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ORIGINAL INVESTIGATION

Cosmic transcendence, loneliness, and exchange of emotional support with adult children: a study among older parents in The Netherlands

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Abstract Gerotranscendence defines a shift in meta-perspective from earlier materialistic and pragmatic concerns, toward more cosmic and transcendent ones in later life. Population-based studies that have empirically examined this concept using Tornstam's gerotranscendence scale, highlight cosmic transcendence as a core component, which includes a sense of belongingness with past and future generations. Such generative concerns may increase expectations regarding the quality of the bond with one's children in later life. This study examined whether the association between emotional support exchanged with children and feelings of loneliness later in life varied by the degree of cosmic transcendence of the older parent. Data from 1,845 older parents participating in a population-based study living in The Netherlands were analyzed from the 1995/1996 cycle of the Longitudinal Aging Study Amsterdam. Interviews included self-report measures of cosmic transcendence, loneliness, emotional support exchanged with children, health indicators, and marital status. Results indicated that a negative association between loneliness and level of emotional support exchanged with children was more pronounced among older parents with higher cosmic transcendence scores, in particular among the married. It is argued that cosmic transcendence reflects a sense of generativity and an increased emotional dependency on children in later life. Under favorable social conditions (supportive relationships with children and being married) cosmic transcendent views had a positive impact on social well-being in later life. When children no longer met emotional needs of older parents, cosmic transcendence increased feelings of loneliness.

Keywords Cosmic transcendence · Loneliness · Emotional support · Generativity · Old age

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Introduction

A growing awareness of finitude in old age may trigger the development of less materialistic and more cosmic transcendent views. Tornstam (1989, 1994, 1997, 2005) proposes, in his theory of gerotranscendence, that transcendent changes accompany the aging process and are associated with life-satisfaction and wisdom in later life. Little is known about the concept of gerotranscendence, despite a growing number of empirical studies on the issue (Tornstam 1994; Braam et al. 1998, 2006; Atchley 1999). To date, greater attention has focused on cosmic transcendence, as the most validated dimension of gerotranscendence, and its associations with other philosophical dimensions, such as meaning in life and spirituality (Braam et al. 2006). Little is also known

about the association between cosmic transcendence and social dimensions, such as social support and loneliness. However, one of the cosmic transcendent changes refers to an enhanced sense of belongingness with past and future generations, suggesting an increased importance of the bond between parents and their children in later life. It is well established in the gerontological literature that supportive relationships between older parents and their children decrease loneliness in later life (e.g., Dykstra 1990; Silverstein and Bengtson 1994). In this line of reasoning, it can be expected that later life associations with cosmic transcendence, the supportive bond with children and loneliness may be evident. This study explores the associations between cosmic transcendence, loneliness, and emotional support with children, and examines to what degree cosmic transcendent views affect the often-reported negative association between emotional support from children and loneliness of parents in later life.

Theoretical background

The theory of gerotranscendence proposes that older individuals experience a shift in meta-perspective from earlier materialistic and pragmatic concerns to more cosmic and transcendent ones in later life. Such transcendent changes, as proposed by Tornstam (1989, 1994, 1997, 2005), accompany the aging process, and take place on three levels: the self, social, and cosmic levels. The self-level defines a reduced sense of self-centeredness, a decreased concern with materialism and physical appearance, and an enhanced need for introspection. On the social level, the older person becomes less interested in superficial social contacts, and experiences a growing need for solitude and meditation. Finally, the cosmic level reflects a higher sense of connection with the unity of nature and the universe. The older person experiences a new definition of time, space, life and death, and a growing affinity toward past and future generations. Tornstam argues that gerotranscendence is essentially an intrinsic process increasing with age, which is associated with a sense of life-satisfaction and wisdom. It can also be enhanced by life crises experienced at earlier points in life, and modified by the cultural environment.

Cosmic transcendence has emerged as the most consistent dimension of gerotranscendence from several population-based studies (Tornstam 1994, 1997; Braam et al. 1998, 2006), fulfilling, therefore, to some extent the criteria of replicability. One key aspect of the development of a cosmic transcendent view is an enhanced sense of belongingness with past and future generations. This parallels with Erikson's notion of generativity (1963), which he defined as "primarily the concern in establishing and guiding the next generation" (p. 267). In his original eight stage life-model of psychosocial development, Erikson proposed generativity as the key developmental task of mid-life, which preceeds the development toward "ego-integrity" and wisdom in old age. Erikson et al. (1986) later acknowledged, based on the findings from their study sample, that a growing awareness of finitude and issues related to immortality, also shaped the development of generative concerns around children in old age (Alexander et al. 1991).

The cosmic transcendence construct broadly involves a greater connection between the older person and the unity of all humankind and natural life. Elements of the development of cosmic transcendent ideas may fit with Erikson's notion of generativity, in which older parents nurture a sense of investment in the prosperity of future generations. If adult children are key to a potentially emotional supportive aspect of cosmic transcendence in later life, then it is posited that older parents expect contact with their children more so when they endorse a sense of cosmic transcendence. This leads to an incongruence hypothesis. Incongruence arises when the parent holds high cosmic transcendent views but the relationship with his or her child(ren) is of low quality. This incongruence situation is expected to increase feelings of loneliness, compared to a congruent situation (e.g., having low transcendent views and a low quality relationship with the child, or the combination of high transcendent views and a high quality relationship with the child).

In addition to the general interaction effect between cosmic transcendence and quality of parent–child relationships, we expect that this effect may be even larger for the older old and the widowed, for two reasons. Firstly, transcendent views are known to increase with age and are higher among unmarried (mostly widowed) older adults (Braam et al. 1998). Secondly, the older old and the widowed are proposed to attach greater significance to nurturing generative concerns in light of an awareness of a more limited life span and the absence of a spouse. Data is used from a community-survey of Dutch older parents aged between 58 and 88 years, to answer the following questions:

(1) How do cosmic transcendence, emotional support exchanged with children and loneliness relate to each other in a sample of Dutch older parents?
(2) To what extent does cosmic transcendence interact with the level of emotional support exchanged with children on feelings of loneliness?

(3) Is there a stronger interaction effect of cosmic transcendence and emotional support exchanged with children on loneliness among those aged 75 years and older and among the widowed?

Methods

Sample description

The Longitudinal Aging Study Amsterdam (LASA) is an ongoing multidisciplinary study of predictors and consequences of changes in physical, cognitive, social, and emotional functioning among older people in The Netherlands. A random sample stratified by age and gender was drawn from the population registers of 11 municipalities in three geographical areas in The Netherlands. Starting from the baseline in 1992/1993, data were collected at three-yearly intervals with face-to-face interviews. The details of the LASA-study have been described elsewhere (Deeg et al. 2002). The present study used data from the 1995/1996 time of measurement as the cosmic transcendence scale was included only at this wave.

Non-response

At the second measurement cycle (1995/1996), all accessible participants to the baseline measurement (1992/1993) were approached again, generally using the same instruments and procedures used in the first measurement cycle. Of the original sample at T1 (n=3,107), 3 years later, 13% (n=416) had died, 5% (n=146) was lost to follow-up for other reasons (refused, n=90; ineligible, n=38; not contacted, n=18), and 12% (n=375) was lost due to missing data (application of shortened versions of the interview, n=341; item non-response, n=34). Complete data for loneliness and cosmic transcendence was available for 2,186 subjects (81% of 2,691 respondents still alive). The current study is based on data of the respondents who had at least one child in their contact network (n=1,845).

Respondents who were lost to follow-up for other reasons than mortality (n=505) were compared to those with complete data (n=2,186) on demographic characteristics, functional limitations, and loneliness. Non-response was significantly predicted by lower levels of education, older age, more functional limitations, and higher levels of loneliness at baseline. In multiple regression analysis, significant differences held only for age (β=0.03, SE=0.01, P<0.001) and education (β=−0.13, SE=0.03, P<0.001).

Measurements

Cosmic transcendence. The six items on the cosmic transcendence scale were taken from the Dutch version of Tornstam's gerotranscendence scale. Respondents were asked "Do you recognize this?" in relation to the six statements posed, with response categories either "yes" (1) or "no" (0). Statements included, for example, "Today I feel a greater mutual connection with the universe, compared to when I was 45 years of age" and "Today I feel a greater state of belonging with both earlier and coming generations" (Table 2). In a previous Dutch study, only the cosmic transcendence subscale had a satisfactory level of reliability (Cronbach's α=0.67), whereas the scale characteristics for the ego transcendence subscale were rather weak (Braam et al. 1998). The reliability of the cosmic transcendence scale in this study was very similar (Cronbach's α=0.66). The scale characteristics showed a mean inter-item correlation of 0.25, with all items loading on one factor (Eigenvalue 2.2, explaining 37% of the variance).

Loneliness was measured using a Rasch-type loneliness scale devised by de Jong Gierveld and Kamphuis (1985), which assesses five positive items related to feelings of belongingness, and six negative items related to aspects of missing relationships. Total scale scores ranged from 0 (never lonely) to 11 (very lonely). In this study, the scale was found to have a good reliability score (Cronbach's α=0.84).

Emotional support. Network relationships were identified using a domain-specific approach (van Tilburg 1995). Participants were asked to "Name the persons with whom you have frequent contact and who are important to you" within a choice of seven role domains, including the domain of their children. The frequency of contact was asked for in all types of relationships, and all named persons were aged 18 years and older. Information on support was collected from the top nine network members with the highest contact frequency (excluding the spouse). The question asked about emotional support given, was "How often did it occur in the past year that X told you about his or her personal experiences and feelings?" The question related to emotional support received was "How often in the past year did you tell X about your personal experiences and feelings?" Answers ranged on a scale from "never" (0), "seldom," "sometimes," and "often" (4). For this study, the mean scores of both forms of emotional support exchanged with children in the network were computed for each respondent. This resulted in two scales, both ranging from 0 (no support from children among the top nine network members)

to 3 (all relationships with the children among the top nine network members were often supportive). The parents identified on average 2.4 children (SD=1.2, range=1–8) in the core network.

As support data was only collected for children identified among the top nine network members, parents whose children were not selected into the core network were left out of the analyses. In comparison with the 1,845 parents with at least one child in the core network, the 355 parents with no child in the top nine network were more lonely (2.82 and 2.12, respectively, t=4.27, P=0.000), and had smaller networks (12.5 and 14.8, respectively, t=4.29, P=0.000), but did not differ with regard to cosmic transcendence (2.8 and 2.9, respectively, t=1.47, P=0.142). The selected parent–child relationships had on average a higher contact frequency compared to the parent–child relationships that did not enter the top nine core network (6.6 and 4.9, respectively, t=406, P<0.001). The implications of this selection of frequently contacted parent–child relationships are included in the discussion. It should be kept in mind that the label "emotional support" indicates the exchange of emotional support with frequently contacted children.

Demographic variables included age, gender, marital status, and years of education. Physical health measures assessed chronic conditions and functional limitations. Chronic somatic diseases were examined by asking respondents if they had any of six major disease categories: respiratory diseases, cardiovascular diseases, diabetes, stroke, arthritis and cancer, with scores coded on a yes/no basis, and ranging from 0 to 6 chronic diseases (Kriegsman et al. 1996). Functional limitations were assessed by a six-item questionnaire including items on: (1) dressing, (2) cutting own toenails, (3) sitting and rising from a chair, (4) going up and down stairs, (5) walking 5 min outside the home, (6) using transportation. Answers ranged from 0 "no difficulty" to 3 "unable" (total scale ranges from 0 to 18). The scale has good reliability with a Cronbach's α=0.76 (Kriegsman et al. 1997).

Statistical procedures

To examine the first research question, associations between cosmic transcendence, loneliness, emotional support measures with children, and all continuous variables were computed using Pearson correlations. To examine the second and third questions, multiple regression analysis was conducted with loneliness as the dependent variable. Product interaction terms between loneliness, cosmic transcendence, and emotional support measures with children were evaluated in two separate models for emotional support received and emotional support given. The regression analyses with the interaction terms for cosmic transcendence and support exchanged were repeated for age cohorts above and below those aged 75 years, and for married and widowed parents. To avoid multi-collinearity between first-order terms and product terms, product terms were formed by multiplying the centered scores of both components. The level of significance for analysis of the product terms was set at $P \leq 0.05$, as the power of statistical tests for higher order terms is generally lower than for first-order terms (Aiken and West 1991).

Results

Sample characteristics

Table 1 shows the general characteristics of the study sample. Because of stratification of the sample by age and sex, the proportion of males and females was about equal, namely 52% women and 48% men. Age range was between 58 and 89 years, with a mean of 72 years (SD=8.4). The majority in the sample were married (63%), nearly one-third widowed (31%), and just under 6% either divorced or never-married. The sample was relatively well educated (mean 8.9 years; from a range 5–18), and relatively healthy (mean number of functional limitations 1.3 from a range of 0–6; mean number of chronic illnesses 1.2 from a range of 0–6). The mean number of children identified in the core network was 2.4 (range 1–8). The mean emotional support received and given to children was 2.0 and 2.1, respectively (range 0–3), indicating that the parents on average "sometimes" exchanged support with their children. The mean loneliness score was low at 2.1 (range 0–11). Finally, the mean score on the cosmic transcendence scale was 3.0, indicating that most items were recognized by almost half of the sample (Table 2).

Cosmic transcendence, loneliness, and emotional support

Bivariate analyses revealed that cosmic transcendence showed a weak positive association with loneliness, but cosmic transcendence was not significantly associated with emotional support exchanged with children (Table 3). As expected, loneliness was negatively associated with level of emotional support exchanged (received and given) with children.

Both cosmic transcendence and loneliness were significantly associated with several of the background

Table 1 Characteristics of the study sample (n=1,845)

	Categorical variables	
	n	(%)
Gender		
Female	963	(52)
Male	889	(48)
Marital status		
Married	1,167	(63)
Divorced	111	(6)
Widowed	574	(31)
Never married[a]	56	(3)

Continuous variables			
	Mean	Range	(SD)
Age	72	58–89	(8.4)
Years of education	8.9	5–18	(3.3)
Functional limitations	1.3	0–6	(1.7)
Number of chronic illnesses	1.2	1–6	(1.1)
Number of children in network[b]	2.4	1–8	(1.2)
Emotional support received	2.0	0–3	(0.9)
Emotional support given	2.1	0–3	(0.8)
Cosmic transcendence	3.0	0–6	(1.8)
Loneliness	2.1	0–11	(2.5)

[a] The rate of being never married is very low as the current sample included respondents with at least one child in the support network only

[b] Number of children identified among the nine most frequently contacted network members

Table 2 Gerotranscendence scale [English translation by Tornstam (1994), Dutch translation used in the survey] item scores in study sample (n=1,845)

Cosmic transcendence	% respondents agreeing with statement
1 Today I feel that the border between life and death is less striking compared to when I was 45 years of age	55
2 Today I feel to a higher degree, how unimportant an individual life is, in comparison to the continuing life as such	55
3 Today I feel a greater mutual connection with the universe, compared to when I was 45 years of age	48
4 Today I more often experience a close presence of persons, even when they are physically elsewhere	40
5 Today I feel that the distance between past and present disappears	45
6 Today I feel a greater state of belonging with both earlier and coming generations	53

characteristics. Cosmic transcendence was positively associated with age, gender (females), number of chronic diseases, and number of functional limitations (Table 3). It showed a negative association with being married over not being married, and level of education. Furthermore, loneliness was positively associated with age, gender (females), number of functional limitations, and number of chronic diseases. Loneliness was negatively associated with being married and showed a weak negative association with number of children identified in the network, and years of education.

Thus, with respect to the first question, we conclude that low emotional support exchanged with children was associated with more loneliness, but not with cosmic transcendence, and that cosmic transcendence showed a weak positive association with loneliness. In addition, we can conclude that higher cosmic transcendence and higher feelings of loneliness were more pronounced among the older old, females, the non-married, the lower educated and persons suffering from chronic diseases and/or functional limitations.

Effects of cosmic transcendence and support exchanged on loneliness

The small and positive bivariate association between cosmic transcendence and loneliness disappeared in the multiple regression analysis (Table 4, model I), probably due to the association between cosmic transcendence and the background characteristics of marital status, health, and level of education. The direct effect of low emotional support received from, and given to children, on loneliness remained significant, indicating that low levels of support exchanged with children increased feelings of loneliness among older parents.

Interaction terms between cosmic transcendence and support measures were computed to examine whether cosmic transcendence modified the relationship between low emotional support exchanged with children and loneliness (Table 4, models II and III). Significant interactions were found for mean emotional support received from (β=−0.06, SE=0.03, P=0.013) and given to children (β=−0.05, SE=0.04, P=0.025). Results indicated that higher levels of cosmic transcendence were accompanied by higher levels of loneliness among respondents who both gave and/or received little emotional support with their children (Figs. 1, 2). Thus, with respect to research question 2, the incongruent combination of high cosmic transcendence and low levels of support did increase feelings of loneliness among older parents.

Interaction effects for the old and the widowed

The three-way interaction effect between cosmic transcendence, emotional support exchanged, and age group was not statistically significant. Also, stratified

Table 3 Correlation table (n=1,845)

	Emotional support received		Emotional support given		Cosmic transcendence		Loneliness	
	R	(*P*)	*r*	(*P*)	*r*	(*P*)	*r*	(*P*)
Age	−0.06	(0.015)	−0.15	(0.000)	0.15	(0.000)	0.21	(0.000)
Female (vs. male)	0.18	(0.000)	0.06	(0.017)	0.07	(0.004)	0.06	(0.015)
Married (vs. unmarried)	−0.03	(0.173)	0.08	(0.001)	−0.08	(0.000)	−0.29	(0.000)
Education	0.04	(0.107)	0.15	(0.000)	−0.08	(0.000)	−0.06	(0.012)
Functional limitations	−0.03	(0.155)	−0.10	(0.000)	0.09	(0.000)	0.22	(0.000)
Chronic diseases	−0.02	(0.441)	−0.05	(0.031)	0.08	(0.000)	0.08	(0.000)
Number of children in network	−0.04	(0.107)	−0.03	(0.197)	0.03	(0.220)	−0.08	(0.001)
Emotional support received			0.54	(0.000)	0.04	(0.110)	−0.14	(0.000)
Emotional support given					0.01	(0.564)	−0.16	(0.000)
Cosmic transcendence							0.05	(0.029)

Table 4 Loneliness scale score regressed with socio-demographic variables, cosmic transcendence and support measures exchanged with child (n=1,845)

	Model I		Model II		Model III	
	β	(*P*)	*β*	(*P*)	*β*	(*P*)
Age	0.05	(0.041)	0.05	(0.045)	0.05	(0.039)
Female (vs. male)	−0.01	(0.626)	−0.01	(0.639)	−0.01	(0.656)
Married (vs. unmarried)	−0.24	(0.000)	−0.24	(0.000)	−0.24	(0.000)
Education	0.01	(0.566)	0.01	(0.575)	0.01	(0.610)
Functional limitations	0.14	(0.000)	0.14	(0.000)	0.14	(0.000)
Chronic diseases	−0.02	(0.342)	−0.02	(0.387)	−0.02	(0.331)
Number of children	−0.10	(0.000)	−0.10	(0.000)	−0.10	(0.000)
Emotional support received	−0.11	(0.000)	−0.11	(0.000)	−0.11	(0.000)
Emotional support given	−0.07	(0.013)	−0.07	(0.013)	−0.07	(0.010)
Cosmic transcendence	0.03	(0.224)	0.03	(0.218)	0.03	(0.220)
Cosmic transcendence × emotional support received			−0.06	(0.013)		
Cosmic transcendence × emotional support given					−0.05	(0.025)
R^2 adjusted	0.137					
ΔR^2 adjusted			0.002		0.002	

analyses for age cohorts below and above 75 years, revealed that the two-way interaction effect of cosmic transcendence and support exchanged was not statistically significant (results not shown).

We did find a significant three-way interaction effect between cosmic transcendence, emotional support received from children and marital status (married or not) (β=−0.15, SE=0.07, P=0.034). There was no significant three-way interaction effect with emotional support given to the children in the core network (β=−0.10, SE=0.07, P=0.187). Stratified analyses revealed that among the married parents, their cosmic transcendence interacted highly significantly with the level of emotional support received from children (β=−0.14, SE=0.04, P=0.000, n=1,141) and emotional support provided to children (β=−0.11, SE=0.04, P=0.004). These effects were not significant among the widowed parents, for emotional support received (β=0.04, SE=0.07, P=0.594, n=557), nor for emotional support given to children (β=0.01, SE=0.07, P=0.971). Figures 3 and 4 reveal that for married parents, two interesting combinations of cosmic transcendence and emotional support affect loneliness. The first one is that high cosmic transcendence combined with low levels of support increased feelings of loneliness, corroborating the incongruence hypothesis. The second case, however, showed that high levels of cosmic transcendence combined with high levels of support significantly decreased feelings of loneliness, providing evidence for a congruence hypothesis.

Thus, with respect to research question 3, we can conclude that among married older parents high cosmic transcendence combined with low and high levels of emotional support exchanged with children indeed affected feelings of loneliness. These effects were not found among the widowed and the interaction effect did not vary by age.

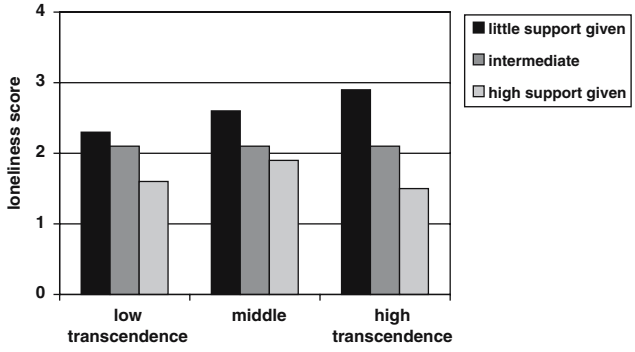

Fig. 1 Mean loneliness scores for categories of *emotional support given* to the children in the core network and for low, intermediate, and high levels of cosmic transcendence; adjusted for demographics, physical health, support received, and number of children (n=1,845)

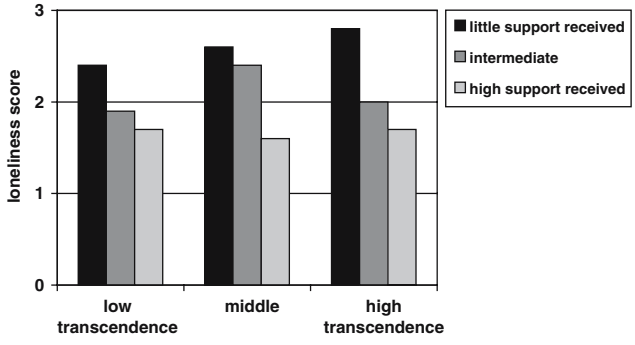

Fig. 2 Mean loneliness scores for categories of *emotional support received* from children in the core network and for low, intermediate, and high levels of cosmic transcendence; adjusted for demographics, physical health, support given, and number of children (n=1,845)

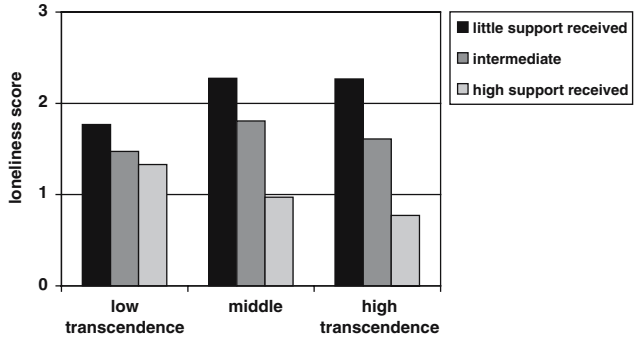

Fig. 3 Married respondents: mean loneliness scores for categories of *emotional support given* to the children in the core network and for low, intermediate, and high levels of cosmic transcendence; adjusted for demographics, physical health, support received, and number of children (n=1,141)

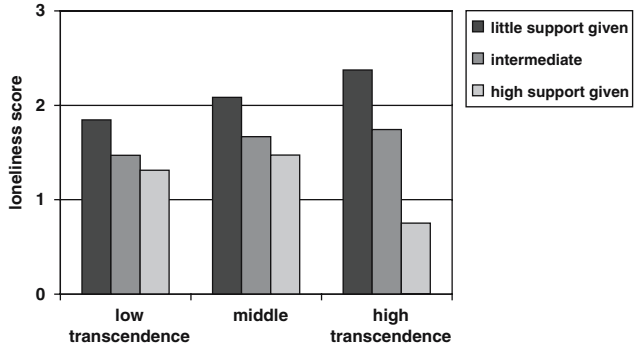

Fig. 4 Married respondents: mean loneliness scores for categories of *emotional support received* from the children in the core network and for low, intermediate, and high levels of cosmic transcendence; adjusted for demographics, physical health, support given, and number of children (n=1,141)

Discussion

The current study had three aims. The first was to examine associations between cosmic transcendence and social dimensions in later life, specifically loneliness and emotional support exchanged with children. Bivariate and multiple regression analyses revealed that cosmic transcendence was only indirectly associated with loneliness in later life. Cosmic transcendent views and feelings of loneliness were both more pronounced among the older old, females, lower educated, the unmarried, and those in poorer health, which explains the small positive association between cosmic transcendence and loneliness. The findings suggest that these subgroups of older persons are more responsive to issues of connectedness and a sense of belonging than their counterparts. Yet, their higher feelings of loneliness suggest that the stronger sense of belonging is not fulfilled to their expectations. For the aged with multiple disadvantages (being old, single, lower educated and in poor health) children are the most important relationships of the personal network (Broese van Groenou and van Tilburg 1997). The fact that no association was found between cosmic transcendent views and emotional support exchanged with children, suggests that cosmic transcendence reflects expectations toward children, or at least a mental orientation toward significant others in general, which need not result in *actual* supportive behavior of other persons.

The second and third objectives of this study examined whether higher levels of cosmic transcendence mediated the association between emotional support exchanged and loneliness, and whether this would be especially the case for the older old and the widowed. We found that loneliness was negatively associated with emotional support exchanged with children, supporting a robust finding in the literature (e.g., Dykstra 1990; Silverstein and Bengtson 1994; de Jong Gierveld and van Tilburg 1995). Our study adds to the insight that cosmic transcendence exacerbates loneliness among older parents exchanging little emotional

support with children. One interpretation of this finding relates to a possible emotional supportive function of developing cosmic transcendent ideas in later life. This fits with Erikson's notion of generativity (1963), where sustaining emotionally satisfying relations with children might be key to the nurturing of generative concerns among older parents. Therefore, older parents expect contact with children, more when cosmic transcendent ideas are endorsed. When there is little or no contact with children, but high transcendence, this could lead to an increased sense of loneliness as generative concerns are compromised.

Furthermore, the association between loneliness and exchange of support being greater for those with high levels of cosmic transcendence, was particularly pronounced for the married compared to the widowed. This unexpected finding may be due to the fact that loneliness is in general highly pronounced among the widowed (Dykstra and de Jong Gierveld 2004). Thus, being widowed is in itself an important predictor for loneliness. Receiving support from children may decrease these feelings of loneliness to some degree, but the in/congruence between expected and received support from children is of little importance to the well-being of widowed older parents. In this line of reasoning, cosmic transcendent views (as an indicator of feelings of generativity) may not alter the impact of supportive relationships of older persons who are highly prone to loneliness.

Among the married, we also found that high cosmic transcendence and high levels of emotional support exchanged with children decreased feelings of loneliness. This suggests that cosmic transcendence enlarges the effect of support from children on loneliness; both in an incongruent situation (high cosmic views and low support) and a congruent situation (high cosmic views and high levels of support) cosmic transcendence increases the negative effect of support on loneliness. However, this effect only seems to be present among older persons who are not particularly prone to loneliness, and for whom the support from children actually makes a difference.

Contrary to our expectations we found no interactions with age. Possibly, the age-related non-response led to an underestimation of interactions with age, as the older old are most often among the most physically frail of older adults and may have an increased need for emotional support, as well as a more deeply felt need for reflection and life-review. However, compared to widowhood, age is in itself no strong predictor for loneliness. Adjusting for health status, marital status and level of education decreased the association between age and loneliness, to a large degree. This in part explains why interactions with age did not exist when all other variables were taken into account.

As noted in Sect. "Methods," our design excluded parents with no children in the top nine network members with the highest contact frequency (excluding the spouse). It is possible that a child who did not enter the top nine network due to infrequent contact, still provided a lot of emotional support. Yet, the positive association between contact frequency and emotional support in the parent–child relationships (r=0.21) indicates that this is not likely to be the case. In addition, a frequently contacted and supportive child may not be selected into the top nine of network members, when the parent has a large network in which many members are frequently contacted. This implies that our selection of parent–child relationships is characterized by relatively high contact frequency and exchange of support. As parents with children among the top nine did not have higher cosmic transcendence scores than parents with no children in the core network, the selection of the children into this group is not associated with feelings of generativity or expectations toward their children. Excluding the less-supportive children and their relatively lonely parents (see Sect. "Methods") probably resulted in an underestimation of the support–loneliness association, and possibly also the support–cosmic transcendence association. Future research on the well-being of older parents should include the support behavior of all children, as our study indicates that parents with non-supportive children feel more lonely, in particular when they hold high cosmic transcendent views.

Another limitation of the study was the use of cross-sectional data, making it impossible to examine changes over time, or to disentangle cohort and aging effects. A different possibility is to perform longitudinal studies, to get insight into the time-order of relationships and the stability of the concept of cosmic transcendence. A further limitation was that effect sizes of correlations between variables seemed to be rather low. Due to the large sample size, correlations of 0.06 or higher were statistically significant at the 5% level (Table 3). The small effects show that direct associations between loneliness, support, and cosmic transcendence are rather weak. More important are the interaction effects, which were statistically significant at the 1% level. We can conclude that under certain social conditions cosmic transcendence affects loneliness.

A final limitation concerns the rather low internal consistency score (Cronbach's α=0.66) of the cosmic transcendence scale, suggesting that the concept is probably more complex and multidimensional. So far, only survey measures have been used to examine this

complex concept as a core component of gerotranscendence. Future research could focus on mixed-method designs, which also incorporate the use of in-depth interviews with a group of older parents themselves. This would help to shed light on the different contexts and circumstances shaping the development, or not, of transcendent ideas in later life, and whether these relate to generative concerns. It is also important to examine how support exchanged in other social relations (e.g., partner, friends) may shape an association between loneliness and cosmic transcendence, and to compare older people without children.

Our conclusion, from the findings of this study highlights that high cosmic transcendence exacerbates loneliness in later life among older parents who exchange little emotional support with their children, and that this was especially the case among the married. We have proposed that there may be an emotionally supportive function related to the development of cosmic transcendent ideas, in line with the nurturing of generative concerns in later life. Among parents, a lack of contact with their children may compromise these concerns and exacerbate a sense of loneliness, especially when there are no other strong predictors of loneliness, such as widowhood. The study showed the added value of cosmic transcendent views in the social context of aging. To conclude, we agree with Tornstam that cosmic transcendent views are associated with life-satisfaction and well-being, but in particular, under positive social circumstances.

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