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Article

The Mediating Role of Empathy in the Relationship between Age and Social Support across the Lifespan

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Abstract: Aging involves several changes depending on genetic and behavioural factors, such as lifestyle and number and quality of social relationships, which in turn can be influenced by empathy. Here, the change in the perceived social support across the life span as a function of empathy was investigated, considering the mediating role of the empathy, after controlling for gender and education. 441 people (18-91 years old) filled in the Italian short version of the Interpersonal Support Evaluation List (ISEL-12) and the Social Support Questionnaire (SSQ6) as well as the Empathy Questionnaire (EQ) and the Reading the Mind in the Eyes test (RMET). The mediation analyses with ISEL-12 showed that age and the EQ fully mediated the relationship between age and Appraisal, Belonging and Tangible scores. Further, the EQ fully mediated only the relationship between age and SSQ6-People. These results showed that empathic skills play a key role in the relationships between age and social support. This suggests: empathy can trigger social support and ultimately well-being if stimulated across the lifespan, especially since young age; this would help to form the socio-emotional competence across the years, as a sort of cushion that can be useful in the elderly to fulfil active aging.

Keywords: well-being; affective support; community engagement; ageing; mental health; socio-emotional skills

1. Introduction

Social support is defined as the provision of emotional, instrumental, or informational assistance or guidance [1]. Above all, it involves the perception that one is cared for, esteemed, and part of a mutually supportive social network, and consequently produce several positive effects on mental and physical health [2]. For example, perceived social support moderates the appraisal of threatening situations and enhances self-confidence to cope with new challenges [3–5]. Furthermore, the perception of support is a better predictor of health outcomes than the actual receipt of support [6–8]. When an individual is able to perceive the existence of a social support, he/she feels a sense of belonging, increasing the capability to recognize the self-worth [9,10]. Social support is considered as one of the five critical factors necessary for successful aging along with diet, education, physical and cognitive exercise [11,12].

Social support changes as age increases [13]. Within the theoretical frame of the socioemotional selectivity theory (SST) [14–18], age differences in goals and in time horizons influence social preferences and the composition of social networks, as well as cognitive processing. When social interactions as well as the composition of social networks change, especially older people choose to spend more of their time with close others. The decreasing of relationships with age led to wonder about older adults being lonely and depressed [19]. However, other studies reported that this change in social networks reflects a proactive pruning process whereby older people increasingly invest their limited time in relationships with close others [20]. Specifically, older individuals maintain their most

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meaningful, core relationships and let go the less satisfying, peripheral social partners. It has been reported that when asked to older people to imagine they have a half hour of free time, they choose to spend time with a close social partner rather than a novel one, differently younger individuals do not show this preference. Not only the number of relationships changes, but also the quality of social contacts, indeed, relationship quality improves over time with children, spouses, and other meaningful partners, presumably as a reflection of both experience and motivation [18].

Undoubtedly, supportive social relationships have positive effects on physical and mental health [20]. Several studies demonstrated as partners, children, family, friends, neighbours, colleagues as well as community members may represent an important source of support in life periods characterized by poor health and stress [22–25]. However, social networks are not static across lifespan [26]. Wrzus and colleagues [27] performed a meta-analysis on 277 studies finding that: i) social network increased from adolescence until young adulthood and then decreased; ii) both the personal and friendship networks decreased throughout adulthood; iii) the family network was always stable in size; iv) other specific networks including colleagues and neighbors were crucial only in determined ages. Summing up, individuals from young adults draw support very different than those in middle or late adulthood.

Age also affects empathy. As defined by Baron-Cohen and Wheelwright [28], empathy is an important ability that allows us to tune into how someone else is feeling, or what they might be thinking. Empathy allows us to understand the intentions of others, to predict their behavior, and to experience an emotion triggered by their emotion. In short, empathy plays a central role in social interactions (e.g. pro-social behavior, inhibition of aggressive behavior and of externalizing problem behavior) allowing us to interact effectively in the social world [27]. Interestingly, empathy was found slightly higher in women than men [28,29]. Of particular interest is the fact that older adults experience some reduction of empathy [30–32] associated with greater risk for loneliness and depression, and poorer personal life satisfaction [30,33,34]. Chen and colleagues [35] found that older adults reported lower trait empathic concern and personal distress than the younger group.

Moreover, empathy can be conceptually divided into a cognitive and an emotional component [36–40]: the cognitive component helps us to identify his or her emotions at the cognitive level and thus implies the ability to take another person's perspective, while emotional empathy refers to our ability to experience an emotion similar to that of another person, even though the event that caused the emotion did not directly happen to us [38,41]. In this conceptual perspective, some studies focused on age-related psychological differences in empathy suggesting that older adults have lower cognitive empathy and preserved or increased emotional empathy [36,42]. Previous studies have shown how cognitive empathy also varies as a consequence of age, since older people (usually older than 64 years) obtain lower scores on cognitive empathy in comparison with younger people (with age ranges between 17 to 56 years) when using performance tests [36,42–44]. Studies of empathy development show that emotional and cognitive empathy have different developmental trajectories; cognitive empathy develops more slowly and steadily in life span and therefore may rely more strongly on learning experiences, while emotional empathy remains relatively stable throughout development [45–48]. Labouvie-Vief [49] proposed that the cognitive empathy and age relationship would exhibit an inverted-U-shaped curve, which was later confirmed by O'Brien et al. [50] and by Gutierrez-Cobo et al. [51]. However, other studies revealed that older adults show increased prosocial behavior in the form of monetary donation in response to an empathic context.

It is also true that the lack of consistent results may be due to the differences in methods to measure empathy, sample sizes as well as the unequal numbers of men and women. In particularly, depending on the tests used, different facets of empathy can be assessed; in fact, sometimes even the very form of measurement is used to define the type of empathy [52,53]. There are many measures of empathy, but the most commonly used empathy tests are the Reading the Mind in the Eyes (RMET) [54]; test, which primarily measures cognitive empathy capacity, and the Empathy Quotient (EQ) [28], which provides an overall empathy score without dividing between affective and cognitive empathy [36,55].

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Empathy is one of the factors underlying social support: individuals with a high capacity for empathy may more actively understand the care and support of others [56]. In this vein, people with high empathy have a stronger ability to actively obtain support and can more actively understand the care and support from others. Emotionally competent individuals have sensitivity to care and support from the outside world. On the contrary, people with low empathy may not care about others' support and concern for them. This may further affect their attitude towards others. People with high empathy are more likely to perceive support and then exhibit higher prosocial behavioral tendencies [57].

Therefore, considering the relationship between age, empathy and social support, in the present study the idea was to assess if the cognitive or emotional empathy mediates the relationships between age and interpersonal support defined as 'appraisal', 'belonging' and 'tangible', on the one hand, and social support defined in terms of number of people and level of satisfaction, on the other hand. After controlling for gender and educational level, the hypothesis was formulated as follows: the empathy partially mediates the relationships between age and social support and social network.

2. Method

2.1. Participants

The eligible study sample was composed by individuals without neurological or psychiatric disorders. To exclude the presence of cognitive decline in participants older than 45 years, the Mini-Mental State Exam (MMSE) [58,59] was administered. Additionally, the history or the presence of neurological or psychiatric diseases were investigated by an informal interview carried out before the test phase. Seventeen participants were excluded because they reported having cerebral ischemia or head trauma or for having scored below the cutoff of the MMSE (cut-off = 23) [60]. A final sample of 441 participants took part in the study (mean age = 42.51, SD = 16.93; age range 18-91 years; 220 males and 221 females). Participants had a full-time education, ranging from 5 to 18 years (mean = 13.52 years, S.D. = 3.06 years). The study was approved by the Local Ethical Committee, in accordance with the Declaration of Helsinki. Each participant signed the consent form.

2.2. Instruments

2.2.1. Social Support Measures

Interpersonal Support Evaluation List shortened version -12 items (ISEL-12) [61–63]. It is a 12-item scale investigating three types of social support (appraisal, belonging, and tangible). Specifically, the appraisal sub-scale corresponds to the perceived availability of someone with whom to discuss issues of personal importance; the belonging sub-scale measures the perception that there is a group which one can identify and socialize with; the tangible sub-scale investigates the perceived availability of material aid. Participants respond on a four-point Liker scale ranging from 1 (definitively false) to 4 (definitively true); on each subscale the score ranges from 0 to 12. Higher scores correspond to a high perception of social support received.

Social Support Questionnaire 6 (SSQ6) [64]. It is a 6-item questionnaire developed to measure both the social support network and the satisfaction of the social support received. Each item solicits a two-part answer: Part 1 asks participants to list up to nine people that fit the description stated in the question (e.g., "Whom can you really count on to help you feel better when you are feeling generally down-in-the-dumps?") and are available to provide support, and Part 2 asks participants to indicate for each of the person indicated in the first part, the level of satisfaction using a 6-point Likert scale, ranging from '1 - very dissatisfied' to '6 - very satisfied'. The score reflecting the number of people ranges from 6 to 54, whereas the score related to satisfaction ranges from 6 to 36.

2.2.2. Empathy Measures

Empathy Quotient (EQ) [28]. It is a 60-item questionnaire: 40 items measure empathy and 20 are filler items. EQ assesses empathy in adults. According to Baron-Cohen and Wheelwright [28] the

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items are not separated into cognitive and emotional empathy as the two components are often not easily distinguishable as they co-exist. Each item is a first-person statement on a 4-point Likert Scale (ranging from Strongly Agree to Strongly Disagree). Baron-Cohen and Wheelwright [28] established a cut-off of 30 to screen for autism spectrum disorders. The instrument is scored on a scale of 0 (the least empathetic possible) to 80 (the most empathetic possible).

Reading the Mind in the Eyes test (RMET) [54,65]. It is composed by 36 photographs of the eye region of 19 actors and 17 actresses surrounded by four single-word describing mental state descriptors (e.g., bored, angry). One of these descriptors fitted with the mental state depicted in the photo, and the others were uncorrected. Participants had to choose the correct mental state for each photo. It is based on a four-alternative forced-choice paradigm, with 25% correct guess rate. The test score was the number of descriptors correctly identified (Maximum score: 36).

2.3. Procedure

Participants were tested individually in a quiet room with artificial lighting and seated on a height-adjustable chair filling in questionnaires after having answered to a socio-demographic-anamnestic interview and performed the MMSE.

3. Statistical Analysis and results

Analyses were carried out using IBM SPSS Statistics software v.24 (2016). Data were first transformed in z scores and checked for the presence of potential univariate outliers considering a cut-off of ±4 z-scores as the reference values for samples larger than 100 [66,67]. In total, 6 outliers were detected and excluded from subsequent analyses. The new sample consists in 435 participants. Then, data were tested for normality using the Kolmogorov-Smirnov Test showing that all variables of interest were not normally distributed: $Z_{Age} = .124$, $p < .0001$; $Z_{Educational\ level} = .257$, $p < .0001$; $Z_{ISEL12\text{-}Appraisal} = .085$, $p < .0001$; $Z_{ISEL12\text{-}Belonging} = .124$, $p < .0001$; $Z_{ISEL12\text{-}Tangible} = .138$, $p < .0001$; $Z_{SSQ6\text{-}People} = .077$, $p < .0001$; $Z_{SSQ6\text{-}Satisfaction} = .489$, $p < .0001$. Therefore, the Spearman's Rho correlation analysis was carried out (see Table 1). In general, age correlated negatively to empathy quotient ($r = -.170$, $p < .01$), ISEL12-Belonging ($r = -.111$, $p < .05$) and ISEL12-Tangible ($r = -.160$, $p < .01$), whereas empathy quotient correlated positively to all scores of ISEL-12 (Appraisal: $r = .305$, $p < .01$; Belonging: $r = .312$, $p < .01$; Tangible: $r = .242$, $p < .01$) and SSQ6 (People: $r = .136$, $p < .01$; Satisfaction: $r = .168$, $p < .01$) (See Table 2 for details). Given that gender and educational level were not correlated to the outcomes, the mediation analyses were carried out without controlling for the covariates. In addition, because RMET did not correlate with any measure of social support, mediation analyses were not conducted.

	Mean (SD)	1-Age	2-Gender	3-Edu.	4-EQ	5-RMET	6-ISEL-12-A	7-ISEL-12-B	8-ISEL-12-T	9-SSQ6-P	10-SSQ6-S
1	42.17 (16.75)	1									
2	---	-.017	1								
3	7.45 (3.02)	-.194**	.014	1							
4	44.24 (12.04)	-.170**	.161**	.066	1						
5	21.94 (5.10)-	-.186**	.088	-.038	.068	1					
6	12.61 (2.81)	-.093	.093	.007	.305**	.024	1				
7	12.63 (2.32)	-.160**	-.035	-.021	.312**	.023	.502**	1			
8	13.13 (2.23)	-.111*	-.027	-.020	.242**	-.015	.565**	.586**	1		
9	22.42 (10.81)	.011	.028	-.017	.136**	.017	.253**	.090	.143**	1	

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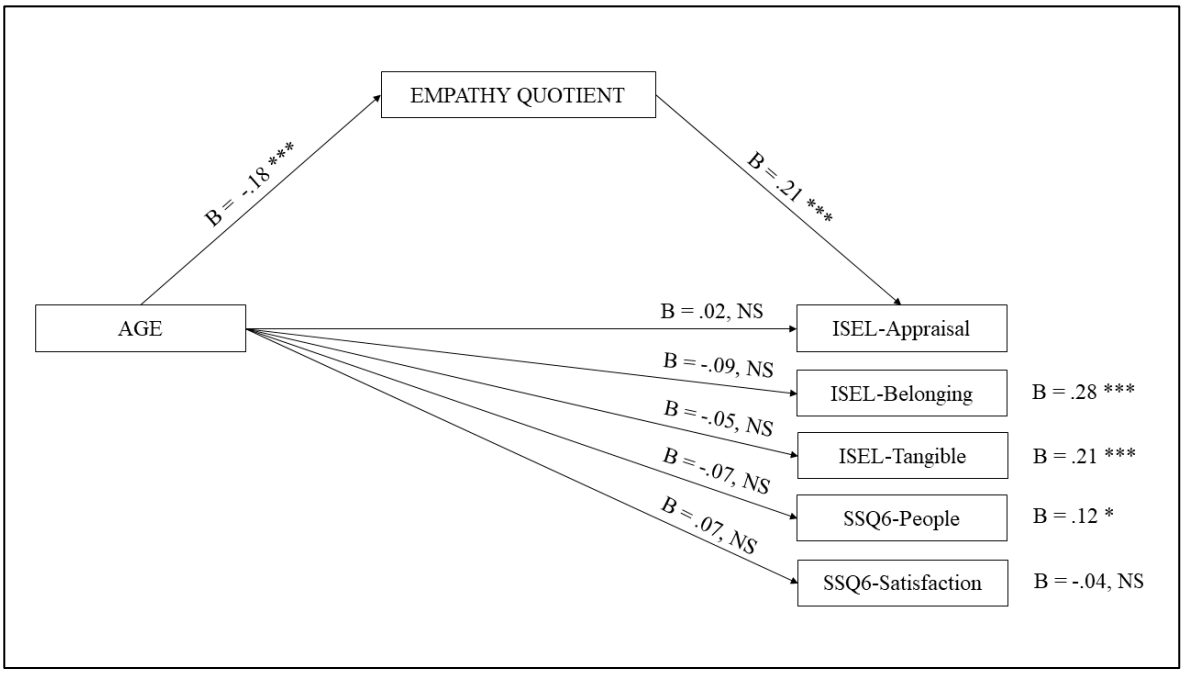
10	7.45 (7.49)	.089	.076	-.008	.168**	.091	.265**	.241**	.225**	.193**	1

Note: ** p < .01 (two-tailed); * p < .05 (two-tailed); Edu = Educational Level; EQ = Empathy Quotient; RMET=Eyes test; ISEL-12-A = ISEL-12-Appraisal; ISEL-12-B = ISEL-12-Belonging; IESL-12-T = ISEL-12-Tangible; SSQ6-6 = SSQ6-People; SSQ6-S = SSQ6-Satisfaction.

The hypothesis that the empathy quotient mediates the association between age and social support was investigated using the PROCESS macro for SPSS (version 3.5) [68]. Five mediation models were carried out, one for each social support score (See Figure 1), using age as focal predictor and empathy quotient as mediator. 5000 bootstrap samples were used. Bootstrapping is a non-parametric method which bypasses the issue of non-normality distribution [69].

----- Insert Figure 1 approximately here -----



Note: *** p < .001; ** p < .01; * p < .05.

As regards the first model, using ISEL-12-Appraisal as the outcome, the direct effect of age was not significant (b = .02, p = .68). Age negatively predicted the empathy quotient (b = -.18, p < .001), which in turn positively predicted the outcome (b = .21, p < .001). Therefore, the indirect effect was significant (indirect effect = -.0373, 95 % BootLLCI = -.0637 - BootULCI = -.0163).

As regards the second model, using ISEL-12-Belonging as the outcome, the direct effect of age was not significant (b = -.09, p = .06). Age negatively predicted the empathy quotient (b = -.18, p < .001), which in turn positively predicted the outcome (b = .28, p < .001). Therefore, the indirect effect was significant (indirect effect = -.0506, 95 % BootLLCI = -.0824 - BootULCI = -.0231).

As regards the third model, using ISEL-12-Tangible as the outcome, the direct effect of age was not significant (b = -.05, p = .28). Age negatively predicted the empathy quotient (b = -.18, p < .001), which in turn positively predicted the outcome (b = .21, p < .001). Therefore, the indirect effect was significant (indirect effect = -.0381, 95 % BootLLCI = -.0651 - BootULCI = -.0162).

As regards the fourth model, using SSQ6-People as the outcome, the direct effect of age was not significant (b = .07, p = .16). Age negatively predicted the empathy quotient (b = -.18, p < .001), which in turn positively predicted the outcome (b = .12, p < .05). Therefore, the indirect effect was significant (indirect effect = -.0217, 95 % BootLLCI = -.0462 - BootULCI = -.0044).

As regards the fifth model, using SSQ6-Satisfaction as the outcome, the direct effect of age was not significant (b = -.07, p = .14). Age negatively predicted the empathy quotient (b = -.18, p < .001), which in turn did not predict the outcome (b = -.04, p = .40). Therefore, the indirect effect was not significant (indirect effect = -.0074, 95 % BootLLCI = -.0067 - BootULCI = .0249).

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4. Discussion

In the present study, we found that the three types of social support (Appraisal, Belonging, and Tangible), as measured by the ISEL-12, and the social support network, as measured by SSQ6, are fully mediated by the empathy quotient and the empathy quotient changes as subjects' age increases. Several studies demonstrate that empathy in aging is a crucial capacity because it predicts loneliness, people with poor empathy experience greater levels of loneliness [36,57,70]. In general, empathy affects the quality of older adults' relationships [34,70], and the life satisfaction [70], which relate to increased morbidity in the elderly [71]. In addition, loss of empathy has been considered as a key symptom in patients with Alzheimer's disease and frontotemporal dementia, and some have suggested that these measures might also help distinguish between the two conditions [72–77]. Gouveia et al. [78] found a decline in the EQ's emotional and social subscales in elderly people.

Another aspect should be considered when measuring empathy is related to the instrument used. For example, in our study we used, on the one hand, the Reading the Mind in the Eyes Test (RMET) [54], which primarily measures cognitive empathy capacity by inferring complex emotions and other mental states from photographs of the eye region of human faces, and, on the other hand, the Empathy Quotient (EQ) [28], which is a self-report questionnaire that provides an overall empathy score without dividing between affective and cognitive empathy [55]. By using RMET and EQ, results are often inconsistent. For example, some studies have reported that older adults have lower cognitive empathy than younger adult [29–32,79]; one study found no difference between young and old participants [35], whereas another study showed that older adults are characterized by higher levers of empathy [50]. Consistent with Schieman and Co-authors [79], our data showed that both test correlate negatively with age indicating lower empathic ability as age increases.

In the empathy literature, data on the consistency between the two tests are also discordant, in fact while some studies found a relationship between RMET and EQ [80,81], other did not [65,82]. It has been also noted that the interpretation of performance during the eyes test is complicated by its dependence on verbal ability [80,83] and the influence of education, race, and ethnicity [84]. This may explain why our data find that only the EQ correlates positively with the measures of social support we used. Furthermore, both the EQ and the measures of social support used in our work, unlike the RMET, are self-report questionnaires that may suffer from the social desirability bias, being influenced by demand characteristics, as individuals may want to appear empathetic or self-sufficient because these latter are believed to be desirable characteristics.

In the present study, in agreement with some data from the literature [30–32], we found that at increasing age decrease the cognitive and emotional empathy and that empathy is crucial for people to be satisfied with the social support they receive and perceive. On the other hand, older people may generally need more than younger people to receive help from others to make up for the physical and psychological difficulties inherent in age, but the fact that the empathic capacity decrease plays against a large e dense social support network. In particular, age does not have a direct effect on perceived social support but it correlates negatively with empathy i. e., older subjects are less empathic than younger subjects and in turn lower empathic abilities mediate the perception of less social support.

Thus, it can be hypothesized that the changes found in the literature [36,42] in the quality and quantity of social interactions and in the composition of social networks were due to an effect mediated by the decreased ability to decode and to understand the intentions of others, to predict their behavior, and to experience an emotion triggered by their emotion. In fact, it is conceivable that elderly people are still able to fully empathize with people they are closest to and have known for a long time (such as family members), but have more difficulty with new people, with the consequence that they prefer to spend their free time with family members rather than forming new relationships [17,20]. An alternative hypothesis comes from the study by Richter and coworkers [85] who found that older adults show better performance on tasks that were relevant to them, suggesting that, in general, older adults perform lower than younger adults on tests of empathic accuracy, except when the information is emotionally relevant to them. However, a confirmation of reduced empathy in ageing also comes from two neuroimaging studies [35,86]. These studies showed that, despite

conflicting behavioral results in terms of empathy, older adults show reduced activity in regions typically associated with empathy in younger adults (e.g., anterior cingulate and insula).

In a review [36] concerning the psychological and neural mechanisms of empathy in ageing emerged that older adults have lower cognitive empathy (to understand others' thoughts and feelings) than younger adults, but similar and in some cases even higher levels of emotional empathy (to feel emotions that are like others' or feel compassion for them). This is in line with reduced activity in a key brain area associated with cognitive empathy, and also supports our results. Indeed, we found that only one test (EQ) correlates with all aspects of social support (appraisal, belonging and tangible) as well as with the satisfaction of the social support received probably because EQ measured both cognitive and emotional empathy with respect to RMTE.

From a certain point of view it may seem a contradiction that as I get older, at the time when I most need to receive social support I lose the ability to be empathic on a cognitive level, and this has a negative effect on the possibility of receiving support. It is also possible that young people's self-assessment of support is superficial and not significantly linked to tangible support; however, the fact that the EQ also mediates the tangible dimension would seem to refute this interpretation.

Our results emphasize the importance of working on psychological and cognitive well-being by using training that facilitates cognitive empathy, because increasing this capacity maintains the social network and support received. Empathy is an innate quality, but it is also malleable and can be enhanced by strategic educational interventions [87,88]. Many methods were found to be effective in developing greater levels of empathy, e.g., the use of video recordings [89,90], service to disadvantaged communities [91], reflective writing [92,93], and in our view could easily be used in education to increase empathy in young adults by creating an empathic cognitive reserve that would counteract its decline with age.

This is particularly important because, it is now well established, that some social and environmental variables can have positive and protective effects on the mental and physical health of elderly people [94]; in fact, e.g., Ricciardi and collaborators [95] find that older people who had higher levels of perceived social support experienced fewer symptoms of geriatric depression. Continuing to be an active and positive part of the social context brings the elderly person a number of primary and secondary benefits and through targeted interventions this is possible. The pandemic taught us that it is possible to be part of a social network even at a distance and showed us how those who managed to maintain social relationships even during the period of home restriction suffered less from the negative consequences of isolation and reduced the psychological phenomena of unease and fear that the condition experienced at that time had brought. Therefore, every intervention aimed at reducing mental health vulnerability is mandatory.

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