



# Grandparental help in Indonesia is directed preferentially towards needier descendants: A potential confounder when exploring grandparental influences on child health



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## ABSTRACT

A considerable body of evidence has now demonstrated positive correlations between grandparental presence and child health outcomes. It is typically assumed that such correlations exist because grandparental investment in their grandchildren improves child health and wellbeing. However, less is known about how grandparents allocate help to adult children and grandchildren, particularly in lower income contexts. Here we use detailed quantitative data from the longitudinal Indonesia Family Life Survey (data collected in 1993, 1997, 2000, 2007;  $n = 16,250$ ) to examine grandparental help in a society transitioning both demographically and economically. We test the hypothesis that grandparents direct help preferentially towards those adult children and grandchildren most in need of help. This hypothesis was supported for help provided by married grandparents and single grandmothers, who tended to provide more help to their adult children when this generation had young children themselves, provide financial help if their adult children were poorer, and provide more household help if their adult daughters worked outside the home. One unexpected result was that help from maternal and paternal grandparents is positively correlated; if one set of grandparents is helping the other set is more likely to help, counter to our predictions. These results provide support for the hypothesis that grandparents preferentially invest in some descendants over others, where married grandparents and single grandmothers tend to invest in those adult children and grandchildren with the most need. Investigating the effect of grandparents on child health outcomes may therefore be confounded by grandparent's preferential investment in needier descendants.

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## 1. Introduction

The importance of intergenerational transfers is now recognized by a number of disciplines. It is increasingly acknowledged that grandparents can have significant impacts on child wellbeing, and that grandparental help may even be the difference between life and death for some children (Sear and Mace, 2008). In this paper, we take an evolutionary perspective to focus on transfers down generations: specifically, from the grandparental generation down to their adult children and grandchildren. Evolutionary social scientists have recently produced a considerable body of work on grandparents, much of it stemming from their interest in the

cooperative breeding hypothesis, which proposes that human mothers *need* help to raise children, since the costs of raising multiple dependent children in our species are too high for mothers to manage alone (Hrdy, 2005, 2009; Mace and Sear, 2005). Evolutionary theory predicts that grandmothers may be an important source of help for their children and grandchildren since post-reproductive women may increase their inclusive fitness by helping adult children produce fit offspring (Hamilton, 1964). Grandfathers may similarly provide help, even though men can continue reproduction until later in life, because in stable, monogamous relationships, a man's reproductive career likely ends with his wife's.

Evolutionary anthropologists have now produced a number of studies which show that the presence of grandparents is positively correlated with the health and wellbeing of their grandchildren (Mace and Sear, 2005; Meehan et al., 2014). The assumption is

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typically made in these studies that grandparental investment is driving these correlations, often backed up by qualitative observations that grandparents are providing help in these societies (it is possible that alternative explanations may drive some of these correlations, such as intergenerational transmission of genetic or environmental factors, but are unlikely to fully explain such consistent correlations: see [Coall and Hertwig, 2010](#); [Sear and Coall, 2011](#); [Snopkowski and Sear, 2013](#)). Only rarely in such studies is quantitative data collected on the actual helping behavior of grandparents (e.g. [Meehan et al., 2013](#)). Further, less is known about which conditions lead grandparents to help. Do grandparents preferentially provide help to some descendants over others and how might this affect the relationship between grandparental presence and grandchild health outcomes? Here we use detailed quantitative data from Indonesia on help provided from the grandparental generation to descendant generations to test the assumption that grandparents provide such downward transfers, and to examine in detail the predictors of such investment. Specifically, we test the hypothesis that grandparents preferentially direct investment towards those descendants most in need of help.

From evolutionary theory, we expect individuals to optimally allocate resources to maximize fitness ([Smith and Fretwell, 1974](#)). Just as parental investment may be allocated unequally to offspring, in order to maximize returns on investment ([Clutton-Brock, 1991](#)), so might grandparents invest unequally in descendants, if the returns to investment in each descendant are not equal. For grandparents, they can invest in (a) their own somatic effort; (b) children, grandchildren, and other kin; or (c) mating effort. Hamilton's rule provides predictions on how to allocate resources to different kin. It states that we expect help to be provided if the reproductive benefit (b) to the recipient multiplied by their level of relatedness ( $r$ ) is greater than the reproductive cost to the donor (c):  $rb > c$  ([Hamilton, 1964](#)). The components of Hamilton's rule have been studied in the grandparent literature, largely in high-income contexts (as this is where most quantitative data on grandparental helping behavior can be found). Evolutionary researchers, for example, have focused on the level of relatedness,  $r$ , and shown that with reduced relatedness, we see reduced investments ([Chrastil et al., 2006](#); [Coall et al., 2014](#); [Euler and Weitzel, 1996](#); [Pollet et al., 2006](#); [Smith, 1991](#)). Other researchers have been interested in the costs of helping,  $c$ , and have looked at the characteristics of the helper ([Albertini et al., 2007](#); [Cao, 2006](#); [Euler and Weitzel, 1996](#); [Gray, 2005](#); [Hank and Buber, 2009](#); [Leek and Smith, 1991](#); [McGarry and Schoeni, 1997](#); [Pashos, 2000](#)). Such research does not typically investigate the direct fitness costs of helping, but instead investigates characteristics of the grandparent, which may be linked to fitness costs. For example, grandparents are more likely to help when they are in good health ([Albertini et al., 2007](#); [Cao, 2006](#); [Leek and Smith, 1991](#)), suggesting that in times of bad health, grandparents may invest resources in their own somatic effort to avert the risk of death. The benefits of helping,  $b$ , have so far received the least attention, but are also an important part of the equation. Here we examine whether Indonesian grandparents are sensitive to the benefits of helping, by determining whether grandparental help is directed preferentially towards those who are most in "need". Again, we are not directly measuring the fitness benefits of helping; instead we assume that providing investments towards these adult children and grandchildren will result in larger returns on investment (in fitness terms: such as improved survival rates for grandchildren and quicker reproductive rates for adult children) than investing in adult children and grandoffspring with less need. If grandparents provide help to adult children and grandchildren with the most 'need', it implies that need may confound the relationship between grandparental help and child/grandchild outcomes. Simply looking at child outcomes may not

provide the full picture of the impact of grandparental help.

### 1.1. *The importance of context*

Before describing our analysis, we first consider the role of context in grandparenting behavior. From the existing grandparenting literature, it is clear that context matters for grandparental investment. Grandparents are not always associated with beneficial outcomes for children in all populations, and there is also some variation in which grandparents are most important in which contexts. Broadly speaking, maternal grandmothers appear to invest most in grandchildren and to be most beneficial for grandchildren, but there is some variation around this trend ([Euler and Michalski, 2007](#); [Sear and Coall, 2011](#); [Sear and Mace, 2008](#)). A potential problem with comparing across contexts is that the grandparent literature tends to differ across these contexts due to differences in data availability, which are the result of demographic differences. Broadly, we refer in this paper to low-income (high mortality, high fertility, largely pre-demographic transition societies), high-income (low mortality, low fertility, post-transitional societies), and middle-income (those in the process of transitioning both economically from low to high income, and demographically from high to low fertility) contexts. We recognize that there is considerable variation within contexts, and that these are somewhat arbitrary categories, but we do think they are heuristically useful, as there are significant differences between these three contexts in demographic and economic variables of relevance to grandparenting.

High-income contexts are typified by low child mortality rates, long lifespans, low fertility rates, high levels of investment in children, but also pension systems to support elderly individuals, which may free up the older population financially so that they can invest substantially in grandparenting. Research in these contexts, which principally comes from the United States and Europe, has predominantly focused on the helping behavior of grandparents, particularly the characteristics of helpful grandparents, with less emphasis on the impact of grandparents on child outcomes. The impact of grandparents on grandchildren (in terms of health, at least) may be less obvious in wealthy societies, where children are largely in good health. In such environments, grandparental characteristics found to be of importance in predicting help are: relationship to grandchild ([Euler and Weitzel, 1996](#); [Pollet et al., 2006](#); [Smith, 1991](#); [Kaptijn et al., 2013](#); [King et al., 2003](#); [Pashos, 2000](#)); ability of grandparent to help ([Albertini et al., 2007](#); [Cao, 2006](#); [Coall et al., 2009](#); [Hank and Buber, 2009](#); [Ho, 2013](#); [Hogan et al., 1993](#); [King et al., 2003](#); [Leek and Smith, 1991](#); [McGarry and Schoeni, 1997](#); [Pollet et al., 2006](#); but see [Pashos, 2000](#)); and the need of descendants ([McGarry and Schoeni, 1997](#); [Vandell et al., 2003](#); but see [Hogan et al., 1993](#)). For full reviews of the grandparental help literature see [Coall and Hertwig \(2010\)](#) and [Euler and Michalski \(2007\)](#).

A growing body of research conducted by evolutionary anthropologists in low-income, often subsistence societies, has shown that grandparental (particularly grandmaternal) presence is correlated with better health and higher survivorship of grandchildren ([Meehan et al., 2014](#); [Sear and Mace, 2008](#)). Much less research has directly examined the characteristics that influence the likelihood of providing grandparental help in low-income contexts. Instead, there has been more research on what grandparents (in general) do for adult children and grandchildren; this research has shown that in rural Ethiopia grandmothers help with domestic chores and agricultural tasks ([Gibson and Mace, 2005](#)), in northeast India they help with childcare ([Leonetti et al., 2005](#)); among the Aka foragers of central Africa grandmothers reduce work energy expenditure of the mother ([Meehan et al., 2013](#)); and

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