Responsiveness of the Duke Social Support sub-scales in older women

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Abstract

Objective: an abbreviated form of the Duke Social Support Index (DSSI) as used in a large longitudinal study of older Australian women was examined with respect to factors that might be expected to affect social support for older women over time.

Methods: in this large cohort study two sub-scales of the DSSI, one describing the size and structure of the social network (four items) and the other perceiving satisfaction with social support (six items), were analysed in relation to outcome and exploratory variables.

Results: over a 3-year period, the network score increased among women whose life circumstances meant that they were likely to receive more support (e.g. recent widowhood). Likewise, those women at risk of becoming more socially isolated (e.g. those with sensory loss) became less satisfied with their social support. Changes in both measures were tempered by women's mental health and optimism.

Conclusions: although the sub-scales of the DSSI may not fully reflect the complexity of social support paradigms, they are responsive to changes in the lives of older women and can be useful in community-based epidemiological studies.

Keywords: *social support; women's health; longitudinal studies; Duke Social Support Index; elderly*

Introduction

Social support is an inherently broad construct which has been described in terms of one's social network (commonly estimated by the number of persons within the network) and the quality of interactions between an identified person and their social contacts. As social support has an important role in health and well-being, especially in older people, there is a need for brief instruments that can be used to measure this construct in large-scale epidemiological studies. For longitudinal studies, the measure should be responsive, that is, able to detect changes over time.

Examining social support in older adults is important because they are at increased risk of declining social support networks due to a number of factors, including the deaths of friends, retirement, declines in physical health and decreased mobility. Other variables which may impact on social support include gender and mental health. Women extend and in turn receive more support over their life than men [1] and experience greater benefits from their social networks [2]. Although much research supports the view that women in general possess social support networks which may be more

extensive and robust than those of men, these can come at a price (for example, the need to continue to provide support in such an extended network) [3]. These gender differences also appear to decrease beyond age 70 [4]. Some studies have found a negative relationship between depression and social support, suggesting that depressed individuals may repel potential sources of support or that lack of social support may be a factor in the development of poor mental health [5]. Other research suggests that women who may require more support (for example, recently bereaved or those with physical illness) may both attract more support and potentially drive away support if depressive symptoms develop [6]. As women are more vulnerable to depression than men throughout the lifespan [7], aspects of mental health functioning are of particular interest when considering social support among women.

Although researchers categorise types of social support in various ways, instrumental and emotional social support are the most studied. Several theoretical frameworks for social support have been advanced. For example, Litwak's [8] task-specific model of social support suggests that different sources of support (e.g. friends vs. family) typically provide

different types of support (e.g. companionship vs. domestic tasks). Several models specifically address changes to social support later in life. Carstensen's [9] socioemotional selectivity theory proposes that older adults actively prune their social networks to maintain optimal support in the face of limitations such as physical declines and what may be perceived as a limited amount of time remaining. Thus, while the number of people in an older individual's social support network may decline, the amount of support derived remains fairly stable, with numbers of close relationships remaining comparable to younger cohorts [10].

This paper considers the Duke Social Support Index (DSSI) [11] sub-scales in relation to factors that might be expected to affect social support for older women over time. An abbreviated form of the DSSI has been used in the Australian Longitudinal Study on Women's Health, which explores factors that promote or reduce health in a large sample of women who are broadly representative of the whole Australian population. The psychometric properties of the DSSI and cross-sectional relationships with socio-demographic and health characteristics among older women in this large longitudinal study have been previously described [12].

The current study aims to evaluate the responsiveness of the two DSSI sub-scales in relation to demographic and psychological factors that might be expected to lead to changes in social support over time.

Methods

Participants

Participants were drawn from the Australian Longitudinal Study on Women's Health. This analysis is based on data from the first and second surveys of the older cohort conducted in 1996 and 1999 when the women were aged 70–75 and 73–78 respectively. A detailed description of the study and participants [13] is contained in Appendix 1 in the supplementary data on the journal website http://www.ageing.oxfordjournals.org.

For both Survey 1 and Survey 2, a total of 6,373 women had completed all 10 items of the DSSI and additionally had provided information on all the explanatory variables described below.

Measures

Outcome variables

The DSSI consists of two sub-scales. The first measures the size and structure of the social network (hereafter Network) and consists of four items. The second is a six-item sub-scale which measures the perceived satisfaction with the behavioural or emotional support obtained from this network (hereafter Satisfaction). These sub-scales are analysed separately in this study. A list of all items in both sub-scales, the response options and scoring system is contained in Appendix 2 in the supplementary data on the journal website http://www.ageing.oxfordjournals.org.

Network scores ranged from 4 to 12 with higher scores indicating more social contacts. The Network scale had a moderate but acceptable value of 0.6 for Cronbach's α at both Survey 1 and Survey 2. Satisfaction scores ranged from 6 to 18 with higher scores indicating a greater level of satisfaction with social support. The Satisfaction scores had a Cronbach's α of 0.8 at both Survey 1 and Survey 2. Changes in the Network and Satisfaction scores were calculated by subtracting the Survey 1 score from the Survey 2 score so that a positive value for change in Network score indicates an increase in social contacts and a positive value for change in Satisfaction score indicates an improvement in satisfaction with social support.

Explanatory variables

Factors hypothesized to impact on Network scores were demographic variables, including marital status, recency of widowhood, moving house, country of birth, income and a major decline in the health of a close family member or friend. Factors hypothesized to impact on Satisfaction scores included limited mobility, difficulties in hearing or seeing, incontinence and major personal illness. Psychological characteristics which might mediate the impacts of these variables on Network and Satisfaction scores included mental health as measured by the five-item Mental Health sub-scale (MH) of the SF-36 [14]; hardiness as determined by the control sub-scale of the Health-Related Hardiness Scale [15] and dispositional optimism assessed by the Life Orientation Test—Revised [16]. Scores on the SF-36 MH scale were categorised into <53 or ≥53, where the lower range of scores is regarded as indicative of probable psychiatric disorder. Change groups were defined for time varying categorical variables; for example, four categories were determined for change in the MH score between Survey 1 and Survey 2: unchanged at ≥53, unchanged at <53, changed from <53 to ≥53 and changed from ≥53 to <53. The explanatory variables hardiness and optimism were only measured at Survey 2, but were included in the model as these traits have been described as stable over time and are characteristics that influence attitudes and behaviour [17].

Statistical analyses

One-way analyses of variance were used to investigate the association between all categorical explanatory variables and Network and Satisfaction scores at Survey 1 and change in Network and Satisfaction scores between Surveys 1 and 2.

The general linear model (GLM) procedure in the SAS statistical package was used to perform multiple linear regression with change in Network or Satisfaction score, the dependent variable. A backward selection process was used to determine the variables included in each model. Variables were removed from the model one at a time, using a conservative significance level of 0.005, until all variables in the model were statistically significant. The OM option within least-squares means (LSMEANS) was used to adjust

Table 1. Univariate analysis of variance: Network and Satisfaction scores at Survey 1 against various baseline characteristics: mean and 95% confidence interval for each level and *P*-value for variable

Marital status[a]	n	Network score	Satisfaction score
Married/de facto	3,753	8.79 (8.74, 8.84)	16.98 (16.93, 17.03)
Separated/divorced/never married	550	8.82 (8.68, 8.96)	16.48 (16.29, 16.66)
Widowed in the past year	184	9.20 (8.97, 9.43)	16.81 (16.51, 17.11)
Widowed more than 1 year ago	1,861	9.25 (9.18, 9.32)	16.91 (16.83, 16.99)
		<0.0001	<0.0001
Moved house			
Yes	379	8.74 (8.57, 8.92)	16.47 (16.25, 16.69)
No	5,994	8.95 (8.91, 8.99)	16.94 (16.90, 16.98)
		0.0157	<0.0001
Country of birth			
Australian born	5,006	9.03 (8.99, 9.08)	16.97 (16.92, 17.02)
Other English speaking	870	8.76 (8.64, 8.87)	16.82 (16.70, 16.94)
Europe	397	8.25 (8.08, 8.41)	16.50 (16.29, 16.72)
Asia	64	8.34 (7.88, 8.81)	16.41 (15.93, 16.89)
Other	36	8.28 (7.76, 8.80)	16.72 (16.15, 17.30)
		<0.0001	<0.0001
Decreased income in past 12 months			
Yes	1,190	8.96 (8.87, 9.06)	16.69 (16.58, 16.81)
No	5,183	8.93 (8.89, 8.97)	16.96 (16.92, 17.01)
		0.5374	<0.0001
Major decline in health of a close family member or friend in past 12 months (not spouse)			
Yes	1,882	9.09 (9.02, 9.16)	16.82 (16.74, 16.90)
No	4,491	8.87 (8.82, 8.92)	16.95 (16.90, 17.00)
		<0.0001	0.0060
Limited in walking 100 m			
Yes	1,098	8.62 (8.53, 8.72)	16.48 (16.35, 16.61)
No	5,275	9.00 (8.96, 9.04)	17.00 (16.96, 17.05)
		<0.0001	<0.0001
Hearing problems in past 12 months			
Yes	2,276	8.91 (8.85, 8.98)	16.74 (16.66, 16.81)
No	4,097	8.95 (8.90, 9.00)	17.01 (16.96, 17.06)
		0.4158	<0.0001
Sight problems in past 12 months			
Yes	4,139	8.90 (8.85, 8.95)	16.80 (16.74, 16.86)
No	2,234	9.01 (8.94, 9.07)	17.12 (17.06, 17.19)
		0.0102	<0.0001
Incontinence			
Yes	2,127	8.86 (8.79, 8.93)	16.74 (16.66, 16.82)
No	4,246	8.97 (8.92, 9.02)	17.00 (16.95, 17.05)
		0.0117	<0.0001
Major personal illness			
Yes	737	8.77 (8.65, 8.89)	16.58 (16.43, 16.73)
No	5,636	8.96 (8.92, 9.00)	16.96 (16.91, 17.00)
		0.0028	<0.0001
Mental health score			
≥53	5,834	9.02 (8.98, 9.06)	17.06 (17.02, 17.10)
<53	539	8.06 (7.91, 8.20)	15.34 (15.11, 15.58)
		<0.0001	<0.0001

[a]25 women had missing marital status at Survey 1, but marital transition status could be determined.

for different sample sizes among levels of the categorical variables.

The explanatory variables included were the categorical variables described in Table 1 and the continuous variables optimism and hardiness. The score at Survey 1 of the sub-scale of interest (Network or Satisfaction) was also included to adjust for possible regression to the mean.

Results

Explanatory variables statistically associated with Network and Satisfaction scores at Survey 1 are presented in Table 1. A greater Network size was significantly associated with widowhood, being born in Australia or another English-speaking country, major decline in the health of a close family

member or friend, adequate mobility, not having a major personal illness and having a higher MH score. Satisfaction with social support was significantly positively associated with being widowed or in a married or de facto relationship, remaining in the same house, being Australian born or from another English-speaking country, stable income, adequate mobility, no hearing or sight difficulties or incontinence, no major personal illness and having a better MH score.

Explanatory variables statistically associated with change between Survey 1 and Survey 2 in Network score or Satisfaction score in univariate analyses are shown in Table 2. An increase in Network size was significantly associated with recent widowhood, decreased income, good or improved mobility and improved mental health. Most women became less satisfied with their social support, with the largest decreases associated with being born in another country, ongoing problems with sight and a reduction in mental well-being.

After adjusting for all other explanatory variables in the model and regression to the mean, increases in Network scores from Survey 1 to Survey 2 were associated with being widowed, especially recently, and not experiencing major mobility limitations. Network size was also positively associated with optimism scores. A reduction in Network size was associated with being born in another country and declining or ongoing poor mental health (Table 3).

After adjusting for all other explanatory variables, decreases in Satisfaction scores from Survey 1 to Survey 2 were associated with women being single (never married, separated or divorced), being born in another country, ongoing or new hearing difficulties, continuing sight difficulties and continued poor or decreasing mental health. Higher optimism scores were associated with a greater level of satisfaction with social support.

Discussion

The results show that the two sub-scales of the DSSI ('social network characteristics' and 'satisfaction with social support') were responsive to changes in older women's life situations and characteristics in the hypothesised directions. Social networks appear to increase in women likely to require help or assistance, especially those recently widowed. These individuals, due to their circumstances and current needs, may attract increased attention from their existing social network. This is congruent with age- and gender-related models of social support (e.g. Litwak's [8] task-specific model of social support), suggesting that these women are benefiting from the responsiveness of the social networks they have put in place. Litwik's model matches social support tasks with appropriate providers; future research could examine what specific types of providers are of significance to those recently widowed.

Social networks appeared to decrease for women less able to access their network, either physically (e.g. those with limited mobility) or psychologically (e.g. those with lower MH or optimism scores). These individuals may be unable to access their networks effectively, or may in fact be resistant to approaches from within their network, particularly if the individual is withdrawing socially due to depression, for example. Again, this is congruent with research suggesting that those with depression may repel social support from existing networks. This reduction in the social network may reflect adaptation to a perceived lack of social support from some quarters of their existing network, with the individual disengaging from those whose support is not adequate for their needs, resulting in a smaller social network. This is congruent with Carstensen's [9] socioemotional selectivity theory and may be considered adaptive at this stage in the women's life course. However, in the case of depression in older women, further research is warranted to ascertain if such pruning of relationships is by design, as well as whether or not having a smaller but more responsive network is indeed of greater utility.

Satisfaction with social support was similar in women who were married or in a de facto relationship and widows; this may be a function of the increased amount of social interaction the widowed group attracts from their social network. Satisfaction with social support in women with a hearing or sight impairment was low, possibly due to unwillingness or inability to participate in social interactions or their decreased ability to derive pleasure from such contact. Other studies of older women have indeed found lower rates of social participation associated with sensory loss [18].

Finally, optimism was higher in women who were more satisfied with their social support. So-called existential variables such as optimism have previously been found to be associated with an individual's ability to overcome difficulties [19]. It is possible that women with more optimistic outlooks are better able to utilise their social support networks, thus deriving greater satisfaction from them.

Women from non-English-speaking countries were less satisfied with their social network, possibly reflecting a shrinking over time of a cohort of peers from their country of origin who share similar experiences. This may explain why women from English-speaking countries other than Australia experience similar dissatisfaction; changes in community composition or acculturation may be at work in such cases. However, in other research, social support was found not to differ significantly by age among immigrant groups although the emotional distress reported among immigrant groups increased with increasing age [20]. Social support and satisfaction with social support in immigrant groups, particularly as these people age, is an area which requires further study.

A possible limitation of the present study is the small range of values obtained on the Satisfaction scale. Many women scored the maximum value, perhaps reflecting an unwillingness to acknowledge inadequacies of social support. At Survey 2, average scores were lower as improvements could not be adequately measured due to this ceiling effect. Consequently, this scale may not be as responsive to perceived change in social support as other measures which give a wider range of observed values. The absence of questions about negative aspects of social support is another shortcoming of the DSSI. Other measures of social support that

Table 2. Univariate analyses of variance: change in Network and Satisfaction scores between Surveys 1 and 2 against categorical explanatory variables: mean and 95% confidence interval for each level and *P*-value for variable

Marital status	*n*	Change in network	Change in satisfaction
Married/de facto at both	3,302	0.07 (0.02, 0.12)	−0.34 (−0.39, −0.28)
Separated/divorced/never married at both	489	0.04 (−0.08, 0.17)	−0.51 (−0.68, −0.34)
Widowed at both	2,039	0.07 (0.01, 0.13)	−0.35 (−0.43, −0.28)
Recent widow	417	0.71 (0.57, 0.85)	−0.33 (−0.49, −0.16)
Other change	126	−0.08 (−0.32, 0.16)	−0.57 (−0.88, −0.27)
		< 0.0001	0.1551
Moved house			
Yes at both surveys	109	0.15 (−0.18, 0.48)	−0.33 (−0.80, 0.14)
No → Yes	551	0.11 (−0.01, 0.24)	−0.50 (−0.66, −0.34)
Yes → No	270	0.22 (0.05, 0.40)	−0.39 (−0.59, −0.20)
No at both surveys	5,443	0.10 (0.06, 0.14)	−0.34 (−0.39, −0.30)
		0.5756	0.2196
Country of birth			
Australian born	5,006	0.09 (0.06, 0.13)	−0.31 (−0.36, −0.26)
Other English speaking	870	0.12 (0.02, 0.22)	−0.53 (−0.64, −0.41)
Europe	397	0.23 (0.09, 0.37)	−0.60 (−0.81, −0.40)
Asia	64	0.42 (0.01, 0.84)	−0.16 (−0.63, 0.32)
Other	36	−0.28 (−0.70, 0.15)	−0.86 (−1.52, −0.20)
		0.0544	0.0001
Decreased income in past 12 months			
Yes at both surveys	426	0.21 (0.07, 0.35)	−0.42 (−0.61, −0.24)
No → Yes	423	0.33 (0.19, 0.47)	−0.23 (−0.38, −0.08)
Yes → No	764	0.11 (0.01, 0.21)	−0.43 (−0.55, −0.31)
No at both surveys	4,760	0.08 (0.04, 0.12)	−0.35 (−0.40, −0.31)
		0.0023	0.2109
Major decline in the health of a close family member			
or friend in past 12 months (not spouse)			
Yes at both surveys	550	0.12 (0.01, 0.23)	−0.42 (−0.55, −0.29)
No → Yes	580	0.14 (0.03, 0.26)	−0.41 (−0.54, −0.28)
Yes → No	1,332	0.05 (−0.03, 0.13)	−0.33 (−0.42, −0.24)
No at both surveys	3,911	0.12 (0.08, 0.16)	−0.35 (−0.41, −0.30)
		0.4154	0.6349
Limited in walking 100m			
Not limited at both	4,644	0.15 (0.11, 0.19)	−0.32 (−0.37, −0.28)
Limited → not limited	387	0.16 (0.01, 0.31)	−0.39 (−0.58, −0.20)
Not limited → limited	631	−0.08 (−0.20, 0.03)	−0.42 (−0.57, −0.28)
Limited at both	711	−0.04 (−0.15, 0.07)	−0.53 (−0.69, −0.37)
		< 0.0001	0.0149
Hearing problems in past 12 months			
Yes at both surveys	593	0.11 (−0.01, 0.23)	−0.53 (−0.69, −0.38)
No → Yes	77	0.03 (−0.32, 0.37)	−0.62 (−1.11, −0.14)
Yes → No	1,683	0.10 (0.03, 0.17)	−0.36 (−0.44, −0.27)
No at both surveys	4,020	0.11 (0.07, 0.15)	−0.33 (−0.38, −0.28)
		0.9599	0.0259
Sight problems			
Yes at both surveys	1,011	0.12 (0.03, 0.22)	−0.64 (−0.76, −0.51)
No → Yes	209	0.04 (−0.15, 0.23)	−0.40 (−0.61, −0.19)
Yes → No	3,128	0.13 (0.08, 0.18)	−0.30 (−0.36, −0.24)
No at both surveys	2,025	0.08 (0.02, 0.14)	−0.31 (−0.38, −0.25)
		0.5489	< 0.0001
Incontinence			
Yes at both surveys	949	0.08 (−0.02, 0.17)	−0.49 (−0.61, −0.36)
No → Yes	309	0.14 (−0.02, 0.31)	−0.48 (−0.67, −0.30)
Yes → No	1,178	0.13 (0.05, 0.22)	−0.34 (−0.43, −0.24)
No at both surveys	3,937	0.10 (0.06, 0.15)	−0.33 (−0.38, −0.28)
		0.7944	0.0348
Major personal illness			
Yes at both surveys	210	0.06 (−0.14, 0.27)	−0.50 (−0.79, −0.21)
No → Yes	522	0.02 (−0.11, 0.14)	−0.44 (−0.59, −0.29)
Yes → No	527	0.08 (−0.05, 0.21)	−0.54 (−0.71, −0.37)
No at both surveys	5,114	0.12 (0.08, 0.16)	−0.33 (−0.37, −0.28)
		0.4125	0.0142
Mental health			
≥53 unchanged	5,569	0.11 (0.08, 0.15)	−0.32 (−0.36, −0.28)
<53 unchanged	206	−0.01 (−0.24, 0.21)	−0.99 (−1.36, −0.62)
Changed to ≥53	333	0.27 (0.10, 0.44)	−0.01 (−0.25, 0.23)
Changed to <53	265	−0.13 (−0.32, 0.07)	−1.15 (−1.43, −0.86)
		0.0043	< 0.0001

Table 3. Fully adjusted general linear model: change in Network and Satisfaction scores between Surveys 1 and 2 against various categorical and continuous scale explanatory variables significant at $P<0.005$: mean and 95% confidence interval for each level

	Change in Network	Change in Satisfaction
Marital status		
Married/de facto at both	−0.01 (−0.05, 0.03)	−0.33 (−0.38, −0.28)
Separated/divorced/never married at both	0.01 (−0.10, 0.12)	−0.68 (−0.82, −0.54)
Widowed at both	0.23 (0.18, 0.28)	−0.34 (−0.41, −0.27)
Recent widow	0.58 (0.46, 0.69)	−0.27 (−0.42, −0.12)
Other change	−0.05 (−0.26, 0.16)	−0.46 (−0.74, −0.19)
Country of birth		
Australian born	0.14 (0.10, 0.17)	−0.30 (−0.34, −0.26)
Other English speaking	0.01 (−0.07, 0.09)	−0.60 (−0.70, −0.50)
Europe	−0.00 (−0.13, 0.12)	−0.58 (−0.74, −0.43)
Asia	0.22 (−0.07, 0.52)	−0.27 (−0.65, 0.11)
Other	−0.47 (−0.87, −0.07)	−0.63 (−1.14, −0.13)
Limited in walking 100 m		
Not limited at both	0.16 (0.13, 0.20)	
Limited → not limited	0.08 (−0.04, 0.21)	
Not limited → limited	−0.02 (−0.12, 0.07)	
Limited at both	−0.11 (−0.20, −0.02)	
Mental health		
≥53 unchanged	0.14 (0.11, 0.17)	−0.29 (−0.33, −0.25)
<53 unchanged	−0.32 (−0.49, −0.14)	−1.42 (−1.65, −1.20)
Changed to ≥53	0.05 (−0.08, 0.18)	−0.28 (−0.45, −0.11)
Changed to <53	−0.21 (−0.36, −0.06)	−1.15 (−1.34, −0.96)
Hearing Problems in past 12 months		
Yes at both surveys		−0.56 (−0.69, −0.44)
No → Yes		−0.61 (−0.95, −0.26)
Yes → No		−0.35 (−0.43, −0.28)
No at both surveys		−0.33 (−0.38, −0.28)
Sight problems		
Yes at both surveys		−0.63 (−0.72, −0.53)
No → Yes		−0.38 (−0.59, −0.17)
Yes → No		−0.31 (−0.37, −0.26)
No at both surveys		−0.30 (−0.37, −0.23)
Optimism	0.27 (0.21, 0.33)	0.43 (0.36, 0.50)
Network score at Survey 1	−0.48 (−0.50, −0.46)	−
Satisfaction score at Survey 1	−	−0.39 (−0.41, −0.36)

capture instrumental and emotional types of social support from different sources (e.g. family members as distinct from friends) may offer additional levels of insight on social support. For example, the social support questions used in the MacArthur Studies of Successful Aging include items assessing the frequency of receipt of emotional and instrumental support, as well as the frequency of negative interactions involving conflict or excessive demands, from three sources (spouse, children and friends and family) [21].

Conclusions

In summary, the DSSI, a brief social support measure, captures components of both social network and perceived emotional satisfaction. In a large longitudinal study of older women, both of these measures were found to change in the expected directions as the women's lives changed over a 3-year period, providing evidence of their construct validity and responsiveness to change over time.

Key points

- The DSSI, a brief social support scale, captures components of both social network and perceived emotional satisfaction.
- Social network size and structure appears to increase among women whose life circumstances call for more support (e.g. recent widowhood).
- Over time, women at possible risk of becoming more socially isolated (e.g. those with sensory loss) become less satisfied with their levels of social support.

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Conflicts of interest

There are no conflicts of interest.

Supplementary data

Supplementary data for this article are available online at http://ageing.oxfordjournals.org.

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