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The Convoy Model: Explaining Social Relations From a Multidisciplinary Perspective

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Purpose of the Study: Social relations are a key aspect of aging and the life course. In this paper, we trace the scientific origins of the study of social relations, focusing in particular on research grounded in the convoy model. **Design and Methods:** We first briefly review and critique influential historical studies to illustrate how the scientific study of social relations developed. Next, we highlight early and current findings grounded in the convoy model that have provided key insights into theory, method, policy, and practice in the study of aging. **Results:** Early social relations research, while influential, lacked the combined approach of theoretical grounding and methodological rigor. Nevertheless, previous research findings, especially from anthropology, suggested the importance of social relations in the achievement of positive outcomes. Considering both life span and life course perspectives and grounded in a multidisciplinary perspective, the convoy model was developed to unify and consolidate scattered evidence while at the same time directing future empirical and applied research. Early findings are summarized, current evidence presented, and future directions projected. **Implications:** The convoy model has provided a useful framework in the study

of aging, especially for understanding predictors and consequences of social relations across the life course.

Key Words: Social relations, Convoy model, Social support

The scientific study of social relations has contributed in real and significant ways to our understanding of aging. Social relationships are acknowledged as a key element of well-being and recognized as having far-reaching and cumulative effects on health over the life course. Yet, the relevance of social relations to the study of aging has not always been as widely recognized as it is today. Though social relations have theoretically represented key aspects of the human condition beginning with the earliest philosophers, social relations have often been seen to lack credibility as a legitimate subject of study. In the last century, many viewed the study of social relations as not “real science” because it was thought that social relations could not be objectively measured. Researchers lamented that measurement of social relations represented individual and personal bias that was hopelessly confounded with “soft”

(read social science) outcomes. And most significantly, it was believed that social relations were not causally related to significant objective outcomes. However, others firmly believed that an important relationship did exist and could be scientifically documented. Later, we consider theoretical and methodological developments in the field, describe the convoy model, and briefly outline past contributions. We then present potential future directions in the study of social relations.

Historical Background

The modern study of social relations has interdisciplinary roots, which contributed in fundamental ways to our understanding of the importance of social relationships. Influential research that informs today's scientific study of social relations include: (a) the early sociological work of [Young and Willmott \(1957\)](#) and [Botts \(1957\)](#) that highlighted the importance of considering both the interrelationships among family members and the influence of the broader community on family members; (b) [Barnes' \(1974\)](#) anthropological description of multiple levels of social networks and their interlocking importance developed from his observations of a rural Norwegian fishing village; (c) [Cassel's \(1976\)](#) clinical insights regarding the role of social relations in the development of resistance to disease; and (d) [Stack's \(1974\)](#) qualitative observations of how poor urban African Americans managed the challenges of poverty through social ties. These studies assessed social relations differently among different populations, but each concluded that social relations had an important and significant influence on health and well-being. Although they produced similar findings, these studies, as with others emerging at that time ([Cantor, 1979](#); [Fischer, 1982](#); [Wellman & Wortley, 1989](#)), were relatively small, of select samples, using methodologies that prevented generalized application to the aging experience.

The next stage of research involved large epidemiological studies in the United States ([Berkman & Syme, 1979](#); [House, Robbins, & Metzner, 1982](#)) and abroad ([Orth-Gomer & Johnson, 1987](#)). These studies generally showed that social ties were significantly related to lower mortality. People with more social ties or who were more socially integrated lived longer. Associations with mortality led many to consider seriously the importance of social relations especially as people age because death is a clear, objective, indisputable (read

not soft) outcome that is closely tied to aging. Although the measures of social ties in these studies were relatively crude and differed from study to study, the samples were large and representative and the findings consistent—a clear improvement over the small, convenience samples of much of the earlier work.

Focus on older people provided additional insight about what might be the critical mechanisms explaining the associations between social relations and health. [Lowenthal and Haven \(1968\)](#), studying a sample of older people in Northern California, found that those who reported having at least one confidant were significantly less likely to be institutionalized in the following years. [Myerhoff \(1980\)](#) expanded this work to focus on older Russian Jewish immigrants living in Venice, CA. She found that even these immigrants who had left their extended family behind in Russia, and either never had or lost the little family they did have in the United States, survived by developing close social relations with nonrelatives, in essence synthetic families. They shared the joys and sorrows of daily life with these fictive kin, helping each other as necessary and as they were able. [Blazer \(1982\)](#), in a regionally representative sample of older North Carolinians, showed that better quality social ties were more significantly associated with well-being than a simple count of the number of social ties an individual reported. This work suggested that there was an affective, emotional, or psychological component to what made social relations important. In addition, they had true, lasting, and at least temporally causal associations with clear objective outcomes, for example, mortality.

Nevertheless, much of this work lacked an integrated theoretical grounding. Building on the research focusing on attachment, roles, and organizations, [Kahn and Antonucci \(1980\)](#) developed the convoy model of social relations. The term convoy was coined by [Plath \(1980\)](#) to capture the group living and learning cohort within which Japanese children were being raised. In particular, he meant to convey the protective function found within social relations as individuals experienced age-related events throughout their lifetime ([Antonucci & Akiyama, 1994](#)). [Kahn and Antonucci \(1980\)](#) used the term to capture the life span and life course nature of social relations, with a special emphasis on emotional closeness ([Antonucci, 2001](#)). Current gerontological research increasingly recognizes the importance of this perspective for understanding

the present circumstances and future projections of the lives, health, and well-being of older people (Fuller-Iglesias, Smith, & Antonucci, 2010).

Theoretical Development: The Convoy Model of Social Relations

Conceptualizing social relations as a convoy enables a parsimonious representation of a highly complex human circumstance. According to the convoy model, individuals are surrounded by supportive others who move with them throughout the life course. These relationships vary in their closeness, their quality (e.g., positive, negative), their function (e.g., aid, affect, affirmation exchanges), and their structure (e.g., size, composition, contact frequency, geographic proximity). The structure, function, and quality of convoys are influenced by personal (e.g., age, gender) and situational (e.g., role demands, norms, values) characteristics while having significant implications for health and well-being. The convoy measure involves placing close and important individuals into three concentric circles representing three levels of closeness: close, closer, closest.

The convoy model contributed several theoretical advancements to the study of social relations. First, social relations are conceptualized as multidimensional. In their most basic form, they include structure, type, and quality dimensions. Early work, using simple counts of the number of contacts or ties an individual had with other people or organizations, tended to emphasize quantity of relations (Berkman & Syme, 1979; House et al., 1982), but later work assessed the quality of the relations in addition to quantity (Antonucci, Fuhrer, & Dartigues, 1997; Blazer, 1982). These latter studies demonstrated that although the quantity of relationships was important, in fact, relationship quality was actually more predictive of most outcomes, including mortality and both physical and mental health. However, it is clearly necessary to have some quantity of relations in order to have high quality relations. Hence, there is an important link between the two. Second, the convoy model overcame the use of global nonspecific measures of social networks, for example, asking general questions that did not allow for the analyses of different structural or composition characteristics. Previous survey studies tended to ask about social relations generally, either lumping all family members together (i.e., spouse, children, siblings)

or combining family and friends (Gurin, Veroff, & Feld, 1960). Convoys of social relations utilized an approach that specifically identified network member characteristics including: relationship type (i.e., spouse, friend), gender, age, contact frequency, and geographical proximity among other characteristics. Third, social relations are considered important at any given point in time, yet they also build from previous experiences and hence incur additional significance over time. Fourth, the experience of social relations may be understood objectively as well as subjectively and from multiple perspectives. Finally, the convoy model itself posits the contextual nature of social relations. Emerging from multidisciplinary perspectives, and given that aging is a lifelong process, the convoy model with its underlying life span and life course perspectives has provided critical insights in gerontology.

True to the study of aging, which is a quintessentially interdisciplinary enterprise, the convoy model has been used by researchers in multiple disciplines including anthropology, epidemiology, human development, medicine, psychology, sociology, and social work. The utility of the convoy metaphor for understanding social relations from various disciplinary perspectives is also apparent. For instance, a sociological perspective on convoys moves away from examining the quality of support convoys provide, instead emphasizing contextual elements. A focus on time convoys, for example, draws attention to rules, resources, and expectations that accompany timing norms according to age and gender (Moen & Hernandez, 2009). Furthermore, the idea of solidarity convoys emphasizes shared meanings and shared norms (Dannefer, 2000). In sum, a sociological lens on convoys privileges the structure and function of convoys, particularly as they link to various group characteristics such as age, race, gender, and socioeconomic status (SES) (Ajrouch, Antonucci, & Janevic, 2001; Ajrouch, Blandon, & Antonucci, 2005; Peek & Lin, 1999; Stoller & Pugliesi, 1991).

The reach and application of the convoy model has also been valuable for gerontology in that the notion of a convoy easily translates to divergent cultural and national contexts. The method developed to define a person's convoy has been used successfully in the United States among diverse groups including white Americans, African Americans, Arab Americans, and Hispanic Americans (Ajrouch, 2005; Ajrouch et al., 2001, 2005; Levitt, Guacci, & Weber, 1992), as well as in Japan (Antonucci,

Akiyama, & Takahashi, 2004; Lansford, Antonucci, Akiyama, & Takahashi, 2005), in England among Bangladeshis (Phillipson, Bernard, Phillips, & Ogg 2001), in France (Antonucci et al., 1997), in Germany (Minnemann, 1994; Wagner, Schutze, & Lang, 1999), in Mexico (Fuller-Iglesias & Antonucci, 2009), and in Lebanon (Abdulrahim, Ajrouch, Jammal, & Antonucci, 2012). People across the life course, from young to old and in various settings, quite readily identify close and important persons. We believe this work has moved the field ahead in important ways, uncovering elements of social relations that are universal across diverse populations, as well as those that have unique cultural attributes.

Research Findings: Personal and Situational Characteristics

With the theoretical grounding provided by the convoy model, a series of studies, using representative national and regional data, made it possible to explore some of these issues in a more scientifically rigorous manner. A focus on personal characteristics including age, gender, SES, and race/ethnicity provided important understandings of how social relations vary.

The first study to use the convoy model, Supports of the Elderly, involved a national data collection in the early 1980s (Antonucci, 1985) and established basic findings concerning the convoys of older people and age differences in those convoys. At the time, many believed that older people were isolated and alone, with few social interactions but, as noted later, this study showed that older people had close and supportive convoys of social relations. The preliminary examination of the convoy model (Antonucci & Akiyama, 1987a) identified age and circle placement patterns in the structure (size, age, sex, years known, proximity, contact frequency) and composition (spouse, children, siblings, other family, and friends) of adult convoys. This first empirical investigation of the convoy model was critical because it established the possibility of acquiring and examining high quality, detailed social network data. This work was designed to overcome significant theoretical and methodological challenges prevalent in the field at that time. Much of the work, especially the survey research, had been atheoretical in nature, for example, reporting epidemiological data but without any theoretical framework within which to understand them. The utilization of the convoy model allowed

the framing of social relations within a unifying theoretical perspective and was useful in improving the quality of available social network data. Interestingly, there were no age differences in network size among the three age groups examined (50–64; 65–74; 75–95). In addition, there were few age differences in the receipt of six types of support: confiding, reassurance, respect, sick care, talk with when upset, and talk about health. Surprising to many was the finding that people reported receiving about the same amount of support regardless of age, although people in the oldest ages did report providing support to fewer people. These findings were inconsistent with theories of the time, which suggested that older people were socially isolated. Analyses of another national study also produced findings that were not consistent with the common view of old people but were consistent with Carstensen's (1995) socio-emotional selectivity theory. The socioemotional selectivity theory argues that older people tend to restrict their networks as they get older, feeling that with less time left to live, they concentrate their affective energies on those people who were most important to them. Lansford, Sherman, and Antonucci (1998) examined adults aged 21 years and older and found that younger, not older, people reported wishing they had more friends. Analyses of convoy data reveal that aging brings with it a shift in some dimensions of social relations.

Early findings also provided insights into the ways gender shaped the experience of social relations in later life. Data from the Supports of the Elderly study mentioned earlier showed that older women tended to have significantly larger networks than men. Women reported providing more support than men, except with respect to spouses. Interestingly, men reported providing more support to their wives than women reported providing to their husbands—perhaps reflecting an emphasis on financial support. On the other hand, women were shown to have more multifaceted social networks than men, more friends but about the same number of family members (see Antonucci, 1985, 1994; for details, see Antonucci & Akiyama, 1987b). There was one exception: women were less likely to be married than men, a fact that is increasingly true with age. In general, earlier, as well as later, empirical evidence suggests that there is something different about the nature of men and women's social relations. There seem to be strengths and weaknesses in

both. For example, women with larger social networks report less happiness (Antonucci, Akiyama, & Lansford, 1998). Women have more ties from which they draw satisfaction but apparently are also more burdened by them. On the other hand, men have fewer ties, seem to feel less responsible for them, and are less burdened by them. These differences continue to fascinate, are still not well understood, and require further exploration.

With a more advanced theoretical perspective, researchers began to identify additional critical aspects of social relations and consider their advantages and disadvantages. A distinction was made between objective and subjective, actual and perceived assessments of support. Support may include the support believed to be available if needed (perceived support) or support actually provided during times of stress (enacted support). Both types of measures are important in the study of aging, though perhaps under different circumstances. In the abstract, the subjective assessment of support is highly predictive of well-being, but if an actual need arises, the objective receipt of support naturally becomes critical. In other words, if circumstances arise when support is needed and not received, the results are devastating. Likewise, individuals report better well-being when support is perceived as reciprocal, and research shows that giving support improves well-being more so than receiving support.

Other findings also offered intriguing insights into how convoys could be shaped by circumstance. Examination of socioeconomic differences among men and women indicated occupational effects are more pronounced for men in later life; those who held professional occupations reported the least geographically proximal networks (Ajrouch et al., 2005); and people of different ethnic or racial groups tend to have distinct convoy characteristics reflecting their position in the larger society. Thus, African Americans tended to have smaller networks, more family-dominated convoys, and more frequent contact with their convoy members than whites (Ajrouch et al., 2001). Interestingly, these differences tend to disappear with age. The race differences diminish with increasing age so that older blacks and whites report similar levels of contact frequency and proportion of kin in their networks, whereas this is not true among younger people. Hence, convoys of social relations yield deeper insights into how aging experiences are similar across diverse groups, but also where they may incur unique attributes.

Adaptations to the Convoy Model: Another Level of Complexity

As researchers became increasingly aware of the aging population, as better data and more sophisticated analytic strategies became available, more complex questions about aging and the life course could be examined. Several new research directions highlighted the complexity of social relations and their nuanced associations with well-being and health. Among these research areas are the following: (a) an exploration of how, if, and when social relations might influence the link between stress and health, (b) an examination of pattern-centered versus variable-centered approaches to identifying support network clusters, (c) a more detailed exploration of support from the perspective of both the provider and the recipient under conditions of stress, and (d) an assessment of how relationships change over time. We briefly illustrate each area later.

As the stress-buffering hypothesis (Cohen & Wills, 1985) gained attention for identifying critical conditions under which social relations emerge as most influential, the convoy model incorporated stress as a key area of study. Antonucci, Ajrouch, and Janevic (2003) examined the association between SES and health. Although lower SES is a stressor known to be associated with poor health, they demonstrated that convoy relationships could offset this association. Antonucci and colleagues found that middle-aged men with lower levels of education (an indicator of SES) who reported high quality key network relationships had the same high levels of health as men with higher levels of education. Health is, of course, an increasingly significant concern with age. This finding is especially important because the possibility that the lifelong and cumulative link between SES and stress could be attenuated with key social ties invites intriguing and potentially critical interventions that might benefit vulnerable elders facing stressful circumstances.

Another line of recent research examining social relations, stress, and health revealed that relationships both buffer and exacerbate the influence of stressful life circumstances on health, sometimes in unexpected and surprising ways. These studies often distinguish between the positive and negative qualities of relationships. Positive qualities including support, companionship, and affection are frequently associated with

better health and well-being (Antonucci, Birditt, & Akiyama, 2009; Cohen, 2004; Holt-Lunstad, Smith, & Layton, 2010). In contrast, the negative aspects of relationships, often measured as the extent to which relationships are demanding, critical, and involve conflict or tension, can sometimes also be associated with better health and well-being (Antonucci, Birditt, & Webster, 2010; Birditt & Antonucci, 2008). Some examples are detailed later.

Birditt and Antonucci (2008) examined the influence of relationship quality on mortality under life threatening or serious illnesses. Contrary to the traditional association between positive support and increased longevity, this study found that lower positive and higher negative quality relations buffered the association between illness and mortality. Individuals with chronic illnesses who reported lower levels of spousal love and more demanding and critical relationships with their spouses were less likely to die than those reporting higher levels of love and less demanding and critical relationships. Similarly, people with chronic conditions who reported that their child is demanding had greater survival rates than people whose child is not demanding. A somewhat parallel set of analyses by Antonucci and colleagues (2010) found that greater negative relations with children and friends were associated with improved survival. Further, individuals with a chronic illness who had less positive relations with children and friends were more likely to die than those with greater positive relations, which is consistent with more traditional expectations for these associations. The examination of negative relationship quality and stress has also been extended through the use of biomeasures. Birditt, Newton, and Hope (2012) found that greater spousal demands, more spousal confiding, and lower reliance on spouse buffered the association between perceived stress and blood pressure. These findings point to the nuanced nature of social relationship quality and link with health outcomes in later life. They also indicate that a singular perspective suggesting that a “one-size-fits-all” view of the association between positive or negative relations and good or bad health outcomes is simply not accurate. The impact of social relations on health varies in important lifesaving ways depending on specific circumstances.

Overall, it appears that relationships have a significant influence on the stress–health link. However, a convoy of social relationships is

more complicated than indicated by the traditional positive or negative relationship association with health. Positive aspects of relationships may have detrimental effects just as negative aspects of relationship may have beneficial effects on the stress–health link. Relationships that are demanding (traditionally considered negative) may be perceived as demanding because they “demand” improvements in health behaviors, whereas relationships that are overly supportive may positively reinforce bad health behaviors or lead to increased dependence and physical declines. Older people often face challenging health situations, which may require difficult lifestyle changes and/or adherence to complicated medical regimens. The previously briefly summarized findings suggest that careful attention must be paid to the health benefits of relationships with both positive and negative qualities.

Another cause for the advancement of the study of social relations is related to the availability of new analytic techniques. Such advances made it possible to analyze profiles of social networks by taking a pattern-centered rather than variable-centered approach. Although pioneering work in this area was contributed by Wenger (1992) in the United Kingdom and Litwin (1995) in Israel, we focus here on research using these new analytic strategies with parallel structure measures of social convoys in the United States, Japan, and Germany. The pattern-centered approaches allow for the examination of several social relations variables simultaneously and the grouping of individuals based on their social relations characteristics. Common profiles across countries included: family focused, friends focused, diverse, and restricted. Comparisons across countries also identified different profiles and different profile distributions depending on the culture. Thus, in Germany, an additional unmarried supported group was also identified and was actually the most prevalent, whereas in Japan, an additional profile of people married with peripheral relationships was observed. In Germany and the United States, there were two types of restricted networks. The most prevalent profile in Japan was family focused, which was least common in the United States, where diverse networks were most frequent (for details, see Fiori, Antonucci, & Akiyama, 2008; Fiori, Antonucci, & Cortina, 2006; Fiori, Smith, & Antonucci, 2007). Clearly, there were some similarities but also important differences across cultures. Pattern-centered investigations informed the

study of older people's social relations in several ways. These findings led to the conclusion that multiple patterns of social relations were normative. This is particularly noteworthy both because many current and future elders in the United States come from different cultures and because it highlights that context and circumstance are likely to influence both normative profiles and their association with the health and well-being of older adults.

The next step in this line of pattern-centered research identified relationship quality patterns and revealed that relationship profiles have an important influence on well-being. Cluster analyses across multiple relationships identified five social network types: high quality network, high family/friend quality, high spouse/family quality, low spouse/family quality, and low network quality (Birditt & Antonucci, 2007). These findings offered a broader perspective on the association between relationship quality and health. Rather than assuming that everyone must have a high quality relationship with spouse to achieve higher levels of well-being, these findings indicated that having at least two high quality relations, not necessarily with a spouse, can be associated with greater well-being. However, if one lacked good friendship relationships, then the spousal relation was particularly important for well-being. This study showed relationship quality with multiple others, not necessarily including a spouse, could be associated with well-being, thus demonstrating that links between relationship quality and well-being depend on multiple factors, for example, number of relationships, types of relationship, and the relationship context. Because older people are increasingly likely to not be married and to live in varied contexts, these are promising and important findings.

Another advancement in recent convoy model research is the inclusion of multiple perspectives on support exchanges. The availability of new multilevel modeling analytic techniques and data including reports of both the provision and receipt of support under circumstances of stress has led to an interesting line of research concerning enacted support. Birditt, Antonucci, and Tighe (2012) identified individuals reporting high levels of stress and their designated helpful network members. They found that the amount of instrumental and emotional support provided varied by relationship quality and perceived stressfulness of the event. People with higher quality relationships

enacted high levels of support under conditions of both high and low stress. By contrast, people with lower quality relationships enacted greater support under conditions of higher stress but less support under conditions of lower stress. The results suggest that lower quality relationships are mobilized only when stress is high. Thus, it appears that individuals can rely on their lower quality ties to meet their support needs when they are under extreme stress but not under conditions of lower stress. These findings should inform observations and interventions with older people. As older people often experience both forms of stress, for example, with an acute health event, followed by a less acute period of recovery and/or rehabilitation, it should not be assumed that support available during acute stress will also be available during less stressful periods of recovery and/or rehabilitation. At the same time, it may be helpful to know that social partners appear to feel obligated to provide support to those experiencing extreme stress regardless of the quality of their relationships. This is useful information when attending to the needs of elders with less positive social convoys.

With longitudinal data available, it also became possible to examine change over time. The most interesting findings are with negativity over time. Although some research suggests that relationship negativity should decline over time as people learn to regulate their emotions and to avoid conflict, recent work suggests that there are not universal declines in negative quality. Birditt, Jackey, and Antonucci (2009) examined negative aspects of relationships with children, best friends, and spouses more than 12 years. They found that the trajectories of negative relations varied by relationship type. Relationships with children and friends tended to decline in negativity, whereas relationships with spouses increased in negativity over time. Spouses may report high levels of negativity that increase or remain consistent because they have more frequent contact and thus more opportunities for negative interactions (Akiyama, Antonucci, Takahashi, & Langfahl, 2003). Increases in negative relationship quality over time may also reflect learned patterns of interaction, which have been reinforced over time. Spouses or partners may become more comfortable and more expressive of negative emotions as they age. Although older people are less likely to be married as they grow older, some older people remain in very long marriages, or less frequently, in second or third marriages. The

increased likelihood of negativity in these relationships can be a source of concern, perhaps offset if that negativity is used to enhance the likelihood of positive health behaviors as noted earlier.

Research also shows that daily social interactions are associated with daily well-being. Of all the daily stressors that individuals experience, negative social interactions are the most frequently associated with poor well-being (Almeida, 2005; Bolger, DeLongis, Kessler, & Schilling, 1989). Reactions to tensions are also associated with daily well-being, and the associations between tensions and daily well-being vary by age. For example, research using multilevel modeling shows that avoidant reactions to tensions are more highly associated with poor well-being among younger individuals than older individuals (Birditt, 2013; Charles, Piazza, Luong, & Almeida, 2009). In contrast to negative interactions, daily positive interactions such as support, intimacy, and affection are associated with lower daily negative and higher daily positive affect (DeLongis, Capreol, Holtzman, O'Brien, & Campbell, 2004; Ditzen, Hoppmann, & Klumb, 2008; Gable, Reis, & Downey, 2003; Gleason, Iida, Bolger, & Shrout, 2003; Reis & Collins, 2000).

Future Directions

The field of social relations has a multidisciplinary past with many insightful observations concerning their influence and development. Continued research in the directions briefly outlined earlier will offer exciting contributions to the field of gerontology. There are several new developments that are likely to be important, and research within the context of the convoy model should prove fruitful to advancing the study of aging as well as relevant policy and practice initiatives. We identify three promising research areas: contagion, gene/environment interplay, and the brain.

A great deal of recent attention has been given to the concept of contagion. For example, friends and friends of friends are more likely to be similar, that is, to smoke, be obese, be lonely, and even to be happy, although to a much lesser degree. Most of this work has focused on social networks, that is, structural aspects of social relations (Christakis & Fowler, 2007, 2008; Fowler & Christakis, 2008). The integration of this work within a convoy model perspective will permit a more comprehensive understanding of the processes and mechanisms through which these relationships develop

and are associated. The convoy model elaborates multiple dimensions of social relations including structure, support type, and relationship quality. A focus on how these dimensions influence health and well-being over time should prove especially helpful. Previous research has shown that relationship qualities (positive, negative) can have bidirectional influences on health and well-being. A more nuanced examination of contagion that incorporates relationship quality should inform earlier structurally based contagion findings. In the study of aging, such elaboration will overcome simplistic conceptualizations of social relations and how they operate, hence enriching understanding of diversity in the aging experience.

New developments in genetics are creating opportunities to examine interchange and bidirectional causality of physical and psychological interactions. The study of gene/environment interplay offers enormous promise (Wanke, Partridge, & Antonucci, 2011). We are increasingly recognizing that although genetic factors may predispose an individual in one direction or another, environmental factors invariably account for a higher percentage of the variance. The convoy model recognizes the important influence of both personal (e.g., genes) and situational (e.g., environment) factors in social relations, health, and well-being. As a result, this theoretical perspective can guide research on how the gene–environment interplay operates. In particular, convoys of social relations are increasingly shown to influence important outcomes including health behaviors that alter the course of or predisposition toward a disease and reactions to threatening or stressful circumstances. Genes associated with impulsivity, antisocial behavior, risk taking, and alcoholism can all be modified by the environment, in particular, an individual's convoy of social relations (Antonucci, Birditt, & Ajrouch, 2011). A detailed examination of convoy characteristics such as positive and negative relationship quality may provide insight into which genes are expressed and which are not. Just as high quality parenting has been shown to reduce the expression of the "impulsivity" gene, might this be similarly true of genetic predispositions toward breast cancer or Alzheimer's disease? The convoy model of social relations provides a heuristic framework for understanding the complexity of gene–environment interplay, contributing to more sophisticated understandings of the ways in which people age.

And finally, recent attention to the interrelation between cognitive brain functioning and social relations, especially in the prevention or postponement of cognitive impairment and various dementias, is particularly interesting (Fratiglioni, Wang, Ericsson, Maytan, & Winblad, 2000). For example, Amieva and colleagues (2010) demonstrated in a 15-year longitudinal study of French elderly that those who reported relationship satisfaction and who felt they received more support than they provided were less likely to develop dementia. As we enter a period of intense interest in mapping the brain, additional advancement should be forthcoming in understanding what is most critical about these links and how they might best be applied to promote optimal aging. Future research using the convoy model as a guiding theoretical perspective might explore the possibility of how specific brain patterns (e.g., personal characteristics) link with multiple dimensions of social relations such as variations in relationship quality (e.g., more positive ties vs. negative) and/or social structure (e.g., higher proportion of family or friends in network). More refined brain mapping might demonstrate the neurological links underlying social relations and/or identify the neurological basis for the effects of social relations.

Future research should also consider how the science of social relations has provided unique insights into practice and policy initiatives related to aging and the life course. Because convoys of social relations provide an intuitive way to ascertain the structure, type, and quality of support available to older adults, they have direct practice implications. For instance, health care practitioners may use such an approach to quickly gauge the extent of support available after hospital discharge, or following a medical diagnosis that requires hands-on care. Moreover, the powerful influence of social relations on various health and well-being outcomes has undeniably made social relations a public health concern. Social relations influence the cost of care that may accompany old age. In particular, being able to remain at home rather than institutionalized enables enormous cost benefits. Yet, the ability to remain home is often contingent on the constellation of social relations available. The convoy model identifies the multiple dimensions of social relations, how they inform one another, are influenced by various personal and situational characteristics, and ultimately how

they influence well-being outcomes. Such detailed information on social relations illuminates potential pathways for supporting older adults in the community.

An ongoing intervention program funded by the MacArthur Foundation (Antonucci & Kahn, 2012) in two California affordable housing properties builds on the earlier Antonucci and colleagues (2003) finding about the ability of social relations to offset the known negative link between low SES and health. The intervention program focuses on increasing people's awareness of the community around them and the degree to which they can help each other. In keeping with the convoy concept, it emphasizes the degree to which people can help create and benefit from mutually supportive behaviors and thus, enjoy the health enhancing, aspects of resident interactions, that is, their convoys. The interventions are designed to create a supportive environment that improves individual health behaviors, sustain independent living, and avoid transfer to assisted living or skilled nursing homes. It also addresses the disadvantages of negative interactions by highlighting the costs of negativity in contrast to positivity and provides workshops on how to reduce the negative aspects of their convoys. If shown to be successful, evidence will be available to elicit policy changes both from Housing and Urban Development (who administer the affordable housing communities) as well as Congressional bodies such as the Senate Committee on Aging and the House Ways and Means Committee.

In sum, the study of social relations has offered a unique window into the most influential psychosocial aspects of human development. In particular, the convoy model has provided a framework by which to integrate personal and situational characteristics and their influences on the social relations and health of individuals both cross-sectionally and longitudinally. As we become increasingly aware of the powerful effects social relations have on the individual, the convoy model of social relations offers potentially useful pathways for understanding and influencing policy to enhance the behavior, health, and well-being of all ages.

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