

Reciprocal Relationship between Social Support and Psychological Distress among a National Sample of Older Adults: An Autoregressive Cross-Lagged Model*

Annie Robitaille,¹ Heather Orpana,² and Cameron N. McIntosh³

RÉSUMÉ

Dans cette étude, nous avons examiné les relations longitudinales entre les cinq dimensions de soutien social et la détresse psychologique afin de déterminer si (1) le soutien social est lié à niveaux subséquentes de la détresse psychologique ; ou (2) si les niveaux de détresse psychologique ont été liés à des niveaux ultérieurs de soutien social ; ou (3) si la détresse et le soutien avaient une relation réciproque (bi-directionnel) à travers le temps. L'étude a examiné le rapport bidirectionnel longitudinal entre les dimensions différentes du soutien social et la détresse psychologique, en utilisant un modèle autorégressif de corrélation avec décalage pour cinq périodes de données. Nous avons trouvé des preuves (d'appui) de la relation réciproque entre le soutien affectueux et la détresse. L'augmentation de la détresse psychologique était liée à des niveaux élevés de la suite des interactions sociales positives et significativement liée à un soutien par la suite plus émotionnel et informationnel. Aucune relation significative n'a été trouvée entre un soutien tangible et structurelle et la détresse psychologique. Cette étude démontre que les différents types de soutien sont associés avec la détresse psychologique d'une manière correspondante et que la détresse psychologique peut être important, deux ans plus tard, pour prévoir des niveaux de soutien social.

ABSTRACT

In this study we examined the longitudinal relationships between five dimensions of social support and psychological distress to determine whether (1) social support was related to subsequent psychological distress levels; or (2) if distress levels were related to subsequent social support levels; or (3) if distress and support had a reciprocal (bi-directional) relationship across time. Using bivariate autoregressive cross-lagged models, we analysed data from 2,564 older adults. We found support for the reciprocal relationship between affectionate support and distress. Higher psychological distress was related to subsequently higher levels of positive social interaction, and significantly related to subsequently higher emotional/informational support. No significant relationship was found between tangible and structural support and psychological distress. This study demonstrates that different types of support are associated in correspondingly different ways with psychological distress, and that psychological distress may be important in predicting levels of social support two years later.

¹ University of Victoria, Canada

² University of Ottawa, Canada

³ Statistical Consultant, Ottawa, Canada

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Correspondence and requests for offprints should be sent to / La correspondance et les demandes de tirés-à-part doivent être adressées à:

Annie Robitaille, Ph.D
Department of Psychology
University of Victoria
P.O. Box 3050
Victoria, BC V8W 3P5
(annie.g.robitaille@gmail.com)

The beneficial relationship between social relationships and mental and physical well-being has been noted by many researchers for over a century (Blazer, 1982; Blazer & Hybels, 2005; Bosworth & Schaie, 1997; Durkheim, 1897; Krause, 1997; Krause, Liang, & Yatomi, 1989). Few studies, however, have examined the relationship between social support and psychological distress in later life (Cairney & Krause, 2005). Older age is characterized by changes in social relationships that result from reduced mobility, widowhood, the aging of friends, and the changing of goals (Carstensen, 1995; Carstensen, Isaacowitz, & Charles, 1999; Powell, 2004; Shaw, Krause, Liang, & Bennett, 2007). Furthermore, psychological distress, and the associated feelings of unhappiness and disinterest in activities, can also influence later social support levels. Still, the influence of psychological distress as an antecedent of social support has received little attention (Blazer, 1983; Matt & Dean, 1993; Murphy, 1985).

Despite the practical importance of understanding the relationship between social support and psychological distress over time, there are only a few longitudinal studies on this topic. Few of these have focused on a representative sample of older Canadians and over an extended period of time. Even fewer of these studies have treated social relationships as a process that can change as people age (Shaw et al., 2007). Most studies have treated social support as a time-invariant variable by only including social support at baseline. A design looking at the bi-directional relationship between support and distress using multiple time points would be more suitable for examining the reciprocal relationship between both factors. Understanding the relationship between social support and psychological distress would lead to an improved understanding of which social interventions might be implemented over the life span and help improve the quality of life of older adults.

The primary purpose of this study was to examine the longitudinal relationship between the different types of social support and psychological distress over an eight-year period, to determine whether social support was related to subsequent psychological distress levels or if psychological distress levels were related to subsequent social support levels, or both.

The Influence of Social Support on Distress

The main-effect model of social support posits a direct effect of social support on mental health, regardless of whether stressors are present (Cassel, 1976; Cohen & Wills, 1985). Proponents of this model suggest that having a large social network and being socially integrated into one's community may increase the likelihood of experiencing more positive feelings and fewer negative ones, provide a greater sense of community

and stability, and make the person feel good about him- or herself (Cassel, 1976; Cohen & Wills, 1985). Many studies have provided support for the positive influence of social relationships on psychological distress (Camirand & Nanhou, 2008; Couture, Larivière, & Lefrançois, 2005; Myer, Stein, Grimsrud, Seedat, & Williams, 2008). Nonetheless, other researchers have found no association between both variables, with some even reporting that higher support was linked with higher distress (Cruza-Guet, Spokane, Caskie, Brown, & Szapocznik, 2008; Krause & Rook, 2003; Liang, Krause, & Bennett, 2001). One possible explanation for these discrepancies is that those researchers used different measures and types of social support.

Social support is conceptualized and measured differently by different researchers (Turner, 1992). To better understand the influence of social relationships on psychological distress, it is important to examine specific dimensions of social support as opposed to a single, global construct. This is necessary because different types of support can have different outcomes in different situations (Caron & Guay, 2005; Cohen, Gottlieb, & Underwood, 2000, 2001). For the purpose of this study, we applied a categorization that is widely accepted and used by many authors (Hutchison, 1999; Langford, Bowsher, Maloney, & Lillis, 1997): structural support which measures network size and four dimensions of functional support referred to as emotional/informational (items measure the extent to which interpersonal relationships provide positive affect [emotional support] and guidance [informational support]), tangible support (items measure the extent to which behavioural help is provided to them), positive social interaction (items measure the extent to which someone to have fun with is available when needed), and affectionate support (items measure the extent to which interpersonal relationships provide love and affection). On the basis of conceptual differences between these dimensions of social support, it is not unlikely that the dimensions would exhibit different relationships with measures of mental health.

Recently, a number of studies have examined the influence of social network (Ryan & Willits, 2007), social integration (Ferraro & Su, 1999), overall perceived and received social support (Cairney & Krause, 2005; Couture et al., 2005; Gadalla, 2009; Matt & Dean, 1993; Préville, Hébert, Bravo, & Boyer, 2001; Ryan & Willits, 2007), and perceived and received informational, emotional, and tangible support on psychological distress (Camirand & Nanhou, 2008; Cruza-Guet et al., 2008; Krause, Liang, & Keith, 1990; Kubzansky, Berkman, & Seeman, 2000).

Cruza-Guet et al. (2008) found that received informational support but not tangible and emotional support

was related to higher distress. Higher satisfaction with their received tangible, emotional, and informational support was related to lower distress (Cruza-Guet et al., 2008). Kubzansky et al. (2000) found that a lower level of emotional support but not tangible support was related to increased distress. Ferraro and Su (1999) found that, in general, higher social integration was associated with lower psychological distress. Researchers found, although not specifically with a sample of older adults, that higher social support (four dimensions of social support combined) was correlated with lower psychological distress levels in a study using the National Population Health Survey (NPHS; Gadalla, 2009). These studies demonstrate the importance of examining different types of support and how the association (strength and direction) between support and distress changes depending on the type of support older adults used.

Influence of Psychological Distress on Social Support

One limitation of the studies we reviewed is that they were all cross-sectional in nature. Cross-sectional observational studies render it impossible to make inferences about the sequence of events (Cruza-Guet et al., 2008). While it is likely that social support causes changes in psychological distress, another possible explanation is that psychological distress levels cause changes in social support (Blazer, 1983; Matt & Dean, 1993; Murphy, 1985). Individuals who are depressed or who have higher levels of psychological distress may view the world in a more negative light and be more dissatisfied with their social support, may be more likely to isolate themselves from the rest of the world, and may be more likely to receive less support as a result of changes in their mood (Blazer, 1983; Murphy, 1985). For example, the revised fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV-TR) mentions social withdrawal as a possible sign of major depression (American Psychiatric Association, 2000). Therefore, it seems possible that people with depression are at risk of decreased social support. However, to date, inconsistent results have been found: some studies suggest that depression leads to lower social support (Lakey & Dickinson, 1994; Matt & Dean, 1993) and others indicate that it results in higher support (Blazer, 1983). Still others have failed to find that effect altogether (Cairney & Krause, 2005; Krause et al., 1989).

In work that we found to be more closely aligned with our study, Matt and Dean (1993) examined the bi-directional relationship between received social support and psychological distress. For the old-old group, higher support predicted lower distress and higher distress predicted lower support. For the young-old group, this cross-lagged effect was not found. However, only

two time points with a 22-month interval were included (Matt & Dean).

Generally, the aforementioned studies highlight the possibility that the existence of a relationship between social support and distress, as well as the direction of this association, depends on the type of social support being studied. More research is needed to (a) provide a more-detailed theoretical explanation of the main-effect model regarding which of the different dimensions of social support are important predictors of psychological distress, and (b) to gain a better understanding of the discrepancies found between studies.

The current study investigated the longitudinal, bi-directional relationship between different dimensions of social support (i.e., structural support and four types of functional support called emotional/informational support, tangible support, positive social interaction, and affectionate support), and psychological distress. Based on the aforementioned literature review and theoretical background, we hypothesized that higher positive social interaction would have a significant negative relationship with psychological distress levels and that higher distress would be associated with lower subsequent social support. For the perceived availability of tangible support and structural support, we hypothesized that there would be no relationship between support and subsequent distress levels and between distress and subsequent support. For affectionate support, we expected to find either a unidirectional or a reciprocal link between both variables with higher affectionate support predicting lower subsequent levels of distress and higher distress predicting lower affectionate support. For the perceived availability of emotional/informational support, we hypothesized that higher support would predict subsequently lower distress and that higher distress would predict subsequently lower support.

Methods

Sample and Data

Data from the National Population Health Survey (NPHS) were used (Statistics Canada, 2008). The data set includes seven cycles of longitudinal data collected over a 12-year period from 1994–1995 to 2006–2007. The household component of the longitudinal NPHS includes information about Canadian household residents' health, socio-demographic status, health services utilization, predictors of health, chronic conditions, and activity restrictions. It includes information about the same individuals every two years from 10 provinces excluding those living on Indian Reserves and Crown Lands, full-time members of the Canadian Forces Bases, and some remote areas in Ontario and

Quebec. People in health institutions were excluded from the current analyses.

The NPHS longitudinal sample size is 17,276 persons. A computer-assisted personal and telephone interviewing (CAI) method was used to collect the data. In our study, we used only data from cycle 3 (1998–1999) to cycle 7 (2006–2007), because the first two cycles used a different social support scale. Respondents 55 years of age and older when they first started the survey in 1994–1995 were included in our analysis. The response rate for cycle 3 was 88.3 per cent (Statistics Canada, 2008), and a prior study of attrition indicated that older adults were least likely to be non-responders (Swain, Caitlin, & Beaudet, 1999).

Measures

Medical Outcomes Study Social Support Survey. The Medical Outcomes Study (MOS) social support survey is a 19-item survey that measures four dimensions of perceived availability of functional social support. The four dimensions are (a) emotional/informational support, (b) tangible support, (c) positive social interactions, and (d) affectionate support (Sherbourne & Stewart, 1991). Functional support is the extent to which relationships serve particular functions. *Emotional/informational support* includes eight items measuring the extent to which interpersonal relationships provide guidance and positive affect (e.g., “someone you can count on to listen to you when you need to talk”). *Tangible support* includes four items measuring the extent to which behavioural help is provided to them (e.g., “someone to help you if you were confined to bed”). *Positive social interactions* include four items measuring individuals’ availability of someone to have fun with. *Affectionate support* includes three items measuring the extent to which the function of love and affection is met (“someone to love and make you feel wanted”).

The questions we asked participants concerning the MOS were answered on a five-point scale ranging from “none of the time” to “all of the time” with higher values indicating more social support. The survey also includes one structural measure of social support (“about how many close friends and close relatives do you have?”). Participants were asked to report the exact number of close friends and the exact number of close relatives. Sherbourne and Stewart (1991) have found good convergent and discriminant validity for the MOS social support survey. Also, internal consistency values have ranged from .90 to .97, and test-retest reliability has ranged from .72 to .78 (Robitaille, Orpana, & McIntosh, 2011; Sherbourne & Stewart, 1991). Confirmatory factor analysis (CFA) produced a four-factor structure (Gjesfjeld, Greeno, & Kim, 2008; Robitaille et al., 2011; Sherbourne & Stewart, 1991). A four-factor

model with good internal consistency has also been reported for the current sample (Robitaille et al., 2011).

Psychological Distress. Psychological distress is a non-specific negative psychological state that includes feelings of depression and anxiety combined (Kessler et al., 2003; Mirowsky & Ross, 2003). It is less severe and does not affect individuals to the same degree as depression does (Mirowsky & Ross, 2003). It does, however, lead to feelings of worthlessness, sadness, and irritability and in some cases can lead to depression and anxiety (Préville, Potvin, & Boyer, 1995; Turcotte & Schellenberg, 2007).

The K6 is a validated measure which includes six items used to assess individuals’ non-specific psychological distress in population surveys (Kessler et al., 2003). It was initially developed for use in the US National Health Interview Survey (NHIS) in order to screen for community cases of non-specific distress based on severity rather than diagnosis. Sample items include these: “During the past month, about how often did you feel so sad that nothing could cheer you up?” and “During the past month, about how often did you feel hopeless?”. Respondents were asked to answer on a five-point scale ranging from “none of the time” to “all of the time”. Each question score ranges from 0 to 4, and the total scale score ranges from 0 to 24.

The K6 has strong psychometric properties and can accurately discriminate between DSM-IV cases and non-cases (Furukawa, Kessler, Slade, & Andrews, 2003; Kessler et al., 2002, 2003). Furthermore, compared to the General Health Questionnaire (GHQ-12), the K6 has been found to better discriminate DSM-IV anxiety cases, depression cases, and non-cases and to be a better scale for measuring mental health (Furukawa et al., 2003).

Covariates. Four covariates were measured at baseline. These included (a) gender (1 = males; 2 = females), (b) education level (grouped in four categories: less than secondary graduation, secondary graduation, some postsecondary education, and postsecondary graduation), (c) age, and (d) language (1 = English; 2 = French). For language, respondents were asked to select their preferred language. This item was used to select French- and English-speaking Canadians included in the current study. Although the identification of English- and French-speaking individuals included respondents living anywhere in Canada, the vast majority of participants who responded to the French version of the NPHS lived in the province of Quebec.

Analysis

To examine the relationships between social support and psychological distress over time, we implemented

a bivariate autoregressive cross-lagged model within a structural equation modeling framework (cf. Bollen & Curran, 2006). This type of modeling strategy let us examine, using a series of regression equations, reciprocal effects among two focal variables over time. More specifically, in our study, measurements of both social support and psychological distress at a given time point t were simultaneously regressed on measurements of these two variables at the immediately preceding time point, $t-1$.

The bivariate autoregressive cross-lagged model therefore provided us with information about whether the different types of social ties at time $t-1$ predicted psychological distress at time t , above and beyond the $t-1$ observations of psychological distress, and similarly, whether psychological distress at time $t-1$ predicted social support at time t , over and above the measurements of social support at time $t-1$. To illustrate further, the autoregression of social support at time t on support measured at time $t-1$ effectively created a "residual change score" (Bollen & Curran, 2006, p. 210) for social support between the waves of data collection. At the same time, social support at time t was regressed on psychological distress at time $t-1$, and thus distress at time $t-1$ was uniquely predicting the change in social support between times t and $t-1$.

We used the same strategy to predict residualized change in psychological distress between time $t-1$ to time t , from social support at time $t-1$. This approach has therefore provided more accurate estimates of the reciprocal relationships between two focal variables than can be achieved via cross-sectional analysis (Marsh & Craven, 2006).

In addition to examining the bivariate autoregressive relationship between social support and psychological distress, our study included four baseline covariates: gender, age, education, and language. These variables came first in the posited causal ordering. A total of five cross-lagged models were estimated. These were fit to five waves of data. All models included the same four covariates and psychological distress. They differed only by our including a different dimension of social support (emotional/informational support, tangible support, positive social interactions, affectionate support, and structural support). See Figure 1 for a path diagram of the model of the reciprocal relationship between social support and psychological distress.

Given the large number of survey items available for each of our models (e.g., the emotional/informational model includes a possible 14 survey items per NPHS wave; times 5 waves = 70), we used parceling instead of creating full latent variables for the MOS social support scale and the K6 measure, to help ensure stable estimation for our different longitudinal models

(Yang, Nay, & Hoyle, 2010). Specifically, we tallied the scores on the K6 items to form a psychological distress scale, and formed social support subscales from the MOS in the same way. A separate longitudinal model for each specific type of social support also helped to ensure stable estimation of the cross-lagged relationships.

In Mplus (Muthén, & Muthén, 2010), models with missing data can be accommodated by making missingness conditional on the covariates included in the model. In this situation, the maximum likelihood (MLR) estimator becomes a robustified full information maximum likelihood (FIML) estimator (Enders, 2006), under the assumption of missing at random (MAR) with respect to the covariates. Therefore, in the Mplus implementation of FIML under MLR, robust standard errors in the presence of missing data are estimated (Yuan & Bentler, 2000). With FIML, parameters are estimated directly from the available raw data on a case-wise basis, and the chi-square test statistic and model fit indices are calculated from the log likelihood of the data for each observation (Duncan, Duncan, & Strycker, 2006; Enders, 2006).

We used sampling weights to account for unequal probabilities of selection, and we normalized the weights according to the method suggested by Statistics Canada (2008). Further, given that using clustered data from a complex survey design may result in underestimated standard errors and provide biased chi-square values, we applied the linearization method (also called Taylor Series approximation) with both the NPHS stratum and stratum identifiers. This method has been found to provide correct estimates of standard errors in clustered data (Stapleton, 2006).

To assess the overall fit of the models, we examined six fit indices: (a) likelihood ratio test statistic, (b) p values, (c) degrees of freedom (df), (d) comparative fit index (CFI), (e) Tucker-Lewis index (TLI), and (f) root mean square error of approximation (RMSEA) (Browne & Cudeck, 1993). Given our large sample size, it was likely that the χ^2 test statistic would be significant, suggesting that the discrepancy between the observed and the hypothesized models was greater than would be expected by chance alone. We reported the approximate fit indices while keeping in mind that these were not meant to provide or omit support for a perfectly fitting model, but rather to provide information about whether or not the model was acceptable based on the approximate fit (Millsap, 2007).

As a general rule, CFI and TLI values greater than .95 are indicative of an acceptable fit (Hu & Bentler, 1999). The RMSEA value represents the fit of the model to the population if parameter values are optimally chosen (Browne & Cudeck, 1993). RMSEA values that are less than .05 represent good fit, and values up to .08 correspond

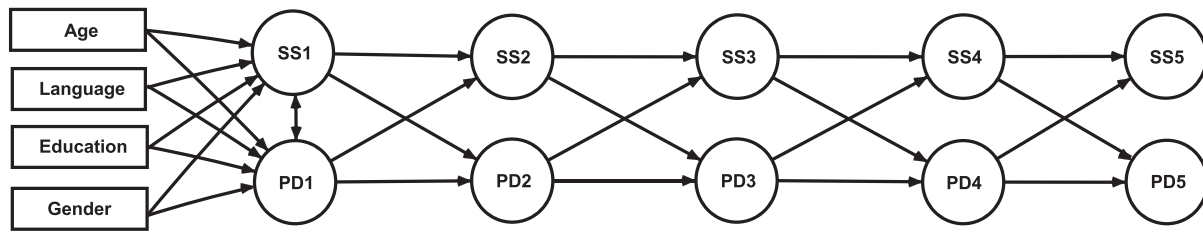


Figure 1: Bivariate autoregressive cross-lagged model of social support and psychological distress

Note. Correlations between the different cycles of distress and those between the different cycles of affectionate support were excluded from the figure for clarity purposes. SS = social support; PD = psychological distress.

to a reasonable fit (Byrne & Campbell, 1999; Hu & Bentler, 1999).

We also examined the model parameter estimates. Given past critiques of standardization in both multiple regression and structural equation modeling (Greenland, Maclure, Schlessman, Poole, & Morgenstern, 1991; Greenland, Schlessman, & Criqui, 1986; Hargens, 1976; Kim & Feree, 1981), we reported only unstandardized estimates in the current study. Specifically, standardized estimates depend on the standard deviations of the variables involved, which are descriptive, sample-specific quantities. Therefore, the size of a standardized coefficient may simply be an artifact of a given standard deviation.

Results

Sample Description

The final sample consisted of 2,564 respondents ranging in age from 55 to 89, with an average age of 63.98 years ($SD = 6.86$) when they first started the study in 1994–1995. Of this sample, 41 per cent were male and 59 per cent were female. Sixty-two per cent were married, in a common-law relationship, or living with a partner; four per cent were single; and 26 per cent were widowed, separated, or divorced. Forty per cent reported less than a secondary school education; 13 per cent, a secondary school education; 19 per cent, some post-secondary education; and 25 per cent, a post-secondary graduation. Only French- (23.41%) and English-speaking (76.59%) respondents were included in the final analyses.

Relationship between Affectionate Support and Psychological Distress

The model fit the data well (see Table 1). The parameter estimates for the cross-lagged model provided some support for a reciprocal relationship between affectionate support and psychological distress after controlling for age, education, gender, and language (see Table 2). The paths from Time 1 (T1) psychological distress to Time 2 (T2) social support, T1 social support to T2 psychological distress, T2 social support to Time 3 (T3) psychological distress, and T3 psychological distress to Time 4 (T4) social support were significant. These findings suggest that higher affectionate support leads to higher levels of psychological distress two years later and that higher levels of distress lead to higher levels of affectionate support. The other four paths were non-significant. For all time waves, prior affectionate support predicted later support, and prior psychological distress predicted later levels of distress. Parameter estimates for the covariates for all models are available in Table 3.

Relationship between Tangible Support and Psychological Distress

The model fit the data well (see Table 1). The paths relating tangible support and psychological distress were all small with only the path from T3 psychological distress to T4 tangible support being just barely significant (see Table 2). For all time waves, prior tangible support and psychological distress predicted later support and psychological distress, respectively.

Table 1: Goodness of fit statistics for the Medical Outcomes Study (MOS) social support scale

Model	df	χ^2	p	CFI	TLI	RMSEA
AS	39	84.94	$p < .0001$	.98	.96	.021
TS	39	101.09	$p < .0001$	.98	.95	.025
PSI	39	68.46	$p = .0025$	.99	.97	.017
EIS	39	74.19	$p = .0006$	.99	.97	.019
SS	39	75.80	$p = .0004$	.98	.96	.019

df = degrees of freedom; χ^2 = chi-square values; p = probability values; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error approximation; TS = tangible support; AS = affectionate support; PSI = positive social interaction; EIS = emotional/informational support; SS = structural support.

Table 2: Unstandardized estimates, standard errors, and confidence intervals for the autoregressive cross-lagged models

Parameters	AS		TS		PSI		EIS		SS			
	95% CI		95% CI		95% CI		95% CI		95% CI			
	low	high	low	high	low	high	low	high	low	high		
PD (T2) on PD (T1)	0.92(.20)*	1.31	0.37	1.35	0.82(.15)*	1.11	0.53	1.11	0.84(.16)*	1.15	0.74(.14)*	1.01
PD (T2) on S (T1)	0.13(.06)*	0.01	0.26	0.16	0.08(.05)	-0.04	-0.01	0.17	0.04(.02)	-0.001	-0.002(.007)	-0.02
S (T2) on S (T1)	1.08(.21)*	0.67	1.49	1.81	1.34(.29)*	0.51	0.77	1.91	1.24(.30)*	0.66	1.80(.40)*	1.03
S (T2) on PD (T1)	0.13(.06)*	0.01	0.25	0.36	0.33(.12)*	-0.03	0.09	0.57	0.51(.22)*	0.07	0.94	-0.01
PD (T3) on PD (T2)	1.48(.27)*	0.94	2.01	1.97	1.18(.20)*	1.02	0.79	1.57	1.16(.20)*	0.76	1.45(.25)*	0.95
PD (T3) on S (T2)	0.18(.08)*	0.04	0.33	0.14	0.09(.05)	-0.04	-0.01	0.18	0.03(.02)	-0.01	0.07	-0.01
S (T3) on S (T2)	0.97(.19)*	0.60	1.34	1.21	1.45(.31)*	0.65	0.84	2.06	1.60(.43)*	0.77	2.44	0.32
S (T3) on PD (T2)	0.01(.06)	-0.10	0.13	0.08	0.27(.13)*	-0.10	0.01	0.53	0.54(.32)	-0.08	1.15	-0.16
PD (T4) on PD (T3)	0.86(.10)*	0.66	1.06	1.11	0.87(.09)*	0.62	0.69	1.06	0.82(.09)*	0.65	1.00	0.46
PD (T4) on S (T3)	0.01(.04)	-0.07	0.10	0.09	0.02(.03)	-0.04	-0.04	0.08	0.002(.02)	-0.03	0.03	-0.02
S (T4) on S (T3)	1.40(.24)*	0.94	1.86	1.99	1.74(.28)*	0.92	1.19	2.30	1.99(.41)*	1.20	2.79	0.26
S (T4) on PD (T3)	0.17(.08)*	0.01	0.34	0.42	0.38(.14)*	0.004	0.10	0.66	0.85(.35)*	0.17	1.54	-0.13
PD (T5) on PD (T4)	1.13(.47)*	0.21	2.05	1.89	0.66(.16)*	0.68	0.34	0.98	0.72(.17)*	0.39	1.06	0.91
PD (T5) on S (T4)	0.04(.19)	-0.33	0.40	0.21	-0.24(.12)*	-0.11	-0.46	-0.01	-0.12(.07)	-0.23	0.02	-0.03
S (T5) on S (T4)	0.94(.25)*	0.45	1.43	1.37	1.26(.22)*	0.50	0.83	1.68	1.09(.24)*	0.61	1.56	0.91
S (T5) on PD (T4)	0.05(.08)	-0.10	0.20	0.23	0.23(.12)	-0.13	-0.19	0.47	0.26(.23)	-0.19	0.70	-0.29

T1 = Time 1; T2 = Time 2; T3 = Time 3; T4 = Time 4; T5 = Time 5; EST = unstandardized estimates; SE = standard errors of estimates; S = social support; SS = structural social support; TS = tangible support; AS = affectionate support; PSI = positive social interaction; EIS = emotional/informational support; PD = psychological distress * denotes significant paths (critical value = ± 1.96)

Table 3: Unstandardized estimates, standard errors, and confidence intervals for the covariates

Parameters	AS		TS		PSI		EIS		SS	
	95% CI		95% CI		95% CI		95% CI		95% CI	
	EST.(SE)	low high	EST.(SE)	low high	EST.(SE)	low high	EST.(SE)	low high	EST.(SE)	low high
PD on Language	0.80(.18)*	.45 1.15	0.77(.16)*	.45 1.09	0.64(.20)*	.25 1.04	0.68(.21)*	.27 1.08	0.86(.18)*	.50 1.22
PD on Education	-0.11(.05)*	-.20 -.02	-0.08(.05)	-.18 .02	-0.12(.05)*	-.22 -.01	-0.12(.05)*	-.21 -.006	-0.09(.05)	-.20 .01
PD on Age	-0.006(.02)	-.04 .03	-0.006(.01)	-.03 .02	-0.02(.01)	-.04 .002	-0.02(.01)	-.04 .001	-0.01(.01)	-.03 .007
PD on Gender	0.74(.27)*	.21 1.27	0.80(.22)*	.37 1.23	0.93(.16)*	.62 1.24	0.90(.17)*	.58 1.22	0.87(.18)*	.52 1.22
S on Language	-0.56(.18)*	-.91 -.21	-0.34(.27)	-.86 .18	-0.36(.14)*	-.63 -.09	-0.73(.30)*	-1.39 -.20	-1.34(.26)*	-1.85 -.83
S on Education	0.10(.05)*	.008 .18	0.07(.05)	-.03 .16	0.10(.04)*	.02 .18	0.16(.07)*	.03 .30	0.07(.09)	-.10 .25
S on Age	-0.02(.01)	-.04 .00	-0.03(.01)*	-.05 -.004	-0.01(.01)	-.03 .009	-0.01(.02)	-.05 .03	-0.01(.01)	-.04 .01
S on Gender	-0.23(.11)*	-.44 -.009	-0.80(.20)*	-1.20 -.41	-0.49(.09)*	-.67 -.31	-0.81(.17)*	-1.14 -.48	-0.79(.23)*	-1.25 -.34

EST = unstandardized estimates; SE = standard errors of estimates; S = social support; SS = structural social support; TS = tangible support; AS = affectionate support; PSI = positive social interaction; EIS = emotional/informational support; PD = psychological distress
 * denotes significant paths (critical value = ± 1.96)

Relationship between Positive Social Interaction and Psychological Distress

The model fit the data well (see Table 1). All paths for the effect of psychological distress on positive social interaction (from T1 to T2; T2 to T3; T3 to T4) except for the last time wave (T4 to T5) were significant, suggesting that higher psychological distress was related to higher social support two years later even after controlling for previous social support, distress levels, and covariates (see Table 2). Only one path for the effect of positive social interaction on psychological distress was significant, with higher levels of positive social interaction predicting lower psychological distress. For all time waves, prior positive social interaction predicted later support, and prior psychological distress predicted later levels of distress.

Relationship between Emotional/informational Support and Psychological Distress

The model fit the data well (see Table 1). The paths from T2 and T3 psychological distress on T3 and T4 emotional/informational support, respectively, were significant with higher psychological distress being related to subsequently higher emotional/informational support (see Table 2). All other cross-lagged paths were non-significant. For all time waves, prior emotional/informational support was correlated with later support, and prior psychological distress was associated with later distress.

Relationship between Structural Support and Psychological Distress

The model fit the data well (see Table 1). There was no cross-lagged relationship involving structural social support and psychological distress (see Table 2). The only paths that were significant in that model were for structural support predicting subsequent levels of structural support and psychological distress predicting later levels of distress over time.

Discussion

Drawing upon nationally representative longitudinal data, the objective of the current study was to investigate the reciprocal relationship between various dimensions of social support and psychological distress in a sample of older adults. This study is among the first to demonstrate that different results can be found for the long-term relationship between social support and psychological distress depending on the dimensions of support being studied.

The finding that structural support is unrelated to distress aligns with our hypotheses as well as with previous research, suggesting that the number of close

friends and relatives is not an important predictor of subsequent distress, and conversely, that the amount of structural support is not affected by previous distress (Ryan & Willits, 2007). It has already been identified in the literature that the quantity of friends and relatives does not have a direct relationship with the quality of support offered.

The longitudinal relationship between tangible support and distress was weak, with higher distress marginally predicting subsequently higher support at only one wave. This is consistent with other studies that have failed to find an association between social support and psychological distress (Krause et al., 1990), and more specifically between tangible support and distress (Cruza-Guet et al., 2008; Kubzansky et al., 2000). The type of help measured by tangible support (e.g., receiving assistance around the house when sick) is beneficial when this type of help is needed (Cohen & Wills, 1985; Taylor & Aspinwall, 1996; Thoits, 1986, 1995). Rather than being related directly with psychological distress (main-effect model), it is likely that tangible support acts as a moderator when stressors are present (e.g., becoming ill) by reducing the impact of stressors and in turn decreasing distress (stress buffering model; Cohen & Wills, 1985).

The perception of there being someone available to have fun with (i.e., positive social interaction) was related to lower distress two years later only at the last time wave, suggesting only minimal support for this cross-lagged effect. In contrast, the relationship between higher distress and subsequently higher positive social interaction was clearly stronger and more consistent, with only the last time wave being non-significant.

Some support was found for the reciprocal association between affectionate support and later psychological distress and between psychological distress and later support. Contrary to our hypothesis, affectionate support was associated with higher later psychological distress for two of the four time intervals (regression paths). Some previous studies have also reported that increased social support is related with increased psychological distress (Cohen & Wills, 1985; Cruza-Guet et al., 2008; Krause et al., 1990). For older adults, it is possible that too much social support leads to a feeling of loss of independence and decreased self-worth. Still, this would be more likely to occur as the result of other types of support such as tangible or informational support. Clearly, more research is needed to answer these questions.

In the case of emotional/informational support, the temporal association was unidirectional. Contrary to our hypothesis, a higher level of distress was a significant antecedent of a higher level of social support for two of the four time intervals (regression paths). This is

also contrary to the research of Matt and Dean (1993), who found that higher distress was associated with lower social support 22 months later. Nonetheless, in the current study we also found this association – between higher psychological distress and higher social support two years later – for positive social interaction and affectionate support. Although the direction of the association between support and distress was unexpected, ours is not the first study to find such a relationship (Blazer, 1983). Blazer found that depression was related to increased support 30 months later.

A number of factors may explain our results. The levels of distress observed in our sample were generally low. Lower levels of psychological distress may be adaptive or at least not maladaptive (Blazer, 2009), and therefore the associations observed may be driven by associations in this non-pathological range of symptoms. Higher distress would then elicit higher social support as a form of coping. Additionally, mild psychological distress would not be expected to lead to withdrawal as is found in clinical depression. Future research should explore the longitudinal association between social support and severe psychological distress.

Overall, it is interesting that results from this study provide support for the association of psychological distress with subsequent levels of social support rather than only for the association of social support with subsequent distress. Cross-sectional studies more often interpret a relationship between social support and distress as indicative of social support being protective against distress. We are not implying that social support is not protective against distress but, rather, that the opposing explanation also must be considered: that distress can lead to the seeking of social support.

The lack of a stronger predictive influence of the different dimensions of social support on distress can be explained by the measures used. A recent study using a cross-lagged model found that loneliness rather than social support predicted depressive symptomatology in older adults (Cacioppo, Hawkley, & Thisted, 2010).

Limitations of the current study include the discrete time interval of two years that was used. That is, there were two year intervals between each data collection wave. Shorter time lags between measurements of distress and social support (e.g. six months, one year) might better capture changes in distress and support over time and result in different results. Studies have been found to have different results depending on the discrete time interval used (Oud, 2002). A second limitation was that, as mentioned, levels of distress were relatively low, and thus this factor limited the range of experiences that we studied.

A third limitation was that this study excluded those who were not living in a household, which would include

those at high risk for low social support and high psychological distress (e.g., residents of health care and other institutions).

A fourth limitation was that, although we attempted to run the model employing the latent variables and their indicators, it would not converge given the complexity of the model. We also encountered convergence problems due to model complexity when we attempted to control for covariate effects at each NPHS wave used in this study, which necessitated controlling for the covariates at the first wave only. Although this was an observational study, and causation should not be inferred from the observed results, the longitudinal autoregressive cross-lagged model that we used brings us one step closer to being able to establish causality between social support and psychological distress through establishing temporal sequence.

To our knowledge, this is the first study to investigate the long-term reciprocal association between different types of social support and psychological distress for older adults. This study highlights an important area of research and theory development that has been widely understudied among older adults. It would appear that psychological distress in the general population of older adults could be important in predicting subsequent levels of social support. Implications for these findings include the need for a greater awareness of the bi-directional nature of the relationship between social support and psychological distress, among those who develop programs targeting older adults. Given varying results found as a result of the dimension of support used, program developers should be made aware of these different types of support in order for programs to be better tailored to the needs of older adults. We hope this study will encourage the development of carefully designed intervention studies so that researchers might more fully understand the role of psychological distress levels on perceived availability of support and on other people's willingness to provide support.

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