the user's dependence on professional support and, thus, to set objectives which promote the mobilisation of non-specialist mental health support, which is consistent with the values of psycho-social rehabilitation and recovery,. Finally, to refer to the general hypothesis of this work: by providing further information about the user (anamnesis, medical history, recovery objectives, etc.), the sociogram enables professionals to assess, on an individual basis, whether a more cohesive network, offering coherent support, or a more fragmented network, providing autonomy and opportunities, is in the best interests of the user.

The EGONET project was developed as a reaction to feedback from health professionals. It was set up by the "Mental Health Service Research" group of the UCLouvain Institute of Health and Society in collaboration with the Institut Paul Lambin, CERDECAM, Epsylon, and Brusano and financed by Innoviris. EGONET is a research project aimed at developing computer-assisted face-to-face interventions for mental health professionals and

psychiatric service users, based on the sociogram developed for this study. The aim is for this tool to be usable in routine practice. The computerised environment includes five components: (1) a computer-assisted collection and mapping tool, (2) a distant data warehouse, (3) an analytical module of the characteristics of the social networks collected, (4) the generation of a feedback report consisting of the social network mapping and a summary of information collected and analysed about the social support network, and (5) a feedback web app that allows the feedback report presentation to be customised according to the clinician's and the patient's needs. The objectives of the project are to assess the intervention’s implementation in terms of adoption and feasibility, to evaluate the level of satisfaction of patients with their social support in general and their social network in particular, and to strengthen the knowledge about the social capital of people with severe mental illnesses. But that is another story...

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