ORIGINAL PAPER

W. L. Coventry · N. A. Gillespie · A. C. Heath · N. G. Martin

Perceived social support in a large community sample
Age and sex differences

■ **Abstract** *Background* The positive health and well-being effects of social support have been consistently demonstrated in the literature since the late 1970s. However, a better understanding of the effects of age and sex is required. *Method* We examined the factor structure and reliability of Kessler's Perceived Social Support (KPSS) measure in a community-based sample that comprised younger and older adult cohorts from the Australian Twin Registry (ATR), totalling 11,389 males and females aged 18–95, of whom 887 were retested 25 months later. *Results* Factor analysis consistently identified seven factors: support from *spouse, twin, children, parents, relatives, friends* and *helping* support. Internal reliability for the seven dimensions ranged from 0.87 to 0.71 and test-retest reliability ranged from 0.75 to 0.48. Perceived support was only marginally higher in females. Age dependencies were explored. Across the age range, there was a slight decline (more marked in females) in the perceived support from *spouse*, *parent* and *friend*, a slight increase in perceived *relative* and *helping* support for males but none for females, a substantial increase in the perceived support from *children* for males and females and a negligible decline in *total KPSS* for females against a negligible increase for males. The perceived support from *twin* remained constant. Females were more likely to have a confidant, although this declined with age whilst increasing with age for males.

Conclusions Total scores for perceived social support conflate heterogeneous patterns on sub-scales that differ markedly by age and sex. Our paper describes these relationships in detail in a very large Australian sample.

■ **Key words** perceived social support – twins – age – sex and reliability

Introduction

There is now a wealth of literature on social support and its effects on health and well-being. A relatively recent review of the social support literature by Seeman (1996) presented strong evidence that social integration leads to reduced mortality risk and a better health state, a finding consistent with earlier reviews of the social support literature (such as Cohen and Wills 1985; House et al. 1988; Kessler and McLeod 1985; Vaux 1988). So extensive has been this social support literature that Veiel and Baumann (1994 p. 1) claimed "measured by both its impact on current thinking concerning the social etiology of mental and physical disorders, and by the sheer volume of publications, social support has joined stress and coping as one of the three most important constructs in current mental health research".

Despite this abundance of social support literature, there are areas requiring clarification, specifically age and sex differences in Perceived Social Support (PSS) from specified members of the support network. Further, by using a twin sample, we can for the first time explore the perception of support from one's twin and compare this against perceived support from non-twin siblings. More importantly, we can explore the extent to which PSS is influenced by genetic versus environmental factors, although this will be the subject of a subsequent paper. However, our first aim is to explore the factor structure and internal and test-retest reliability of the Perceived Social Support measure used by Kessler et al. (1992, 1994) (KPSS).

The current research relies on a measure of *perceived*

W. L. Coventry · N. A. Gillespie · N. G. Martin
Genetic Epidemiology Laboratory
Queensland Institute of Medical Research
Brisbane, Australia

W. L. Coventry (✉)
School of Psychology
University of New England
Armidale, New South Wales, 2351, Australia
E-Mail: wcoventr@pobox.une.edu.au

A. C. Heath
Dept. of Psychiatry
Washington School of Medicine
St Louis, USA

social support as opposed to *received* social support. *Perceived* support represents the subjective perceptions of the extent to which social network members are available to provide social support (Cohen and McKay 1984) and represents the cognitive component of social support. In contrast, *received* social support can be viewed as the behavioural component of social support, as it requires activation in particular interpersonal transactions (Dunkel-Schetter and Bennett 1990). *Received* social support has been shown to be less reliable in buffering against the adverse effects of life stress on psychological health (Cohen and Wills 1985; Kessler 1992) and less predictive of health and well-being (Kessler and McLeod 1985; Turner 1992; Vaux 1988).

Our measure of PSS is based on the measure developed by Kessler et al. (1992, 1994). Their exploratory factor analysis identified three factors: support from *spouse*, *relatives* and *friends*. Internal reliability for these factors was 0.87, 0.86 and 0.81, respectively. They also provided evidence for the construct validity; the three factors were significantly and negatively related to depression. Further, individuals who had experienced a stressful life event were more likely to suffer depression if they had low KPSS in comparison to the individuals with high KPSS (Kessler et al. 1992). However, the test-retest reliability was not reported.

Previous studies exploring test-retest reliability of other PSS measures are summarised in Table 1 and range from between 0.92 and 0.52 (with the exception of Russell et al. (1997) who used a sample of people with alcohol problems and found correlations between 0.24 and 0.41). These test-retest correlations indicate reliability or trait-like stability over time. This is consistent with more rigorous investigations of the stability in social support. Social support has been shown to be stable despite changes to the composition of the social network (Furukawa and Shibayama 1997; Sarason et al. 1983; Solomon et al. 1988) and despite periods of developmental transition when environmental change would be expected to peak (Sarason et al. 1986). These lines of evidence support the argument that personality-like properties of the individual determine social support. This argument contrasts with the original conceptualisation of social support in the late 1970s, as a property of the social environment that was external to the individual (Pierce et al. 1997). Against this original conceptualisation, Pearce et al. (1997) have asserted "there is substantial evidence that perceived support has some personality-like qualities" (p. 5).

We expect the sources of support (such as spouse, twin, child, parent, relative, friends and confidant) to differ in their test-retest reliability. Relationships with family members are more obligatory in nature, in contrast to relations with friends, which are more transient and voluntary (Adams 1967; Allan and Adams 1989). We, therefore, expect more stability, as seen in higher retest correlations, in the obligatory support sources (i.e. spouse, twin, child and parents) due to their greater permanency, but less stability in the more voluntary relations (i.e. friends and confidant).

The test-retest correlations in the current paper will extend the previous literature in three ways. Firstly, the sample size will be substantially larger than previous research with a test-retest sample of 887. Secondly, the time interval between measurement occasions of 25 months will be long relative to other research, with the exception of Sarason et al. (1986) who reported a 36-month interval, but with only 31 participants. And thirdly, these will be the first test-retest correlations reported on the KPSS. In addition to addressing reliability,

Table 1 Test-retest correlations on measures of Perceived Social Support (PSS)

Author	Instrument	Interval	Sample size	Test-retest correlation
Rice and Longabaugh (1996)	Perceived Social Support – Short (Rice and Longabaugh 1996)	2 days	83	0.94 for family and 0.88 for friends
Norbeck et al. (1981)	Norbeck Social Support Questionnaire (Norbeck et al. 1981)	1 week	67	From 0.85 to 0.92 for the ten sub-scales
Oritt et al. (1985)	Perceived Support Network Inventory (Oritt et al. 1985)	2 weeks	146	From 0.72 to 0.88 for the total and six sub-scale scores
MacDonald (1998)	Scales of Perceived Social Support (MacDonald 1998)	1 month	38	From 0.77 to 0.87 for the 15 sub-scales
Zimet et al. (1988)	Multidimensional Scale of Perceived Social Support (Zimet et al. 1988)	2–3 months	69	0.72, 0.85 and 0.75 for significant others, family and friends sub-scales, respectively
Russell et al. (1997)	Social Provisions Scale (Cutrona and Russell 1987)	3 months	276 alcoholics	From 0.24 to 0.41 for the six sub-scales
Power et al. (1988)	Significant Others Scale (Power et al. 1988)	6 months	73 females	From 0.73 to 0.83 for the four sub-scales
Sarason et al. (1986)	Social Support Questionnaire[1] (Sarason et al. 1983)	4 occasions; at 2, 5 and 36 months apart	2 months = 76 5 months = 50 36 months = 31	From 0.86 decreasing to 0.52 as interval increased

[1] 'Satisfaction' scale reported here as it more closely reflects a PSS measure compared to the alternative 'number' scale

this paper also purports to investigate the changing salience of PSS across age.

The Convoy Model (Kahn and Antonucci 1980; Antonucci 1985, 1990) conceptualises social support as a network of relations that moves with a person through life. The model has provided a unique contribution to the social support literature with its focus on the developmental life span. The current research will further contribute to understanding social support within this convoy model by employing a cross-sectional design to investigate the changing salience of PSS throughout adulthood for males and females. A large body of research has investigated the age changes in social support for males and females. The current review will be restricted, firstly, to studies that employ measures which reflect PSS based on their face validity and, secondly, to non-clinical samples for consistency with the current sample.

In addressing sex differences in social support, a rather comprehensive review of the literature by Vaux (1988, p. 169) concluded "empirical findings regarding sex differences in social support are mixed and inconsistent". Since this review, the literature on PSS has remained inconsistent with some reporting no differences in sex (Furukawa et al. 1999; Turner and Noh 1988) and others reporting higher levels of support in females (Ross and Mirowsky 1989; Turner and Marino 1994; Zimet et al. 1988).

Likewise, previous research on the PSS level across different ages has presented conflicting results with some reporting a decline across age (Zautra 1983; Furukawa et al. 1999; Morgan et al. 1991), no difference by age (Antonucci and Akiyama 1987; Kitamura et al. 2002; Turner and Wood 1985; Turner and Noh 1988) and an increase with increasing age (Lin et al. 1986).

The inconsistencies in these age and sex effects on PSS could be caused by one of two limitations. Firstly, among the multitude of studies published on social support there has been diversity in the conceptualisation and operationalisation of the concept (Cohen and Wills 1995; Uchino et al. 1996). According to Winemiller et al. (1993), the support literature has been limited by the use of unstandardised, ad hoc instruments with disregard for the complex and multidimensional nature of the concept. In line with this, Vaux (1988) has argued, quite appropriately, that social support is best viewed as a metaconstruct "comprising of several legitimate and distinguishable theoretical constructs" (p. 28). This disparity in conceptualisation of social support and the variety of measures observed in the studies reviewed so far provide one possible explanation for these inconsistencies.

Secondly, there is a need to consider the different sources of social support when exploring the effects of age and sex. The findings reviewed so far have been based on measures that have conflated the sources of support. However, Olsen et al. (1991) assert "mixing the prevalence and impact of various social network sources is capable of concealing effects otherwise capable of being observed" (p. 771). Olsen et al. (1991) further suggest that if questions are detailed and refer to specific support sources, then it is possible to gain a greater understanding in the study of age dependencies. In attending to this limitation, we reviewed the age and sex effects for the different sources of support and this has been presented in Table 2. The table presents, separately for males and females, support from spouse, twins, children, parents, relatives and friends. This review suggests the effects of age and sex differ for the different sources of support. Accordingly, the different sources of support will be considered in the current research.

Several hypotheses have been derived from the literature review presented in Table 2. For total KPSS, no age or sex effects are anticipated. For perceived support from one's spouse, females are expected to perceive a decline in support as age increases, as husbands become less involved in the child-rearing and as the children perform the husband's support role instead. In contrast, males are expected to perceive constant or increased levels of spouse support across age with wives devoting less time to their mature children. For support from children, males and females are hypothesised to perceive increased support with increasing age, as their mature children are better able to provide support. Regarding support from relatives, females are expected to perceive higher levels of support than males, as females, being the primary caregivers, will tend to rely more on relatives, but both males and females are expected to maintain constant levels across age. Support from friends is expected to be higher in females than males, but is expected to decline as age increases for both, as spouse and children become important and friends are lost, move away, or die.

Subjects and methods

◼ Participants

The participants comprise two twin cohorts from the Australian NHMRC Twin Register (ATR); an older cohort born before 1964 and a younger cohort born 1964–1971. The first of these cohorts has been shown to be typical of the Australian population in many respects, including the prevalence of psychiatric symptoms (Kendler et al. 1986), although they tend to be slightly more middle class and educated than average, particularly for males (Baker et al. 1996).

Both cohorts were mailed an extensive Health and Lifestyle Questionnaire (HLQ). In the period 1988–1989, the questionnaire was mailed to the older cohort, which included 7,616 twin subjects (3,808 twin pairs), aged 24–95 years ($M = 42.3$, $SD = 14.2$) who had participated in a mail survey in 1981. The twins who were contacted but who failed to return a completed questionnaire were followed up by telephone up to five times, at which point they were asked to complete an abbreviated telephone interview to obtain basic demographic information (including family status, socio-economic status and education, but not KPSS). One hundred and thirty-nine twin pairs were excluded, as one or both twins had died since participation in 1981. Of the remaining 7,338 participants, mailed questionnaires that contained at least one response to the KPSS questions were obtained from 5,884 individuals, representing a response rate of 80%.

Then, in 1989, the questionnaire was mailed to the younger adult cohort, which included 8,538 twin subjects (4,269 twin pairs), aged 18–28 ($M = 23.4$, $SD = 2.3$) who had been recruited 10 years earlier

Table 2 Previous literature investigating age effects of Perceived Social Support (PSS) for individual support sources

Support source	Sex differences	Cross-sectional age differences
Spouse	– None (Turner and Marino 1994[1])	*Females:* – Progressively lower in the older than 35-year-olds (Turner and Marino 1994[1]) *Males:* – Similar levels across age (Turner and Marino 1994[1]) – Higher as age increased (particularly in early years of marriage; Olsen et al. 1991[2])
Twin	No previous literature	
Children	– Greater in females (Depner and Ingersoll-Dayton 1988[3])	*Females:* – Similar levels across age (Depner and Ingersoll-Dayton 1988[3]) *Males:* – Similar levels across age (Depner and Ingersoll-Dayton 1988[3]) – Higher as age increased (Olsen et al. 1991[2])
Parents	No previous literature	
Relatives	– Greater in females (Turner and Marino 1994[1])	*Females:* – Higher as age increased but non-significant (Turner and Marino 1994[1]) *Males:* – Higher as age increased but non-significant (Turner and Marino 1994[1])
Friends	– Only greater in females in the 36–45 age bracket (Prezza and Pacilli 2002[5]) – Greater for females (Depner and Ingersoll-Dayton 1988[3]; Turner and Marino 1994[1]; Zani et al. 2001[6]; Zimet et al. 1988[7])	*Females:* – Lower as age increased (Levitt et al. 1993[4]) – Similar levels across age (Turner and Marino 1994[1]) *Males:* – Lower as age increased (Olsen et al. 1991[2]) – Similar levels across age (Turner and Marino 1994[1]) *Males and females:* – Lower as age increased (Prezza and Pacilli 2002[5])

[1] Age range: 18–55, Sex: males and females
Measure: Provisions of Social Relations Scale – Short (Turner et al. 1983)
[2] Age range: 16–74, Sex: males
Measure: Olsen et al. (1991)
[3] Age range: 50–75+, Sex: males and females
Measure: Depner and Ingersoll-Dayton (1988)
[4] Age range: adult women, their mothers and grandmothers, Sex: females
Measure: Levitt et al. (1993)

[5] Age range: 18–77, Sex: males and females
Measure: Multidimensional Scale of Perceived Social Support (Zimet et al. 1988)
[6] Age range: 14–19, Sex: males and females
Measure: Multidimensional Scale of Perceived Social Support (Zimet et al. 1988)
[7] Age range: 17–22, Sex: males and females
Measure: Multidimensional Scale of Perceived Social Support (Zimet et al. 1988)

while at school. The follow-up procedure was identical to the procedure for the older cohort. Despite this extensive follow-up, 1,000 twin pairs were unable to be re-contacted, which is understandable given that a decade had passed since recruitment. Of the remaining 6,538 participants, mailed questionnaires that contained at least one response to the KPSS questions were obtained from 3,722 individuals, representing a response rate of 57 %. A reason for this lower response rate relative to the response rate of the older cohort is that the older cohort, but not the younger cohort, represented a sample of known responders, having responded to the 1981 questionnaire.

Across both cohorts, there were 6,835 males and 9,318 females with a mean age of 30.6 ($SD = 12.5$) and 33.6 ($SD = 14.2$), respectively.

In 1991, the HLQ was re-mailed to the first 500 male and 500 female respondents from the older cohort. The ages ranged from 27 to 89 ($M = 45.5$, $SD = 13.7$). The average test-retest interval for respondents was 2.1 years. Questionnaires that contained at least one response to the KPSS questions were obtained from 879 individuals, representing a response rate of 88 %. Because the retest questionnaire was mailed before the last questionnaires were returned from the older cohort and was only mailed to participants who had already returned the 1989 questionnaire, uncooperative individuals were undersampled.

■ Instruments

Each HLQ contained Kessler et al.'s (1992) 19-item self-report measure of PSS (KPSS); a scale developed for use by the Virginia Twin Registry prior to compilation of the HLQ. The KPSS is presented in Appendix A. The first 18 items were based on three questions assessing respondents' belief that members of their social network would be

willing to: (a) listen to their problems, (b) understand the way they felt about things, and (c) would help if help was needed. The three questions were asked for parents, spouse, children, twin, relatives and friends. Instead of Kessler's five-point response scale, the current research used a four-point response scale as follows: 'not at all' (0), 'a little' (1), 'quite a bit' (2), 'a great deal' (3). This change enabled the KPSS scale to correspond to other measures in the questionnaire, which also used a four-point scale. The response options for the nineteenth item, "Is there anyone in your life with whom you have a close relationship and can share your most private feelings?" (referred to as 'confidant' hereafter), were 'yes' or 'no'.

Age of participants was computed by subtracting each participant's date of birth from the mean return date of all questionnaires. The mean rather than actual return date was used for computational convenience to ensure each twin pair was the same age and deviations from true age were trivial. Participants also reported on their marital status (never married, widowed, married, de facto/living together, separated, divorced or remarried), their number of children and if they had a deceased twin, mother or father.

■ Data cleaning

We identified and removed illegitimate responses: 1,283 who had reported on spouse support, but who were non-married (their spouse support responses were deleted); 17 who had reported on twin support, but who had a deceased twin (their twin support responses were deleted); 163 who had reported on support from children despite not having children (their child responses were deleted); and 667 who had reported on parent support despite both parents being deceased (their parent responses were deleted). Incomplete responses to the

three items (help, listen and understand) for each source of support were deleted for that source of support.

Results

Except where stipulated, all analyses were conducted in SPSS. Individual item response frequencies for each of the first 18 items of the KPSS based on the combined older and younger cohorts are presented in Appendix B.

We next conducted an exploratory factor analysis on the first 18 items using the data from the older and younger cohort with the factors extracted by principal components analysis. Following Kendler et al.'s (1987) approach, separate analyses were conducted for twin one and twin two (assignment as twin one or two was by order of registration with the ATR). In determining the number of factors, Kaiser's rule suggested six for females and seven for males and Velicer's minimum average partial test suggested one. Accordingly, all factor solutions between one and seven were considered. The solution optimising simple structure, under both an orthogonal and oblique rotation (using the Varimax and Direct Oblimin methods, respectively), had seven factors:

spouse, *twin*, *child*, *parent*, *relative*, *friend* and *help*, and this structure emerged in both twins. Likewise, when separate analyses were conducted for males and females (this included opposite sex dizygotic twins) and the three sub-samples of non-married respondents (with the three spouse items excluded), parentless respondents (with the three parent items excluded), and childless respondents (with the three child items excluded) (the twinless sample size (n = 24) was too small for factor analysis), the seven factors consistently emerged. The factor loadings for twin one and two are presented in Table 3 for males and Table 4 for females.

A three-factor structure was examined in an attempt to replicate Kessler et al.'s (1992) three factors of *spouse*, *relative* and *friend*. When only females were considered (to reflect Kessler et. al.'s (1992) all-female sample), the closest replication was as follows: one factor with the three spouse items loading (a spouse factor), a second factor with the three friend and three child items loading (a friend/child factor), and a third factor with the three parent and three twin items loading (a parent/twin factor). The three relative items were dropped due to cross-loadings on the friend/child and parent/twin factors. Unfortunately, Kessler et al. (1992) did not present

Table 3 Factor loadings for exploratory factor analysis with orthogonal rotation (Varimax) of the Kessler Perceived Social Support (KPSS) measure – male participants

Items	Factors (loadings less than 0.25 are suppressed[1])													
	Twin 1 (explains 78% of total variance)							Twin 2 (explains 79% of total variance)						
	I	II	III	IV	V	VI	VII	I	II	III	IV	V	VI	VII
Spouse														
Help					0.67		0.41				0.79			0.26
Listen					0.84						0.82			
Understand					0.84						0.82			
Twin														
Help		0.66					0.58				0.67			0.57
Listen		0.87									0.86			
Understand		0.84									0.84			
Child														
Help	0.79						0.38	0.80						0.39
Listen	0.84							0.83						
Understand	0.87							0.87						
Parent														
Help						0.65	0.61						0.60	0.63
Listen						0.81							0.79	
Understand						0.79							0.83	
Relative														
Help			0.68				0.57					0.65		0.60
Listen			0.83									0.84		
Understand			0.84									0.77	0.26	
Friend														
Help				0.66			0.51		0.69					0.51
Listen				0.86					0.82					
Understand				0.82					0.86					
Eigenvalues	5.40	1.82	1.68	1.61	1.33	1.20	0.99	5.60	2.02	1.67	1.46	1.29	1.19	0.98
% Variance RSSL[2]	12.4	11.5	11.5	11.4	11.2	10.8	9.0	12.6	11.8	11.8	11.6	11.3	10.9	8.9

[1] Of the suppressed loadings, ten were between 0.20 and 0.25, 77 were between 0.10 and 0.20 and 116 were less than 0.1
[2] Rotated Sums of Squared Loadings

Table 4 Factor loadings for exploratory factor analysis with orthogonal rotation (Varimax) of the Kessler Perceived Social Support (KPSS) measure – female participants

Items	Factors (loadings less than 0.25 are suppressed[1])													
	Twin 1 (explains 81 % of total variance)							Twin 2 (explains 82 % of total variance)						
	I	II	III	IV	V	VI	VII	I	II	III	IV	V	VI	VII
Spouse														
Help				0.76			0.35				0.73			0.42
Listen				0.87							0.89			
Understand				0.87							0.88			
Twin														
Help			0.71				0.51		0.74					0.47
Listen			0.89						0.89					
Understand			0.89						0.89					
Child														
Help	0.82						0.37	0.80						0.41
Listen	0.88							0.87						
Understand	0.88							0.90						
Parent														
Help						0.63	0.61				0.71			0.51
Listen						0.85					0.84			
Understand						0.85					0.84			
Relative														
Help					0.70		0.52						0.64	0.58
Listen					0.85								0.87	
Understand					0.85								0.84	
Friend														
Help		0.72					0.47			0.72				0.48
Listen		0.88								0.88				
Understand		0.88								0.87				
Eigenvalues	5.37	1.99	1.88	1.72	1.43	1.16	1.10	5.41	2.10	1.86	1.79	1.40	1.14	1.03
% Variance RSSL[2]	13.0	12.3	12.3	12.3	12.1	11.4	7.8	12.8	12.8	12.3	12.2	12.0	11.8	7.9

[1] Of the suppressed loadings, three were between 0.20 and 0.25, 66 were between 0.10 and 0.20 and 135 were less than 0.1
[2] Rotated Sums of Squared Loadings

any details on the content of their three factors, so comparison with our results is restricted. This aside, no clear replication of Kessler et al.'s (1992) structure was apparent. We decided the seven factor solution was more theoretically appealing to analyse, so it was chosen over this three-factor structure.

As observed in Tables 3 and 4, there was some inconsistency in the order of the factors when they were ordered by eigenvalue size, across twin one and twin two for males and females. While *children* consistently had the largest eigenvalue and *help* consistently had the smallest, the eigenvalue order of the remaining factors (*spouse*, *twin*, *parent*, *relative* and *friend*) varied. However, the Rotated Sums of Squared Loadings (RSSL) showed very little difference in the variance accounted for across these remaining five factors. As can be seen in Table 3, the RSSL variability for twin-one males ranged from 11.5 % for *twin* through to 10.8 % for parent; for twin-two males, the variability ranged from 11.8 % for *friend* through to 10.9 % for *parent*. In Table 4, the RSSL variability for twin-one females ranged from 12.3 % for *friend* through to 11.4 % for *parent*; for twin-two females, it ranged from 12.8 % for *twin* through to 11.8 % for *relative*. Therefore, the inconsistent order of the factors according to eigenvalue was not considered a problem.

Sub-scale scores were then computed as the mean of the non-missing responses on each factor and a *KPSS total* score was computed as the mean of all non-missing responses from the first 18 items.

Reliability of the KPSS measure was assessed. Firstly, internal reliability was assessed with Cronbach's alpha using combined data from the older and younger cohorts. Cronbach alphas for the *total KPSS, spouse, twin, children, parents, relatives, friends* and *helping* support were 0.87, 0.79, 0.83, 0.84, 0.79, 0.83, 0.81 and 0.71 respectively.

Secondly, test-retest correlations with a 25-month interval were calculated using data from the older cohort and polychoric correlations computed in PRELIS (Jöreskog and Sorbom 1999). These correlations are presented in Table 5. The correlations were moderate to high ranging from 0.55 to 0.75 across the 18 individual items and the sub-scales. The *confidant* correlation was slightly lower at 0.48. These retest correlations are comparable to the reviewed literature and, in particular, are comparable with Sarason et al.'s (1983) research with an equivalently long test-retest interval. Reporting on the

Table 5 Polychoric test-retest correlations for the Kessler Perceived Social Support (KPSS) measure

	n	KPSS items			KPSS sub-scales
		Help	Listen	Understand	
Spouse	660	0.75	0.69	0.68	0.72
Twin	829	0.73	0.73	0.71	0.71
Children	586	0.72	0.63	0.64	0.66
Parents	599	0.75	0.70	0.60	0.66
Relatives	704	0.58	0.55	0.58	0.58
Friends	815	0.58	0.57	0.61	0.55
Help	860				0.61
KPSS Total	860				0.65
Confidant	847				0.48

Table 6 Sex differences on the Kessler Perceived Social Support (KPSS) measure

Sub-scale	Males		Females		t	d.f.	η
	M	SD	M	SD			
Spouse[2]	3.66	0.49	3.47	0.64	10.26***	3588	0.029
Twin[2]	3.08	0.74	3.33	0.73	−18.18***	7252	0.044
Child[1]	2.64	0.85	2.79	0.84	−5.08***	4000	0.006
Parent[2]	3.14	0.66	3.14	0.71	−1.88	6336	0.001
Relative[2]	2.37	0.77	2.48	0.79	−5.98***	6427	0.006
Friend[1]	2.81	0.68	3.00	0.69	−13.63***	9429	0.019
Help[1]	3.36	0.54	3.44	0.52	−7.14***	9479	0.005
KPSS[1]	2.93	0.50	3.05	0.49	−11.26***	9479	0.013

[1] equal variance assumed; [2] unequal variance assumed
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Social Support Questionnaire, with a 5-month interval (n = 50) the correlation was 0.67 and with a 36-month interval (n = 31) the correlation was 0.55.

Analyses were conducted on the data from the older and younger cohorts to investigate the effect of age and sex across the seven factors. The data were transformed using ranked normal weights to achieve normality and to overcome the significant negative skew apparent on *total KPSS* and all KPSS sub-scales except *relative*.

T-tests were performed separately on the seven factors to investigate sex differences. Sex had a significant effect on all KPSS factors except for *parent*. These results are presented in Table 6. However, the probability levels were interpreted with caution given the large sample size and non-independence of twin one and twin two and credence was given instead to effect sizes. The only notable sex differences according to effect size were, firstly, for perceived support from *twin*, $t(7252) = -18.18$, $p < 0.001$, $\eta = 0.044$, with females reporting higher levels

($M = 3.33$, $SD = 0.73$) than males ($M = 3.08$, $SD = 0.74$), and, secondly, for perceived support from *spouse*, $t(3588) = 10.26$, $p < 0.001$, $\eta = 0.029$, with males reporting higher levels ($M = 3.66$, $SD = 0.49$) than females ($M = 3.47$, $SD = 0.64$).

Sex differences on *confidant* were also explored with a significantly greater percentage of females believing they had a confidant (90%) compared to males (80%), $\chi^2 (1, N = 9222) = 197.26$, $p < 0.001$, Cramer's V = 0.146.

Graphical presentations on the age effects of KPSS are presented in Fig. 1 for males and Fig. 2 for females. As observed in the graphs, for males, there was more perceived support from one's *spouse* than from the other sources of support. However, for females, while this was the case in the early years of marriage, perceived *spouse* support became less prominent after these early years and was comparable to the support from *children* and *twins*. For both males and females, there was less support from *relatives* compared to the other sources of support.

Fig. 1 For males, the effects of age on the Kessler Perceived Social Support (KPSS) measure (within each support source, the sample size in some age groups was too small and so was collapsed with adjoining age groups. Missing data points are observed where this has occurred) (n per cell = 42–9,499)
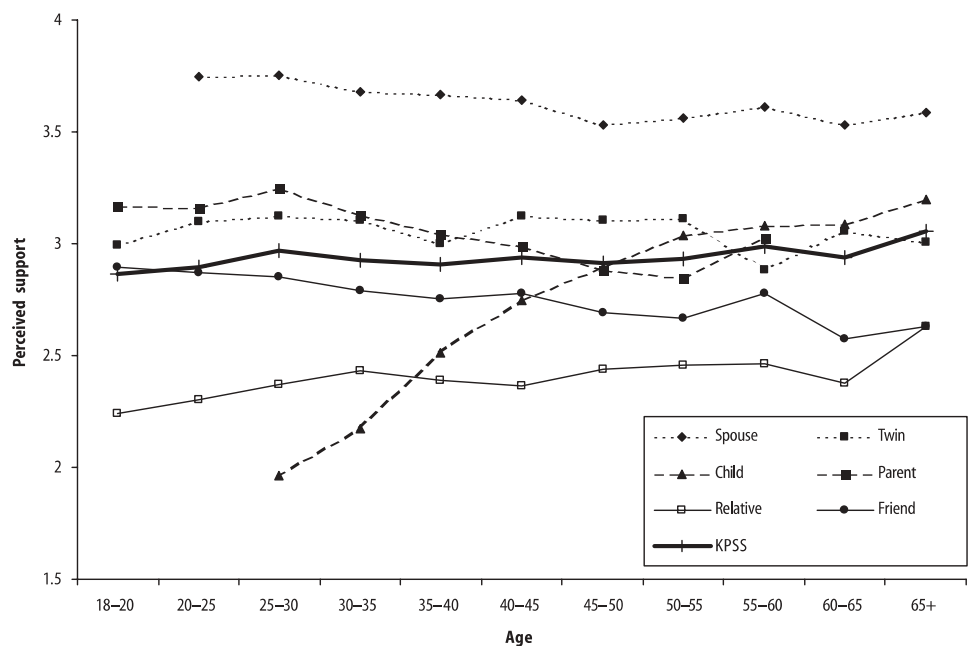
Fig. 2 For females, the effects of age on the Kessler Perceived Social Support (KPSS) measure (within each support source, the sample size in some age groups was too small and so was collapsed with adjoining age groups. Missing data points are observed where this has occurred) (n per cell = 100–1,498)
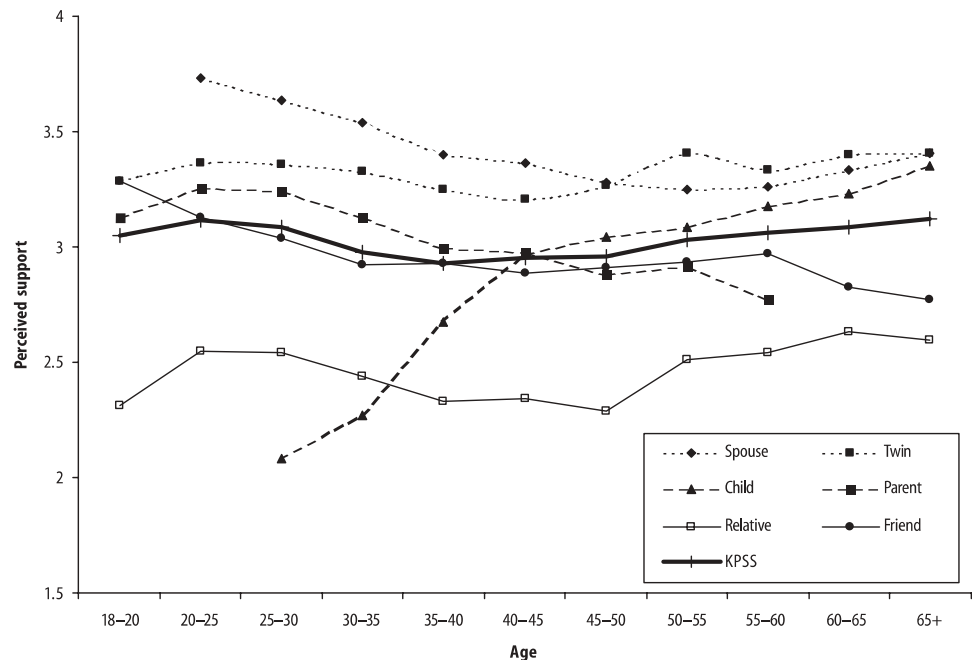
Pearson correlations were computed to investigate the relationship between age and KPSS and its subscales for males and females and these are presented in Table 7 along with the intercorrelations between the subscales. To explore sex differences in these age correlations, tests for a significant difference were conducted (as outlined in Cohen and Cohen 1983) and these are also presented in Table 7. There was a significant sex difference for five of the seven factors and for *total KPSS* as presented in Table 7. The more notable of these correlation differences was on perceived support from *relatives*, $r_{female} = 0.00$, $r_{male} = 0.08$, $z = 3.49$, $p < 0.001$, and on *total KPSS*, $r_{female} = -0.04$, $r_{male} = 0.05$, $z = 4.47$, p < 0.001.

Point-biserial correlations were computed between age and *confidant* for males and females in PRELIS (Jöreskog and Sorbom 1999). The availability of a *confidant* increased as male age increased, $r(1,9222) = 0.11$, $r^2 = 0.01$, but declined slightly as female age increased,

$r(1,9222) = -0.04$, $r^2 = 0.00$, and this difference was significant, $z = -6.91$, p < 0.001.

Discussion

The factor structure and reliability of the KPSS measure was investigated. The exploratory factor investigation consistently identified seven factors across twin one and twin two for males and females. This structure was inconsistent with Kessler et al.'s (1992, 1994) three-factor structure on the KPSS of *spouse*, *relative* and *friend*. There are four possible explanations for the different factor structures. Firstly, Kessler's research used a five-point scale in contrast to the four-point scale used in the current research. Secondly, Kessler's sample of 2,102 females was smaller than the current sample size of 6,969 females and 4,420 males. Thirdly, there was much less

Table 7 Pearson intercorrelations of the Kessler Perceived Social Support (KPSS) measure with age. Significance of difference in age correlation between males and females is indicated

Sub-scale	Age	Spouse	Twin	Child	Parent	Relative	Friend	Help	KPSS
						Females (n = 2,095–6,101)			
Age		–0.18**	0.01	0.44	–0.15*	0.00***	–0.14*	0.00*	–0.04***
Spouse	–0.12**		0.20	0.26	0.27	0.25	0.21	0.32	0.52
Twin	0.00	0.27		0.25	0.37	0.31	0.19	0.41	0.62
Child	0.43	0.31	0.25		0.24	0.32	0.26	0.50	0.63
Parent	–0.09*	0.27	0.43	0.27		0.47	0.25	0.48	0.70
Relative	0.08***	0.21	0.35	0.33	0.44		0.39	0.63	0.73
Friend	–0.10*	0.26	0.27	0.25	0.30	0.44		0.52	0.59
Help	0.07*	0.29	0.46	0.50	0.46	0.64	0.53		0.79
KPSS	0.05***	0.49	0.68	0.64	0.71	0.72	0.63	0.77	
	Males (n = 961–3,479)								

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

variability in the age of Kessler's female sample ($M = 28.9$, $SD = 7.9$) in comparison to the females in the current sample ($M = 33.6$, $SD = 14.2$). Fourthly, the inconsistent factor structures could be a reflection of cultural differences between Kessler's American sample and the ATR data in the current research. Further research using a confirmatory factor analysis needs to be conducted on the current data to be comprehensive in addressing this possibility.

Empirical research has supported the utility of this seven-factor structure. Previous research (e. g. Antonucci and Akiyama 1987; Furukawa et al. 1999; Kitamura et al. 2002) has been limited in detecting age dependencies in social support, as the sources of support have been conflated. However, as evidenced by Olsen et al. (1991) and the results of the current research, age effects that would ordinarily be concealed at the 'source-conflated' level (i. e. where individual support sources cannot be identified) can be observed at the source-specific level and can provide greater clarity in understanding the age effects of support. Therefore, the seven-factor structure would appear to be more appropriate than the three-factor structure for investigating age dependencies.

The test-retest correlations were appropriate for the construct and reflected trait-like stability over the 18-month interval. However, as predicted, stability was lower in perceived support from *relatives*, *friends* and *confidants* (between 0.58 and 0.48) as they represent more voluntary and distant support sources than the obligatory family relations such as one's *spouse*, *twin*, *children* and *parents* (between 0.72 and 0.66). Combined with the internal reliability coefficients (between 0.87 and 0.71), the test-retest correlations are of adequate stability to attest sound reliability in the KPSS.

The discussion to follow will address, firstly, the sex difference irrespective of age and, secondly, the findings on cross-sectional differences in age for males relative to females. The previous literature on sex differences in social support is inconsistent, oscillating between no sex differences to greater support in women. The results of the current research are consistent with this previous literature and suggest slightly higher levels of KPSS in females than males irrespective of age, although this difference was slight and accounted for only 1 % of the variability in KPSS.

A greater depth of understanding of sex differences can be gained by exploring the individual sources of support. The most notable of these sex differences was for *twin* and *spouse* support. While there is no prior research exploring sex differences in twin support, females reported higher levels of support from their *twin* than males, accounting for 4 % of the variability in KPSS. For *spouse* support, males perceived higher support than females and this difference also accounted for 3 % of the variability. While Turner and Marino's (1994) finding on *spouse* support was non-significant, it trended in the same direction. As hypothesised and observed in the literature (Depner and Ingersoll-Dayton 1988; Zani et al. 2001; Zimet et al. 1988), support from

friends in the current investigation was higher in females than males, but this difference was only slight and accounted for only 2 % of the variability. The literature also suggested mothers would perceive higher support levels from their *children* than fathers (Depner and Ingersoll-Dayton 1988). While the current results support this finding, the effect accounts for only 0.05 % of the variability. Likewise, while females reported higher levels of *helping* support, this difference only accounted for 0.05 % of the variability. Support from *parents* did not differ between males and females.

Age effects were then explored. The previous literature addressing age effects on PSS is inconsistent; oscillating between declines and increases as age increased. *Total KPSS* was relatively constant across age. However, there was a difference between the sexes, which was significant, with males reporting slightly increased levels of support as their age increased compared to females who experienced slightly decreased levels. However, both of these age effects explained less than 0.3 % of the variability in KPSS. The source-specific findings provided further understanding of the age effects of PSS.

For perceived support from one's *spouse*, it was hypothesised that males' perceived support would remain stable (Turner and Marino 1994) or increase (Olsen et al. 1991) as age increased. However, the results showed a slight decline in male *spousal* support across age, which accounted for 1 % of the variability in age and this is inconsistent with the previous research. However, the findings showed that this decline in male *spousal* support was significantly less rapid than the decline in female *spousal* support, which accounted for 3 % of the variability. This latter finding was consistent with the previous literature in that female *spousal* support has been shown to decline as age increases (Turner and Marino 1994). It was not possible for this decline in spouse support with age to be caused by the death of a spouse, as spouse responses were deleted if a spouse was deceased. Rather, it could reflect the declining emphasis on the spouse relationship with the advent of the family and the ability of aging children to provide support to their parents to replace the support provided by the spouse.

Substantial age effects were observed in the support from *children* with an increase in mothers' and fathers' perceived support from *children* as age increased with this effect accounting for 18 % of the variability in PSS. This finding reflects the increasing support *children* are able to provide their parents as they grow older. This was consistent with Olsen et al.'s (1991) findings with a male sample, but was inconsistent with Depner and Ingersoll-Dayton (1988) whose sample was aged over 50. However, in partial support of Depner and Ingersoll-Dayton's (1988) finding, the graph of this result in Figs. 1 and 2 suggests the increase in support from *children* is less pronounced after 50 years of age.

For support from *parents*, there was a slight decrease as both male and female ages increased, although there is no previous research against which to compare this result. This decrease was significantly greater for fe-

males, where it explained 2 % of the variability, in comparison to males, where it explained 0.7 % of the variability.

For the findings on the perception of support from *relatives*, there was a slight increase in support as male age increased, explaining 1 % of the variability, but as female age increased the support from *relatives* remained constant. This difference between males and females was significant. While Turner and Marino (1994) did not observe sex differences, there was a non-significant trend of increased *relative* support across age for males and females.

Some authors in the previous literature on *friend* support observed a decline as age increased (Prezza and Pacilli 2002) for males (Olsen et al. 1991) and females (Levitt et al. 1993), while others did not (Turner and Marino 1994). A decline in support from *friends* with age was also observed in the current results for males and females and reflects the increased importance of family and the eroding social network over time. The decline in support from *friends* for females was significantly greater than the decline for males, accounting for 2 % and 1 % of the variability, respectively.

With the availability of a *confidant*, despite the higher levels observed in females overall, males' reports of having a *confidant* increased as their age increased (explaining 1 % of the variability), whereas females' reports decreased with age (explaining less than 0.5 % of the variability). This difference between males and females was significant. Support from one's *twin* remained constant across adulthood for males and females.

To summarise, there was very little change for males and females in *total KPSS* as age increased, which suggests KPSS is uninfluenced by age. However, this source-conflated measure has concealed important age effects apparent at the source-specific level. Perceived support from one's s*pouse* declined as age increased, while *child* support increased substantially. There was a slight decline in support from *parents* and *friends* with increasing age and minimal change with age for the other sources of support. These findings are testimony to the benefit of considering age effects at the source-specific level.

The limitations of this paper are sixfold. Firstly, the data used were cross-sectional. Ideally, developmental changes would be investigated using a longitudinal design. However, data collection throughout adulthood was beyond the scope of this investigation. Secondly, the PSS measure used was non-source-specific in that there was no sibling category. The relative category could have been interpreted by participants as including siblings. In order to more thoroughly investigate the source-specific effects, these two categories would need to be defined as 'relatives outside the immediate family' and 'siblings'.

A third limitation was the alpha inflation caused by two factors; the large sample size and the non-independence of observations with genetic relatedness between the twin pairs. The alpha inflation meant there was greater power to detect mean effects, which, while significant, were trivial in their effect sizes. Fourthly, it is

likely that over-cooperative participants were sampled in the 500 males and 500 females from the first cohort who were retested, as these participants were selected if they were the first to return their initial questionnaire. Fifthly, we are unable to generalise our results to a non-twin population. However, a future paper will be able to explore this as the HLQ was mailed to 19,420 participants who were related to the twins in the current study.

A sixth limitation is that these results have been interpreted as the effect of *age* on perceived support, but it is possible that these differences have also been caused by the changing importance of family relations over *time*. The differing strength of family relations over *time* may mean that participants born in the late nineteenth century have grown up with a different perception of support from that of the participants born as recently as the early 1970s. Thus, in females, the lower perception of spouse support in older females may be due to old *age*, or it may be because a lower importance was placed on perceived support from spouse by females born prior to 1945 compared to females born after this. Unfortunately, we are unable to differentiate the two explanations, but for child support at least, with higher levels of support in older participants (as their children grow older and are better able to provide support), it appears that the effect of *age* rather than *time* provides the best explanation.

Conclusions

In conclusion, we unveiled an alternative factor structure to Kessler et al. (1992, 1994), and this proved to be more appropriate for investigating age dependencies. Additionally, we attested the reliability of the KPSS measure with test-retest correlations demonstrating reasonable stability over an 18-month interval, particularly for obligatory support sources rather than voluntary sources.

Overall, for males and females, perceived support levels were observed to be fairly similar for the different sources of support. However, with the exception of support from one's *spouse*, slightly higher levels were observed for females, which was consistent with some of the findings in the previous literature. The age-correlated findings suggest perceived support remains relatively stable across the adult age range with the exception of perceived support from *children* where levels increase as age increases, as one would expect, and this provides evidence for the construct validity of the KPSS. Slight age differences in support from *spouse*, *parents*, *relatives*, *friends*, *help*, *PSS total* and *confidant* were observed for males and females. In each case, females demonstrated lower levels than males as age increased. Otherwise (i. e. for *twin* and *children*), the age differences between males and females were negligible.

The review of age and sex differences in the social support literature revealed inconsistent findings. The results of the current research have further contributed to an understanding of the Convoy Model of social support

through an exploration of the changing salience of support for males and females for specific support sources. While these results add greater clarity to our understanding gained from the previous literature, particularly given the substantially larger sample size in the current study, some remaining inconsistencies suggest the need for replication and greater attention in addressing the different measurement approaches used to investigate PSS.

Appendix A: The Kessler Perceived Social Support (KPSS) Measure

Please use this scale to answer the next three questions. Please number each person on the space provided
(1) Not at all   (2) A little   (3) Quite a bit   (4) A great deal

How much do the following people listen to you if you need to talk about your worries or problems?

| Your spouse | Your twin | Your children | Your parents | Your other relatives | Your friends |

How much do the following people understand the way you feel and think about things?

| Your spouse | Your twin | Your children | Your parents | Your other relatives | Your friends |

How much would the following people go out of their way to help you if you really needed it?

| Your spouse | Your twin | Your children | Your parents | Your other relatives | Your friends |

Is there anyone in your life with whom you have a close relationship and can share your most private feelings?
Yes   No

Appendix B: Response frequencies (%) for 6,835 males (m) and 9,316 females (f)

Scale: (1) Not at all   (2) A little   (3) Quite a bit   (4) A great deal

How much do the following people listen to you if you need to talk about your worries or problems?

Scale	Spouse		Twin		Child		Parent		Relative		Friend	
	m	f	m	f	m	f	m	f	m	f	m	f
1	1	3	10	5	26	17	6	7	28	23	7	4
2	8	17	30	20	35	34	24	23	40	39	36	26
3	25	28	32	30	27	33	35	34	24	26	39	43
4	66	53	28	45	13	16	34	36	9	11	18	28
n	1,638	3,319	3,357	5,950	1,234	2,768	2,943	4,995	3,032	5,393	3,290	5,846

How much do the following people understand the way you feel and think about things?

Scale	Spouse		Twin		Child		Parent		Relative		Friend	
	m	f	m	f	m	f	m	f	m	f	m	f
1	1	3	6	4	19	14	6	7	24	21	7	5
2	9	17	26	17	34	32	32	29	48	45	39	31
3	28	30	35	31	32	35	42	42	23	28	40	45
4	62	50	33	47	14	18	20	22	5	6	14	20
n	1,638	3,319	3,357	5,950	1,234	2,768	2,943	4,995	3,032	5,393	3,290	5,846

How much would the following people go out of their way to help you if you really needed it?

Scale	Spouse		Twin		Child		Parent		Relative		Friend	
	m	f	m	f	m	f	m	f	m	f	m	f
1	0	1	2	2	12	8	1	2	9	8	2	2
2	1	3	9	7	9	12	5	6	27	22	19	15
3	7	9	23	17	24	22	19	16	33	35	41	38
4	92	87	66	75	56	58	74	76	31	35	38	45
n	1,638	3,319	3,357	5,950	1,234	2,768	2,943	4,995	3,032	5,393	3,290	5,846

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