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Parenting Style as an Investment in Human Development[*]

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Abstract
We propose a household production function approach to human development that explicitly considers the role of parenting style in child rearing. Specifically, parenting style is modelled as an investment that depends not only on inputs of time and market goods, but also on attention. Our model relates socioeconomic disadvantage to parenting style and human development through the constraints that disadvantage places on cognitive capacity. We find empirical support for key features of our model. Parenting style is a construct that is distinctive to standard parental investments and is important for young-adult outcomes. Effective parenting styles are negatively correlated with disadvantage.

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1.   INTRODUCTION

There is mounting evidence that early experiences are critically important in laying the foundation for one's overall life chances. A recognition that children's intellectual, emotional, and social development is tied to their family circumstances well and truly before they enter school (e.g. Bradley and Corwyn 2002; Feinstein 2003; Heckman 2006), has prompted researchers to renew their efforts to understand the role of families in shaping children's well-being. The overarching concern is that social and economic disadvantage constrains families' ability to invest in their children, thereby perpetuating disadvantage from one generation to the next. The relationship between socioeconomic disadvantage and human development is complex, however, and disadvantage is about much more than having low income. Berger et al. (2009), for example, argue that "the hypothesis that the home environment completely mediates the relationship between income and child outcomes can't be rejected" (p. 985). Knowing more about the extent to which disadvantage operates causally through income – or through some other channel – is fundamental to assessing whether increasing incomes through social benefit programs can "buy" better outcomes (Ermisch 2008).

Economists have begun to respond to this debate by extending their research scope beyond traditional models of human development to consider an expanded set of investments in children, including the style of parenting itself. The concept of "parenting style" was formalized in developmental psychology more than 50 years ago as a means of characterizing parents' control over and approach to disciplining their children (Baumrind 1966). Although in the intervening years a large psychological literature has developed linking parenting style to outcomes in childhood and adolescence, economists have only recently begun to explicitly consider its importance. Doepke and Zilibotti (2017), for example, develop a model of parenting in which parenting style is the equilibrium outcome of parents' investments in instilling marketable skills in their children, while Cunha (2015) models parenting style as the combination of parental investments and institutional arrangements chosen by parents when raising their children. Others have modeled parenting style in a game-theoretic framework in which parents actively choose the control they exert (or patience they display) in an effort to prompt their child to display good behavior, study hard, and avoid risky behavior (e.g. Burton et al. 2002; Hao et al. 2008; Cosconati 2009; Lundberg et al. 2009). Consistent with these theoretical perspectives, new empirical evidence indicates that parenting style is important in the production of cognitive and non-cognitive skills (Dooley and Stewart 2007; Fiorini and

Keane 2014) and that "parenting in early childhood contributes to the intergenerational persistence in incomes found in many studies" (Ermisch 2008 p. 69).

Our objective is to extend this literature by assessing the role of parenting style and socioeconomic disadvantage in human development. Our notion of parenting style is in the spirit of the developmental psychology literature and captures both the closeness of the parent-child relationship and the degree of monitoring parents employ. We explicitly model a household's parenting style as an investment decision that is important in the production of human development. Tackling the problem in this way has the advantage of allowing parenting style to be endogenous, providing an explanation for why parents might adopt different styles. Unlike previous researchers, we allow investments in human development – including in parenting style – to rely not only on inputs of time and market goods, but also on a third input which we conceptualize as attention or cognitive effort. Thus, investments in children and adolescents (e.g. helping with school work, reading to children, providing a good diet, monitoring activities, etc.) will be constrained not only by parents' time or income, but also by the mental effort required to consistently pay attention to, engage with, monitor, and supervise their children. Finally, we take seriously the notion that disadvantage itself limits cognitive capacity and alters decision-making (e.g. Shah et al. 2012; Mani et al. 2013; Mullainathan and Shafir 2013) by allowing a household's endowment of attention (cognitive capacity) to depend on its socioeconomic status. Our approach allows us to formally link disadvantage to parental investment choices without the need to assume that socioeconomic status influences parents' preferences over child outcomes. This is crucial since "[f]or economists to rest a large part of their theory of choice on differences in tastes is disturbing since they admittedly have no useful theory of the formation of tastes" (Michael and Becker 1973, p. 380). This is particularly true of parenting style.

We assess the empirical support for the key features of our model by estimating a series of conditional correlations using detailed administrative welfare records matched to survey information from both young people (aged 18) and their parents. The cross-sectional survey data provide us with several measures of parenting style and human development outcomes (educational achievement, non-cognitive skills, and risky behavior), while socioeconomic disadvantage is captured using administrative data on the public assistance families received over more than a decade while young people were growing up. We find that the key features of our model are empirically supported. Parenting style is a construct that is distinct from standard money- and time-intensive parental investments. Moreover, parenting style is

correlated with socioeconomic disadvantage. In particular, the extent to which parents monitor their young-adult children decreases with disadvantage, even amongst parents making comparable levels of other goods- and time-related investments. Finally, parenting style is also correlated with young adults' outcomes even after accounting for other parental investments.

We make a number of contributions to the literature. Most importantly, we demonstrate that parenting style can be modelled using a production function approach to understand investments in human development. That is, parenting style can be characterized as an endogenous investment – stemming from parents' rational choice – in the production of human development. To our knowledge, only four other studies model parenting style directly (see Burton et al. 2002; Cosconati 2009; Lundberg et al. 2009; and Doepke and Zilibotti 2017). Like these studies, we also analyze parenting style in the context of an optimal choice problem. In our model, heterogeneity in parenting style does not originate in parental preferences; it comes from differences in the constraints parents face and the choices they make when investing in their children. This allows us to understand diversity in parenting styles without necessarily appealing to heterogeneity in parental preferences. Moreover, our model nests existing production-function approaches to estimating the determinants of children's cognitive and non-cognitive skills, providing a theoretical link to traditional models of parental investment.

Second, explicitly modelling parental attention (cognitive effort) as an input in human development provides a conceptual framework for understanding the potential for socioeconomic disadvantage to constrain outcomes not only through a lack of financial resources, but also through a lack of parental cognitive resources. We believe that it is quite natural to view many effective parental behaviors (e.g. establishing control, discipline, and routine, etc.) as being much more taxing of mental effort and attention than of either money or time. Cognitive resources are also central to social interaction and prosocial behavior (Rameson et al. 2012); self-control (Shiv and Fedorikhin 1999), as well as ethical behavior (Gino et al. 2011) all of which are relevant for parenting behavior. Yet disadvantage may deeply affect children and adolescents by taxing their parents' cognitive resources (Mullainathan and Shafir 2013). We provide a framework for developing the theoretical and empirical implications of this proposition as well as for characterizing the inherent tradeoffs between inputs of market goods, time, and attention in human development.[1]

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[1] Fiorini and Keane (2014) argue that studies which focus on single inputs into child development and do not consider the trade-offs between alternative inputs provide limited and potentially misleading information.

Finally, our paper contributes to the empirical evidence on socioeconomic disadvantage and human development formation more generally. Our analysis of youth extends the existing economics literature on parenting style, which to date has only considered outcomes measured in childhood. There is evidence that adolescents' achievement is more closely related to their own perceptions of parenting than to what parents report they are doing (Paulson 1994), making youths' self-reports arguably the most valid way of measuring parenting style (Aunola et al. 2000). Moreover, we capture family resources during childhood using administrative data on welfare receipt which allows us to study the link between parenting and human development in the context of a much broader notion of socioeconomic disadvantage than is typically captured by parental income, occupation, or education alone.

The remainder of this paper is structured as follows. In Section 2 we review the literature on investments in human development paying particular attention to the role of parenting and socioeconomic disadvantage. Our theoretical framework is described in Section 3. In Section 4 we describe our empirical strategy, the details of the Youth in Focus data are presented, results from our preferred specification and our sensitivity analysis. Finally, Section 5 concludes.

2. THE LITERATURE

There is a long tradition in developmental psychology, public health, and sociology of relating children's outcomes to the nature of the parenting that they have experienced (e.g. McLoyd 1998; Guo and Harris 2000; Brooks-Gunn and Markman 2005; Berger et al. 2009; Kelly et al. 2011). Economists, in contrast, have historically focused more on the decisions – particularly the human capital investment decisions – that parents make for their children than on the way that they parent. However, a growing recognition of the importance of childhood for long-term well-being has led economists to increasingly turn to broader concepts of parenting behavior to enrich their understanding of human development.

2.1 Parenting Style in Developmental Psychology

Drawing on philosophical debates dating back to the 1920s about the role of permissive, child-centered policies in education, Baumrind (1966) proposed a typology of three parenting styles – "permissive", "authoritarian" and "authoritative" – which are distinguished mainly in terms of the relative importance parents attach to control of versus freedom for their children. Over

time, this framework has been extended to accommodate a wider range of parental behavior. Today it is common for parenting style to be characterized by two underlying processes: i) the number of demands made by parents; and ii) the nature of parental reinforcement. These are often referred to as demandingness (control) and responsiveness (warmth), respectively (see Darling and Steinberg 1993; Spera 2005 for reviews). This two-factor approach also naturally gives rise to an extension of Baumrind's (1966) original parenting-style typology to include "disengaged" as a fourth style of parenting. Disengaged parenting (i.e. low levels of both warmth and control) has been linked to impulsivity, behavioral and emotional problems, school dropout, substance abuse, and delinquency in their children, while children's best social, cognitive, and behavioral developmental outcomes are usually associated with authoritative parenting (i.e. high levels of both warmth and control) (Wake et al. 2007; see also Maccoby and Martin 1983; Baumrind 1991).

The good news is that effective parenting seems to protect children from some of the adverse effects of socioeconomic disadvantage (McLoyd 1998; Guo and Harris 2000; McCulloch and Joshi 2002). The bad news is that "economic hardship diminishes parents' ability to interact with and socialize children in ways that are beneficial to their well-being" (Guo and Harris 2000, p. 431). Moreover, it appears that it is this disruption in effective parenting which is at least partially to blame for the adverse consequences of financial stress for children and adolescents (e.g. McLoyd 1998; Bradley and Corwyn 2002; Conger et al. 2002; Mistry et al. 2009; and the references therein). Bradley and Corwyn (2002), for example, argue that parents with high socioeconomic status engage in a number of practices (e.g. using richer vocabulary, eliciting more child speech, reading, etc.) which "are strongly implicated" as mechanisms underpinning the relationship between socioeconomic status and children's intellectual and academic achievement (p. 382).

Psychologists have traditionally viewed stress as the underlying mechanism linking disadvantage and ineffective parenting. The repeated stresses associated with having too little income and living in inadequate housing in poor, often violent, neighborhoods produce hormonal responses which overtime can take a physiological toll on individuals. Health scientists refer to this as "allostatic load" (McEwen 2000) and it can affect parenting (see Bradley and Corwyn 2002 for a review).

2.2   Economic Models of Parent-Child Interactions

Increasingly economists are building upon this idea by incorporating poverty-induced psychological stress into models of economic behavior in an effort to understand how poverty is perpetuated (e.g. Shah et al. 2012; Mani et al. 2013; Haushofer and Fehr 2014). This innovation has the potential to enrich our understanding of the ways that socioeconomic disadvantage hinders human development. Importantly, there is growing evidence that being preoccupied with pressing budgetary concerns leaves fewer cognitive resources available for decision making (Mani et al. 2013). In effect, "scarcity changes how people allocate attention: It leads them to engage more deeply in some problems while neglecting others" (Shah et al. 2012, p. 682).[2] Yet effective parenting requires consistent mental effort and continuous attention. Consequently, it may be the tax on cognitive "bandwidth" – generated by a lack of income – which explains the link between disadvantage and ineffective parenting (Mullainathan and Shafir 2013).

Family economists have been instrumental in constructing theoretical models of the interactions between parents and their children.[3] One of the most well developed literatures in this space examines intergenerational transfers in the form of financial resources, co-residence, or time (see, for example, Cameron and Cobb-Clark 2008; Cigno et al. 2017). Models have been developed to explain transfers that flow from parents to their adult children (e.g. through the provision of care for grandchildren or mortgage assistance), from adult children to their parents (e.g. through co-residence or the provision of personal services), or in both directions simultaneously (Laferrère and Wolff 2006). Much of the empirical research effort has been directed at differentiating between the various incentives for transfer behavior, including altruism, implicit payments for services provided by relatives, insurance mechanisms to support consumption smoothing across extend family members, and reciprocity.[4]

Parent-child interactions are shaped not only by families' financial resources, values, beliefs, etc. but also by the broader social and institutional context. For example, public transfers are likely to at least partially crowd out private transfers between family members (see Jensen 2004 for a review). Moreover, Solon (2004) models the relationship between public and private investments in children's human capital and demonstrates that

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[2] Socioeconomic disadvantage, for example, has been linked to increased risk-taking, more impatience, and diminished self-control (Haushofer & Fehr 2014; Bernheim et al. 2015).

[3] Ermisch (2003) provides an excellent overview.

[4] Lillard and Willis (1997) provide extensive descriptions of each of these motives in a developing country context.

intergenerational earnings persistence is greater the less progressive are public investments in children. Cultural and social norms also matter. In particular, Bisin and Verdier (2001) develop a theoretical framework in which parents' incentives to instill particular preferences in their children depend on community values as well as the broader socioeconomic context.[5] They argue that increases in the economic returns to independent decision-making underlie the long-term decline in authoritarian parenting, while permissive parenting is a less attractive option in societies that are more unequal.

The decisions that parents make in relation to their young and adolescent children have also been extensively studied. Researchers often adopt a non-cooperative game theoretic approach when modelling the interactions between parents and their adolescent children (e.g. Kooreman 2004; Hao et al. 2008; Lundberg et al. 2009). Unlike the cooperative approach commonly taken in examining interactions between spouses, adolescents are better seen as separate economic agents with the power to affect family outcomes (Lundberg et al. 2009). In contrast, young children traditionally are assumed to have no agency rendering the problem one of modeling the decisions – typically investment decisions – an altruistic (or paternalistic) parent makes on their behalf. There is an extensive literature that adopts a production function approach to studying the investments that parents make in their children's human capital (see Attanasio et al 2015 for a review). Researchers are increasingly turning to models in which young children are also decision makers (e.g. over their study effort or own behavior) to understand a wider range of developmental issues including the effort that children expend (Weinburg 2001), the way children learn (Lizzeri and Siniscalchi 2008), child maltreatment (Akabayashi 2006) and the share of household surplus captured by children (Galiani et al. 2017).

Importantly, family economics is now paving the way for an economic conceptualization of the nature of parenting itself. Taking a broad-brush approach, economists often do not distinguish between parenting style (i.e. the emotional climate in which parents raise their children) and parenting practices (i.e. the specific behaviors that parents use to socialize their children) in the way that developmental psychologists typically advocate (Darling and Steinberg 1993). Cosconati (2009), for example, models parenting style as the constraints parents place on their children's time use, while Lundberg et al. (2009) model the control that parents exert over their children's decision making. In contrast, Burton et al. (2002)

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[5] The empirical evidence on cultural transmission is somewhat limited, but nonetheless suggests that interactions within families and local communities play a role in shaping, for instance, ethnic and religious identities (Bisin and Verdier 2010), risk preferences (Dohmen et al. 2006), and attitudes towards welfare (Barón et al. 2015).

conceptualize parenting style as parents' degree of patience in response to their children's misbehavior. Cunha (2014) models parenting style as the specific way parents combine their investments in children with existing institutions that also affect child development. Finally, Doepke and Zilibotti (2017) consider parenting style (in the Baumrind sense) to be the equilibrium outcome of a process in which the socioconomic environment shapes families' incentives to instill patience and risk aversion in their children. In empirical microeconomics, economists have linked parenting practices, including establishing regular family mealtimes, rules about television watching and computer use, and routines around homework and bedtimes, to a range of positive health and developmental outcomes for children (see Del Bono et al. 2016; Ribar and Zapata 2014).

The economics literature on parent-child interactions and the developmental psychology literature on effective parenting styles have evolved largely independently of one another. However, research linking these diverse strands of the literature is producing new insights into human development. Our work makes an important contribution by integrating the role of socioeconomic disadvantage and parenting style in human development. This moves us closer to developing policy initiatives to mitigate the adverse impact of poverty on human development.

3.   THEORETICAL MODEL

Our theoretical framework draws heavily on Becker's household production model of consumer behavior in which households use inputs – typically time and market goods – to produce commodities which they then consume, yielding direct utility (Becker 1965; Michael and Becker 1973). This framework has been used extensively in the literature to study a range of household behaviors including households' decisions to have and invest in their children (e.g. Becker and Lewis 1973; De Tray 1974; Liebowitz 1974; Gronau 1977).

We make three innovations on the standard model of home production. First, we explicitly model a household's "parenting style" as a parental investment which is fundamental to the production of human development. Second, parental investments in human development – including in parenting style – rely not only on inputs of time and market goods, but also on a third input which we will refer to as attention or cognitive effort.[6] Third, we allow

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[6] Interestingly, Michael and Becker (1973) model home production as a function of time inputs, market goods, a3.1nd the "environment" in which production takes place. The role of environmental inputs, however, has not

socioeconomic disadvantage itself to constrain cognitive capacity by modelling a household's endowment of attention as a function of their socioeconomic status.

3.1.   A Home-Production Investment Approach

We begin by assuming that parents care about parenting-related investments only to the extent that they affect human development.[7] Moreover, parental utility is assumed to be separable in human development (Q) and non-parenting-related commodities ($Z_{\sim P}$). Specifically,

$$U(Z) = u(Q(Z_P), Z_{\sim P}) \tag{1}$$

where Z_P is a vector of parenting-related investments, including parenting style, $Z_{\sim P}$ is a vector of non-parenting related commodities, including leisure time and own consumption goods (e.g. food, clothing, etc.) . $U(Z)$ is increasing in both $Q(Z_P)$ and $Z_{\sim P}$.

The assumption that the parental utility function is separable is relatively innocuous in our case as it implies, simply put, that parents always prefer greater human development irrespective of the level of non-parenting-related commodities they consume.[8] We believe this to be a sensible representation of parents' preferences. Assuming that preferences are separable also has the advantage of making theoretical models more mathematically tractable by eliminating the need to explicitly model parental preferences for non-parenting commodities as part of the human development maximization problem. Instead parents' choice problem can be recast as a two-stage process. First, parents decide which (and what level) of parenting-related investments to make in order to maximize their children's development given any level of inputs (i.e. the time, market goods, and attention) allocated to parenting. They do the same for each of the non-parenting-related commodities. Second, given the potential utility achievable in the first stage, parents then decide how to allocate their overall endowment of inputs to parenting and each of the non-parenting commodities. As our interest is in human

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received much attention in the home production literature. More recently, economists have explicitly begun to consider the role of inattention in inter-temporal decision making (see Taubinsky 2014), however, as yet these models have not been applied to parental decision making.

[7] Although parenting-related investments can also have consumption benefits for parents and thus children can provide utility directly to them (Becker 1960, p. 210), we abstract from that here in order to focus on the potential for mechanisms that are not preference-based to account for the relationship between socioeconomic disadvantage and human development.

[8] See Gorman (1959) for the formal conditions underpinning utility separability.

development, we will focus our attention solely on the first stage of this problem—i.e., the production of parenting-related investments.[9]

Let the production of human development be given by:

$$Q = q(Z_{P1}, \dots, Z_{PJ}) \qquad (2)$$

where $j = 1 \dots J$ indexes parenting-related investments Z_P. Parents produce parenting style and other child investments using a combination of market goods (x_j), time (t_j), and attention (a_j). Specifically, let

$$Z_{Pj} = z_j(x_j, t_j, a_j). \qquad (3)$$

Parents face the usual income and time constraints. In addition, the ability to pay attention and exert cognitive effort is also limited. Parents who experience financial strain, relationship breakdowns, job stress or illness, for example, will struggle to devote their full attention to their children. Thus, parental investments in human development are constrained by the total available income (I^P), time (T^P), and attention (A^P) that has been allocated to parenting:

$$T^P = t_w + \sum_j t_j \qquad (4)$$

$$A^P = a_w + \sum_j a_j \qquad (5)$$

$$I^P = w \cdot t_w \cdot a_w + V^P = \sum_j p \cdot x_j \qquad (6)$$

Parents devote a fraction of the total time and attention allocated to parenting to labor market work in order to generate the income necessary to purchase inputs in the form of market goods.[10] The remainder of their time and attention is allocated to producing investments in their children. We define "parenting income" (I^P) to be the sum of labor income $(w \cdot t_w \cdot a_w)$ and the non-labor income allocated to human development (V^P). Labor income is the result of rewarding – at predetermined wage w – effective (i.e., attention-augmented) work which is endogenously determined by the time (t_w) and attention (a_w) allocated to work.[11] Finally, market goods are purchased at an exogenously-given price p.

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[9] See Del Boca et al. (2014) for a less general model that explicitly accounts for parents' trade-off between child rearing and other consumption.

[10] We simplify notation by considering x to be a "basket of goods" priced by an index p.

[11] Our choice of attention-augmented earnings follows the same rationale as Becker's (1985) model of effort allocation in the household, which incorporates energy – the parallel of attention in our model – into the allocation of resources across economic activities. In fact, the interaction between attention and time in the production of earnings in our model is a specific case of Becker's earnings specification where "firms are indifferent to the distribution of hours among identical workers" (Becker 1985, p. S44). Alternatively, it is possible to assume that $w = w(a)$, with $w' > 0$ and $w'' < 0$. The central intuition behind our model does not change under this more general framework.

3.2   Endowments of Attention and Socioeconomic Status

The question then arises; how should we conceptualize a household's endowments of attention and cognitive resources? Though many approaches might be adopted to capture heterogeneity in households' cognitive resources, given our specific focus on human development it is particularly useful to link attention endowments to socioeconomic circumstances through the tax that poverty imposes on households' cognitive resources.

This perspective is consistent with the evidence that poverty limits self-control (Bernheim et al. 2015), the ability to parent (McLoyd 1998, Bradley and Corwyn 2002), and cognitive functioning more generally. Farmers are less able to perform cognitive tasks before the harvest (when poor) than they are after the harvest (when rich), for example. Similarly, income is unrelated to cognitive performance when experiment participants are randomly primed to think about an easy financial challenge, but is positively related to performance when the financial challenge is hard (see Mani et al. 2012). Poverty sharpens people's attention on meeting their immediate needs (food, shelter) and limits their ability to focus on longer-run issues (Shapiro 2005; Shah et al. 2012).[12]   In short, "the evidence indicates that poverty causes stress and negative affective states which in turn may lead to short-sighted and risk-averse decision-making, possibly by limiting attention and favoring habitual behaviors at the expense of goal-directed ones (Haushofer and Fehr 2014, p. 862).

Given this, we assume that a household's available attention (cognitive resources) can be written as:

$$A \stackrel{\text{def}}{=} A(SES) \tag{7}$$

where SES is household socioeconomic status and $A' > 0$, $A'' < 0$. While economists tend to focus on income- or wealth-based measures of socioeconomic disadvantage, sociologists are more likely to focus on measures based on parental education, occupation, or family structure (e.g., Sewell and Shah 1967; Mueller and Parcel 1981; Hollingshead 2011). Our modeling approach easily accommodates both perspectives.

Optimal parental investment in children's human development and the corresponding effective use of parental time and attention in producing those investments result from the maximization of Q constrained by the relevant investment technologies and the available

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[12] The tunneling that scarcity induces – i.e. the heightened focus on the most salient issues to the exclusion of others – is not specific to poverty, but rather holds across a broad range of contexts (Shah et al. 2012; Mullainathan & Shafir 2013). Those who are hungry focus on food-related cues, for example, while those who are busy focus more intensely on task deadlines (see Shah et al. 2012 and the references therein.)

resources allocated to investments in human development. We can collapse constraints (4) through (6) into the following overarching constraint:[13]

$$S^P = w \cdot T^P \cdot A^P + V^P = \sum_j p \cdot x_j + w\left(T^P \sum_j a_j + A^P \sum_j t_j - \sum_j t_j \sum_j a_j\right). \quad (8)$$

Equation (8) is an analogue of Becker's full income constraint, which can be more accurately (though less eloquently) described as "full attention-augmented income devoted to parenting." On the left-hand side, we have the total (potential) household income when all time and attention allocated to parenting are devoted to producing parenting income. On the right-hand side, we have the sum of resources expended by the household on parenting, valued at their respective market prices, and accounting for the complementarities of time and attention in producing labor income. In particular, the expression in parenthesis on the right-hand side of Equation (8) captures the opportunity cost (foregone income) associated with the fact that household effective (attention-augmented) work effort is reduced by devoting both time and attention to parenting.

3.3   A Household's Choice Problem for Parental Investments

The second stage of the household's choice problem can then be written as the unconstrained maximization of

$$L = q\left(Z_{P1}, \ldots, Z_{PJ}\right) + \lambda\left[S^P - \sum_j p \cdot x_j - w\left(T^P \sum_j a_j + A^P \sum_j t_j - \sum_j t_j \sum_j a_j\right)\right]. \quad (9)$$

After some algebra, the first order condition for this problem with respect to an arbitrary child investment, Z_{Pj}, can be expressed as

$$\frac{\partial Q}{\partial Z_{Pj}} = -\lambda\left[p \sum_j \frac{dx_j}{dZ_{Pj}} + wa_w \sum_j \frac{dt_j}{dZ_{Pj}} + wt_w \sum_j \frac{da_j}{dZ_{Pj}}\right]. \quad (10)$$

These conditions have the usual "marginal productivity equals marginal cost" interpretation.[14] Equation (10) makes clear, however, that while the marginal cost of market goods is their market price p, inputs of time are valued at their opportunity cost at the margin, i.e. the income an additional unit of time would have generated at the current level of wages and attention at work, wa_w. Similarly, attention is also valued at its marginal cost, i.e. the income an additional

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[13] To see this, substitute Equations (4) and (5) into Equation (6) and rearrange.

[14] The counterpart to Equation (10) when there is joint production—i.e. the use of an input in the production of more than one investment at the same time—captures the same intuition but adds notational burden (see Michael & Becker 1973).

unit of attention allocated to work would have generated at the current wage and time allocated to work, wt_w.

The solution to the maximization problem given in Equation (9) results in the optimal Marshallian demands for parenting-related time, markets goods, and attention allowing the optimal level of parenting-related investments to be identified. In what follows, we derive the comparative statics that result from our model and compare them to those from a traditional home production investment model in which attention is absent. General results which do not require any functional form assumptions regarding the nature of the production technology are reported in Table 1. Results from a stylized case in which parenting investments are linear functions of their inputs and the production of human development is Cobb-Douglas in parenting investments are reported in the Online Appendix A.

3.3.1 Comparative Statics and Model Comparisons

We begin by simplifying the exercise in two ways. First, mirroring Michael and Becker's non-jointness assumption, we restrict parental investments to be functions of single inputs. Second, we restrict our attention to the case in which human development is produced with one market-goods investment, one time-based investment, and one attention-based investment which we conceptualize as parenting style.[15] Even though parenting style has traditionally been conceptualized as a multi-dimensional construct, a single attention-based parenting style in our model simplifies the exposition of the role of attention in shaping it. These two restrictions allow us to drop the Pj subscripts and write the set of parental investments as $Z_P = \{Z_x, Z_t, Z_a\}$, where Z_x is the goods-intensive parental investment, Z_t is the time-intensive parental investment, and Z_a is attention-intensive parenting style. The input constraints for time and attention become $T^P = t + t_w$ and $A^P = a + a_w$, respectively. Our simplified model thus results in parents maximizing the following:

$$L = q(Z_x, Z_t, Z_a) + \lambda[w \cdot T^P \cdot A^P - p \cdot x - w(T^P \cdot a + A^P \cdot t - t \cdot a)]. \qquad (9')$$

In deriving the solution to this problem, the Lagrange multiplier λ is a nuisance parameter which we can avoid by analyzing *ratios* of the first order conditions generated by (9') rather than the first order conditions themselves. Specifically, our model results in the following three ratios of interest:

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[15] Comparative statics can also be derived in the case of joint production and multiple parental investments of the same type. However, the results are only informative under additional functional form assumptions and they add little to the intuition of the model.

$$R_x^t = \frac{\frac{\partial Q}{\partial Z_t}}{\frac{\partial Q}{\partial Z_x}} = \frac{w}{p} \cdot (A^P - a) \cdot \left(\frac{\frac{dt}{dZ_t}}{\frac{dx}{dZ_x}} \right) = \frac{w}{p} \cdot (A^P - a) \cdot \psi_x^t \tag{11a}$$

$$R_x^a = \frac{\frac{\partial Q}{\partial Z_a}}{\frac{\partial Q}{\partial Z_x}} = \frac{w}{p} \cdot (T^P - t) \cdot \left(\frac{\frac{da}{dZ_a}}{\frac{dx}{dZ_x}} \right) = \frac{w}{p} \cdot (T^P - t) \cdot \psi_x^a \tag{11b}$$

$$R_t^a = \frac{\frac{\partial Q}{\partial Z_a}}{\frac{\partial Q}{\partial Z_t}} = \frac{w \cdot (T^P - t)}{w \cdot (A^P - a)} \left(\frac{\frac{da}{dZ_a}}{\frac{dt}{dZ_t}} \right) = \frac{(T^P - t)}{(A^P - a)} \cdot \psi_t^a \tag{11c}$$

where ψ simplifies our notation by representing the ratio of the inverse marginal products for alternative pairs of inputs. As we have assumed that parenting investments are well-behaved, monotonically increasing functions of their inputs, all ψs are strictly positive and, for small changes in inputs, can be taken as constant.

Unlike our model, traditional home production investment models do not account for the role of parental attention in producing child development or in driving full income. As a result, in traditional models only the trade-off between inputs of time and market goods is relevant. This is given by:

$$Traditional \ R_x^t = \frac{\frac{\partial Q}{\partial Z_t}}{\frac{\partial Q}{\partial Z_x}} = \frac{w}{p} \cdot \left(\frac{\frac{dt}{dZ_t}}{\frac{dx}{dZ_x}} \right) = \frac{w}{p} \cdot \psi_x^t . \tag{11a'}$$

The first panel of Table 1 shows the predicted changes in the relative marginal productivity of time-intensive versus goods-intensive parental investments with respect to exogenous changes in the endowment of attention allocated to parenting (A^P), the market price (p), and wage rate (w). These comparative statics are particularly important because they provide a basis for testing our model (first row) against a corresponding model in which attention is omitted (second row). Importantly, our model predicts that changes in the amount of attention allocated to parenting-related investments (A^P) will result in a change in the extent to which parents make time- versus goods-intensive investments in their children. Specifically, our model predicts that the relative marginal product of time-intensive investments increases with A^P if $\frac{\partial a}{\partial A^P} < 1$ and falls if $\frac{\partial a}{\partial A^P} > 1$. In a traditional home production investment model, the relative productivity of time- versus goods-intensive investments is not affected by changes in parental attention (see Column 1, Panel 1). Changes in market prices (Column 2, Panel 1) or wage rates (Column 3, Panel 1) also have different implications for the relative productivity of time-

versus goods-intensive investments in the two models. The direction and magnitude of these differences is likely to be ambiguous *a priori*, however, as they depend on the technological relationships between inputs and parental investments and between parental investments and human development.

Our parenting model also results in predictions about the way that the relative productivity of parenting style versus time- and goods-intensive investments respond to changes in the endowment of attention, market prices, and wage rates (panels 2 and 3, Table 1). The traditional model is, of course, silent on these relationships. The sign and magnitude of these comparative statics naturally also depend on the technological relationships – in particular the degree of complementarity or substitutability – between the alternative types of investments in producing human development. Generating more concrete predictions requires making specific functional form assumptions (see Online Appendix A).

Table 1 Here

3.3.2 Parenting Style and Socioeconomic Status

In our model, the investments that parents make in their children's human development are functions of not only time and market goods, but also of parental attention the endowment of which depends on parents' socioeconomic status (see Equation 7). Our model thus generates a rich set of predictions about the role of attention and socioeconomic disadvantage in shaping the investments that parents make in their children.

In particular, socioeconomic disadvantage directly affects the financial resources that parents have when investing in their children. Poverty is characterized by not only low income, but also by a lack of wealth, both of which constrain parents' ability to purchase inputs of market goods. In our model, as in a traditional home production model, this is effectively captured in the full-income constraint by low wages (w) and a lack of unearned income (V^P). Socioeconomic disadvantage also taxes cognitive "bandwidth" altering the way that people allocate attention (Shah et al. 2012; Mani et al. 2013; Mullainathan and Shafir 2013), potentially constraining children's life chances not only through a lack of financial resources, but also through the expectations they form, the risks they are exposed to, and the experiences they have. Our model is unique in allowing socioeconomic disadvantage to affect investments in human development by decreasing the attention parents have available in raising their children (A^P). The complex relationship between socioeconomic disadvantage and human

development can be seen by considering the overall effect of a change in socioeconomic status on the relative productivity of alternative parenting investments i and j. Specifically,

$$\frac{\mathrm{d}R_j^i}{\mathrm{d}SES} = \left(\frac{\partial R_j^i}{\partial w} \cdot \frac{\mathrm{d}w}{\mathrm{d}SES}\right) + \left(\frac{\partial R_j^i}{\partial V^P} \cdot \frac{\mathrm{d}V^P}{\mathrm{d}SES}\right)$$
$$+ \frac{\partial R_j^i}{\partial A^P} \cdot \left[\left(\frac{\partial A^P}{\partial w} \cdot \frac{\mathrm{d}w}{\mathrm{d}SES}\right) + \left(\frac{\partial A^P}{\partial V^P} \cdot \frac{\mathrm{d}V^P}{\mathrm{d}SES}\right) + \left(\frac{\partial A^P}{\partial \varepsilon} \cdot \frac{\mathrm{d}\varepsilon}{\mathrm{d}SES}\right)\right] \tag{12}$$

where $i, j = \{x, t, a\}$, R_j^i are defined in Equations (11a) – (11c) and ε captures dimensions of socioeconomic disadvantage that are orthogonal to wage rates and unearned income. The first two right-hand-side terms in Equation (12) capture the component of the overall effect of socioeconomic status on parenting that operates through wages and unearned income, respectively. The remaining term is the component of the socioeconomic status effect which operates by altering parents' available attention. If attention is irrelevant for human development then $\frac{\partial R_j^i}{\partial A^P} = 0$ and changes in socioeconomic status are completely captured by changes in financial resources in the form of wages or unearned income. Moreover, the way that socioeconomic disadvantage influences parental investments depends on the way that disparity in socioeconomic status manifests itself. If differences in socioeconomic circumstances largely reflect factors not captured by income or wealth – perhaps because the tax and transfer system successfully smooths financial resources – the effect of disadvantage on human development may largely operate through the constraints it places on parents' attention.

4. EMPIRICAL SUPPORT

Our interest is in assessing whether the key features of our investment model of parenting style are empirically supported. Consequently, we estimate a series of reduced-form conditional correlations in order to assess whether our data are consistent with the following. We first investigate whether parenting style can be separately identified from the traditional forms of parental investments, namely goods- and time-intensive investments. We then assess whether parenting style is related to socioeconomic status in a manner consistent with our theoretical model. Finally, we consider whether parenting style in turn matters for human development.

4.1   The Youth in Focus Data

Our data come from the Youth in Focus (YIF) Project which was designed to study the intergenerational transmission of socioeconomic disadvantage.[16] Data from Australia's social security system are used to identify all 18 year-olds born between October 1987 and March 1988.[17] A comparison with census data indicates that approximately 98 percent of youths in the birth cohort are captured in our administrative data (Breunig et al. 2009). This provides us with high-quality, fortnightly information on the transfer payments their families received from the time they turned three years old. We match extensive survey data for a sample of 18 year-olds and their mothers to summary measures of payment histories using these administrative data.

One clear advantage of the YIF data is their long-term perspective. In the same vein as the recent literature on human development (e.g., Cunha et al. 2010), we see investments in parenting style as a cumulative process with long-run benefits in preparing children for later life. Our data allow us to link parenting to outcomes in early adulthood rather than in childhood which has not yet been done in the economics literature. Moreover, "family disadvantage is poorly assessed by conventional measures of poverty that focus on family income, wealth, and parental education" (Kautz et al. 2014, p. 12). In contrast, the YIF data offer an opportunity to measure socioeconomic disadvantage using a complete and accurate administrative history of the social assistance that families received over more than a decade. Finally, the YIF survey asks both youths and parents detailed questions about family life. Thus, we are able to obtain a more balanced perspective on parent-child interactions than is possible when considering only parental reports.

The main drawback of our data is that while they contain self-reported retrospective information, the survey data are essentially cross-sectional. The single wave of youth-parent survey data provides contemporaneous information about both parenting style and youth outcomes. Thus, we will effectively be estimating correlations that condition on a range of other factors. Our objective is to assess whether our theoretical framework is consistent with the pattern of correlations we observe in the data and in the previous literature.

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[16] For details see Breunig et al. (2007; 2009) and http://youthinfocus.anu.edu.au.

[17] Australia's social security system is nearly universal because many family-related payments are either not means-tested at all or have very high income thresholds. For example, the Family Tax Benefit is an income tax credit for families with children that is denied only to families in the top 20 percent of the income distribution. To place these benefits in context, similar benefits in the United States are provided to families through the tax system in the form of child care rebates and standard deductions for dependent children.

The construction of our key measures is discussed below.

4.2   Is Parenting Style Distinguishable from Goods- and Time-Intensive Investments?

We have modelled parenting style as an investment in children that is constrained not only by time and income, but also by endowments of attention. Thus, we expect parenting style to be distinguishable from the other standard types of goods- and time-intensive investments that parents make in their children.

4.2.1 Parent-Youth Interactions

The YIF Survey asks young people and their parents numerous questions about the interactions they have with one another. Parents, for example, report: whether or not they provide financial help to youths (and if they expect to be repaid); their participation in school committees; and their children's extracurricular activities while they were growing up. Young people provide information about the nature of their relationship with their parents including: whether their parents know their friends; how much their parents want to know (and actually do know) about their whereabouts; and whether they were read to and had help with homework when they were younger. Both parents and youth report the extent to which the parent respects the youth's views and opinions. Together, these questions allow us to take a broad perspective on the ways that parents invest in their children. Financial assistance, for example, is goods-intensive in that it imposes an opportunity cost on parents' own consumption. It is primarily constrained by income. Participating in school committees and reading to children are time-intensive and both are constrained by parents' time endowments. Extracurricular activities require inputs of both time and market goods, while other interactions are less easily characterized as being either goods- or time-intensive.

Responses to a wide range of questions are used to create 12 measures of parent-youth interactions which are categorized into two types (see Table B1 in the Online Appendix for details on these variables). The first type includes five measures of traditional goods- and time-intensive interactions: i) the financial help that parents provide to their children; ii) whether this assistance is considered to be a gift; iii) the number of extra-curricular activities the youth participated in; iv) parental involvement in school committees; and v) reading to children. The remaining seven measures are not easily classified as either goods- or time-intensive and

capture other dimensions of the parent-child relationship that are better described as attention-intensive.

With this conceptual categorization in mind, we first investigate the underlying correlation among these 12 parent-child interaction measures using an exploratory Principal Component Analysis (PCA). Our objective is to determine whether the seven measures we have labeled as attention-intensive are, in fact, merely alternative forms of goods- and time-intensive interactions. Exploratory PCA addresses this issue since it is designed to reduce the original 12 measures to a few components that are sorted by importance (i.e. the amount of the original variation captured by each component) and are orthogonal to each other. The components are linear combinations of the original measures and the weights (loadings) associated with each of the measures are informative about how each component can be interpreted. If all the important variation comes from the five goods- and time-intensive measures, the most important PCA components will have higher loadings on these measures. The remaining seven measures will not load strongly on any of the primary components and may load only on less important components that explain little of the overall variation. On the other hand, if our 12 parent-child interaction measures have sufficient information to separately identify parenting style, we expect that at least one important PCA component will have low loadings on goods- and time-intensive measures and high loadings on the rest.

We are primarily interested in the loadings of the first component of the PCA, reported in Column 1 of Table 2.[18] Almost a quarter of the variation is captured by the first component which loads only weakly on the goods- and time-intensive measures and very strongly on the other seven measures. Moreover, a simple index constructed as the sum of these last seven measures correlates positively but weakly with similar goods-intensive ($\rho = 0.157$) and time-intensive ($\rho = 0.199$) indices. Finally, we see that all three indices often independently predict youth outcomes.[19] Thus, our measures of parent-child interactions do not appear to be simply a function of the market goods and time invested in them by their parents.

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[18] The loadings of the first five main components, with eigenvalues larger than one, are reported in Table B3 in the Online Appendix.

[19] These results are presented in Tables B4 and B5 in the Online Appendix.

4.2.2 Parameterizing Parenting Style and Goods- and Time-Intensive Investments

We then use our 12 parent-child interaction measures to obtain indices that can be interpreted as goods-intensive, time-intensive, and attention-intensive parental investments.[20] The loadings in Column 1 of Table 2 suggest that the seven parent-child interaction measures in the bottom panel capture constructs that are different to those inherent in the first five measures. To obtain clearly interpretable factors from the data, we create our indices of parental investments as predicted scores from two separate confirmatory PCAs.[21] In the first step, a confirmatory PCA of the five goods- and time-intensive interaction measures results in two primary components. The component loadings, which are rotated to facilitate interpretability, are reported in the second and third columns of Table 2. These two resulting indices can be clearly interpreted as measures of "time-intensive" and "goods-intensive" parental investments.

In step two, we conduct a separate confirmatory PCA of the remaining seven interaction measures. This results in two primary components – together accounting for approximately half of the variation – which are rotated to improve interpretability. Loadings are reported in the fourth and fifth columns of Table 2.[22] The first component loads highly on measures (reported both by parents and youths) that identify whether the parent respects the youth's views and opinions about the important things in life as well as on youths' assessments of whether their parents' behavior is respectful and friendly towards them or not. We label the index using these loadings "*respectful*" parenting. The second component loads highly on youth-reported measures of what their parents want to know—and in fact do know—about where they go after school and at night and what they do with their free time. We label the index based on these loadings "*monitoring*" parenting. Together these two indices form our measure of parenting style.

Table 2 Here

Interestingly, our two parenting-style indices, respectful and monitoring, align extraordinarily well with aspects of the two canonical dimensions of successful parenting – demandingness and responsiveness – identified in the human development literature (see Maccoby and Martin 1983; Baumrind 1991). Our respectful component is closely associated

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[20] The value of differentiating between goods- and time-related inputs is shown in Attanasio et al. (2015).

[21] PCA and factor analysis are frequently used to construct indices of latent parenting constructs from multiple items (e.g. Ermisch 2008; Fiorini & Keane 2014).

[22] The use of the Oblimax rotation results in factors that are non-orthogonal and are, in fact, clearly linked through the common loadings on the last two measures.

with the concept of nurturance (Baumrind 1966; 1973); with the key distinction being that our index emphasizes respect over warmth. Our monitoring component shares elements of the parental monitoring index developed by Small and Kerns (1993) and has similarities with Baumrind's (1973) parental control dimension of parenting style.[23] Closely-related constructs have also been identified in the recent literature in economics (Ermisch, 2008; Fiorini and Keane, 2014; Akee et al. 2015).[24]

4.3   Is Parenting Style Related to Socioeconomic Disadvantage?

Our theoretical model predicts that socioeconomic disadvantage is related to parenting styles that are less advantageous for children. We consider the empirical support for this proposition below.

4.3.1 Parameterizing Socioeconomic Disadvantage

We begin by using our administrative social security records to create a measure of socioeconomic disadvantage. Specifically, we cumulate the means-tested welfare payments that families received across a range of programs including: disability support pensions, unemployment benefits, parenting payments, etc. These welfare payments capture not only the consequences of low income and limited financial assets, but also the specific circumstances – e.g., having dependent children, being unemployed, becoming disabled – that lead people in poor families to be eligible for particular programs. We focus on more severe forms of socioeconomic disadvantage by categorizing families as "disadvantaged" if they received welfare support for six years or more while the young person was growing up (i.e. during the 1994-2005 period). Our indicator of disadvantage thus identifies families that have received means-tested welfare payments for more than six years. This indicator accounts for a broad, multidimensional notion of family disadvantage which is preferable to more traditional measures based on low income alone (Corak 2006; Heckman 2011; Kautz et al. 2014).

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[23] Doepke and Zilibotti (2017) compare parenting styles across countries. In aggregate, parenting style has a relatively uniform distribution in Australia with approximately one-third of parents falling into each of the three main categorizations (authoritarian, authoritative, permissive). Relative to U.S. parents, Australian parents are somewhat less likely to employ authoritative parenting (see Doepke & Zilibotti 2017; Figure 1 p. 1337).

[24] Our two indices can be used to categorize parents into four mutually exclusive types: authoritative (highly respectful and highly monitoring); authoritarian (not respectful and highly monitoring); permissive (highly respectful and not monitoring); and disengaged (not respectful and not monitoring). These four categories are commonly used in the developmental psychology literature (e.g., Baumrind 1967; Maccoby & Martin 1983), and have recently been incorporated into economic models of preference transmission (Doepke & Zilibotti 2014). Results using the four-way classification are available upon request.

Summary statistics for the variables in our analysis are reported in Table B2 in the Online Appendix separately for disadvantaged (6+ years of welfare receipt) and relatively advantaged youth (< 6 years or no welfare receipt).

4.3.2 Estimation and Results

Table 3 presents the parameter estimates for various regression models of respectful (Panel A) and monitoring (Panel B) parenting styles on socioeconomic disadvantage. We consider four specifications. We first establish the unconditional correlation between socioeconomic disadvantage and our two parenting styles (Column 1). We then add controls for parental background, including parent's age, education, and foreign-born and Aboriginal status indicators (Column 2). We further control for an extensive set of current family socioeconomic characteristics, including the family's yearly net total earnings, the mother's internal economic locus of control, and indicators for parental asthma, depression, physical disability or mental disability (Column 3). Our final specification also holds constant the goods- and time-intensive investments that parents make in order to isolate the direct relationship between socioeconomic disadvantage and parenting style (Column 4).

We find that socioeconomic disadvantage is negatively related to the respectful component of parenting style as expected (see Panel A of Table 3). However, the relationship is imprecisely estimated and disappears completely when we account for parental background, family disadvantage, and the goods- and time-intensive investments that parents make. At first glance, this result is unexpected. Reviews of the developmental psychology literature often conclude that the economic stress and other negative life events associated with poverty result in an increased tendency to discipline children in a harsh and inconsistent manner and to ignore children's dependency needs (see McLoyd 1998; Bradley and Corwyn 2002). A closer reading of that literature, however, indicates the penalty that disadvantage imposes on parental warmth may be a less robust finding than commonly thought.[25] In addition, our measure of respectful

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[25] For example, amongst the supporting studies cited by Bradley and Corwyn (2002), some report only heavily mediated effects which are hard to interpret (e.g., Conger et al. 1992). Others combine warmth, nurturance and other parenting practices together, making it impossible to infer the relationship between disadvantage and separate parenting constructs (e.g., Lempers et al. 1989; Conger et al. 1992; McCoy et al. 1999). Of the studies with good measures of economic disadvantage and parental warmth, at least one does not find a strong association between the two (McLoyd et al. 1994). Several studies find no (or only a weak) relationship between socioeconomic status and parental warmth (e.g., Patterson et al. 1989, Dodge et al. 1994, Davis et al. 2001, Davis-Kean 2005), while Guo and Harris (2000) and Yeung et al. (2002) are somewhat unique in reporting some evidence of a negative relationship.

parenting relies more on parental respect for the youth's opinions than on the absence of harsh and abrasive parenting which is at the core of the "warm" parenting component in the existing literature.

Table 3 Here

In contrast, there is a strong negative relationship between socioeconomic disadvantage and the monitoring component of parenting style (see Panel B of Table 3). This relationship is economically meaningful, statistically significant, and persistent even when we account for parental background characteristics, family disadvantage, and the other investments that parents make. Interestingly, both goods-intensive and time-intensive parental investments are also strongly associated with higher levels of parental monitoring, again suggesting that they either rely on the same inputs or are complementary in child-rearing. These results for young adults are broadly consistent with previous evidence that social class is associated with the number of organized activities that children engage in, the interest adults take in children's activities, the autonomy children have from adults, and the extent to which it is children's activities (rather than adults) that take precedence in daily life (Lareau 2003).

4.4   Is Parenting Style Related to Youth Outcomes?

If parents' endogenous choices about the style they adopt are, in fact, an important mechanism for investing in their children, then we should observe that parenting style is associated with improved outcomes for young adults. We consider this issue below.

4.4.1 Parameterizing Youth Outcomes

Our focus is on several alternative youth outcomes: i) educational attainment (i.e. high-school completion); ii) academic achievement (i.e. university entrance scores); iii) non-cognitive skills (i.e. locus of control); and iv) risky behavior (i.e. illicit drug use, delinquent behavior, running away, early parenthood, problem drinking, etc.).

Educational attainment is captured by an indicator for high-school completion which takes the value of one if young people report completing 12th grade; and zero otherwise. The young people in our sample are just over 18 years old on average and approximately 72 percent of them report having completed high school.

Our measure of academic achievement comes from the university entrance scores that most Australian students receive upon completing high school.[26] Importantly, rankings are available only for the selective subset of young people ($\mathbf{N = 715}$) who graduate from high-school and meet the other requirements. Because of this, we expect that our results will understate the effect of socioeconomic disadvantage on academic achievement. Scores range between 40 and 100 and the sample average is approximately 74.

We measure non-cognitive skills using an index of the degree to which young people have an internal locus of control. Having an internal locus of control has been associated with higher earnings, faster earnings growth, less unemployment, and an increased propensity to make a range of human development investments (see Cobb-Clark 2015 for a review.) We construct an index of locus of control by summing seven items adapted from the Pearlin Mastery Scale (Pearlin et al. 1981). Responses to those items reflecting external control tendencies have been reversed. The response scale for each item ranges from 1 to 4. Thus, our locus of control index ranges from 7 to 28, has an overall mean of approximately 21, and is increasing in internal locus of control. To facilitate interpretation, we standardize the index to have a mean of zero and a standard deviation of one.

Finally, YIF respondents were asked whether they have ever: run away from home; gotten into trouble with the police; had problems with alcohol; used illicit drugs; attended child or juvenile court due to juvenile offending; hung out with a bad crowd; become pregnant or gotten someone pregnant; and been seriously injured or assaulted. We construct an indicator of risky behavior that takes the value of one if the youth responds 'yes' to one or more of these eight questions. Fully 41 percent of 18-year-olds in our sample have engaged in at least one of these risky behaviors.

4.4.2 Estimation and Results

We assess the relationship between parenting style and youth outcomes by separately regressing all four youth outcomes on respectful and monitoring parenting styles, and

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[26] Specifically, high-school graduates who meet certain minimum coursework requirements (e.g. with respect to minimum credit hours, English requirements, school attendance, etc.) are assigned a percentile ranking based on their academic performance in grades 11 and 12. Rankings are based on a combination of in-class performance, performance on standardized state-based exams, and the degree of difficulty in students' curriculum. Although each of Australia's six states and two territories calculates this ranking differently, a national conversion allows comparisons to be made across students educated in different jurisdictions. These rankings are high-stakes in that places for specific degree programs at Australian universities are centrally allocated in rank order on the basis of students' entrance rankings (see Marks et al. 2001).

controlling for goods-intensive and time-intensive parental investments, socioeconomic disadvantage, and various other parental background characteristics. Our main focus is on the coefficients associated with monitoring and respectful parenting.

We find that the respectful component of parenting style is strongly related to youths' outcomes (see Table 4). More respectful parenting is significantly associated with a greater likelihood of graduating from high school; a higher university entrance score; a more internal locus of control; and less risky behavior. Specifically, respectful parenting is particularly important for the development of the youths' non-cognitive skills: a one standard deviation increase in the respectful parenting index is associated with a 0.314 standard deviation increase in internal locus of control (see Column 3 of Panel C). This positive effect of respectful parenting is more than three times as large as the negative effect associated with socioeconomic disadvantage, which is consistent with the evidence that effective parenting can protect children from some of the adverse effects of socioeconomic disadvantage (McLoyd 1998; Guo and Harris 2000; McCulloch and Joshi 2002). Respectful parenting is also associated with a substantial reduction in risky behavior. The likelihood of engaging in a range of risky behaviors falls by 9.2 percentage points for every one standard deviation increase in our index of respectful parenting (see Column 3 of Panel D). Finally, the association between respectful parenting and educational attainment and academic achievement, though much smaller, are nonetheless large enough to be considered economically meaningful.

Table 4 Here

The monitoring component of parenting style, on the other hand, is associated with significantly less risky behavior, but is unrelated to youths' educational attainment, academic achievement, or non-cognitive skills.[27] Given our data, we are unable to determine whether youths' decisions regarding the risks they take respond to the style their parents adopt or whether parents modify their style in response to the choices that their children make. Most likely there is an element of truth in both. Experimental evidence, however, suggests that youths' propensity to engage in risky behavior can respond to the intensity of parental monitoring. Stanton et al. (2004), for example, find that an intervention designed to increase parental monitoring was effective in reducing suspensions, cigarette smoking, illicit drug use,

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[27] We also created and analyzed indicators for each of our eight forms of risky behavior separately. Respectful parenting is correlated with significantly lower levels of risky behavior across the board. Monitoring parenting is correlated with lower levels of getting in trouble with the police and using illicit drugs.

etc., while U.S policy changes in the 1990s that moved parents from welfare to work led to an increase in adolescents' self-reported tobacco and alcohol consumption, perhaps due to a reduction in parental monitoring (Morris et al. 2001).

4.5   Summary

The results of our empirical exercises lend support to the proposition that parenting style is an important investment in human development. The broad range of parent-youth interactions we consider are not fully captured by goods- and time-intensive parental investments. Instead, many interactions are subsumed by two indices of parenting style that can be interpreted as respectful and monitoring parenting. These indices align with the primary parenting constructs in the extensive literature in developmental psychology. Socioeconomic disadvantage is negatively associated with the extent of parental monitoring even after accounting for a number of controls and for the potential effects of unobserved factors. This is consistent with the view that parenting style is constrained by attention and cognitive bandwidth which are taxed by disadvantage. Finally, respectful parenting is associated with a greater likelihood of graduating from high school; a higher university entrance score; and a more internal locus of control, while parental respect and monitoring are both associated with less risky behavior. In short, parenting style matters.

5.   CONCLUSIONS

Fostering parents' capacity to support their children's development – regardless of their socioeconomic circumstances – is an important step in breaking the cycle of intergenerational poverty. Effective parenting can protect children from many of the adverse effects of growing up in disadvantage. At the same time, there is compelling evidence that economic hardship is often associated with less effective parenting behaviors.

This paper makes an important contribution in formalizing the complex relationship between parenting, socioeconomic disadvantage, and children's development. Specifically, we model parenting style as an investment decision that is important in the production of human development. Unlike previous researchers, we allow investments in child rearing – including in parenting style – to rely not only on inputs of time and market goods, but also on a third input which we conceptualize as attention or cognitive effort. Socioeconomic disadvantage affects parental investment decisions through the constraints it imposes on households'

endowments of attention (cognitive capacity). Importantly, our model finds empirical support in the data and is consistent with the well-established literature in developmental psychology.

Formally modelling the tradeoffs that parents make in raising their children – as we have done here – is fundamental to the formation of social policy designed to generate better outcomes for disadvantaged children. Evaluations of parenting interventions, for example, typically focus only on specific parenting behaviors (e.g. reading to children; monitoring; health care; helping with homework; providing routine; etc.) without considering the consequences for other parental investments. Understanding these tradeoffs is essential in evaluating the overall impact of policies targeting parental decision making. Moreover, to the extent that poverty constrains parents' cognitive bandwidth, income transfers that move families out of poverty will not only increase parents' financial resources, but also permit parents to devote more attention and cognitive effort to raising their children. Both are expected to result in better outcomes for children and adolescents. Importantly, effective parenting may be increased more efficiently through parenting interventions that target attention and cognitive effort directly.

Empirically, we provide clear evidence that it is important to distinguish between the "respectful" and "monitoring" components of parenting style. We find that socioeconomic disadvantage appears to limit parents' ability to monitor – but not to be respectful towards – their children, while it is respectful parenting that is mostly associated with better outcomes for young adults. Parental monitoring is associated only with less risky behavior. These alternative components of parenting style have been prominent in developmental psychology for decades and there is a large literature that links authoritative parenting to a range of positive outcomes including childhood weight problems, school readiness, school performance and later school enrolment, subjective well-being, and various risky behaviors (Dornbusch et al. 1987; Steinberg et al. 1992; Rhee et al. 2006; Chan and Koo 2011). Authoritative parents, however, are characterized by high levels of both parental respect and monitoring, implying that the effect of respectful and monitoring parenting cannot be unequivocally disentangled. Our results indicates that for many outcomes the beneficial effects of an authoritative parenting style may operate through higher levels of parental respect rather than more intensive monitoring.

Our rather straight-forward investment model generates powerful insights into the relationship between parenting style, socioeconomic disadvantage and human development. It also provides a conceptual link to the long-standing psychology literature in child development. It is limited, however, by its static nature. Parenting behavior will almost certainly respond to

what children and adolescents actually do (e.g. Burton et al. 2002; Lundberg et al. 2009), arguing for extensions of the basic model to permit a dynamic investment approach. Moreover, our simple investment model is perhaps best suited to childhood and early adolescence when children's agency is more limited. Youth are more likely to be economic agents with independent preferences and the power to influence family outcomes (e.g. Lundberg et al. 2009), however, making non-cooperative game theoretic approaches to modelling parental investments particularly attractive.

There are a number of pressing questions left unanswered. In particular, Ermisch (2008) argues that parenting in early childhood contributes to the intergenerational persistence in incomes and our theoretical model certainly demonstrates that conceptually this proposition makes a great deal of sense. Empirically, however, we find little evidence that parenting style mediates the socioeconomic disadvantage penalty over and above traditional goods- and time-intensive investments. This is because socioeconomic disadvantage is correlated with certain dimensions of parenting style (monitoring) that may be less important than others (parental respect) for children's outcomes. This then raises the question: How much does parenting style in fact contribute to the intergenerational persistence of socioeconomic disadvantage?

Moreover, effective parenting does appear to compensate for a lack of financial resources (McLoyd 1998; Guo and Harris 2000; McCulloch and Joshi 2002). Heckman (2011), for example, argues that "an economically advantaged child exposed to low-quality parenting is more disadvantaged than an economically disadvantaged child exposed to high-quality parenting" (p. 33). Yet we know very little about the magnitude of this tradeoff and the mechanism through which it operates. Explicitly modelling parenting style as an important investment in the production of human development provides a means of quantifying these relationships. To what extent does parenting style substitute for, or rather complement, inputs of time and market goods? How does socioeconomic disadvantage affect the technological relationship underpinning the production of human development?

We also need to know more about the ways in which the returns to investments in parenting style depend on: i) the dimension of style we have in mind; and ii) the outcome under consideration. Consistent with the literature, we find, for example, that young people's risk-taking is linked to the extent to which their parents monitor them (see Stattin and Kerr 2000). Respectful parenting, on the other hand, appears to have benefits across a wide range of outcomes suggesting that the returns to these alternative aspects of parenting style differ.

Finally, we need to assess the potential to improve children's outcomes through initiatives that increase parental attention. Our paper points to a number of potential strategies. Reducing the cognitive taxes imposed on the poor (see Mani et al. 2013), may have additional benefits in increasing the endowment of attention that disadvantaged families have available for parenting. Automatizing monthly bill payments, simplifying the welfare application process, and providing insurance against unforeseen health or income shocks are just a few examples of policies that could potentially liberate attention in disadvantaged families. Moreover, workplace policies that make it easier and less costly for parents to pay attention to work may be effective in reducing the opportunity cost of parenting. Lastly, it appears to be possible to directly shift parents' attention towards parenting. Mayer et al. (2015), for example, demonstrate that text messages reminding parents to read to their children is effective in increasing the time parents devoted to reading. Our model provides a straight-forward conceptual framework for quantifying the costs and benefits of these alternative strategies making it possible to assess the welfare implications of parenting interventions.

References

Akabayashi H (2006) An equilibrium model of child maltreatment. J Econ Dynamics and Control 30: 993-1025

Akee R, Simeonova E, Costello EJ, Copeland W (forthcoming) How does household income affect child personality traits and behaviors? Am Econ Rev (forthcoming)

Attanasio O, Cattan S, Fitzsimons E, Meghir C, Rubio-Codina M (2015) Estimating the production function for human capital: Results from a randomized control trial in Colombia. NBER Working Paper, No. w20965

Aunola K, Stattin H, Nurmi JE (2000) Parenting styles and adolescents' achievement strategies. J Adolesc 23: 205-222

Barón JD, Cobb-Clark DA, Erkal N (2015) Cultural Transition and the Intergenerational Correlation in Welfare Receipt. South Econ J, (2015) Vol. 82(1), pp. 208-234

Baumrind D (1966) Effects of authoritative parental control on child behavior. Dev Psychol 37(4): 887-907

Baumrind D (1967) Child care practices anteceding three patterns of preschool behavior. Genetic psychology monographs 75(1): 43-88

Baumrind D (1973) The development of instrumental competence through socialization. In: Anne Pick (Eds.) Minnesota symposium on child psychology, Vol 7, University of Minnesota Press, Minneapolis, pp 3-46

Baumrind D (1991) The influence of parenting style on adolescent competence and substance use. J Early Adolesc 11(1): 56-95

Becker GS (1960) An economic analysis of fertility. In: Demographic and economic change in developed countries, NJ: NBER, Princeton, pp 209-240

Becker GS (1965) A theory of the allocation of time. Econ J 75(299): 493-517

Becker GS, Lewis HG (1973) On the interaction between the quantity and quality of children. J Political Econ 81(2): S279-S288

Becker GS (1985) Human capital, effort, and the sexual division of labor. J Labor Econ 3(1): S33-S58

Berger LM, Paxson C, Waldfogel J (2009) Income and child development. Child and Youth Serv Rev 31(9): 978-989

Bernheim BD, Ray D, Yeltekin S (2015) Poverty and self-control. Econometrica 83(5): 1877-1911

Bisin A, Verdier T (2001) The economics of cultural transmission and the dynamics of preferences. J Econ Theory 97:298-319

Bisin A, Verdier T (2010) The economics of cultural transmission and socialization. In: J. Benhabib, A. Bisin, and M. Jackson (ed) Handbook of Social Economics. Elsevier, pp 339-416

Bradley RH, Robert FC (2002) Socioeconomic status and child development. Annu Rev Psychol 53(1): 371-399

Breunig R, Cobb-Clark DA, Gørgens T, Sartbayeva A (2007) User's guide to the youth in focus data version 1.0. Youth in focus project discussion paper series, The Australian National University

Breunig R, Cobb-Clark DA, Gørgens T, Ryan C, Sartbayeva A (2009) User's guide to the youth in focus data version 2.0. Youth in focus project discussion paper series, The Australian National University

Brooks-Gunn J, Markman L (2005) The contribution of parenting to ethnic and racial gaps in school readiness. The Future of Children 15(1): 139-168

Burton P, Phipps S, Curtise L (2002) All in the family: A simultaneous model of parenting style and child conduct. Am Econ Rev 92(2): 368-372

Cameron L, Cobb-Clark DA (2008) Do coresidency and financial transfers from the children reduce the need for elderly parents to work in developing countries? J Popul Econ 21(4), 1007-1033

Cigno A, Komura M, Luporini A (2017) Self-enforcing family rules, marriage and the (non)neutrality of public intervention. J Popul Econ 30: 805–834

Chan TW, Koo A (2011) Parenting style and youth outcomes in the UK. Eur Sociol Rev 27(3): 385-399

Cobb-Clark DA (2015) Locus of control and the labor market. IZA J Labor Econ 4(1): 1-19

Conger RD, Conger KJ, Elder GH, Lorenz FO, Simons RL, Whitbeck LB (1992) A family process model of economic hardship and adjustment of early adolescent boys. Child Dev 63(3): 526-541

Conger RD, Wallace LE, Sun Y, Simons RL, McLoyd VC, Brody GH (2002) Economic pressure in African American families: A replication and extension of the family stress model. Dev Psychol 38(2): 179-193

Corak M (2006) Do poor children become poor adults? Lessons from a cross country comparison of generational earnings mobility. Res Econ Inequal 13(1): 143-188

Cosconati, Marco. 2009. Parenting style and the development of human capital in children. Unpublished Manuscript, Bank of Italy.

Cunha, Flávio. 2015. "Subjective rationality, parenting styles, and investments in children." In Paul R. Amato, Alan Booth, Susan M. McHale, Jennifer Van Hook (Eds.) Families in an Era of Increasing Inequality (pp. 83-94). Cham: Springer.

Cunha F, Heckman JJ, Schennach SM (2010) Estimating the technology of cognitive and noncognitive skill formation. Econometrica 78(3): 883-931

Darling N, Steinberg L (1993) Parenting style as context: An integrative model. Psychol Bull 113(3): 487-496

Davis CL, Delamater AM, Shaw KH, La Greca AM, Eidson MS, Perez-Rodriguez JE, Nemery R (2001) Parenting styles, regimen adherence, and glycemic control in 4-to 10-year-old children with diabetes. J Paediatr Psychol 26(2): 123-129

Davis-Kean PE (2005) The influence of parent education and family income on child achievement: The indirect role of parental expectations and the home environment. J Family Psychol 19(2): 294-304

De Tray DN (1974) Child quality and the demand for children. J Political Econ 81(2): S70-S95

Del Boca D, Flinn C, Wiswall M (2014) Household choice and child development. Rev Econ Stud 81(1): 137-185

Del Bono E, Francesconi M, Kelly Y, Sacker A (2016) Early maternal time investment and early child outcomes. Econ J 126(596): F96-F135

Dodge KA, Pettit GS, Bates JE (1994) Socialization mediators of the relation between socioeconomic status and child conduct problems. Child Dev 65(2): 649-665.

Doepke M, Zilibotti F (2017) Parenting with style: Altruism and paternalism in intergenerational preference transmission. Econometrica 85(5):1331-1371

Dohmen T, Falk A, Huffman D, Sunde U (2011) The intergenerational transmission of risk and trust attitudes. Rev Econ Stud 79(2):645-677

Dooley M, Stewart J (2007) Family income, parenting styles and child behavioural–emotional outcomes. Health Econ 16(2): 145-162

Dornbusch SM, Ritter PL, Leiderman PH, Roberts DF, Fraleigh MJ (1987) The relation of parenting style to adolescent school performance. Child Dev 58(5):1244-1257

Edwards ME, Plotnick R, Klawitter M (2001) Do attitudes and personality characteristics a_ect socioeconomic outcomes? The case of welfare use by young women. Soc Sci Q 82 (4):827-843

Ermisch J (2003) An Economic Analysis of the Family. Princeton, New Jersey: Princeton University Press.

Ermisch J (2008) Origins of social immobility and inequality: parenting and early child development. Natl Inst Econ Rev 205(1):62-71

Feinstein L (2003) Inequality in the early cognitive development of British children in the 1970 cohort. Economica 70(277):73-97

Fiorini M, Keane M (2014) How the allocation of children's time affects cognitive and non-cognitive development. J Labor Econ 32(4):787-836.

Galiani S, Staiger M, Torrens G (2017) When children rule: Parenting in modern families NBER Working Paper 23087 (January)

Gino F, Schweitzer ME, Mead NL, Ariely D (2011) Unable to resist temptation: How self-control depletion promotes unethical behavior. Organizational Behavior and Human Decision Processes 115(2): 191-203

Gorman WM (1959) Separable utility and aggregation. Econometrica 469-481

Gronau R (1977) Leisure, home production, and work-the theory of the allocation of time revisited. J Political Econ 85(6): 1099-1123

Guo G, Harris KM (2000) The mechanisms mediating the effects of poverty on children's intellectual development. Demography 37(4): 431-447

Hao L, Hotz VJ, Jin GZ (2008) Games parents and adolescents play: Risky behaviour, parental reputation and strategic transfers. Econ J 118(528): 515-555

Haushofer J, Fehr E (2014) On the psychology of poverty. Science 344(6186): 862-867

Heckman JJ (2006) Skill formation and the economics of investing in disadvantaged children. Science 312(5782): 1900-1902

Heckman JJ (2011) The economics of inequality: the value of early childhood education. Am Educ 35(1): 31-35

Hollingshead AB (2011) Four Factor Index of Social Status. Yale J Sociol (8): 11-20

Jensen RT (2004) Do private transfers 'displace'the benefits of public transfers? Evidence from South Africa. J Public Econ 88(1-2):89-112

Kautz T, Heckman JJ, Diris R, ter Weel B, Borghans L (2014) Fostering and measuring skills: Improving cognitive and non-cognitive skills to promote lifetime success. OECD Education Working Papers, No. 110, Paris: OECD Publishing

Kelly Y, Sacker A, Del Bono E, Francesconi M, Marmot M (2011) What role for the home learning environment and parenting in reducing the socioeconomic gradient in child development? Findings from the Millennium Cohort Study. Archives of Disease in Childhood 96(9): 832–837

Kooreman P (2007) Time, money, peers, and parents: Some data and theories on teenage behavior. J Popul Econ 20(1): 9 – 33

Lareau A (2003) Unequal Childhoods: Class, Race, and Family Life. University of California Press, Berkeley CA

Laferrère A, Wolff FC (2006) Microeconomic models of family transfers. Handbook of the economics of giving, altruism and reciprocity 1(2):889-969

Leibowitz A (1974) Home investments in children. J Polit Econ 82(2): S111-S131

Lempers JD, Clark-Lempers D, Simons RL (1989) Economic hardship, parenting, and distress in adolescence. Child Dev 60(1): 25-39

Lillard L, Willis R (1997) Motives for Intergenerational Transfers: Evidence from Malaysia. Demography 34(1):115-134

Lizzeri A, Siniscalchi M (2008) Parental guidance and supervised learning. Q J Econ, 123(3): 1161-1195

Lundberg S, Romich JL, Tsang KP (2009) Decision-making by children. Rev Econ Househ 7(1): 1-30

Maccoby EE, Martin JA (1983) Socialization in the context of the family: Parent-child interaction. In: Paul H. Mussen (ed) Handbook of Child Psychology: formerly Carmichael's Manual of Child Psychology. Wiley, New York, pp 3-101

Mani A, Mullainathan S, Shafir E, Zhao J (2013) Poverty impedes cognitive function. Science 341(6149): 976-980

Marks G, McMillan J, Hillman K (2001) Tertiary entrance performance: The role of student background and school factors. LSAY Research Reports. Longitudinal surveys of Australian youth research report; n.22

Mayer SE, Kalil A, Oreopoulos P, Gallegos S (2015) Using behavioral insights to increase parental engagement: The parents and children together (pact) intervention. National Bureau of Economic Research Working Paper 21602, October

McCoy MG, Frick PJ, Loney BR, Ellis ML (1999) The potential mediating role of parenting practices in the development of conduct problems in a clinic-referred sample. J Child Family Stud 8(4): 477-494

McCulloch A, Joshi HE (2002) Child development and family resources: Evidence from the second generation of the 1958 British birth cohort. J Popul Econ 15(2): 283-304

McEwen BS (2000) Allostasis and allostatic load: Implications for neuropsychopharmacology. Neuropsychopharmacology 22(2): 108-124

McLoyd VC, Jayaratne TE, Ceballo R, Borquez J (1994) Unemployment and work interruption among African American single mothers: Effects on parenting and adolescent socioemotional functioning. Child Dev 65(2): 562-589

McLoyd VC (1998) Socioeconomic disadvantage and child development. Am Psychol 53(2): 185-204

Michael RT, Becker GS (1973) On the new theory of consumer behavior. Swed J Econ 75(4): 378-396

Mistry RS, Benner AD, Tan CS, Kim SY (2009) Family economic stress and academic well-being among Chinese-American youth: The influence of adolescents' perceptions of economic strain. J Family Psychol 23(3): 279-290

Morris P, Huston A, Duncan G, Crosby D, Bos H (2001) How Welfare and Work Policies Affect Children: A Synthesis of Research. MDRC, New York

Mueller CW, Parcel TL (1981) Measures of socioeconomic status: Alternatives and recommendations. Child Dev 52(1): 13-30

Mullainathan S, Shafir E (2013) Scarcity: Why Having so Little Means so Much. Henry Holt and Company LLC, New York

Patterson CJ, Cohn DA, Kao BT (1989) Maternal warmth as a protective factor against risks associated with peer rejection among children. Development and Psychopathology 1(1): 21-38

Paulson SE (1994) Relations of parenting style and parental involvement with ninth-grade students' achievement. J Early Adolesc 14(2): 250-267

Pearlin LI, Menaghan EG, Lieberman MA, Mullan JT (1981) The stress process. J Health Soc Behav 22(4): 337-356

Patacchini E, Zenou Y (2007) The racial test score gap and parental involvement in Britain. Technical report. IZA Discussion Paper No. 2613.

Rameson LT, Morelli SA, Lieberman MD (2012) The neural correlates of empathy: Experience, automaticity, and prosocial behavior. J Cogn Neurosci 24(1): 235-245

Rhee KE, Lumeng JC, Appugliese DP, Kaciroti N, Bradley RH (2006) Parenting styles and overweight status in first grade. Pediatrics 117(6): 2047-2054

Ribar DC, Zapata D (2014) Food assistance and family routines in three American Cities. Rev Econ Househ: 1-16

Rotter JB (1966) Generalized expectancies for internal versus external control of reinforcement. Psychological Monographs: General and Applied 80(1): 1-28

Sewell WH, Shah VP (1967) Socioeconomic status, intelligence, and the attainment of higher education. Sociol Educ 40(1): 1-23

Shah AK, Mullainathan S, and Shafir E (2012) Some consequences of having too little. Science 338(6107): 682-685

Shiv B, Fedorikhin A (1999) Heart and mind in conflict: The interplay of affect and cognition in consumer decision making. J Consumer Res 26(3): 278-292

Small SA, Kerns D (1993) Unwanted sexual activity among peers during early and middle adolescence: Incidence and risk factors. Journal of Marriage and the Family 55(4): 941-952

Solon G (2004) A Model of Intergenerational Mobility Variation over Time and Place. In M Corak (ed) Generational Income Mobility in North America and Europe. University Press, Cambridge

Spera C (2005) A review of the relationship among parenting practices, parenting styles, and adolescent school achievement. Educ Psychol Rev 17(2): 125-146

Stanton BF, Li X, Galbraith J, Cornick G, Feigelman S, Kaljee L, Zhou Y (2000) Parental underestimates of adolescent risk behavior: a randomized, controlled trial of a parental monitoring intervention. J Adolesc Health 26(1): 18-26

Stattin H, Kerr M (2000) Parental monitoring: A reinterpretation. Child Dev 71(4): 1072-1085

Steinberg L, Lamborn SD, Dornbusch SM, Darling N (1992) Impact of parenting practices on adolescent achievement: Authoritative parenting, school involvement, and encouragement to succeed. Child Dev 63(5): 1266-1281

Taubinsky D (2014) From intentions to actions: A model and experimental evidence of inattentive choice. Working paper, Harvard University

Wake M, Nicholson JM, Hardy P, Smith K (2007) Preschooler obesity and parenting styles of mothers and fathers: Australian national population study. Pediatrics 120(6): e1520-e1527

Weinberg BA (2001) An incentive model of the effect of parental income on children. J Political Econ 109(2): 266 – 280

Yeung JW, Linver MR, Brooks-Gunn J (2002) How money matters for young children's development: Parental investment and family processes. Child Dev 73(6): 1861-1879

Partial derivative of:	In model:	With respect to: $\dfrac{\partial}{\partial A^P}$	$\dfrac{\partial}{\partial p}$	$\dfrac{\partial}{\partial w}$
R_x^t	Parenting	$\dfrac{w}{p}\psi_x^t\left(1-\dfrac{\partial a_w}{\partial A^P}\right)$	$-\left(\dfrac{w}{p^2}\psi_x^t\right)\left(\dfrac{\partial a}{\partial p}p+a_w\right)$	$\dfrac{\psi_x^t}{p}\left(a_w-w\dfrac{\partial a}{\partial w}\right)$
	Traditional	0	$-\left(\dfrac{w}{p^2}\psi_x^t\right)$	$\left(\dfrac{\psi_x^t}{p}\right)$
R_x^a	Parenting	$-\left(\dfrac{w}{p}\psi_x^a\right)\dfrac{\partial t}{\partial A^P}$	$\left(\dfrac{w}{p^2}\psi_x^a\right)\dfrac{\partial t}{\partial p}$	$\left(\dfrac{1}{p}\psi_x^a\right)\dfrac{\partial t_w}{\partial w}$
	Traditional	N/A	N/A	N/A
R_t^a	Parenting	$-\dfrac{\psi_t^a}{a_w^2}\left(\dfrac{\partial t}{\partial A^P}a_w+t_w\dfrac{\partial a_w}{\partial A^P}\right)$	$\dfrac{\psi_t^a}{a_w^2}\left(\dfrac{\partial t_w}{\partial p}a_w-t_w\dfrac{\partial a_w}{\partial p}\right)$	$\dfrac{\psi_t^a}{a_w^2}\left(\dfrac{\partial t_w}{\partial w}a_w-t_w\dfrac{\partial a_w}{\partial w}\right)$
	Traditional	N/A	N/A	N/A

Table 2
PRINCIPAL COMPONENT ANALYSES OF PARENT-CHILD INTERACTIONS

	Exploratory PCA	Confirmatory PCA: Defining parental investments			
				Parenting Style	
	First Component	*Time-intensive*	*Goods-intensive*	*Respectful*	*Monitoring*
Eigenvalues =	2.89	1.37	1.15	2.57	1.26
Variation captured =	0.24	0.27	0.23	0.36	0.18
Goods- and Time-intensive Interactions:					
Parent helps youth with money	0.17	0.06	**0.65**		
1 if parents don't expect money aid to be repaid	0.05	-0.06	**0.73**		
Parent: Participated in parent committee/meetings	0.14	**0.64**	-0.16		
Number of youth's extracurricular activities	0.15	**0.59**	0.08		
Youth: Parents read to me at night when younger	**0.30**	**0.48**	0.14		
Attention-intensive Interactions:					
Parent: I can respect youth's views and opinions	0.28			**0.38**	-0.02
Youth: Mother respects my views and opinions	**0.36**			**0.59**	-0.07
Youth: Mother's behavior towards me is friendly	**0.37**			**0.59**	-0.05
Youth: Mother wants to know whereabouts	**0.31**			-0.16	**0.69**
Youth: Mother really knows whereabouts	**0.30**			0.09	**0.60**
Youth: Mother knows my friends	**0.41**			0.25	0.26
Youth: Parents help with schoolwork & guidance when younger	**0.36**			0.23	0.29

This table reports the component loadings of a Confirmatory Principal Component Analysis (PCA) on all parent-child interaction measures (Column 1, orthogonal and unrotated), and the component loadings of two additional PCAs: the first one on a set of goods- and time-intensive parent-child interactions (Columns 2 and 3, oblimax rotated), and the second one on a set of attention-intensive parent-child interactions (Columns 4 and 5). All PCAs are based on tetrachoric, polychoric and polyserial correlations of the underlying measures.

Table 3

SOCIOECONOMIC DISADVANTAGE AND PARENTING STYLES

Panel A. Respectful Parenting Style and Disadvantage

	(1)	(2)	(3)	(4)
More than 6 years of welfare	-0.081	-0.067	-0.038	0.014
	(0.062)	(0.064)	(0.068)	(0.067)
Goods-intensive investments				0.071**
				(0.030)
Time-intensive investments				0.164***
				(0.029)
Parent's background	No	Yes	Yes	Yes
Parent's current SES	No	No	Yes	Yes
Observations	1,358	1,358	1,358	1,358
R-squared	0.001	0.006	0.021	0.050

Panel B. Monitoring Parenting Style and Disadvantage

	(1)	(2)	(3)	(4)
More than 6 years of welfare	-0.220***	-0.192***	-0.221***	-0.128*
	(0.066)	(0.067)	(0.071)	(0.067)
Goods-intensive investments				0.199***
				(0.028)
Time-intensive investments				0.231***
				(0.029)
Parent's background	No	Yes	Yes	Yes
Parent's current SES	No	No	Yes	Yes
Observations	1,358	1,358	1,358	1,358
R-squared	0.009	0.019	0.022	0.107

*This table reports least squares regression coefficients of respectful parenting style (Panel A) and monitoring parenting style (Panel B) on an indicator of heavy welfare reliance while the youth was growing up, and on goods-intensive and time-intensive parental investments. The respectful and monitoring parenting style indices and the goods-intensive and time-intensive investment indices are constructed as linear combinations of the corresponding measures in Table 2, weighted by their factor loadings. Parent's background includes age, education, and foreign-born and aboriginal status. Parent's current SES includes total earnings, unemployment status, mother's internal Locus of Control, and physical and mental health. Heteroscedasticity robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 4
PARENTING STYLES AND YOUTH OUTCOMES

Panel A. Parenting and Youths' High School Graduation

	(1)	(2)	(3)
Respectful parenting	0.028**		0.023*
	(0.013)		(0.013)
Monitoring parenting	0.016		0.002
	(0.013)		(0.013)
Goods-intensive investments		0.030**	0.028**
		(0.013)	(0.013)
Time-intensive investments		0.051***	0.047***
		(0.012)	(0.013)
More than 6 years of welfare	-0.128***	-0.110***	-0.110***
	(0.029)	(0.029)	(0.029)
Observations	1,358	1,358	1,358
R-squared	0.052	0.062	0.064

Panel B. Parenting and Youths' University Entrance Score

	(1)	(2)	(3)
Respectful parenting	2.119***		1.993***
	(0.672)		(0.679)
Monitoring parenting	-0.209		-0.78
	(0.645)		(0.654)
Goods-intensive investments		1.519**	1.650**
		(0.649)	(0.663)
Time-intensive investments		1.806***	1.647**
		(0.640)	(0.646)
More than 6 years of welfare	-3.414**	-2.496	-2.716*
	(1.597)	(1.593)	(1.591)
Observations	715	715	715
R-squared	0.122	0.124	0.136

(continued below)

(Table 4 continued from above)

Panel C. Parenting and Youths' Internal Locus of Control

	(1)	*(2)*	*(3)*
Respectful parenting	0.323***		0.314***
	(0.027)		(0.026)
Monitoring parenting	0.020		0.009
	(0.029)		(0.030)
Goods-intensive investments		-0.009	-0.036
		(0.028)	(0.027)
Time-intensive investments		0.154***	0.098***
		(0.029)	(0.028)
More than 6 years of welfare	-0.112*	-0.097	-0.095
	(0.061)	(0.064)	(0.061)
Observations	1,341	1,341	1,341
R-squared	0.117	0.03	0.126

Panel D. Parenting and Youths' Risky Behavior

	(1)	*(2)*	*(3)*
Respectful parenting	-0.095***		-0.092***
	(0.013)		(0.013)
Monitoring parenting	-0.041***		-0.030**
	(0.013)		(0.014)
Goods-intensive investments		-0.051***	-0.038***
		(0.014)	(0.014)
Time-intensive investments		-0.046***	-0.023*
		(0.014)	(0.014)
More than 6 years of welfare	0.102***	0.089***	0.087***
	(0.030)	(0.031)	(0.031)
Observations	1,341	1,341	1,341
R-squared	0.089	0.053	0.096

This table reports least squares regression coefficients on the following youth outcomes: a high school graduation dummy (Panel A), University Entrance Scores (Panel B), internal Locus of Control scores (Panel C), and risky behavior dummy (Panel D). These youth outcome variables are regressed on: respectful and monitoring parenting styles, goods-intensive and time-intensive parental investments, on an indicator of heavy welfare reliance while the youth was growing up, and on parent's background (with unreported coefficients). The respectful and monitoring parenting style indices and the goods-intensive and time-intensive investment indices are constructed as linear combinations of the corresponding measures in Table 2, weighted by their factor loadings. Parent's background includes age, education, and foreign-born and aboriginal status. Heteroscedasticity robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1