Human Relationships

A Systematic Review of the Outcomes of Intergenerational Programs for Children, Adolescents, Young Adults, Middle Age Adults, and Older Adults

A thesis submitted in partial fulfillment of the requirements for the degree of Bachelor of Science in Cognitive Science at Yale University

Advised by Dr. Claudia Valeggia and Dr. Melanie Martin

NATHALY MELISSA BASTO CAMARGO

YALE UNIVERSITY

New Haven, CT

April 2017

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Abstract

Primary Objective: To evaluate the outcomes of Intergenerational Programs for children, adolescents, young adults, middle age adults, and older adults.

Background: Intergenerational Programs (IGPs) are social vehicles that increase cooperation, interaction, and exchange between members of any two different generations. However, there is only one scoping review that has evaluated the literature on IGPs. Thus, there is a need for a systematic review and meta-analysis of recent studies on IGPs.

Methods: Empirical studies on IGPs that used nonfamilial IG interaction were systematically reviewed. Eighty nine published studies from January 2012 and March 2017 in peer-reviewed, English-language journals were identified through a search in MEDLINE, Embase, PsychINFO, and PsychEXTRA. Fifteen articles met the inclusion criteria and were evaluated.

Results: The shared outcomes across three or more generations were: 1) Enjoyment (children; young adults; older adults) 2) Satisfaction (adolescents; young adults; older adults) 3) Improved perceptions of another generation (children; adolescents; young adults; older adults) 4) Higher social skills (children; young adults; older adults) 5) Social contribution (adolescents; young adults; older adults). Some older adults did not experience changes in self-perceived health, agitation, quality of life, depression, mood, communication, loneliness, or sense of community. A meta-analysis was not done, as the studies varied in design, methods, and statistical analyses.

Conclusions: This systematic review found support for the assertion that IGPs positively impact the physical and psychological health and wellbeing of young and older generations. This review highlights the need for improvements in future research on IGPs, such as the use of consistent definitions of generations and for more studies that include adolescents and middle-age adults.

Keywords: Intergenerational Program, outcomes, children, adolescents, young adults, middle age adults, older adults, population aging, age segregation, ageism

Introduction

The concept of a generation rests upon two foundations of human relationships: the family and the group. The familial meaning of generation is contained in its Greek root, *genos*, which means to come into existence (Nash, 1978). As Nash (1978) describes, "that moment when a child is born simultaneously produces a new generation separating parent and offspring—*gonos* ergo *genosm*" (p. 1). In short, generation represents reproduction, and reproduction necessitates the family. The group meaning of generation, on the other hand, is less understood than the familial meaning because it rests upon historical and social contexts. It is this social meaning that has complicated and prevented the process of a unified definition of generation (Bienvenu & Legendre, 2015; Bristow, 2015; Deane et al., 2016; Hareven, 2000; Kertzer, 1983; Jaeger, 1985; Nash, 1978). Despite high variability in the use of generation, the generally agreed-upon definition is familial: a period of thirty years, the average length of time where children take the place of their parents and have offspring (Brown, 1993; Jaeger, 1985).

The concept of generation as familial has been present in many societies for millennia (Kertzer, 1983). Generational age distinctions were crucial for family structure and genealogy in the Bible, Greek poetry, Classical and Hellenistic Roman periods, and historiography (Jaeger, 1985; Kertzer, 1983; Nash, 1978). Generation in the familial sense has also been used to reference the stages of life in relation to an individual's family role, i.e., as a child, a parent, or a grandparent. This perspective persisted until the twentieth century, when psychologist Erik H. Erikson and his wife, Joan Erikson, developed a description of the human life cycle. Erikson presented the stages of the life cycle in *Childhood and Society* (1950) in a chapter titled, "Eight Ages of Man" (pp. 247-274). These 8 stages were divided into five main categories: childhood (oral-sensory, muscular-anal, locomotor-genital, and latency), adolescence, young adulthood,

adulthood, and maturity (Erikson, 1950). Erikson prescribed corresponding psychological experiences to each life stage. Infants in the oral-sensory life stage experience trust vs. mistrust; toddlers in the muscular-anal life stage experience autonomy vs. shame; young children in the locomotor-genital life stage experience initiative vs. guilt; children in the latency life stage experience industry vs. inferiority; adolescents in the adolescence life stage experience identity vs. role confusion; young adults in the young adulthood life stage experience intimacy vs. isolation; middle age adults in the adulthood life stage experience generativity vs. stagnation; lastly, older adults in the maturity life stage experience ego integrity vs. despair (Erikson, 1950). These life stages, in particular the five main stages, represent five different generations.

The familial meaning of generation has recently been used in the field of ecology, in which the generation time relates to biological factors such as body size or evolutionary entropy (Bienvenu & Legendre, 2015; Brown et al. 2004; Demetrius et al. 2009). In ecology, several biological measures have been used to quantify the generation time, including the time it takes for a population to grow by a factor of its net reproductive rate, the age at which members of a cohort are expected to reproduce, and the mean age of mothers at birth in the stable population (Bienvenu & Legendre, 2015; Caswell, 2001; Coale, 1972). However, the relationship between these three measures is not well understood (Bienvenu & Legendre, 2015). To address this issue, Bienvenu & Legendre (2015) recently developed a matrix population model which describes the dynamics of structured populations and allows for the computation of biological descriptors (Caswell, 2001). In developing this model, they introduced a new measure of the generation time: the average time between two reproductive events in the genealogy of the population. In their model, Bienvenu & Legendre found that the generation time is the inverse of the sum of the elasticities of the growth rate to changes in the fertilities.

Although the familial meaning of generation persisted throughout history, a new meaning developed during the eighteenth century with the rise of industrialization. Industrialization brought about a new emphasis on citizenship and the state, which shifted the meaning of generation from familial to social and nationalistic (Bristow, 2015; Eisenstadt, 1963). This transformation gave rise to the works of Karl Mannheim, who provided a theory of generation for the first time in history in the early twentieth century. Mannheim (1952) defined a generation as a group of individuals of similar ages who experience an important historical event during their youth. This historical event produces shared meaningful experience among a social cohort. That cohort then influences events that can impact the next generation, and the intergenerational cycle continues.

Mannheim's theory of social cohorts is seen in the five documented generations of the twentieth century in the Western world: The Greatest Generation (1901-1927), the Silent Generation (1928-1945), the Baby Boom Generation (1946-1964), Generation X (1965-1980), and the Millennial Generation (1981-1998) (Deane et al., 2016). The names of these generations come from the historical and social contexts that occurred during the birth and development of these generations (Beckett, 2010; Bristow, 2015; Deane et al., 2016; Willets, 2010). Mannheim's theory resulted in the life course theory, which analyzes the timing of life transitions in relation to historical times (Pilcher, 1995). As Hareven (2000) describes, "the pace and definition of timing patterns are determined by their social and historical context," (p. 14). The life course approach contains greater sensitivity to variations in experience between generations and reflects recent transformations in theories of generation.

These numerous meanings and uses of generation have puzzled many scholars and created inconsistencies within the literature. As a result, Kertzer (1983) presented four modern-

day meanings of generation: kinship descent, cohort, life stage, and historical period. Kinship descent refers to the familial meaning of generation: reproduction and population replacement. Cohort refers to the succession of people moving through the age strata. The use of cohort is found in the academic context, in which "literary generations" succeed one another every ten to fifteen years. Life stage category refers to a generation in terms of the socially constructed life stages of a culture, such as a college generation. Finally, historical period refers to important historical events that influence a group of youth.

This brief trace through the history of the concept of a generation reveals that, although generation is an intuitive concept, it is also a highly complex one. However, the primary importance of generation is not its definition, but its relational sense. The intriguing question is, how do people from the five generations of the twentieth century feel about one another and how do they interact with each other? The relationship between two or more generations is known as an *intergenerational* (IG) relationship. Intergenerational Programs (IGPs) started in the 1960s to increase cooperation, interaction, and exchange between members of different generations. This systematic review and meta-analysis aims to evaluate the outcomes of IGPs for children, adolescents, young adults, middle age adults, and older adults. This study will use clear and consistent definitions of a generation, considering the manifold definitions that currently exist.

For the purposes of this study, generation will be defined as a period of thirty years, which is the average length of time where children take the place of their parents and have offspring (OCED, 2016). This definition was chosen because it represents current fertility trends and because it is the most agreed-upon definition (Brown, 1993; Jaeger, 1985). Moreover, human developmental stages will be defined in the following ways, based upon the legal rights of each age category: children (0-12 years old), adolescents (13-17 years old), young adults (18-

39 years old), middle age adults (40-64 years old), and older adults (65 years old and over). Consequently, IG interactions will be defined as interactions between individuals who are at least 30 years apart. When referring groups of people in different developmental stages and age groups, however, an IG interaction will be defined as a difference of at least thirty years between the oldest age of one group and the youngest age of another group. For example, an interaction between a group of adolescents and a group of middle age adults is considered an IG interaction because the oldest age of middle age adulthood, as defined above, is sixty-four years, and the youngest age of adolescence is thirteen years. The difference between these two is fifty-one years, which is greater than thirty years and thus qualifies the interaction as an intergenerational. Subsequently, an IG interaction can occur in the following eight reciprocal ways:

1. Child-young adult
2. Child-middle age adult
3. Child-older adult
4. Adolescent-middle age adult
5. Adolescent-older adult
6. Young adult-middle age adult
7. Young adult-older adult
8. Middle age adult-older adult

The only kinds of interactions that would not be considered intergenerational in this review are reciprocal child-adolescent and adolescent-young adult interactions because the age gap between these two pairs of age groups is less than thirty years. All these definitions will be maintained in order to preserve simplicity, consistency, and clarity throughout this systematic review.

With the concept and definition of generation and IG relationships established, this study will proceed to provide a comprehensive background for IGPs. The background will cover the evolution of IG relationships, the evolution of life expectancy, the rise of age segregation, and the history of IGPs. Following the background will come the rationale for this systematic review and meta-analysis, the methods, results, discussion, strengths and limitations, and conclusions.

Background

A. The Evolution of Intergenerational Relationships

Intergenerational relationships enabled the survival of our species. During the Pleistocene, about 1.8 million years ago, early hominins grew up depending on a wide range of caretakers in small groups of extended, multi-generational families (Blaffer Hrdy, 2011; Hewlett, 2008; Tronick et al., 1987). This small, multi-generational environment promoted three crucial behaviors for their evolutionary success: cooperative breeding, alloparenting, and multiage child playgroups (Blaffer Hrdy, 2011; Konner, 2008, 2016; Sellen, 2016). Alloparenting refers to a kind of cooperative breeding where group members other than the parents take on a parental role and help parents rear their young (Blaffer Hrdy, 2011). Sarah Blaffer Hrdy (2011) hypothesizes that alloparenting enabled early hominins to decode the mental states of others, a development which was reproductively advantageous and which transformed hominins into emotionally modern humans. Furthermore, with alloparental assistance, mothers conserved energy, were better nourished, remained safer from predation, lived longer, and reproduced at a faster pace. All of these advantages combined enabled the survival of more children (Blaffer Hrdy, 2011).

We can still see traces of our evolutionary history in current day hunter-gatherer communities, where families of multiple generations live and work together and where cooperative breeding, alloparenting, and multiage playgroups are the norm (Blaffer Hrdy, 2010; Konner, 2016; Tronick et al., 1987). One of these hunter-gatherer groups is the !Kung San of northwestern Botswana. The !Kung San have a small band size, seminomadic mobility, fluid group structure, and flexibility of adaptive, subsistence strategies. Their caretaking practices have been considered to be similar to those of our early ancestors (Tronick, Morelli & Winn, 2008). Using several quantitative studies of modern-day hunter-gatherers, Konner (2016)

describes that alloparenting is frequent in these groups, especially co-paternal care and abundant allomaternal care from sisters, aunts, and grandmothers.

The contribution of alloparental care from grandmothers was of particular importance to our evolution (Hamilton, 1974). Blaffer Hrdy (2011) calls long-lived grandmothers "humankind's ace in the hole," and other kin, "wild cards," (p. 272). Apart from human females, no other primates and very few other mammals take decades to mature before they begin to reproduce and then live for decades after menopause (Blaffer Hrdy, 2011). This phenomenon has puzzled researchers for decades. By the late eighties and nineties, however, anthropologists started finding answers to this puzzle. They found that assistance from maternal grandmothers played a critical role in early hominin evolution because grandmothers were experienced in childcare, sensitive to infant cues, adept at local subsistence tasks, and unusually altruistic, which enabled them to help new mothers rear their young (Blaffer Hrdy, 2011). Grandmothers were especially useful when mothers were young, inexperienced, or lacked older children to help them (Hawkes et al, 1998; Lahdenperä et al., 2004). Though it was certainly not easy for women to reach grandmotherhood, Kurland and Sparks (2003) estimate that, under good conditions with low mortality, a 20-year-old mother would have about a 50% chance of having a 40-year-old grandmother alive to help her raise her children (Hawkes & Blurton Jones, 2005; Ivey, 1993; Meehan, 2005).

Just as alloparenting benefited mothers, it is suggested that alloparenting was also advantageous for infants and children in our evolutionary past (Tronick, Morelli & Winn, 2008). We can infer this from hunter-gatherer groups such as the Efe from Ituri Forest of Zaire. The Efe live in small virilocal camps of six to fifty people and have a system of multiple caretaking which extends beyond the family (Tronick, Morelli & Winn, 2008). This system facilitates the

development of precocious social skills in infants and contributes to the development of infants' capacities for maximizing culturally appropriate behaviors (Tronick, Morelli & Winn, 2008). These benefits are also seen in the Khasi matrilineal tribal peoples from Meghalaya in northeast India. Anthropologist Donna Leonetti found that it is common for Khasi daughters to continue living with their mothers after they have children. The presence of a grandmother is crucial, Leonetti found, as the chances of a child dying were 74% greater without a grandmother living with them. Similarly, Sear and Mace (2008) conducted a study on twenty-eight traditional societies and found that the presence of grandmothers was correlated with a higher child survival in every society. Moreover, they found that children benefited most from having a grandmother present around the age of weaning (Beise, 2005; Sear et al., 2002). Other studies have found that the presence of alloparenting, especially from grandmothers, moderated the negative effects of early social trauma in children (Flinn & Leone, 2006; Quinlan & Flinn, 2005).

In conclusion, we have relied on IG relationships for reproductive success and survival for millions of years. The help of grandmothers when mothers were in young and inexperienced and when children were in weaning was especially crucial and evolutionarily advantageous. In short, IG relationships transformed us into emotionally modern, cooperative humans that relied on alloparenting, cooperative breeding, and multiage relationships, all of which helped us survive.

B. The Evolution of Life Expectancy

It is important to trace the evolution of human life expectancy in order to know if humans in our evolutionary past lived long enough to have IG interactions. The evidence of research

suggests that, as a whole, humans in our evolutionary past lived long enough to reach grandparenthood.

Using skeletal samples and bone preservations, many researchers have estimated that Paleolithic humans had life expectancies of about 15-20 years. Moreover, they estimated that this life expectancy increased to about 25 years starting about 10,000 years ago with the development of agriculture (Cutler, 1975; Gage, 1998; Herrmann & Konigsberg, 2002; Lovejoy et al., 1977; Mensforth, 1990; Weiss, 1981). However, there is a large paleodemographic literature that disagrees with these known age estimates (Gurven & Kaplan, 2007). Various anthropologists, evolutionary historians, and human biologists argue that the body of *Homo sapiens* is designed to last about 72 years (Gurven & Kaplan, 2007; Judge & Carey, 2000; Lahdenperä et al., 2004).

To address this controversy, Gurven and Kaplan (2007) assessed the mortality profiles of all extant hunter-gatherers for which there is adequate high-quality demographic data. Gurven and Kaplan found that the modal adult life span for hunter-gatherers is 68-78 years. Within these extant hunter-gatherer groups, they found that their mortality rates remained stable and low at around 1 percent per year from the age of maturity until around age 40, when the mortality rate doubled with a time of about 6-9 years. Moreover, they found that survival to grandparental age was achieved by over two-thirds of people who reached sexual maturity and could last an average of 20 years. The mortality rates of these hunter-gatherers differed among populations and periods. For example, illnesses accounted for 70%, violence and accidents for 20%, and degenerative diseases for 9% of all deaths. However, these differences are rather small when taking into account their different environments. Consequently, Gurven and Kaplan conclude that human bodies are designed to function well for about seven decades in the environment in

which our species evolved. Moreover, they conclude that extensive longevity seems to be a novel feature of *Homo sapiens*.

This research suggests that in our evolutionary past, people indeed lived long enough to have multi-generational families and to take part in frequent IG interactions, especially in their small community settings. This suggests that IG interactions were an important part of our human evolution.

Thousands of years later, with improvements in sanitation, nutrition, and public health, humans are living longer, the world population is exponentially growing (World Health Organization, 2015). Moreover, there is a faster pace of population aging, which is the shift in distribution of a country's population towards older ages (WHO, 2015). Average life expectancy has increased linearly at about three months per year over the past 160 years (Oeppen & Vaupel, 2003; Riley, 2001). At the turn of the twenty-first century, average worldwide human life expectancy reached 66 years, with differences in countries ranging from 39 years in Zambia to 82 years in Japan (United Nations 2007). Moreover, there are worldwide trends toward population aging. Between 2015 and 2050, the world population aged 60 and over will nearly double from 12% (900 million) to 22% (2 billion) (WHO, 2015). Moreover, between 2015 and 2050, the world population over 80 years will more than triple from 125 million people to 434 million, with about 120 million living in China alone (WHO, 2015). These trends of population aging originally started in high-income countries like Japan but have now reached low and middle income countries. By 2050, 80% of all older adults will live in low and middle income countries like China, Iran, and Russia (WHO, 2015).

These aging trends can also be seen in the United States. Between 2005 and 2015, the population aged 65 and over increased from 36.6 million to 47.8 million, a 30% increase

(Administration on Aging, Administration for Community Living & U.S. Department of Health and Human Services, 2016). This population is projected to more than double to 98 million in 2060 and the population 85 and over is expected to triple from 6.3 million in 2015 to 14.6 million in 2040, following worldwide trends (Administration on Aging, Administration for Community Living & U.S. Department of Health and Human Services, 2016). Moreover, 18% of the older adult population were minorities in 2005 (6.7 million) and this increased to 22% in 2015 (10.6 million) (Administration on Aging, Administration for Community Living & U.S. Department of Health and Human Services, 2016). There are interesting gender differences in aging in the United States. First, women outnumber men at 26.7 million to 21.1 million. Secondly, women have an additional 20.6 years of life expectancy past 65 years while men have an additional 18 years (Administration on Aging, Administration for Community Living, & U.S. Department of Health and Human Services, 2016).

These worldwide demographic changes can contribute to certain transformations in IG interactions. First, they can enable significantly more IG interactions to take place now than took place in evolutionary past. Secondly, they can enable more IG interactions with people over 80 or 85 years old, which was rare in our evolutionary history (Cutler, 1975; Gurven & Kaplan, 2007). Thirdly, they can increase the likelihood of an IG interaction between a younger person and an older woman rather than an older man. However, these demographic changes have had an opposite result: they have transformed family structure, social structure, and social policies in such a way that has dramatically decreased IG interactions and increased IG segregation (Generations United, 2002; Hagestad and Uhlenburg, 2005; WHO, 2015).

C. The Rise of Age Segregation

Our society today is more segregated by age than it has ever been in our past (Generations United, 2002; Hagestad and Uhlenburg, 2005, 2006; Kohli, 1986; McNair & Moore, 2010; Morita & Kobayashi, 2013; Uhlenberg & De Jong Gierveld, 2004; Winkler, 2013). Age segregation is the separation of people based on age (Kohli, 1986). The emergence of the nation state over the last century was one of the biggest factors that gave rise to age segregation (Hagestad & Uhlenburg, 2005; Kohli, 1986). Life was transformed from categorical to temporal as the market and nation-state classified people in receiving rights and duties linked with their age (Kohli, 1986). The state mandated laws that used chronological age to require compulsory attendance in school, legal working ages, and retirement (Kohli, 1986). Consequently, the social structuring of life became tripartite and noticeably divided into childhood, adulthood, and older adulthood. Moreover, these tripartite segments became the basis for rights, responsibilities, opportunities, and constraints (Hagestad & Uhlenburg, 2006). As a result, modern day family and social functions are assumed by age-specific institutions: children and adolescents attend age-segregated schools, young adults attend age-segregated universities, many adults work in environments without children under 16 or older adults over 65, and many older adults live in older adult-only housing (Generations United, 2002; Winkler, 2013). Even recreational activities have become increasingly age segregated over time (Winkler, 2013).

Winkler (2013) investigated the extent to which older adults (aged ≥60), and younger adults (aged 20-34), lived in the same neighborhoods in the United States in 2010. Winkler found that, on average, older adults and younger adults are moderately segregated across the United States at the county level, at a similar level as segregation between Hispanics and non-Hispanic Whites. Winkler also found that many counties within states are disproportionately

older, especially in rural areas, in the West, and in known retirement destinations in places. These counties tend to cluster together, creating entire regions of the state and country that have high age segregation. Florida, Arizona, New Mexico, and the Upper Midwest lakes are representative regions with little age integration. On the other hand, Appalachia and areas of the rural South are examples of regions with higher age integration.

Older adult long-term care services contribute to residential segregation (Winkler, 2013). The Centers for Disease Control and Prevention National Center for Health Statistics (2014) estimated that in the United States in 2014, there were about 9 million older adults in long-term care services including 4,000 hospices, 4,800 adult day services centers, 12,400 home health agencies, 15,600 nursing homes, and 30,200 assisted living care communities. In these long-term services, there were about 282,200 older adults in adult day services centers, 835,200 in residential care communities, and 1,369,700 in nursing homes. Many older adults live or spend the day in age segregated long-term care facilities because of functional and health limitations. However, many also live in these facilities because of financial limitations. In 2015, over 4.2 million older adults (8.8%) lived below the poverty level (Administration on Aging, Administration for Community Living & U.S. Department of Health and Human Services, 2016). Furthermore, the median income of older men in 2015 was $31,372. For older women, the median income was significantly lower at $18,250. Older adult's sources of income in 2014 were Social Security (84%), income from assets (62%), earnings (29%), private pensions (37%), and government employee pensions (16%) (Administration on Aging, Administration for Community Living & U.S. Department of Health and Human Services, 2016).

Age segregation has countless negative consequences, including age stereotypes, ageism, institutional ageism, reproduction of ageism, decreased socialization for young and old, isolation,

lower health and well-being in older adults, IG competition of resources, IG conflict, and a barrier for the creation and maintenance of a generative society (Generations United, 2002, 2016; Hagestad & Uhlenburg, 2005, 2006; Kohli, 1986; Lloyd-Sherlock et al., 2016; McNair & Moore, 2010; Morita & Kobayashi, 2013; Uhlenburg & De Jong Gierveld, 2004; Winkler, 2013). In the words of IG researchers, the greatest problem with age segregation is that it "produces environments in which ageism and age-based stereotypes can proliferate," (Hagestad & Uhlenberg 2005) and that it "...impede[s] the development of what has been called generational intelligence, or the ability to take into account the vantage point of people from different generations when acting in the world," (Vanderbeck & Worth, 2015, p. 4-5).

Age stereotyping is one of the first consequences of age segregation. Although there is no typical pattern to aging, older adults are often stereotyped to be frail or dependent, thus a burden and an inconvenience to society (WHO, 2015). These stereotypes of aging are not just present in the Western world but persist in societies around the world (McConatha et al., 2003). Research indicates that people have more negative views of older adults than they do for young people. Kite and Johnson (1988) confirmed this finding in a meta-analysis in which 69.8% of the 43 studies indicated that people have more negative attitudes toward older adults and 26% reported more negative attitudes toward young people (Kite & Johnson, 1988). These results illustrate that, though there are more age stereotypes for older adults, there are also many age stereotypes for youth. Education is the main governmental institution that maintains these stereotypes by segregating children and adolescents in same-age classrooms for over a decade, with little opportunity for age-mixed interactions. This excludes children and adolescents from participating in society as productive, valued citizens and consequently creates and maintains negative age stereotypes towards them (Generations United, 2002; Holt, 1974). Compulsory

education sets the foundations for institutional age segregation, prevalent age stereotypes, and society's acceptance of it (Generations United, 2002; Holt, 1974).

Age stereotyping can develop into larger problems: ageism, institutional ageism, and a reproduction of ageism. Ageism is a process of systematic stereotyping and discrimination against people because they are younger or older (Butler, 1969; Nelson, 2005). Ageism is common in the United States (Nelson, 2005); however, less research has been done on ageism than on other forms of discrimination like racism and sexism (Lloyd-Sherlock et al., 2016). Institutional ageism involves the inclusion of ageist principles in institutional laws. Institutional ageism is characterized by a language that portrays older adults in negative terms with words such as "elderly" and "senior," which older adults view as offensive and demeaning they produce an image of frailty (Lloyd-Sherlock et al., 2016). Moreover, ageism is often reproduced in children. Studies show that by the age of eight, many children already have negative perceptions of older adults and the aging process (Corbin, Kagan, & Metil-Corbin, 1987; McNair & Moore, 2010). Age segregation and ageism produces stigma, discrimination, and exclusion of adults and children from participation in society, which isolates them and has causes adverse health effects (Adams, Leibbrandt, & Moon, 2011; Carlson, Seeman, & Fried, 2000; Depp & Jeste, 2006; Ehlman, Ligon, & Moriello, 2014; Fisher, 1995; Galbraith et al., 2015; Generations United, 2002; Gottlieb & Gillespie, 2008; Holt, 1974; McNair & Moore, 2010; Narushima, 2005; Okun, 1994; Rowe & Kahn, 1997; Sindi et al., 2012; WHO, 2015).

With new social transformations, we have an ever increasing and urgent need for stronger communication, intimacy, and understanding between generations. There are organizations that are taking measures to accomplish these goals. The World Health Organization (2015), for example, is developing a comprehensive *Global Strategy and Action Plan on Aging and Health*

with member states and other partners. This plan addresses five priority areas: 1) commitment to healthy aging 2) aligning health systems with the needs of older populations 3) developing systems for providing long-term care 4) creating age-friendly environments and 5) improving measurement, monitoring and understanding. Similarly, the United States Department of Health and Human Services (2010) developed *Healthy People 2020,* with the goal to promote quality of life and healthy development and behaviors in all life stages.

We have gone from living in close knit, IG communities to living in age segregated and isolated societies. Various structural, geographical, and social factors have made IG interactions now difficult to experience in everyday life. As a result, Intergenerational Programs (IGPs) were recently created to make human relationships intergenerational once again, as they were for so long in our past.

D. Intergenerational Programs

Intergenerational Programs are social vehicles that increase cooperation, interaction, and exchange between members of any two different generations (Generations United, 2002, 2016; Hatton-Yeo & Ohskao, 2001; Newman, 1997; Ventura-Merkel & Lidoff, 1983). There are hundreds of IGPs around the world that aim to provide activities that allow non-biologically related people of different generations to share their talents, skills, resources, knowledge, and experience with each other and to support one another in relationships that benefit themselves and their communities (European Map of Intergenerational Learning, 2017; Generations United, 2016; Newman, 1997; Ventura-Merkel & Lidoff, 1983). All IGPs have three aspects in common:

1) they involve people from different generations 2) they involve activities that are beneficial for all involved 3) they are based upon sharing (Galbraith et al., 2015).

IGPs take place in both shared sites, where two generations share one facility, and in unshared sites, where generations meet in a designated location (AARP, 1998; Isaki, et al., 2015; Jarrott & Bruno, 2007; Kuehne & Kaplan, 2001). Participants in IGPs are generally children, adolescents, young adults, and older adults in good health (Galbraith et al., 2015). There are many kind of activities in IGPs, yet the most common activities are based around music, arts, and narratives, many of which are Montessori-based and involve both generations (AARP, 1998; Camp et al., 1997; Femia et al., 2008; Galbraith et al., 2015; Gigliotti et al., 2005; Jarrott & Bruno, 2003, 2007; Kuehne & Kaplan, 2001; Lee et al., 2007). The most successful IGPs are those whose activities are well-planned, meaningful for participants, and support relationship building and growth (Galbraith et al., 2015; Holmes, 2009; Lynott, 2007; Schwalbach & Kiernan, 2002).

The history of IGPs is short but accelerated. There has been much progress since the genesis of IGPs (see Appendix A). IGPs started in the United States in the mid-1960s in order to combat the growing problem of age segregation and isolation among older adults (Biggs & Lowenstein, 2011; Newman & Hatton-Yeo, 2008). The first attempts to create IGPs consisted of isolated, hit-and-miss efforts from small groups of people, universities, and state governments (Jarott, 2011; Newman, 1989; Sanchez, 2007).

The first IGP was created in 1963 with a federally sponsored program, the *Foster Grandparents Program* (FGP). In the FGP, low-income older adults aged 60 and above volunteered to provide support to children with emotional trauma and disabilities (Newman, 1989). In exchange, older adults received training, reimbursement, insurance, and a small tax-

free stipend. Other like-minded IGPs and IG social movements started during the late sixties, such as *Adopt a Grandparent* and the *Serve and Enrich Retirement by Volunteer Program* (SERVE). *Adopt a Grandparent* began in 1963 at the P.K. Laboratory School in the University of Florida. In this program, young children made weekly visits to a nearby convalescent home (Newman, 1989). The *Serve and Enrich Retirement by Volunteer Program* started in 1965 in Staten Island when a group of older adults came together to volunteer in local community service projects (Newman, 1989). This small organization, however, had a major political impact and led to the Older Americans Act of 1965. This act created the Administration on Aging, which provided funding for community service, health services, older-adult rights programs, and the National Family Caregiver Support Program (Newman, 1989). A common theme among IGPs in the sixties was that they targeted older adults rather than children.

In the seventies, IGPs began to change. The most significant advancement of this decade was that IGPs and IG movements began to focus on children. This decade saw the first IGPs in school settings, sponsored by State Departments of Education in California, Florida, and Michigan. In these states, IGPs were developed for older adults to participate in schools and school activities, with the goal of benefiting both the older adults and the academic achievement of children (Newman, 1989). In California, for example, older adults were part of the school curriculum and could teach K-12 graders (Newman, 1989). Moreover, universities such as the Pittsburgh University started to develop an interest on IGPs and partnered with organizations and governments in joined efforts to conduct research on IGPs (Newman, 1989). These developments culminated in one last IG movement in the seventies: The California Intergenerational Child Care Act of 1979, which sponsored the creation of two IG child care centers and led to the development of more IG child care centers in California. Though there was

a general shift from a focus on older adults to a focus on children, there were still IGPs that focused on older adults. One example is the *Beth Johnson Foundation*, which was created in 1972 as a national charity to make the United Kingdom age-friendly and to support older adults.

By the eighties, IGPs were more well-known throughout the world. In Europe, announcement knowledge from the past decade resulted in manuals for new IGPs and IG specialists (Newman, 1989; Sanchez, 2007). Moreover, in 1982, the World Assembly on Aging took place in Vienna. This was the first international meeting centered on IG relationships and IGPs and marked an important historical event for the future growth and success of IGPs. In this assembly, representatives from various nations expressed concern for generational alienation in their societies and worked to come up with joint solutions to increase IG solidarity. In the United States, organizations and interest groups began to lobby for an IG agenda in both the local and federal legislatures. Two of the most important organizations created during the eighties were *The National Council on the Aging* (NCoA) and *Generations United*. The NCoA started in 1980 as a national effort that created an IGP network in the United States. *Generations United* started in 1986 after several national agencies came together to advocate for public policy that sustained IGPs. *Generations United* also started publishing research reports on generational demographics, IG relationships, and IGPs in the United States (Generations United, 2002; Sanchez, 2007).

During the eighties, there were also efforts in the media that aimed to spread the idea of IGPs to the public. One example was *Close Harmony* (Noble, 1981), a documentary that showed the creation of an IG choir in Brooklyn. With all these cumulative efforts, IGPs were more important in the public agenda by the end of the decade. Consequently, IGPs in California, Illinois, Massachusetts, New Jersey, New York, and Pennsylvania started to come together to form more powerful interest groups to further increase public support for IGPs (Newman, 1989).

The nineties were characterized by a novel use of IGPs in community development (Biggs & Lowenstein, 2011; Sanchez, 2007). Moreover, IGPs jumped from local and national agendas to the international agenda. In 1999, the International Consortium for IGPs was created. This was one of the first efforts to unite and strengthen the isolated efforts from IGPs around the world and to consider, for the first time, the international impact of IGPs (Sanchez, 2007). Another important transformation during the nineties was that IGPs started reaching out to adolescents and young adults (Bringle & Kremer, 1993; Giles & Eyler, 1994; Newman, 1989; Pine, 1997; Watson et al., 1997).

Since the turn of the twenty-first century, IGPs have developed into more systematic efforts to address social problems (Biggs & Lowenstein, 2011). Originally designed in the sixties as programs that brought the young and old together, IGPs now encourage children, adolescents, young adults, and older adults to contribute to society (Alder, 2003; Biggs & Lowenstein, 2011; Newman et al., 1999; Ohsako, 2002). Moreover, there are increasing IGPs for adolescents and young adults than there were in past decades (Au et al, 2015; Ehlman et al., 2014; King & Lauder, 2016; Lokon et al., 2012; Powers, et al., 2013).

Currently in 2017, there are hundreds, possibly thousands, of IGPs operating in communities across the world (Generations United, 2002). Unfortunately, no database exists for the total number of IGPs worldwide (Generations United, 2016). Generations United is currently developing a database for IGPs across the United States. Preliminary results show that there is an IGP in every state in the United States, with over 500 programs in the database thus far (Generations United, 2016).

In 2009, the European Map of Intergenerational Learning (EMIG) (2017) started as a collaborative network of members that support IG learning in Europe. The EMIG defines

Intergenerational Learning (IL) as "the way that people of all ages can learn together and from each other," (EMIG, 2017). The EMIG associates IL with intergenerational practice (IP), which is defined as bringing together people "…from different generations in purposeful, mutually beneficial activities, which promote greater understanding and respect between generations and contributes to building communities and neighbourhoods where people respect each other and are better connected (EMIG, 2017). The EMIG recently compiled a map of IL Members in Europe, some of which are IGPs and some of which are IG nonprofits or organizations.

From the EMIG map, the number of IL Members European countries is as follows: there is one IL member in Albania, Belarus, Boznia and Herzegovina, Croatia, Denmark, and Lativia; three in Norway, Serbia, Slovakia, and Sweden; four in the Czech Republic, Finland, and Hungary; five in Cyprus, Estonia, and Switzerland; six in Malta; seven in Austria; eight in Northern Ireland; ten in Greece; eleven in the Netherlands and Scotland; twelve in Bulgaria; fourteen in Slovenia and Wales; fifteen in Poland and France; sixteen in Romania; nineteen in Ireland; twenty-one in Belgium; thirty in Germany; thirty-two in Italy; thirty-five in Portugal; forty in Spain; and one hundred thirty-nine in England (EMIG, 2017). Therefore, there are at least 501 known IL Members that support IGPs in Europe.

Furthermore, from the EMIG map, as well as from existing studies of IGPs, there is at least one IGP or IG organization in the following twenty-eight countries or territories: Afghanistan, Andorra, Argentina, Australia, Brazil, Cameroon, China, Georgia, Ghana, Hong Kong, India, Indonesia, Israel, Japan, Luxembourg, México, Nepal, New Zealand, Nigeria, Panama, Qatar, Singapore, Taiwan, Tanzania, Thailand, Turkey, Uganda, and Uruguay (Au et al., 2015; EMIG, 2017; Knight et al., 2017; Low et al., 2015; McKee & Heydon, 2015; Morita, & Kobayashi, 2013; Murayama et al., 2015; Skropeta, Colvin, & Sladen, 2014; Tabuchi &

Miura, 2015; Yasunaga et al., 2016). Taken together, this evidence shows that IGPs have become a worldwide phenomenon.

IGPs have spread throughout the world due to their many advantages. One of the most important advantages and benefits of IGPs is that they are cost effective. IGPs that share sites and resource are able to save much more than programs who use separate spaces and resources for different populations (Chamberlain et al., 1994; Generations United, 2002, 2007). Moreover, funders and donors are more willing to fund IGPs since their funds reach more than one population (Generations United, 2007). In an interview with Heidi Hamilton (2017), the assistant director of *OneGeneration* in Van Nuys, California, Hamilton confirmed the economic advantages of IGPs. *OneGeneration* is a shared-site IGP in which an adult day care center and senior enrichment center is situated next to an infant and preschool center. Each day, the older adults and children who want to take part the IGP meet with each other to do various planned activities for about one hour. According to Hamilton, since childcare is in high demand, it greatly helps fund the centers for older adults in *OneGeneration.*

The second advantage of IGPs is that they meet the needs of many older adults who want meaningful volunteer opportunities but may not have the opportunity to volunteer (Bureau of Labor Statistics, 2005; Butts, 2003; Independent Sector, 2007; Princeton Survey Research Associates International, 2005). A third advantage of IGPs is that they increase knowledge and resources for the growing aging population, whose varying and novel needs will require more innovative care programs in the near future (Generations United, 2007). A fourth advantage of IGPs is that they provide tutors, role models, and mentors for youth, which is especially needed now that many families are living further apart from each other and losing their IG composition (Generations United, 2007). The last advantage is that children, adolescents, and young adults

can provide companionship and support to older adults (Generations United, 2007). In short, IGPs provide several advantages for the community and meet the needs of several age groups.

Moreover, different generations experience specific beneficial outcomes after participating in IGPS. As compared with older adults who do not take part in IGPs, older adults who are involved in IGPs experience the following outcomes: increased action and engagement (Biggs & Lowenstein, 2011), increased mobility (Fried et al., 2002; Maccallum et al., 2006), less reliance on canes (Fried et. al., 2004; Maccallum et al., 2006), fewer falls (Fried et. al., 2004), less incidence of heart disease (Civic Ventures, 2005; Glass, 2003), greater longevity (Civic Ventures, 2005), higher functional abilities (Civic Ventures, 2005; Glass, 2003; Jarrott & Bruno, 2003), better performance on memory tests (Fried et. al., 2004), better problem-solving skills (Fried et al., 2002), lower rates of depression (Fried et al., 2002; Civic Ventures, 2005), lower rates of loneliness (Galbraith et al., 2015), increased self-esteem (Newman & Larimer, 1995), satisfaction (Biggs & Lowenstein, 2011; Newman & Larimer, 1995), higher quality of life (McAdams et al., 1993; Sheung-Tak, Chan & Phillips, 2004), improved perceptions of youth (Burgman & Mulvaney, 2016; Knight et al., 2017), and increased generativity (Bickerstaff, Grasser & McCabe, 2003; Cheng, 2009; Hegeman et al., 2010; Keyes and Ryff, 1998; McKinley & Adler, 2005; Narushima, 2005; Pratt et al., 2008).

Young people experience similar psychological benefits as those of older adults. Moreover, children, adolescents, and young adults experience similar outcomes after participating in IGPs. As compared with young people who do not participate in IGPs, children, adolescents, and young adults who participate in IGPs show the following outcomes: positive changes in perceptions of older adults (Biggs & Lowenstein, 2011; Marx et al., 2004), positive changes in attitudes towards older adults (Balogun, 2002; Blieszner & Artale, 2001; Bringle &

Kremer, 1993; Brown & Roodin, 2001; Dorfman et al., 2002; Femia et al., 2008; Greene, 1998; Hegeman et al., 2002; Heyman et al., 2011; Marx et al., 2004; Pine, 1997; Watson et al., 1997), increased empathy towards older adults (Biggs & Lowenstein, 2011; Femia et al., 2008; Hamilton, 2017; Marx et al., 2004; Pritchett, 2017), a better understanding of aging (Biggs & Lowenstein, 2011; Marx et al., 2004; Galbraith et al., 2015), less fear of aging (Biggs & Lowenstein, 2011; Newman et al., 1985), higher levels of reading development (Rebok et al., 2004; Teale, 2003), enhanced academic learning (Blieszner & Artale, 2001; Brown & Roodin, 2001; McCrea & Smith, 1997; Newman, 1997; Pine, 1997), better attitudes to school (Marx et al., 2004), better behavior at school (Marx et al., 2004), increased school attendance (Marx et al., 2004; Tierney & Grossman, 2000), novel insights about careers in aging (Newman, 1997; Pine, 1997), a lower likelihood of using illegal drugs and alcohol (Tierney & Grossman, 2000), better self-regulation (Femia et al., 2008), improved pro-social behavior and social skills (Corporation for National and Community Service, 2005; Marx et al., 2004), increased self-esteem (Marx et al., 2004; Rosebrook, 2002), better self-understanding (Brown & Roodin, 2001; Dorfman et al., 2002), and a stronger sense of civic responsibility (Blieszner & Artale, 2001; Brown & Roodin, 2001; Giles & Eyler, 1994).

Similar outcomes between older and younger generations include improved perceptions of each other, increased self-esteem, improved social engagement, and increased social responsibility. However, there are also differences between older and younger generations. Older adults show significantly more physical outcomes than young people; however, this because studies focus on measuring the physical health of older adults and not that of young people. Similarly, younger generations show more academic outcomes than older generations because studies focus on measuring these outcomes in younger generations and not in older generations.

These findings highlight that within the IG literature, there still exist the age-stereotypes that exist in society. These stereotypes include 1) older adults have more physical health needs than young people and 2) children, adolescents, and young adults have more academic needs that older adults. However, these are not essential needs but socially constructed needs. In conclusion, studies show that IGPs are able to positively impact the individual's well-being as well as the individual's social impact, regardless of the individual's age.

Research on IGPs has not kept up with the pace of IGP expansion. Moreover, there are several limitations in the current IG literature. First, there is no coherent definition of a generation, IG relationships, or IGPs (Galbraith et al., 2015; Generations United, 2002). Second, most studies on IGPs focus on older adults (Galbraith et al., 2015). Third, studies have not included middle-age adults and have not explained the reasoning for this exclusion (Galbraith et al., 2015). Fourth, many studies include older adults with challenges but do not include children, adolescents, and young adults who experience challenges or disabilities (Belgrave, 2011; Burgman & Mulvaney, 2016; Femia et al., 2008; Galbraith et al., 2002; Gigliotti et al., 2005; Jarrott & Bruno, 2003, 2007; Kosky & Schlisselberg, 2013; Lee, Camp, & Malone, 2007). In short, there is a need for more consistent terminology in the IG literature. Moreover, there is a need for more research on the cross-cultural differences of IGPs and the impacts of IGPs for middle age adults and young people with challenges.

Rationale for the Current Systematic Review and Meta-Analysis

This systematic review and meta-analysis aims to evaluate the outcomes of IGPs for children, adolescents, young adults, middle age adults, and older adults in empirical studies that have been published over the last five years. This is the first systematic review and meta-analysis in the IG literature, and thus addresses the need for a systematic review and meta-analysis in the

literature. This systematic review and meta-analysis is built upon a scoping review by Galbraith et al. (2015). Galbraith et al. (2015) examined the characteristics, goals, and outcomes of IGPs for persons with dementia and youth under 19 years old in twenty-seven qualitative and quantitative studies and descriptive articles about IGPs. The results from this scoping review show that there are enough studies in the literature to justify a systematic review and meta-analysis. This systematic review and meta-analysis will aim to build upon the findings of Galbraith et al. (2015) and to address its limitations.

One of the major limitations in Galbraith et al. (2015) is that generations and IGPs are not defined. Thus, the age ranges for generations are not specified and this creates generational ambiguity. The second limitation is that only persons with dementia and youth were included, thus excluding a large population of healthy older adults, older adults with other functional challenges, and young and middle age adults. The final limitation is that study quality, risk of bias, and evidence was not analyzed. Consequently, this systematic review and meta-analysis aims to define generational age ranges and IGPs, include all generations and populations, analyze the quality, bias, and evidence of included studies, and perform a quantitative meta-analysis for quantitative studies.

The research question of this systematic review and meta-analysis is: what are the outcomes of different generations—children, adolescents, young adults, middle age adults, and older adults—who participate in IGPs? As mentioned previously, generation will be defined as a period of 30 years. IG interaction will be defined as the personal or virtual interactions between individuals or groups who are at least 30 years apart. Children will be defined as humans aged 0-12 years; adolescents will be defined as humans aged 13-17 years; young adults will be defined as humans aged 18-39 years; middle age adults will be defined as humans aged 40-64 years;

older adults will be defined as humans aged 65 years and over. Lastly, program will be defined as any intentional activity with a purpose, goals, rules, and outcomes.

Methods

A. Eligibility Criteria

The steps and procedures used in this selection criteria, data analysis, and results are taken from the PRISMA guidelines (Liberati et al., 2009; Moher et al., 2009) and the Cochrane guidelines for systematic reviews and meta-analyses (Higgins & Green, 2011).

The selection criteria were developed before the search was run. The first selection criterion was the time frame of the search. Studies were included if they were published in peer-reviewed, English-language journals between January of 2012 and March of 2017. This timeframe was chosen firstly to review the most recent literature on IGPs and to assess how IGPs have developed and where they stand today. This timeframe was also chosen to avoid overlap with Galbraith et al. (2015), in which studies published until 2013 were included, though most studies were published between 2003 and 2011. The second selection criterion was nonfamiliarity: studies had to include subjects who were not biologically related to one another because, by definition, IGPs are for non-relatives. The third criterion was that studies needed to be empirical and include an original experiment with methods and results; however, studies could be qualitative, quantitative, or both. Furthermore, all study designs, methodology, quality, biases, and evidence were included in order to evaluate as many studies as possible, given that the literature on IGPs is limited. The last criterion was that studies had to include an IGP in which at least one IG interaction took place, defined as an interaction between at least two people who are 30 years apart in age. However, there was no criteria for the type or structure of

the IG interaction. Studies were excluded if they were program evaluations, program reviews, follow-ups, empirical studies without results, or studies with familial IG relationships.

B. Search Strategy

After a guidance session with a research librarian at the Yale Medical School library, a systematic online literature search was conducted in March of 2017 in the following electronic databases: Ovid MEDLINE(R), Embase (1947 to 2017 March 24), PsychINFO (1967 to March Week 3 2017), and PsychEXTRA (1908 to March 20, 2017). The database provider used to search these databases was Ovid. This electronic search strategy used the following search string in Ovid to search all four databases simultaneously: ((intergenerational or multi generational or multigenerational or mixed age*) adj1 (program* or center*)).tw. The search was limited to humans and articles in the English language. This search string was developed in order to obtain accurate results and to include all generations.

C. Data Analysis

Data from each included study was extracted into an excel sheet (see Appendix B). There were fourteen variables for which data was extracted. In chronological order, these variables were: 1) Program 2) Country 3) Study Design 4) Study Length 5) Subjects 6) Methods and Procedure 7) Outcome Measures 8) Outcomes for Children 9) Outcomes for Adolescents 10) Outcomes for Young Adults 11) Outcomes for Middle Age Adults 12) Outcomes for Older Adults 13) Study quality 14) Strength of evidence.

Program was defined as the type of IGP in the study or the title of the IGP. Country was defined as the country or territory in which the study took place. Study design was defined as the protocol for conducting the study (Liberati et al., 2009). The main categories of study design were: 1) randomized controlled trial or non-randomized, quasi-experimental trial 2) control

group or lack thereof 3) qualitative or quantitative (Higgins & Green, 2011; Liberati et al., 2009; Moher et al., 2009). Study length was defined as the period of time between the start of the data collection until the end of the data collection, excluding the pre-trial preparation or the post-trial data analysis (Higgins & Green, 2011; Liberati et al., 2009). Subjects was defined as the people recruited to participate in the study. The categories for subjects included: total sample size, total sample size by generation, gender, mean age, education level, cognitive status, and other descriptive characteristics. Methods was defined as the process of participant identification and recruitment, group allocation, and data analysis (Higgins & Green, 2011; Liberati et al., 2009). Procedure was defined as the chronological steps taken to obtain the results. Outcome measures was defined as the measurements and tools used to assess the outcomes. Outcomes were defined as the physical and mental consequences for each generation after participating in the IGP.

The PRISMA and Cochrane guidelines suggest that systematic reviews evaluate study quality and evidence. They particularly stress the importance of measuring risk of bias in individual studies (Liberati et al., 2009; Higgins & Green, 2011). Consequently, this analysis assesses the risk of bias in individual studies, at both the study level and the outcome level.

Study quality was defined as the degree of excellence in the studies (Liberati et al., 2009). For measuring study quality, three domains were evaluated: 1) specification of exposure 2) specification of outcome and 3) risk of selection bias, performance bias, and detection bias (Liberati et al., 2009; Higgins & Green, 2011). Specification of exposure and outcome was assessed by noting if studies specified their exposure and outcome clearly or vaguely. The risk of selection bias was low if researchers used a random component in the sequence generation process and if they used an allocation concealment; risk of selection bias was high if researchers used a non-random sequence generation process and if subjects and researchers could predict

group assignments (Higgins & Green, 2011). Finally, risk of performance bias and detection bias was low if there was blinding for the subjects, researchers, and outcome assessors; risk of performance and detection bias was high if there was no blinding methods used and the outcome was likely to be influenced by the lack of blinding (Higgins & Green, 2011). However, these risks could only be assessed in randomized trials. Thus, for non-randomized trial, only risk of selection bias was assessed. In these non-randomized studies, risk of selection bias was low if studies provided the methods of subject recruitment and it was high if studies did not provide the methods of subject recruitment.

Once the three domains were evaluated, studies were categorized as high quality, medium quality, or low quality. Studies of high quality had clear specification of exposure and outcome and had a low risk of selection, performance, and detection biases. Studies of medium quality had a clear specification of exposure but a vague specification of outcome (or vice versa) and had a low risk of one of the three biases but a high risk for the other two biases. Studies of low quality had vague specification of exposure and outcome and had a high risk of selection bias, performance, and detection bias.

Strength of evidence was defined as the validity of results of the studies (Higgins & Green, 2011; Liberati et al., 2009; Moher et al., 2009). For assessing strength of evidence, the risk of reporting bias and generalizability was evaluated (Liberati et al., 2009; Higgins & Green, 2011; Moher et al., 2009). Risk of reporting bias was low if all the pre-specified outcomes were reported; risk of reporting bias was high if not all of the study's pre-specified outcomes were reported, if outcomes were reported using measurements that were not pre-specified, or if outcomes were not pre-specified (Higgins & Green, 2011). Generalizability, or the applicability of the results to the greater population, was measured by the sample size, subject characteristics,

and length of the study: the greater the sample size, the more variety of subjects, and the longer the length of the study, the more generalizable was the study (Liberati et al., 2009). Strong evidence meant the study had a low risk of reporting bias and had high generalizability. Moderate evidence meant the study had a low risk of reporting bias but high generalizability, or a high risk of reporting bias but low generalizability. Weak evidence meant the study had a high risk of reporting bias and low generalizability.

After the data from all the studies was extracted into the excel table, all qualitative descriptions and descriptive statistics were double checked. Any missing information was labeled as "N/A." The final step in the data analysis was to quantitatively synthesize the studies that were similar in design and statistical analysis.

Results

A. Study Selection

The initial search string resulted in eighty-nine articles. The search was imported into EndNote X7, where the references were searched for duplicates. There were ten pairs of duplicates found and consequently deleted. The titles of the remaining seventy-nine articles were screened and included on the basis that they had the terms "intergenerational" or "program," or some indication that they involved an IGP. From the title screening, thirty-six articles were excluded because the title revealed that the studies were reviews of IGPs, theoretical models, investigations on familial IG relationships, or irrelevant for this review. The abstracts of the remaining forty-three articles were screened and included on the basis that they met the inclusion criteria. From the abstract screening, twenty-four articles were excluded because they did not meet the inclusion criteria.

The remaining twenty-one articles were read in detail. Four articles were excluded because they did not meet the inclusion criteria (Devore & Aeschlimann 2016; Fried et al., 2013; Sakurai et al., 2015; Varma et al., 2015). Devore & Aeschlimann (2016) was excluded because it was a summary and review of an IGP. Fried et at. (2013) was excluded after an extensive analysis because it was a trial study that did not yet have the results. Sakurai et al. (2015) was excluded because it was a follow-up study and did not include an original experiment or results. Finally, Varma et al. (2015) was excluded because it was also a follow-study. In the end, a total of fifteen articles met the inclusion criteria and were included for further analysis (see Figure 1).

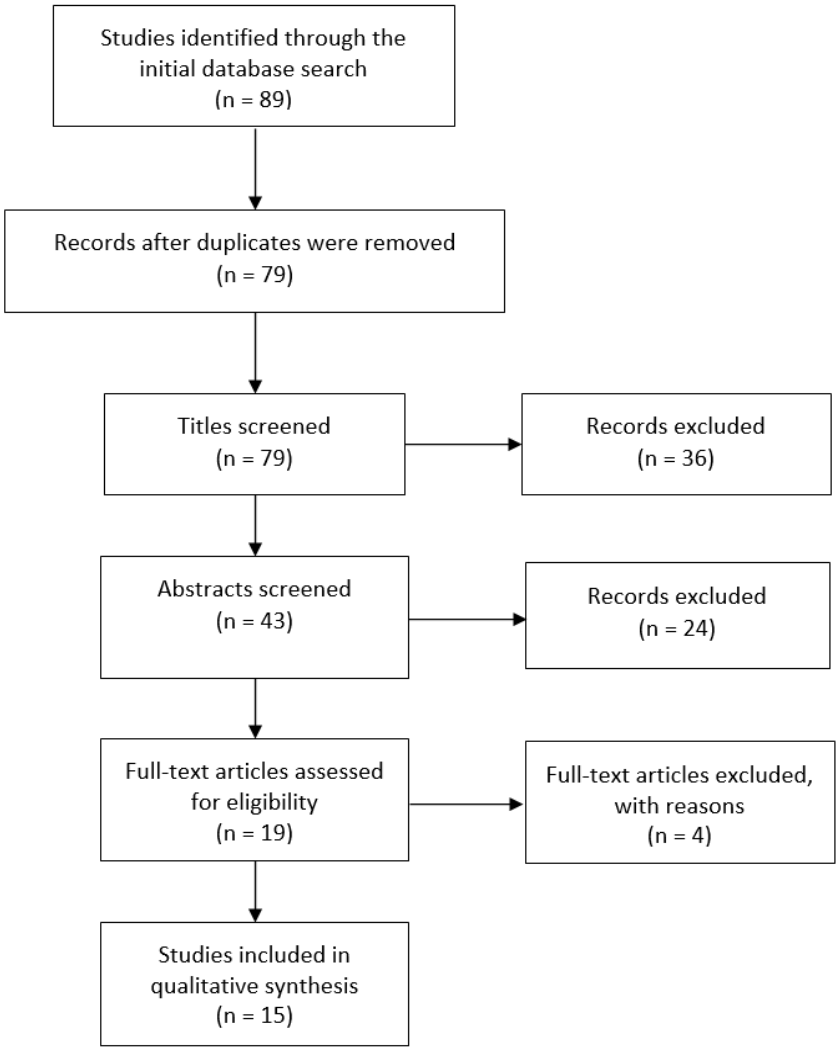

Figure 1: Selection Process for Reviewed Articles (Liberati et al., 2009)

B. Study Results

Forty-six point seven percent of studies were high quality (n=7). These studies had a clear specification of their exposure (the IGP) and outcomes; moreover, they had a low risk of selection, performance, and detection bias (Ehlman, Ligon, & Moriello, 2014; Knight et al., 2017; Lokon, Kinney, & Kunkel, 2012; Murayama et al., 2015; Powers, Gray, & Garver, 2013; Tabuchi & Miura, 2015; Yasunaga et al., 2016). Forty percent of studies were medium quality (n=6). These studies clearly specified their exposure but did not clearly specify their outcome (or vice versa) and had a high risk of two of the three biases (Burgman & Mulvaney, 2016; Isaki & Harmon, 2015; King & Lauder, 2016; Low et al., 2015; Morita, & Kobayashi, 2013; Skropeta, Colvin, & Sladen, 2014). Finally, 13.3% of studies were low quality (n=2). These studies had vague definitions of their exposure and outcome and had a high risk of selection, performance, and detection bias (Au et al., 2015; McKee & Heydon, 2015).

Moreover, 20% of studies had strong evidence (n=3). These studies had a low risk of reporting bias and had high generalizability (Burgman & Mulvaney, 2016; Lokon, Kinney, & Kunkel, 2012; Tabuchi & Miura, 2015). Most studies had moderate evidence (66%, n=10), with a low risk of reporting bias but high generalizability or a high risk of reporting bias but low generalizability (Au et al., 2015; Ehlman, Ligon, & Moriello, 2014; Isaki & Harmon, 2015; King & Lauder, 2016; Low et al., 2015; Morita, & Kobayashi, 2013; Murayama et al., 2015; Powers, Gray, & Garver, 2013; Skropeta, Colvin, & Sladen, 2014; Yasunaga et al., 2016). Finally, 13.3% of studies had weak evidence (n=2), with a high risk of reporting bias and low generalizability to the general population (Knight et al., 2017; McKee & Heydon, 2015).

With the study quality and strength of evidence presented, this section will proceed to present the results of the extracted variables in their chronological order.

a. Program

The type of IGP in the studies varied, though there were similar IGPs across studies. Thirty-three percent of studies (n=5) involved recreational activities and games (Burgman & Mulvaney, 2016; King & Lauder, 2016; Low et al., 2015; Morita & Kobayashi, 2013; Skropeta, Colvin, & Sladen, 2014), 26.7% (n=4) involved reading and literacy (Isaki & Harmon, 2015; McKee & Heydon, 2015; Murayama et al., 2015; Yasunaga et al., 2016), and 20% (n=3) involved oral interviews (Ehlman, Ligon, & Moriello, 2014; Knight et al., 2017; Tabuchi & Miura, 2015). The other IGPs in the studies involved mentoring (Au et al., 2015), art (Lokon et al., 2012), and fitness (Powers et al., 2013).

b. Country

Despite the small sample size, there was a great geographical diversity in the included studies. Forty percent of studies took place in the United States (n=6), 26.7% in Japan (n=4), 20% in Australia (n=3), 6.7% in Canada (n=1), and 6.7% in Hong Kong (n=1). This highlights that IGPs are found cross-culturally and that they are continuing to spread around the world.

c. Study Design

Of the fifteen studies, 80% were non-randomized quasi-experimental studies (n=12), 13.3% were randomized controlled trials (n=2), and 6.7% were case studies (n=1). Of the 12 non-randomized quasi-experimental studies, 58.3% had before-and-after designs (n=7), 16.7% had time sampling designs (n=2), and 8.3% had observational designs (n=1). Of the fifteen studies, 60% were quantitative (n=9), 26.7% were qualitative (n=4), and 13.3% had mixed-methods and were both quantitative and qualitative (n=2). However, though most of the studies were quantitative, the majority of studies did not have control groups in their experiment (73.3%, n=11). The studies that included control groups were the two randomized controlled trials (Low

et al., 2015; Tabuchi & Miura, 2015) and the two time sampling studies (Morita & Kobayashi, 2013; Murayama et al., 2015).

d. Study Length

There was also a great diversity of the time length of the studies. The length of the studies ranged from 60 hours (Au et al., 2015) to 3 years (Murayama et al., 2015; Yasunaga et al., 2016). Eighty percent of the studies were between 60 hours and 7 months (n=12) and 20% of the studies were between two to three years (n=3).

e. Subjects

Before the results for subjects can be presented, the generational terminology used in the studies and the classification of age ranges needs to be clarified. There was a wide variance of terminology for generations. Studies used several terms to define older adults. The most common term across all studies was "older adults" (Au et al., 2015; Burgman & Mulvaney, 2016; Ehlman et al., 2014; Isaki & Harmon, 2015; King & Lauder, 2016; Knight et al., 2017; Lokon et al., 2012; Low et al., 2015; Morita & Kobayashi, 2013; Powers et al., 2013; Tabuchi & Miura, 2015; Yasunaga et al., 2016). Other terms included "elderly" (Au et al., 2015; Isaki & Harmon, 2015; Morita & Kobayashi, 2013; Murayama et al., 2015; Tabuchi & Miura, 2015), "elders" (Ehlman et al., 2014; Lokon et al., 2012; Low et al., 2015; McKee & Heydon, 2015; Morita & Kobayashi, 2013; Powers et al., 2013), "older people" (Skropeta et al., 2014; Tabuchi & Miura, 2015), "senior citizens" (Au et al., 2015; Isaki & Harmon, 2015), "senior volunteers" (Murayama et al., 2015; Yasunaga et al., 2016), and "senior adults" (Powers et al., 2013). This reflects the overall lack of agreement or lack of knowledge in the IG literature for how to call people over the age of 65 years.

In addition to a lack of consistency in generational terminology, there was also a lack of consistency in the age classifications for generations. Au et al. (2015) included adults with a mean age of 60 (SD=6.41) and classified them as older adults, even though according to this systematic review, those adults aged 60-64 would be considered middle age adults. Similarly, Tabuchi and Miura (2015) included adults between the ages of 60-82 and classified them as older adults. Burgman and Mulvaney (2016) included adults between the ages of 50-102 and classified them as older adults. They also included youth between the ages of 5-14 and classified them as children. However, those adults between the ages of 50-64 would be considered middle age adults and those young people between the ages of 13-14 would be considered adolescents in this systematic review. Despite the age range incompatibility between those studies and this review, all of these adults were classified as older adults and the youth were classified as children because these studies measured the outcomes of these age groups as one generation. Therefore, it would be impossible to know which of the subjects in that age group were middle age adults and which were older adults. Similarly, it would be impossible to know which subjects were children and which were adolescents.

Moreover, 60% of the studies (n=9) did not include the ages of one or more of the participating generations. For example, King and Lauder (2016), Lokon et al. (2012), and McKee and Heydon (2015) stated that they included adults in residential institutions but did not specify their ages. For this review, they were classified as older adults. Similarly, McKee and Heydon (2015) included two teachers of elementary school children without specifying their ages. These teachers were assumed to be young adults in this review and classified as such. Similarly, Skropeta et al. (2014) included parents of children aged 0-4. Since it is likely these parents were younger since they had younger children, they were classified as young adults in this review.

Moreover, Yasunaga et al. (2014) included parents of children in 1st and 4th grade without specifying their ages. These parents were classified as middle age adults in this review, since they had older children.

Just as the ages of adults were often not specified in the studies, so were the ages for children, adolescents, and young adults not specified. These age groups were often classified by their school level and were described as students. For example, there were five studies that included young adults who were university students but did not include their ages (Au et al, 2015; Ehlman et al., 2014; King & Lauder, 2016; Lokon et al., 2012; Powers, et al., 2013). Since is very likely that these university students were between the ages of 18-39, they were classified as young adults in this review. Similarly, McKee and Heydon (2015) included 8th grade students and Yasunaga et al. (2016) included first year junior high school students without specifying their ages. Since junior high school students are usually between the ages of 13-14, they were classified as adolescents in this review. That studies defined adolescents as students further reflects the age stereotypes discussed previously in which children stereotyped as students. The limitations of the age assumption procedures used in this study are discussed later in this review.

With generational ambiguity established and addressed, the results for subjects can be presented. The fifteen included studies included a total of 2,024 subjects. Of these total subjects, 31.5% were older adults (n=638), 11.4% were middle age adults (n=230), 10.6% were young adults (n=214), 15.4% were adolescents (n=311), and 31.1% were children (n=631). Thus, the majority subjects were either older adults or children. While all fifteen studies included older adults as participants, 6.7% of studies included middle age adults (n=1), 60% included young adults (n=9), 20% included adolescents (n=3), and 53.3% included children as participants (n=8). Studies, however, did not measure the outcomes for all the subjects they included. Out of the

fifteen studies that included older adults, only 80% of studies (n=12) analyzed the outcomes for those older adults. The one study that included middle-age adults also analyzed the outcomes for middle age-adults. Out of the nine studies that included young adults, 55.6% (n=5) analyzed the outcomes for those young adults. Out of the three studies that included adolescents, 66.7% (n=2) analyzed outcomes for those adolescents. Similarly, out of the eight studies that included children, 62.5% (n=5) analyzed outcomes for children.

Moreover, 46.7% of the studies (n=7) only analyzed the outcomes for one generation and 46.7% (n=7) analyzed the outcomes for two generations. From the seven studies that measured the outcomes for one generation, 57.1% measured the outcomes for older adults (n=4) and 42.9% measured the outcomes for young adults (n=3). From the other seven studies that focused on the outcomes across two generations, 28.6% measured the outcomes older adults and young adults (n=2), 14.3% measured the outcomes for older adults and adolescents (n=1), and 57.1% measured the outcomes for older adults and children (n=4). Only one study (Yasunaga et al., 2016) measured the outcomes across four generations: children, adolescents, middle age adults, and older adults.

Only 66.7% of studies (n=10) reported the gender of their subjects. Out of these ten studies, 60% (n=6) reported the gender of only one generations and not the other(s). The total number of subjects whose gender was reported was 937, or 46.3% of the entire population across studies. Of these 937 subjects, 60.3% were female (n=565).

Similarly, only 60% of studies reported the mean age of their subjects (n=9). Of these nine studies, 66.7% (n=6) reported the mean age of only one generation and not the other(s). From these nine studies, 100% reported the mean age of seniors, 11.1% reported the mean age of young adults (n=1), 11.1% reported the mean age of adolescents (n=1), and 22.2% reported the

mean age of children (n=2). Four studies that did not include the mean age of their subjects, however, included their age range. From these four studies, 100% reported the age range of seniors and 50% reported the age range of children (n=2).

To summarize, there were a total of twelve studies that reported either the mean age or the range of ages of one of more of their participants. The mean age of middle age adults was not reported and only the age ranges of seniors and children were reported. In order to get an approximate mean age from the entire sample of subjects, the mean ages were combined with the range of ages. For those studies that only provided an age range, it was assumed that the center of the distribution would be the mean between the ranges. Thus, the mean was approximated by adding the oldest and youngest ages (given by the range) and dividing this result by two. This was done in order to get the best approximation of the missing means. With these new means, the following formula was used to calculate the weighted average of the means across studies:

$$p = \frac{\sum_{j=1}^{m} Pj \times Mj}{\sum^{m} Mj}$$

where *p* is the weighted average, *m* is the number of studies, *j* is each study, *M* is the number of subjects in each study, and *P* is the average of subjects in each study. Using this formula, the approximate mean age for all subjects was 56 years. Moreover, using this formula, the approximate mean age for seniors across all studies was 78.02 years; the approximate mean age for young adults across all studies was 22.5 years; the approximate mean age for adolescents across all studies was 14.56 years and the approximate mean age for children across all studies was 5.5 years.

Subject characteristics varied widely across studies. Sixty-six percent of studies (n=10) reported older adults' physical and mental capacities. Half of the studies included older adults who were independent in their activities of daily living and had no cognitive impairment

(Ehlman, Ligon & Moriello, 2014; Morita & Kobayashi, 2013; Murayama et al., 2015; Tabuchi & Miura, 2015; Yasunaga et al., 2016) and half included older adults with some kind of physical limitation, such as limited cognitive capacity, communication deficits, neurocognitive disorders, and mild to late staged/severe dementia (Burgman & Mulvaney, 2016; Isaki & Harmon, 2015; Lokon, Kinney & Kunkel, 2012; Low et al., 2015, Skropeta, Colvin & Sladen, 2014). The only characteristics reported of the middle age adults was that they were parents of children in first through fourth grade (Yasunaga et al., 2016).

Most of the young adults were university undergraduate students (Au et al., 2015; Ehlman et al., 2014; King & Lauder, 2016; Lokon et al., 2012; Powers et al., 2013), except for the two young adults in McKee and Heydon (2015) who were teachers and the young adults in Skropeta et al. (2014) who were parents of children ages 0-4. The adolescents in Knight et al. (2017) were 14-15 years old and attended a progressive school that focused on care of the environment and community service. The adolescents in Yasunaga et al. (2016) were first year junior high students, some who had participated in the IGP as children in elementary school and some who had not.

The children in four studies were between the ages of 0-5, in preschool or kindergarten (Low et al., 2015; McKee & Heydon, 2015; Morita & Kobayashi, 2013; Skropeta, Colvin, & Sladen, 2014). The children in the remaining studies were in 1^{st} - 6^{th} grade (Yasunaga et al., 2016), aged 8-11 (Isaki & Harmon, 2015), and aged 5-14 (Burgman & Mulvane, 2016). In general, children were healthy except for those in Burgman and Mulvane (2016), some of who had autism and some who had emotional and behavioral disorders. The children in Isaki and Harmon (2015) came from a Montessori school and were identified by their teachers as having language and reading problems.

f. Outcome Measures

It is important to analyze the pre-specified outcomes and the pre-specified instruments and tools study use to measure the outcomes because both directly determine the outcomes that are found.

There was a total of sixty-three pre-specified outcomes measured across all studies. When combining identical and similar outcomes, this total was halved, resulting in thirty-one categories of identical or similar pre-specified outcomes across studies. These pre-specified outcomes can be organized into three main categories: physical, mental, and social. Of the sixty-three pre-specified outcomes, 22.2% were physical (n=14), 49.2% were mental (n=31), and 28.6% were social (n=18). Of the forty pre-specified outcomes for older adults, 30% were physical (n=12), 37.5% were mental (n=15), and 32.5% were social (n=13). Of the two pre-specified outcomes for middle age adults, 50% were physical and 50% were mental. Of the nine pre-specified outcomes for young adults, 88.9% were mental (n=8) and 11.1% were social (n=1). Of the five pre-specified outcomes for adolescents, 60% were mental (n=3) and 40% were social (n=2). Finally, of the seven pre-specified outcomes for children, 71.4% were mental (n=5) and 28.6% were social (n=2). In short, there were more mental pre-specified outcomes measured across studies, followed by social outcomes, followed by physical outcomes. Following this general trend, the majority of pre-specified outcomes for all the generations (except for young adults) were mental and the second majority were social.

The two most common pre-specified outcomes for young people (children, adolescents, and young adults) were 1) perceptions of and attitudes toward older adults and 2) social awareness and service motivation. In contrast, the five most common pre-specified outcomes for older adults were 1) mental health (i.e., emotional well-being, depression, mood, self-esteem,

satisfaction with life, sense of coherence, loneliness) 2) health 3) physical functioning 4) cognitive status 5) generativity and social participation.

One of the most striking results is that there are many more pre-specified outcomes for older adults than for other generations. Moreover, studies only measured physical health for older and middle age adults, not for other generations. Additionally, young adults were the only generation for which search for meaning in life was measured. This outcomes perhaps represents the mental and social transformations in young adults' lives during college. Finally, children were the only age group for whom reading development was measured. This highlights the fact that children's academic development is seen as important and takes priority over their physical development. A common outcome for all generations, except middle age adults, was social contribution. For children, this was measured as social awareness, the first step for social contribution (Burgman & Mulvaney, 2016); for adolescents, this was measured as sense of participation in the community (Yasunaga et al., 2016); for young adults, this was measured as service motivation (Au et al., 2015); for older adults, this was measured as generativity, or (Ehlman, Ligon, & Moriello, 2014; Tabuchi & Miura, 2015).

The fifteen included studies used self-reports, observations, and scales to measure the pre-specified outcomes. Of the 63 total pre-specified outcomes, 55.6% were measured with scales (n=35), 15.9% were measured with self-reports (n=10), and 7.9% were measured with observations (n=5). Moreover, 7.9% were measured with observations and self-reports (n=5) and 12.7% were measured with both self-reports and scales (n=8).

The scales used to measure pre-specified outcomes varied greatly within the studies, even those that measured the same outcomes. However, a few studies used the same scales to measure pre-specified outcome. For example, Isaki and Harmon (2015) and Skropeta, Colvin, and Sladen

(2014) used the Mini-Mental State Examination (Folstein et al., 1975) to measure older adults' cognitive impairment. Similarly, Burgman and Mulvaney (2016) and Low et al. (2015) used the Children's Attitudes Toward the Elderly scale to measure children's attitudes toward older adults; however, Burgman and Mulvaney (2016) used the original scale (Janz et al. 1976) while Low et al. (2015) used an adaptation of the scale (Heyman et al. 2011). Moreover, three out of four studies that measured depression (Knight et al., 2017; Murayama et al. 2015; Skropeta, Colvin & Sladen, 2014) used the Geriatric Depression Scale (Sheikh & Yesavage, 1986); however, Murayama et al. 2015 used the shortened Japanese version of the scale (Niino, Imaizumi & Kawakimi, 1991). In conclusion, the included studies did not consistently use the same scales to measure pre-specified outcomes and those that did use the same scales used different variations of the same scales. This shows that outcomes across subjects were measured in different ways, thus limiting the comparability of outcomes across studies.

Due to much variability in study design, subject population, methods, and pre-specified outcome measures, a meta-analysis was not done. No two studies were comparable enough in study design, population, methods, outcome measures, and statistical tests to be quantitatively synthesized. There were two cases where a meta-analysis seemed possible, but different outcomes measurements made it impossible. One case was Ehlman, Ligon, & Moriello (2014) with Tabuchi & Miura (2015). Both of these studies measured generativity in older adults, used similar procedures, and used a main effects statistical test. However, Ehlman, Ligon, & Moriello (2014) used the Loyola Generativity Scale while Tabuchi & Miura (2015) used the shortened Generativity Scale they designed in a previous study (Tabuchi et al., 2012). The second case was Au et al. (2015) with Powers Gray, and Garver (2013). Both studies measured young adults' perceptions toward adults; however, Au et al. (2015) used the Identity Subscale in the IG-tension

Ageism Scale (North & Fiske, 2013) while Powers Gray, and Garver (2013) used a refined version of the Aging Semantic Differential (ASD) Scale (Polizzi, 2003). Moreover, Au et al. (2015) performed a *t*-test while Powers Gray, and Garver (2013) performed a chi-square test. Since both cases used different scales to measure their outcomes, it is not ideal to pool their quantitative results because it could lead to between-study heterogeneity and a biased meta-analysis (Puhan et al., 2006).

C. Outcomes

This section presents the outcomes for each generation who participated in IGPs. The outcomes are organized into physical, mental, academic, and social categories. They are presented in this order due to their interconnected relationship. Physical outcomes can affect mental outcomes, both of which can affect academic outcomes, and all of which affect social outcomes.

a. Outcomes for Children

There were five outcomes reported for children: 1) enjoyment 2) improved reading performance 3) improved perceptions of older adults and aging 4) emotional connections with older adults 5) improved social skills.

A. Mental Outcomes

Enjoyment. Burgman and Mulvaney (2016) was the only study that found that children self-reported feeling "good" or "happy" after working with the older adults in the IGP.

B. Academic Outcomes

Improved Reading Performance. Two studies reported improved reading performance (Isaki & Harmon, 2015; McKee & Heydon, 2015). Isaki and Harmon (2015) found that, after eight weeks of reading storybooks with a young adult and an older adult, children became more

confident readers and less hesitant when expected to read (Isaki & Harmon, 2015). Similarily, McKee and Heydon (2015) found that, after young children created multimodal texts and artifacts with older adults for four months, the IG relationships formed with the older adults supported their print literacy acquisition and were integral to the children's meaning-making experiences in reading.

C. Social Outcomes

Improved Perceptions of Older Adults and Aging. Two studies reported improved perceptions of older adults and of aging (Burgman & Mulvaney, 2016; Isaki & Harmon, 2015). Burgman and Mulvaney (2016) found that children with autism and behavioral challenges experienced shifts in attitudes toward older adults after participating in the recreational IGP. This was shown in that children were unfazed by the mental and physical challenges of older adults and developed understanding and respect for the older adults. Isaki and Harmon (2015) found significant improvements on children's view of aging ($t(11) = 3.150$, $p = .009$) after two months of a reading IGP.

Emotional Connections with Older Adults. Three studies reported emotional connections with older adults (Burgman & Mulvaney, 2016; Isaki & Harmon, 2015; Yasunaga et al., 2016). Burgman and Mulvaney (2016) found that children with autism and behavioral challenges had higher levels of empathy, caring and attention for the older adults. Moreover, they found that children were able to read older adults' emotion and displayed uncharacteristic affection towards the older adults. Isaki and Harmon (2015) found that children held the hands of older adults and hugged the older adults. Similarly, Yasunaga et al., (2016) found that, after children interacted frequently with older adults, they had a significantly more positive emotional image of older adults than children with low frequency of interactions with older adults.

Improved Social Skills. Two studies reported improved social skills (Burgman & Mulvaney, 2016; Isaki and Harmon, 2015). Burgman and Mulvaney (2016) found that children had higher levels of social awareness after the IGP. This was shown when they asked questions about older adults' limitations and when displayed uncharacteristic generosity toward older adults. Isaki and Harmon (2015) found that there was higher eye contact between children and older adults and, like Burgman and Mulvaney (2016), increased questions asked by the children to the older adults.

It should be noted that Low et al. (2015) had trouble administering four-year-old children the Children's Attitudes to the Elderly interview. They found that children answered questions based on their prior experience in the facility, struggled to understand the interview questions, and said yes too many times. Researchers decided that this data was not valid, and interviews were not repeated. This shows that administering this test with children younger than five poses challenges and that another scale for young children should be developed.

b. Outcomes for Adolescents

There were also five outcomes reported for adolescents: 1) lower depressive symptoms 2) satisfaction and personal gain 3) higher purpose in life 4) improved perceptions of older adults 5) and higher sense of participation in the community.

A. Mental Outcomes

Lower Depressive Symptoms. Knight et al. (2017) was the only study that found lower depressive symptoms in adolescents after participating in the IGP.

Satisfaction and Personal Gain. Knight et al. (2017) reported satisfaction and personal gain.

Higher Purpose in Life. Knight et al. (2017) found that adolescents experienced a higher purpose in life.

B. Social Outcomes

Improved Perceptions of Older Adults. Two studies reported improved perceptions of older adults in adolescents (Knight et al., 2017; Yasunaga et al., 2016). Knight et al. (2017) found that adolescents from a progressive school who heard and wrote the life story of older adults improved their attitudes towards aging, had fewer age stereotypes, and a recognized the heterogeneity among older adults. Similarily, Yasunaga et al. (2016) found that, two years after participating in an IGP, adolescents still maintained improved images of older adults.

Higher Sense of Participation in the Community. Yasunaga et al. (2016) was the only study that found that adolescents had a higher sense of participation in the local community two years after participating in the IGP, especially for reading picture books to younger children.

c. Outcomes for Young Adults

There were twice as many outcomes reported for young adults than for children and adolescents: 1) enjoyment 2) feeling rewarded 3) changes in search for meaning in life 4) enhanced academic learning 5) insights into careers in aging 6) improved perceptions of older adults 7) emotional connections with older adults 8) uneasiness with giving advice to older adults 9) improved skills for interacting with older adults 10) changes in service motivation.

A. Mental Outcomes

Enjoyment. Three studies reported enjoyment and satisfaction (King & Lauder, 2016; Lokon, Kinney & Kunkel, 2012; Skropeta, Colvin, & Sladen, 2014). King and Lauder (2016) found that university students enjoyed visits with older adults and found them worthwhile. Lokon, Kinney, and Kunkel (2012) found that students enjoyed working with older adults with

dementia. Skropeta, Colvin and Sladen (2014) found that mothers reported loving and enjoying the program because their young children were able to interact with older adults, especially if the mothers moved far from their own parents.

Feeling Rewarded. Lokon, Kinney, and Kunkel (2012) was the only study that found that young adults felt rewarded for giving older adults with dementia positive experiences.

Changes in Search for Meaning in Life. Au et al. (2015) was the only study that found that young adults experienced significant changes in search for meaning in life after they participated in the IGP ($t = -2.49$, $p < .05$).

B. Academic Outcomes

Enhanced Academic Learning. Lokon, Kinney, and Kunkel (2012) found that young adults felt enhanced academic learning after participating in the art IGP with older adults with dementia.

Insights into Careers in Aging. Lokon, Kinney and Kunkel (2012) reported that young adults developed new insights into careers in aging.

C. Social Outcomes

Improved Perceptions of Older Adults and Aging. Three studies reported improved perceptions of older adults (Au et al., 2015; Lokon, Kinney, & Kunkel, 2012; Powers, Gray, & Garver, 2013). Au et al. (2015) found that university students had significant reductions in ageism towards older adults after they participated in the IGP ($t=2.22$, $p<.05$). Similarly, after university students partnered with older adults with dementia in art projects, Lokon, Kinney, and Kunkel (2012) found that students developed more positive attitudes toward older adults and became less fearful of their own aging. After kinesiology undergraduate students conducted the

Senior Fitness Test on older adults, Powers, Gray and Garver (2013) found that their attitudes toward older adults were more positive.

Emotional Connection with Older Adults. Two studies reported the emotional connections young adults felt with older adults (King & Lauder, 2016; Lokon, Kinney, & Kunkel, 2012). King and Lauder (2016) found that students felt an emotional connection with the older adults. Lokon, Kinney and Kunkel (2012) found that young adults developed a sense of friendship and kinship with older adults with dementia.

Uneasiness with Giving Advice to Older Adults. King and Lauder (2016) was the only study that found that students did not like writing a synthesis of relevant research for older adults because they interpreted this as giving advice to the older adults, which most students were not comfortable doing.

Improved Skills of Interacting with Older Adults. Lokon, Kinney, and Kunkel (2012) found that young adults felt more knowledgeable, more comfortable, and more confident in their interactions with older adults with dementia. Specifically, these young adults learned how to cope with challenges of older adults' unpredictable behavior and learned how to balance between assisting the needs of older adults and providing them with opportunities to be independent.

Changes in Service Motivation. Au et al. (2015) found that young adults experienced significant changes in service motivation in life after they participated in the IGP ($t = -3.08$, $p < .05$).

d. Outcomes for Middle Age Adults

Only one study reported three outcomes for middle age adults (Yasunaga et al., 2016). These middle age adults did not directly participate in the IGPs, but experienced the indirect effects of their children attending the IGP. These middle age adults experienced a lower physical

and psychological burden of volunteering in school and increased their knowledge about the IGP and the older adults in the IGP.

e. Outcomes for Older Adults

There were seventeen outcomes reported for older adults: 1) improved physical health 2) no changes in self-perceived health 3) no changes in agitation 4) enjoyment 5) personal gain 6) purpose in life 7) no changes in quality of life 8) no changes in depression 9) no changes in mood 10) improved sense of coherence 11) no changes in communication skills 12) no changes in loneliness 13) improved perceptions of children and adolescents 14) development of IG relationships 15) higher social engagement 16) no changes in sense of community 17) increased generativity.

A. Physical Outcomes

Improved Physical Health. Two studies reported improved physical health in older adults (Skropeta, Colvin, & Sladen, 2014; Yasunaga et al., 2016). Skropeta, Colvin, and Sladen (2014) found that older adults experienced a significant decrease in energy and fatigue after participating in the IGP ($F(1, 31)=10.957$, $p=.002$). Yasunaga et al. (2016) found that older adults had improved self-rated health over time ($p<0.01$).

No Changes in Self-Perceived Health. Skropeta, Colvin, and Sladen (2014) was the only study that found that older adults' perceived their health to be stable over the six months.

No Changes in Agitation. Low et al. (2015) found no differences on agitation for older adults who participated in the IGP compared with those who did not.

B. Mental Outcomes

Enjoyment. Low et al. (2015) found that enjoyment was significantly higher for older adults ($p=0.001$).

Personal gain. Two studies reported personal gain and growth (Knight et al., 2017; Skropeta, Colvin, & Sladen, 2014). Knight et al. (2017) found that older adults experienced personal gain and satisfaction from the IGP. Skropeta, Colvin and Sladen (2014) similarly found that personal growth was a recurrent theme for older adults.

Improved Purpose in Life. Knight et al. (2017) was the only study that found improved purpose in life for older adults who participated in the IGP.

No Changes in Quality of Life. Low et al. (2015) found no differences on quality of life for older adults who participated in the IGP compared with those who did not.

No Change in Depression. Two studies reported no change in depression before and after the IGP (Skropeta, Colvin, & Sladen, 2014; Isaki and Harmon, 2015). Skropeta, Colvin, and Sladen (2014) found no significant difference between the pre-test and post-test results for the Geriatric Depression Scale. Similarly, Isaki and Harmon (2015) found no significant changes for depression and cognitive impairment in older adults before and after participating in the IGP ($p > .05$).

No Changes in Mood. Isaki and Harmon (2015) reported that older adults did not feel that their personal mood changed after the reading IGP.

Improved Sense of Coherence. Two studies reported improved sense of coherence (Murayama et al., 2015; Yasunaga et al., 2016). Murayama et al. (2015) found that sense of coherence, sense of manageability, and sense of comprehensibility (components of sense of coherence) significantly increased over time. Moreover, they found that participation in the IGP was positively associated with sense of manageability and sense of meaningfulness (β=.29, p=.017; β=.35, p=.005). Similarly, Yasunaga et al. (2016) found that sense of coherence and sense of meaningfulness significantly increased for older adults over time.

C. Social Outcomes

No Changes in Communication Skills. Isaki and Harmon (2015) reported that older adults did not feel that their communication skills changed.

No Changes in Loneliness. Au et al. (2015) found no significant changes in emotional loneliness (t=.23) or social loneliness (t=.43) for older adults before and after the IGP.

Improved perceptions of Children and Adolescents. Two studies reported improved perceptions of children and adolescents (Burgman & Mulvaney, 2016; Knight et al., 2017). Burgman and Mulvaney (2016) found that older adults developed understanding and respect for children with autism and behavioral disorders. Similarly, Knight et al. (2017) found that after the oral life history IGP with adolescents, older adults' age stereotypes for adolescents were broken and they recognized the heterogeneity among adolescents.

Development of IG relationships. There were four studies that reported the development of IG relationship (Au et al., 2015; Knight et al., 2017; McKee & Heydon, 2015; Skropeta, Colvin, & Sladen, 2014). Au et al. (2015) found improvement in older adults' self-efficacy in handling IG relationships with young adults (t=2.36, p <.05). Knight et al. (2017) found improved positive IG relationships between older adults and adolescents. McKee and Heydon (2015) found that IG relationships were formed between older adults and children during the digital literacies IGP. Moreover, they found that the IG relationships were integral to the older adults' meaning-making experiences. Skropeta, Colvin, and Sladen (2014) found that older adults developed IG relationships and friendships with children and young adults.

Higher Social Engagement. Five studies reported higher social engagement (Burgman & Mulvaney, 2016; Knight et al., 2017; Low et al., 2015; Morita and Kobayashi, 2013; Yasunaga et al. 2016). Burgman and Mulvaney (2016) found that older adults displayed higher social

engagement in the IGP. This was shown in behaviors such as: increased smiles, higher attention to activities, increased socialization after the children left, and increased participation in subsequent student visits. Knight et al. (2017) found improved social connectedness in older adults who participated in the IGP. Low et al. (2015) found that passive engagement was significantly higher and increased over time (p=0.024) and that self-engagement was significantly lower (p=0.013). Morita and Kobayashi (2013) found that constructive behavior and IG conversation with children and smiles were significantly higher in the social-oriented IGP than in an IGP based on only observing children. Finally, Yasunaga et al. (2016) found that there were significantly higher frequency of exchanges with children for older adults in the IGP than for older adults who did not participate in the IGP (p<.01).

No Changes in Sense of Community. Low et al. (2015) found no differences on quality of life, agitation, or sense of community for older adults who participated in the IGP compared with those who did not.

Increased Generativity. Two studies reported increased generativity (Ehlman, Ligon, & Moriello, 2014; Tabuchi & Miura, 2015). Ehlman, Ligon, and Moriello (2014) found a significant increase in scores on the Loyola Generativity Scale (LGS) $F(1, 124)=4.61$, p=0.034). Interestingly, they also found that older adults who were aged 85 and over had an average 2.27-point gain on the LGS, three times that of those younger than 85 years. Similarly, Tabuchi and Miura (2015) found older adults showed generativity, but only when a young adult reacted to their narratives empathically ($F(1, 28)=17.50$, p<.01).

Discussion

Since Galbraith et al. (2015), there have been at least fifteen original empirical studies on IGPs over the last five years. This shows that, while the literature is still small, it continues to

grow. Though only a few studies were included, there was much variability across studies in location, population, study design, methods, procedure, and outcome measures. Surprisingly, though there was much within-study variability, there were many outcomes that were repeated across studies, both within the same generation and across several generations.

There were a few outcomes that were shared among at least two different generations. For example, both children and young adults experienced academic advantages and emotional connections with older adults after participating in an IGP. Moreover, children, young adults and older adults all enjoyed participating in an IGP and spending time with a younger or older generation. Adolescents, young adults, and older adults experienced feelings of satisfaction, reward, and purpose in life after spending time with another generation. Additionally, children, adolescents, and young adults—and possibly even middle age adults—improved their perceptions of older adults after participating in an IGP. Likewise, older adults improved their perceptions of children and adolescents after participating in an IGP. Furthermore, children, young adults, and older adults improved their social skills and social engagement after participating in an IGP. Finally, adolescents, young adults, and older adults shared their desire to contribute and give back to their community.

There were also outcomes that only one generation experienced. For instance, only adolescents experienced lower depressive symptoms, only young adults felt uneasy with giving advice to older adults, only middle age adults experienced a lower physical and psychological burden of volunteering in schools, and only older adults experienced improved physical health and sense of coherence.

Some outcomes suggest that IGPs are not always beneficial for all older adults. Older adults from several studies experienced some stable and negative outcomes, including no

changes in self-perceived health, agitation, quality of life, depression, mood, communication skills, loneliness, and sense of community. However, most of these stable and negative outcomes were not discussed in the studies. Though these outcomes seem to contradict the general pattern of outcomes for older adults, they are important to keep in mind and studies and IGPs should find ways to improve these outcomes.

Both the shared and unique outcomes show that IGPs continue to positively impact the mental and social well-being of several generations. They not only impact the personal life of individuals but they are able to produce a desire to contribute to society, which is an important benefit of IGPs. Moreover, the shared outcomes show that IGPs do not just bring people together superficially, but that IGPs create environments that allow for genuine and intimate relationships between people who are in different life stages, relationships which result in many shared, meaningful experiences across generations.

Conclusions

We can conclude from the results that, as a whole, IGPs positively impact the physical, mental, and social life of children, adolescents, young adults, middle age adults, and older adults.

There were several limitations across studies. The main limitation was that the fifteen studies did not define generations and generational age ranges. This is one of the first limitation that the IG literature should address within the next five years in order to create consistency and clarity in the IG literature. The next important limitation is that many studies used words like "elderly" and "senior citizens," even though it has been found that older adults resent these terms. Consistent labels, such as older adults, should be used to refer to people over the age of 65, especially if the IG literature aims to end age stereotypes and ageism. Another major

limitation is that, since almost all studies only reported positive outcomes for their subjects, many studies most likely did not report the neutral, stable, or negative outcomes.

This systematic review suggests several direction for future research based on the results of this literature search. Future studies should define generations, use consistent terminology and age ranges for generations, include the total population of subjects, include the gender and mean age of their subjects, include more male participants, include more adolescents and middle age adults, include children and adolescents who are not in school, use a randomized controlled designs with randomization and blinding, use consistent outcome measures, and present the neutral and negative outcomes found in their studies. As this body of research continues to grow, a meta-analysis of IGPs would be helpful for an advanced analysis and substantiation of the evidence found in this systematic review.

With rapidly incoming technological changes and looming socio-cultural transformations, we have an ever increasing and urgent need for stronger communication, intimacy, and understanding between generations. IGPs are starting to make human relationships intergenerational once again, as they were for so long in our past. We must ask ourselves, however, are intentional IGPs the best way to step into the future, or should we try to step away from structure and return to organic interaction, through our own conscious effort?

Acknowledgements

The essence of this thesis is human relationships. Without several relationships in my own life, this thesis would not have been possible. I would like to express my deepest gratitude to my two advisors, Dr. Claudia Valeggia and Dr. Melanie Martin, from the Yale Department of Anthropology. Their kindness, guidance, life-experience, and encouragement throughout this

process really made this thesis possible. I am particularly gratefully to Janis Glover from the Yale University Medical School Library for showing me the guidelines of a systematic review and helping me find the databases and search string that gave this thesis its strong foundation. I am also very grateful to Dr. Mark Sheskin for his patience, sense of humor, and devotion to the seniors and juniors in Cognitive Science. I would like to deeply thank my parents for their love and support throughout my life and for this thesis. Above all, I would like to thank Rodrigo for his love, kindness, and help and for giving me endless inspiration and strength to finish this thesis.

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APPENDIX A
A History of IGPs

Year	Program	Description
1963	Foster Grandparents	A Community Action Project introduced by the Office of Economic Opportunity
1963	Adopt a Grandparent	Developed by the P.K. Yonge Laboratory School in the University of Florida; involved class visits by children to a convalescent home.
1967-69	Serve and Enrich Retirement by Volunteer Experience (SERVE)	Established in Staten Island's Community Service Society; older adults worked with children and young adults at a residential home for the mentally retarded; grew from a project of 23 older adults to 1,500 older adult volunteers
1969	Retired Senior Volunteer Program (RSVP)	Emerged from SERVE; a national program funded by the Older Americans Act of 1965. Today, there are over 750 RSVP programs with over 400,000 older adult volunteers.
1969	National Center for Service-Learning	A student volunteer program that offers resources and assistance for high school and college students to help older adults.
1970	The Grey Panthers	An active collaboration between younger and older adults to address ageism by developing social policy issues.
1972	The Beth Johnson Foundation	A national charity in the United Kingdom dedicated to making the UK age-friendly.
1975	US Dept. of Education & US Administration on Aging	An agreement signed between these two agencies; provided guidelines for older adults to volunteer in schools in fourteen states.
1976	Teaching-Learning Communities	An IGP that brought older adult to public schools in Ann Arbor, Michigan.
1976	California Dept. of Education	The first aging program was introduced into tbe curriculum of California's public schools for grades K-12.
1976-79	Movements in the State of Florida	Legislation was passed for a school volunteer network; older adults joined the classroom instruction team in early childhood classrooms.
1978	The Edna McConnell Clark Foundation	An award of $10,000,000 to six school systems to develop IGPs that would involve older adults and help children's learning for 3 years.
1978	Messiah Village	A retirement home with an IGP in Mechanicsburg, PA.
1978	Generations Together	The first university IGP in the Unversity of Pittsburgh.
1979	IG Child Care Centers	The California IG Child Care Act of 1979 created 2 IG child care centers.
1980s	Movements in Europe	Publication of manuals to create sustainable long-term IGPs; the appearance of the first "IG specialists."
1980s	US Universities	Started introducing IG learning in their curriculum.
1980	National Council on the Aging (NCoA)	A national effort that fostered an IGP network in the US.
1981	Close Harmony	First IG film about creating an IG choir.

1981	The White House Conference on Aging	Two IG position papers were submitted to Congress.
1982	IG Clearinghouse Newsletter	A newsletter for IGPs and IG issues.
1982	State Departments of Aging and Education	A memoranda signed between the Departments of Education and Aging in California, Florida, and Pennsylvania to provide IG curricula and IG experiences in schools.
1982	The World Assembly on Aging in Vienna	The first international meeting on IG relationships expressing concern for alienation in society and that worked to enhance IG solidarity.
1985	The 99th Congress	The IG Education Volunteer Network Act of 1985; established a senior citizens volunteer tutorial network in public schools.
1985-86	IGP Guide Manuals	Several guides were published for developing and implementing IGPs in various settings.
1986	Generations United	Several national agencies joined to advocate for public policy and promote IG relationships and IGPs; became an organization in 1997.
1984-1990	IGP Expansion	New IGPs developed for at-risk children and families, teenage pregnancy, homeless families, abused and abandoned children, children with special needs, and older adults in day care centers.
1993	Experience Corps (EC)	A volunteer-based tutoring program that engaged adults age 50 and above as literacy tutors for struggling students in public schools; today, EC has almost 2,000 trained volunteers in 21 cities serving over 30,000 students each year in high-need elementary schools.
1999	The International Consortium for IGPs	One of the first efforts to coordinate the isolated efforts from all the IGPs around the world.
2003	Journal of IG Relationships	The first academic journal of IG relationships, with its first issue published in 2003.
2006	Research of Productivity by IG Sympathy (REPRINTS)	An IGP started in Japan which educates and engages older adult volunteers in picture book reading to young school-aged children in schools.
1990-Present	Spread of International IGPs	Hundreds of IGPs have started worldwide; from available data, they are mostly located in the USA and Europe.

APPENDIX B
Summary of Included Studies for Review

(Shown on Next Page)

Study	Program	Country	Study Design	Length	Subjects	Methods and Procedure	Outcome Measures
Au et al. (2015)	IG Mentoring Program	Hong Kong	Non-randomized, quasi-experimental, before-and-after design (no control group; quantitative)	66 & 60 hours	N= 46 **Older Adults** (n=17; 12 female; mean age 60, SD 6.41; mean number of years of education 4.35, SD .70) from the Institute of Active Aging **Young Adults** (n=29; 21 female) sophomore university students	**Methods**: Surveys were collected from young adults and older adults in the 1st and last session **Procedure**: 1. Older adults attended 30 hrs of lectures on proactive aging and had 12 hrs of practicum with a younger generation 2. Students attending a service learning class had a requirement of 20 hrs of lectures and 40 hrs of community service where they a. provided support to older adults, chronically ill patients, and their carers and b. partnered with an older adults to provide support and create a task to enhance their well-being for 8 sessions of 16 hrs 3. Twelve students completed the pre-service survey and 29 completed the post-service survey	1**. Older adults' subjective ratings of loneliness**- the Chinese version of the Jong Gierverld Loneliness Scale (Wu, Tang, & Yan, 2005) 2. **Older adults' subjective ratings of self-efficacy in handling IG relationships**- "How confident are you in handling IG relationships?"3. **Young adults' search for meaning in life**- Meaning in Life Questionnaire (MLQ; Steger et al. 2006) 4. **Young adults' service motivation**- An adapted scale (Duffy & Raque-Bogdan, 2010) 5. **Young adults' ageism towards older adults**- The identity subscale in the intergenerational-tension ageism scale (North & Fiske, 2013)
Burgman & Mulvaney (2016)	IGP for Challenged Children and Older Adults	US	Non-randomized, quasi-experimental, observational design (no control group; qualitative)	2 years	N=57 **Older Adults** (n=12; aged 50-102) with limited cognitive functioning and inhibited communication, mobility, and activities of daily living **Children** (n=45; ages 5-14) with a diagnosis of autism and/or emotional/behavioral disorders	**Methods**: 1. Schools selected students with behavioral control 2. Older adults were selected if they needed assistance with tasks of daily living 3. Only one session at the nursing home was planned. **Procedure**: 1. After a preparatory activity, there were 4 IG sessions (3 at the nursing facility, 1 at the school) 2. Students and older adults were paired in a recreation space and worked together on activities like constructing holiday craft kits, playing tabletop volleyball, or performing light gardening tasks 3. Music was part of every interaction and students and older adults engaged in sing-alongs 4. In year two, older adults became guests at the school for an annual spring performance	1. **Older adults' social participation**- Nursing home staff and researchers' observations, discussions with participants, and reports from program staff 2. **Changes in children's social awareness**- chaperone reports 3. **Changed in children's attitudes toward older adults**- the CATE (Children's Attitudes Toward the Elderly) questionnaire (Janz et al. 1976) (it was discontinued due to difficulties in administration and poorly matched with the kind of children in this study)
Ehlman, Ligon & Moriello (2014)	IG Oral History Project	US	Non-randomized, quasi-experimental, before-and-after design (no control group; quantitative)	1 month	N=123 **Older Adults** (n=123; 75% female; aged ≥ 65; mean age 78.4 years, SD 5.8) free of cognitive impairment and mental illness **Young Adults** (n=N/A) university students enrolled in gerontology	**Methods**: 1. Students chose older adults ≥ 65 with no cognitive impairment through personal contacts 2. Surveys were given to older adults before the interview and within 1 week of the last interview **Procedure**: 1. Researchers guided students for 2 hours on oral history and on conducting semi-structured interviews with older adults about (1) childhood and youth, (2) young and middle adulthood and (3) late life 2. Students interviewed older adults in 2-3 one-hour sessions over a 2-3 week period 3. Students transcribed the interviews or wrote biographies of the older adults' lives	1. **Older adults' generativity** - The Loyola Generativity Scale (LGS) (McAdams & de St. Aubin, 1992)
Isaki & Harmon (2015)	Children and Adults Reading Interactively (CARI) IGP	US	Non-randomized, quasi-experimental, before-and-after design (no control group; quantitative)	2 months	N=18 **Older Adults** (n=6; 4 females; aged 72–88 years; mean age 81) with cognitive-communication deficits, mild dementia, & mild neurocognitive disorder **Children** (n=12; 5 females; aged 8-11; mean age 9) with language and reading concerns	**Methods**: 1. The director of assisted living chose older adults who had infrequent visitors, little chance for interaction, and diagnosis of mild neurocognitive disorder 2. Teachers chose students with reading concerns 3. Subjects were assigned to 1 of 3 groups with 1 older adult, 2 children, and 1 grad student clinician 4. Older adults completed the surveys before and after the sessions **Procedure**: 1. Groups met for 45 min for 8 weeks 2. The grad student read a storybook (below grade level) to a child, who read the same story to the others. The 2nd child retold the story. The older adult gave guidance, comments, or asked questions to the children 3. A new book was read every week for 4 weeks and re-read in the same order the second 4 weeks	1. **Older adults' severity of cognitive impairment**- The Blessed Dementia Scale (BDS; Blessed, Tomlinson, & Roth, 1968) & The Mini-Mental State Examination (MMSE; Folstein et al., 1975) 2. **Older adults' changes in mood**- A 10-item adult mood and communication questionnaire developed by the researchers with a 5-point Likert scale 3. **Children's perceptions of older adults**- Selected questions from Section III of the Children's Views on Aging (CVoA; Newman & Marks, 1997) with a 5-point Likert scare & The Mini-Mental State Exam, an adult mood and communication questionnaire and a questionnaire

Outcomes for Children	Outcomes for Adolescents	Outcomes for Young Adults	Outcomes for Middle Age Adults	Outcomes for Older Adults	Study Quality	Strength of Evidence
N/A	N/A	1. Significant change in service motivation (t = −3.08, p < .05) 2. Significant change in search for meaning in life (t= −2.49, p < .05) 3. Significant change in the identity/ageism subscale (t = 2.22, p < .05)		1. Significant change in self-efficacy in handling IG relationships (t = 2.36, p < .05) 2. No significant changes in emotional loneliness (t= .23) or social loneliness (t= .43)	Low	Moderate
1. Higher levels of social awareness (reported by chaperones): higher levels of empathy, caring and attention to others and reading of emotions 2. Shifts in children's attitudes toward older adults: a. Emotional connections with the older adults b. welcoming displays of affection c. being unfazed by the mental and physical challenges of older adults d. uncharacteristic generosity e. questions concerning older adults' limitations e. self-reports of feeling "good" or "happy" after working with the older adults f. development of understanding and respect for the older adults 3. CATE results showed no change in attitudes for the students and no differences between the students who interacted with the residents and those who did not	N/A	N/A	N/A	1. More pleasant and engaged 2. More smiles 3. Higher attention to activities 4. Increased socialization and communication for an extended period after the children departed 5. Increased participation for subsequent student visits 6. A desire to continue 7. Development of understanding and respect for the children	Medium	Strong
N/A	N/A	N/A	N/A	1. Significant main effect across time, F(1, 124) =4.61, p = 0.034, showing a significant increase in scores on the LGS from pretest to posttest in the whole sample 2. When LGS scores were analyzed by gender and age (<85 versus ≥85), interactions were not statistically significant across time, F(1, 124) = 0.37, p = 0.54 and F(1, 124)=0.68, p =0.41, respectively 3. Those in ≥85 (N=21) had an average 2.27-point gain on the LGS, three times that of those <85 (average 0.75-point gain)	High	Moderate
1. Significant findings for the pre and post CVoA scores, $t(11) = 3.150$, $p = .009$ 2. Observations showed that there was a. increased eye contact between the older adults and children and b. increased questions asked by the children to the older adults over time 3. Children held the hands of the older adults during conversations 4. There were hugs between the participants at the end of various sessions 5. Feedback from the teacher several months after the program showed that children in the intervention group became more confident readers 6. Parents reported positive feelings about their children's experience with the program and that their children were less hesitant when expected to read	N/A	N/A	N/A	1. No significant findings were obtained for the MMSE scores or the adult mood and communication questionnaire scores pre and post sessions ($p > .05$) 2. There was no change in cognitive status during older adults' participation in the study 3. Older adults did not feel that their personal mood and communication skills changed because of the program	Medium	Moderate

Study	Program	Country	Study Design	Length	Subjects	Methods and Procedure	Outcome Measures
King & Lauder (2016)	IG service-learning program	US	Non-randomized, quasi-experimental design (no control group; qualitative)	3 semesters	N=98 **Older Adults** (n≈49, varied from 15-30 each semester) from the Active Living Center (ALC) **Young Adults** (n= 49) who were upper classmen undergraduate students (3 classes with 17, 16, 20 students) enrolled in the course: *Adult Years and the Aging Process*	**Methods**: N/A (students in the course and older adults from the ALC participated) **Procedure**: 1. Each class visited the Active Living Center for 1 hour, 6-7 times/semester 2. Early visits included icebreaker games like "Two Truths and a Lie" 3. Students partnered with older adults in projects like making Valentine cards and Easter baskets 4. Students wrote their older adult a 1,000-word "Keepsake Letter" of what they learned from them and a synthesis of relevant research from the course that would be helpful for the older adults 5. Students evaluated the visits and wrote a blog post	1. **Young Adults' enjoyment 2. Amount learned 3. Worthwhileness-** 1. Self-reports of how much young adults enjoyed the experience, how much they learned from it, and how worthwhile it was using a 1-5 scale and 2. Analysis of student evaluations and journals
Knight et al. (2017)	My Life Story	Australia	Mixed-method: 1. Non-randomized, quasi-experimental, before-and-after design (no control group; quantitative & qualitative)	2 months	N=36 **Older Adults** (n=12; aged 66-96; mean age 88.5, SD 7.87; mean age 90.58 years without the 66 year old) from a local aged low-care residential facility **Adolescents** (n=24; aged 14-15, mean age 14.56, SD 0.50) from a school that focused on care of the environment, community service & the development of self and relationships	**Methods**: 1. The principal and English coordinator chose students with interest in participating (this was one option for their community project requirement) 2. The supervisor of the aged-care facility chose the older adults who all agreed to participate 3. Older adults took the tests before and after the program **Procedure**: 1. Adolescents partnered with an older adult and interviewed them to write their life story 2. Six randomly selected older adults and students were interviewed 3. The interviews were semi-structured, recursive, ranged from 20-60 min, and were audio-taped	1. **Older adults' environmental mastery**- A 27-item Ryff Multidimensional Measure of Psychological Welbeing (Ryff &Keyes, 1995) 2. **Older adults' and adolescents' satisfaction with life**- The Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985) 3. **Depression**- Geriatric Depression Scale (GDS; Sheikh & Yesavage, 1986) 4. **Older adults' and Adolescents' social connectedness**- The 15-item version of the Social Connectedness Scale-Revised (Lee, Dean, &Jung, 2008) 5. **Adolescents' attitudes toward aging**- The Age Attitude Scale (Braithwaite, Lynd-Stevenson, & Pigram, 1993) with a 6 pt Likert scale 6. **Adolescents moods**- Short Mood and Feelings Questionnaire (SMFQ; Angold et al.,1995)
Lokon, Kinney & Kunkel (2012)	Opening Minds Through Art (OMA) IG art Program for People with Dementia	US	Non-randomized, quasi-experimental design (no control group; qualitative)	3 months	N=71 **Older Adults** (n≈12) with moderate to late staged dementia in OMA, which was implemented at 2 continuing care retirement communities **Young Adults** (n=59) who were undergraduate students in a Midwest university participating in OMA	**Methods**: 1. Researchers recruited students in OMA 2. One-third of the students received 1 credit hour of independent study and two-thirds were volunteers who received no credit **Procedure**: 1. Students partnered with an older adult and spent 90 mins working with them in art projects for 10-12 weeks, culminating in a gallery exhibition 2. Students receiving credit wrote 6 journals and volunteers wrote 3 journals 3. 300 journals written by 59 students in 2009-2010 were read and analyzed	**1. Young Adults' views of OMA**- student journal responses, analyzed with 1. NVivo 8 (QSR International, 2008) & 2. Grounded theory and the constant-comparison method (Denzin & Lincoln, 2000; Lincoln & Guba, 1985)
Low et al. (2015)	Grandfriends	Australia	Randomized controlled trial (with control group; quantitative)	14 weeks	N=61 **Older Adults** (n=40; 80% female; aged >65; mean age 91) from an aged care unit in a residential aged-care facility with a collocated preschool. Not severely depressed or physically aggressive. 80% had cognitive impairment and moderate dementia **Children** (n=21; 10 female; aged 4) who visited older adults at other facilities but not the aged-care unit	**Methods**: 1. Staff invited all eligible older adults in the aged-care facility 2. Day care staff invited all children in the preschool, with parental consent 3. Half the residents were allocated to the Grand-friends group and half to usual care, done by a statistician with de-identified resident data using the MINIM program, balancing age and gender. Researchers and staff were not blind to group allocation 4. Data and scales were administered to older adults before and after the 12th week **Procedure**: 1. An older adult and a child were paired and had discussions, crafts, and games for 45 mins/week for 12 weeks 2. Educators from the day care center and nursing home staff facilitated the activities	1. **Older adults' agitated behavior**- The Cohen-Mansfield Agitation Inventory (CMAI; Cohen-Mansfield, 2005) 2. **Older adults' psychological sense of community**- The Brief Sense of Community Scale (BSCS; Peterson, Speer, & McMillan, 2008) 3. **Older adults' quality of Life**- The Long Term Care Quality of Life Scale (LTC-QoL; McDonald, 2013) 4. **Children's attitudes toward older adults**- An adaptation of the Children's Attitudes to the Elderly Interview (CATI; Heyman et al., 2011; Middlecamp & Gross, 2002)

Outcomes for Children	Outcomes for Adolescents	Outcomes for Young Adults	Outcomes for Middle Age Adults	Outcomes for Older Adults	Study Quality	Strength of Evidence
N/A	N/A	1. Students enjoyed the visits and found them worthwhile (M = 4.87 / 5 points) 2. Scores were lower for the Keepsake Letters (M Enjoyed=4.24; M Learned=4.28; M Worthwhile=4.61) 3. 79% of the comments for the assignment were positive 4. Most frequently mentioned was the emotional connection students felt with their older adults (83% positive comments of gratitude) 5. Negative comments included the difficulty of writing with less structure and the synthesis of research (80%), which students interpreted as giving advice	N/A	N/A	Medium	Moderate
N/A	1. Paired t-tests of pre and post surveys showed seemingly improved scores on depressive symptoms, purpose in life, and attitude to aging 2. Four mutual major themes emerged in both adolescents and older adults: 1. Breaking down the stereotype 2. Recognition of heterogeneity 3. Satisfaction from making the effort 4. Personal gain through making a contribution	N/A	N/A	1. Paired t-tests of pre and post surveys showed seemingly improved positive relationships, purpose in life, and social connectedness 2. Four mutual major themes emerged in both adolescents and older adults: 1. Breaking down the stereotype 2. Recognition of heterogeneity 3. Satisfaction from making the effort 4. Personal gain through making a contribution	High	Weak
N/A	N/A	1. Students enjoyed working with older adults with dementia and developed more positive attitudes 2. Students: 1. Felt more knowledgeable, more comfortable, and more confident in their interactions with older adults with dementia 2. Felt rewarded for giving older adults with dementia positive experiences 3. Developed a sense of friendship and kinship with their older adults 4. Became less fearful of their own aging 5. Reported enhanced academic learning and insights into careers in aging 6. Learned to cope with challenges of unpredictable behavior by older adults 7. Learned to balance between assisting the needs of older adults and providing them with opportunities to be independent	N/A	N/A	High	Strong
In the baseline assessments, children answered questions based on prior experience in the facility, struggled to understand the interview questions, and said yes too many times. Researchers decided that this data was not valid, and interviews were not repeated at 13 weeks.	N/A	N/A	N/A	Compared between the Grandfriends session and usual activities: 1. Passive engagement was significantly higher for Grandfriends and increased over time (p=0.024) 2. Self-engagement was significantly lower during the Grandfriends sessions (p=0.013) 3. Enjoyment was significantly higher during the Grandfriends sessions (p=0.001) 4. No differences on quality of life, agitation, or sense of community	Medium	Moderate

Study	Program	Country	Study Design	Length	Subjects	Methods and Procedure	Outcome Measures
McKee & Heydon (2015)	IG Digital Literacies Project	Canada	Case study (no control group; qualitative)	4 months	N=28 **Older Adults** (n=7) from the community in a Rest Home **Young adults** (n=2) one kindergarten teacher, one special education teacher **Adolescents** (n=6) who were 8th graders and assisted the class during one IG session **Children** (n=13; aged 3-5) kindergarten students	**Methods**: 1. Two teachers volunteered and designed the curriculum 2. Researchers provided lesson plans with IG multimodal curricula 3. The Rest Home recruited older adults **Procedure**: 1. Researchers and teachers developed the curriculum and observational data 2. The teacher taught the co-constructed lessons in the IG sessions and in the classes 3. Researchers provided resources and shared the observations 4. Older adults and children created texts and multimodal artifacts through singing, art, and digital media 5. Data was collected 6 times over 4 months in 2 IG classrooms	1. **Impact of multimodal curriculum on IG relationships** 2. **Children's print literacy acquisition**- 1. Literacy events were the units of analysis ("any occasion in which a piece of writing is integral to the nature of participants' interactions and their interpretive processes," Heath, 1982, p. 93). 2. Researchers collected qualitative data such as: photos of artifacts, field texts, transcriptions from audio and video taped interactions, informal conversations with participants about artifacts, field notes describing interactions in classes, and semi-structured interviews with all participants
Morita, & Kobayashi (2013)	Performance Based and Social Oriented IGPs	Japan	Non-randomized, quasi experimental, time sampling design (with control group; quantitative)	3 months	N= 45 **Older Adults** (n=25; 20 females; aged 71-101; mean age 85, SD 7.5) who were independent or mostly independent, 8 (32.0%) lived alone and 14 did not have cognitive impairment (56.0%) **Children** (n=20; aged 5-6) in preschool	**Methods**: 1. The 25 older adults were divided into 2 groups: a performance-based IGP (Dec. 2011, n=6) and a social oriented IGP (Jan. 2012, n=8; Feb. 2012, n=6) 2. Older adults gave informed consent and preschool children had parental consent **Procedure**: 1. In the first IGP, children answered questions about their Christmas while older adults listened 2. In the second IGP, children and older adults played Karuta (Japanese card game), Cat's cradle, and Fuku-warai (like pin the tail on the donkey) 3. In the third IGP, one older adult and 3-4 children played action songs (hand play) 4. Programs were recorded with 2 cameras 5. Researchers chose a 5 minute time to analyze in the middle of the video	1. **Older adults' changes in visual attention, facial expression, and IG conversation**- 1. Observation form developed from the Japanese version of the IG Exchanges Attitude Scale (IEAS; Murayama et al., 2011) 2. The 5 minute video observation 3. Pearson's $\chi 2$ Test and Mann-Whitney u test 2. **Older adults' engagement/behavior**- Myers Research Institute Engagement Scale (MRI-ES; Judge et al.) and based on the 5 minute video observation
Murayama et al. (2015)	Research of Productivity by IG Sympathy (REPRINTS)	Japan	Non-randomized, quasi experimental, time sampling design (with control group; quantitative)	3 years	N=80 **Older Adults** (n=80; 83.8% female; aged 65-79; mean age 69.1 years) with tertiary education (23%), secondary education (50.0%), and primary ed. or below (23.8%), lived with others (82.5%), unemployed (78.8%), with good health (77.5%) **Children** (n=N/A) from 3 kindergartens and 6 public child care centers	**Methods**: 1. Older adults were recruited from March-July 2004 in 3 representative municipalities 2. Older adults submitted applications: 54 were allocated to REPRINTS (who had an intensive weekly training for 3 months) and 82 to the control group 3. Baseline data was collected in 2005 and 2006 and the 1st data was collected 9 months after baseline, the 2nd, 1 year after, and the 3rd, 2 years after **Procedure**: 1. Older adults went to schools once every 1-2 weeks to play a hand games and read picture books to children 3. The control group participated in social activity clubs and not in IGPs 4. Repeated in 2005 (term 2) and 2006 (term 3)	1. **Older adults' sense of coherence** (SOC)- 1. Data from 2005 (Term 2) and 2006 (Term 3) were merged and used for the analysis 2. 26 older adults in REPRINTS and 54 in the control were included in the analysis 3. SOC measures sense of meaningfulness (SOM), sense of manageability (SOMB), and sense of comprehensibility (SOCB), Japanese version of the SOC scale, 13-item version (SOC-13) (Togari & Yamazaki, 2005) 2. **Older adults' depressive mood**- The Geriatric Depression Scale-Short Version-Japanese (GDS-S-J) (Niino, Imaizumi, & Kawakami, 1991;Yatomi, 1994)
Powers, Gray & Garver (2013)	Senior Fitness Test IG Learning Experience	US	Non-randomized, quasi-experimental, before- and after design (no control group; quantitative)	3 weeks	N= 62 **Older Adults** (n= 30; 24 female; mean age 84.57 years) from a retirement community of 262 older adults **Young Adults** (n=32) kinesiology undergraduate students enrolled in a required last year course with prior professional working experience with older adults (37.5%) and fitness testing experience (46.9%)	**Methods**: 1. Students participated as part of a class unit 2. All older adults were targeted by flyers and word of mouth 3. Older adults gave informed, voluntary consent 4. The ASD was given to students 1 week before and after the IGP **Procedure**: 1. The week before the IGP, students were trained to conduct the Senior Fitness Test 2. For 50 minutes, students tested as many older adult participants they could 3. Results from one older adult were given to each student at random 4. The students wrote an exercise program to maintain or improve functional fitness of that older adult 5. After a review by the instructor, students returned to the site and provided individual feedback to their older adult	1. **Young adults' attitudes toward older adults**- 1. Researchers examined interaction, time, and group effects for the dependent variable, ASD, using two different grouping variables, professional experience, and fitness experience 2. The refined version of the Aging Semantic Differential (ASD) Scale (Polizzi, 2003)

Outcomes for Children	Outcomes for Adolescents	Outcomes for Young Adults	Outcomes for Middle Age Adults	Outcomes for Older Adults	Quality	Strength of Evidence
1. IG relationships were formed 2. IG relationships supported print literacy acquisition within the multimodal ensembles for children 3. The reciprocal IG relationships were integral to the children's meaning-making experiences as they collaborated as equal partners with the older adults 4. Literacies were full of weight with relationships	N/A	N/A.	N/A	1. IG relationships were formed 2. The reciprocal IG relationships were integral to the older adults' meaning-making experiences as they collaborated as equal partners with the children	Low	Weak
N/A	N/A	N/A	N/A	1. Constructive behavior and IG conversation were significantly higher in the social-oriented group than the performance-based group ($p<0.001$) 2. When weighted smiling rate was used, smiles were significantly more frequent in the social-oriented group ($p<0.05$) 3. Visual attention was significantly higher in the performance-based group than the social-oriented group ($p<0.05$) 4. The kappa coefficients of change in visual attention, facial expression, engagement/behavior, and conversation were 0.82, 0.80, 0.76, and 0.86	Medium	Moderate
N/A	N/A	N/A	N/A	1. SOM significantly increased for members of the intervention ($p < .05$) but not for the controls 2. There were significant main effects of time on SOC ($F(1,78)=7.51$, $nG2 = .027$, $p=.001$), SOMB ($F(1,78)=4.66$, $nG2 =.020$, $p=.003$), and SOCB ($F(1,78)=6.73$, $nG2=.029$, $p=.001$), all increasing over time 3. Participation in the IGP was positively associated with SOMB and SOM ($\beta=.29$, $p=.017$; $\beta=.35$, $p=.005$) 4. No differences in the SOC of males/females ($t(78)=0.29$, $p= .77$)	High	Moderate
N/A	N/A	1. Attitudes toward older adults were more positive 2. There were no significant differences in attitudes between students who had prior professional experience and those who did not ($F(1, 30) = 0.73$, $p = .40$.) but a significant time effect ($F (1,30) = 41.19$, $p = .000$) 3. Scores on the ASD improved by 33.32% 4 .The effect size for ASD change was greater in the group with no prior professional experience ($d = 1.62$) 5. There were larger improvement in positive attitudes among students without prior fitness testing experience ($d = 1.85$)	N/A	N/A	High	Moderate

Study	Program	Country	Study Design	Length	Subjects	Methods and Procedure	Outcome Measures
Skropeta, Colvin & Sladen (2014)	IG playgroup program (IPP)	Australia	Mixed methods: Non-randomized, quasi-experimental, before-and-after design (no control; qualitative and quantitative)	6 months	N=139 **Older Adults** (n=48; 43 female; aged 68-101), 15% with no cognitive impairment, 28% with mild dementia, 38% with moderate dementia, 19% with severe dementia; **Young adults** (n=41) parents and nannies; **Children** (n=50; aged 0-4)	**Methods**: 1. 3 IPP sites- A hostel and high care nursing home for older adults with dementia (Site 1); a low care hostel for older adults with dementia (site 2); a high care Chinese nursing home (site 3) 2. Primary carers identified older adults who could give consent 3. Playgroup leaders identified child carers and researchers invited them to participate with informed consent for them and their children **Procedure**: 1. Diversional therapists introduced activities for the 3 generations: structured and unstructured play and learning experiences 2. Semi-structured interviews (15-30 mins/week, audio taped & transcribed) with older adults, staff, playgroup coordinators, and a group of participants	1. **Older adults' physical functioning, bodily pain, general health, energy/fatigue, social functioning, role limitations due to physical functioning or emotional problems, emotional well-being**- The SF36 (Contopoulos-Loannidis, et al., 2009; Walters, et al., 2001) 2. **Older adutls' depression**- The Geriatric Depression Scale (GDS) 3. **Older adults' cognitive status**- Mini Mental Status Examination (MMSE; Folstein et al., 1975) 4. **Older adutls' and Young adults' perceptions of IPP**- Interview research questions developed by researchers
Tabuchi & Miura (2015)	Narrative IGPs	Japan	Randomized Controlled Trial (with control group, quantitative)	7 months	N=38 **Older Adults** (n=36; 36 male; aged 60-82; mean age 68.38, SD 3.53) with an average of 15.98 years of education and normal subjective economic circumstances (58.82%) and normal health ratings (70.59%). **Young Adults** (n=2; 2 male; aged 22-23) university students	**Methods**: 1. Older adults were recruited at the Nishinomiya city senior center and gave consent 2. Listeners (n=4) were experimental collaborators who were young adults (aged 22 & 23) or older adults (aged 68 & 72) who were trained in empathic and neutral reactions (Empathic=agreement, prompting conversation, eye contact, gestures, facial expression changes; neutral-suppressing the above) 3. Older adults were randomly assigned to 1 of 4 groups and the listeners were randomly assigned to an empathic/neutral condition 4. Questionnaires were answered before and after the narration **Procedure**: 1. Older adults had 20 min. one-on-one sessions with a listener where they talked about things they saw as useful to people later in their lives 2. Sessions were recorded with a video camera and transcribed	1. **Older adults' generativity**- the shortened Generativity Scale (Tabuchi et al. 2012); researchers classified the transcript and created subcategories and higher-level categories. Psychology graduate students determined the subcategory of each utterance and were blinded to subject condition
Yasunaga et al. (2016)	REPRINTS	Japan	Non-randomized, quasi-experimental, before-and-after design (no control group; quantitative)	3 years	N=1,122 **Older Adults** (n=141) who were independent **Middle Age Adults** (n= 230), parents of children in 1st-4th grade; **Adolescents** (n=281**)** first year junior high students **Children** (n=470; 235 female) from 1st-6th grade who had not lived with grandparents (73.7%)	**Methods**: 1. Older adults were recruited in 2004 (as in Murayama et al.) 2. 67 older adults in REPRINTS and 74 controls were recruited and matched in age, sex, and functional capacity 3. All children and some parents in Kawasaki City were examined 4. Data was collected before the program (baseline), and at the 1st and 2nd year after **Procedure**: 1. Older adults were trained for 2 hrs/week for 3 months on child development, book selection, and reading techniques 2. 6-10 older adults visited schools once every 1-2 weeks, played hand games, and read picture books to children 3.Children and parents filled questionnaires 3 times 4. In the 1st follow-up, there were 56 older adults in REPRINTS (39 intensive, 17 low frequency volunteers) and 66 controls. In 2nd, 53 older adults in REPRINTS, 60 controls, and 281 students in jr. high (55 who were in REPRINTS)	1. **Older adults' health** 2. **Functional capacity** 3. **Physical functioning** 4. **Psychological and social variables** 5. **Depression** 6. **Subjective health** 7. **Instrumental activities of daily living** 8. **Self-esteem** 9. **Long-term mental health**- 1. Self-rated 2. Tokyo Metropolitan Institute of Gerontology Index of Competence 10. **Reduction in parents' physical and psychological burden of volunteering in school**- A self-administrated questionnaire 11. **Adolescents' sense of participation in the local community**- A self-administrated questionnaire 12. **Children's images of older adults**- survey analyzed with a 10-item tool using the Semantic Differential method (Nakatani, 1991). Divided into two groups: low and high frequency of exchanges with older adults with 2 subscales: evaluation and potency/activity

Outcomes for Children	Outcomes for Adolescents	Outcomes for Young Adults	Outcomes for Middle Age Adults	Outcomes for Older Adults	Quality	Strength of Evidence
N/A	N/A	Mothers reported loving the program because their children were able to interact with older adults, especially if the mothers moved far from their own parents. Mothers also reported appreciating the attractive and safe environment. (indoors and outdoors, safety, the cafe, the shed)	N/A	1. Older adults' perceptions of their health were stable over 6 months 2. The SF-36 item analysis showed a significant difference between pre-test and post-test results and showed a decrease on energy/fatigue (F(1, 31)=10.957, p=.002) 3. A paired-samples t-test no significant difference between the pre-test and post-test GDS result 4. Interviews showed 5 themes: (1) intergenerational experiences (connection between people, enjoyment, helping others) (2) two-way contributions (lack of family support) (3) friendships (recognition of others, support network) (4) personal growth	Medium	Moderate
N/A	N/A	N/A	N/A	1. Generativity was promoted only when a young adult reacted to the young adults' narratives empathically 2. The empathic reaction conditions had a significantly higher generativity score ($F(1, 28) = 17.50$, $p < .01$) than neutral reaction conditions 3. When the listener was an older adult, the average value of the post-narrative generativity score was 17.85 (2.76) for the empathic reaction group (N=8) and 18.71(3.08) for the neutral reaction group (N=9) 4. When the partner was a young adult, the value was 19.51(3.22) for the empathic reaction group (N=8) and 16.30(3.24) for the neutral reaction group (N=9) 5. When the listener's generation and reaction was the independent variables, the pre-narrative generativity score was the covariate, and the post-narrative generativity score was the dependent variable, the interaction was significant ($F(1, 28)=13.88$, $p < .01$)	High	Strong
1. Children with high frequency of interaction with older adults had a significantly more positive emotional image of older adults at baseline, 1st follow-up, and 2nd follow-up than students with low frequency of interactions with older adults (the general linear model showed a significant interaction adjusted for school grade, sex, experience of exchanges with older adults, and score on the social desirability scale)	1. REPRINTS positively affected the sense of participation in the local community in the long term, especially for 1. Reading picture books 2. Association with the REPRINTS program and 3. Images of older adults (shown by path analysis and ANOVA)	N/A	1. At baseline, the physical burden of volunteering in school was lower among parents of children in lower grades, and it decreased significantly among parents of all grades 2. Parents' psychological burden with reference to volunteering in school was reduced 3. Their level of knowledge about the REPRINTS older adults volunteers increased	1. Significant interaction effects between the groups and time of surveys with regard to frequency of exchanges with children ($p < 0.01$) and self-rated health ($p < 0.01$), and these effects on intensive volunteers lasted for at least 12 months 2. Significant main effects of time on sense of coherence and significant interaction effects for sense of meaningfulness, with scores increasing over time 3. A multiple mediation analysis showed that sense of meaningfulness significantly mediated the effect of participating in this program on depressive mood at the 2-year follow up	High	Moderate