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The Preadult Origins of Post-Materialism: A Longitudinal Sibling Study

Martin Kroh*

Abstract

Using a research design that traces siblings' preferences for post-materialistic values in Germany over two decades, this paper provides new evidence on the origins of value preferences. Focusing on Inglehart's thesis of value change, we test the combined socialization and scarcity hypothesis against the social learning hypothesis, a prominent rival account of preadult value preference formation. Sibling estimates show that the shared preadult environment does indeed exert lasting effects on the permanent component of preferences for post-materialistic policies. In addition to weak effect of the shared experience of socioeconomic scarcity, we find that the intergenerational transmission of post-materialism –which is disregarded by Inglehart's original thesis– plays a significant role in value preference acquisition. We discuss the implications of our individual-level findings for forecasts of aggregate-level trends in value change.

JEL Classification: Z13, D72, C23, C25

Keywords: Value Preferences, Postmaterialism, Sibling Estimates, Intergenerational Transmission, Hierarchical Regression Modeling

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1 Introduction

While theories of value change have a long tradition in the social sciences (e.g., Weber 1904), Ronald Inglehart's silent revolution thesis sparked a particularly intense scholarly debate on changing value preferences in Western societies (for an review see e.g., van Deth & Scarbrough 1995, Hitlin & Piliavin 2004). In a series of publications (e.g., Inglehart 1971, Inglehart 1977, Inglehart 1997, Inglehart & Welzel 2005), Inglehart formulated the thesis that the sustained improvement of socioeconomic conditions in advanced industrial societies in the second half of the twentieth century has caused a gradual shift in the population's value preferences from materialistic goals such as physical security and economic stability to postmaterialistic goals such as self-actualization and civic participation.

Inglehart puts forward an individual-level behavioral model of value preference formation that forms the theoretical underpinning of such aggregate forecasts. In the original formulation of his theory, the behavioral model holds, first, that individuals develop their value preferences during a formative period of their youth and retain them unchanged during their life course (socialization hypothesis). Second, the socioeconomic environment experienced during the preadult period determines the direction of preferences: the experience of economic insecurity disposes young adults to prefer materialistic values, while the experience of lasting affluence favors the development of postmaterialistic value preferences (scarcity hypothesis). The criticism that has been launched against the thesis of post-materialistic value change focuses largely on this behavioral model of value preferences (e.g.,

Marsh 1975, Flanagan 1987, Warwick 1998) as well as Inglehart's empirical operationalization of value preferences (e.g., van Deth 1983*b*, Davis & Davenport 1999).[1]

One prominent objection against Inglehart's view of value formation in young adults has been the relative neglect of parental influences (social learning hypothesis). Given the abundant evidence of the transmission of values and attitudes from one generation to the next (e.g., Jennings & Niemi 1968, Glass, Bengtson & Dunham 1986), a theory that highlights intergenerational differences resulting from differing preadult experiences but that ignores intergenerational similarities resulting from social learning is likely to overestimate value change due to generational replacement. The present paper attempts to advance the post-materialism debate by estimating the effect of the economic position of family background and contrasting it with the effect of parental political views on value formation in young adults.

Despite numerous attempts to either empirically prove or refute the post-materialism thesis, the evidence produced thus far provides, in our view, only indirect support for the behavioral model's validity. To evaluate the socialization hypothesis, many of these studies have estimated the stability of value preferences in adult respondents to determine their preadult origin. Preadult socialization may not be the only possible account for stable value preferences, however. To evaluate the scarcity hypothesis, many link cross-sectional survey data on adults' value preferences either to respondents' recall

[1] In his more recent publications, Inglehart addresses some of this critique by amending aspects of his original thesis. Note that the present paper is designed to test his original thesis of a 'silent revolution' and does not claim to test any later expansions of this theory.

information on the economic security of their parental household during their youth or to aggregate data on the national economy, typically in the form of cohort studies. While proxy information seem unreliable and possibly endogenous in this context, national economic indices appear unsuitable for drawing inferences on individuals' personal experiences during their political maturation.

The present study attempts to fill this gap by rigorously testing the basic behavioral assumptions behind Inglehart's original thesis and contrasting it with the social learning hypothesis using an alternative research design that studies siblings' value preferences. Research on siblings –and dyadic designs in general– are becoming increasingly important in the fields of psychology (e.g., Eaves et al. 1999, Lake et al. 2000), sociology (e.g., Duncan et al. 1998, Warren, Sheridan & Hauser 2002), and economics (e.g., Solon 1992, Björklund et al. 2002), but are seldom used in political science. One advantage of a design that investigates the extent to which siblings share the same value preferences is that it can identify the sum of the influences of the preadult environment on the formation of value preferences without modeling each of these idiosyncratic experiences separately. Moreover, this paper uses longitudinal data containing direct measures of siblings' parental households starting in their childhood to overcome the problems of using either adult respondents' recall of their parental environment during youth or national indices.

This longitudinal sibling design is facilitated by household panel data, which have been underutilized in past value research. Despite their primary focus on social mobility and inequality, the German Socio-Economic Panel

Study (SOEP)[2] contains two decades of measures of post-materialism (1986, 1996, 2006) and the socioeconomic position of individuals, their siblings, and their parents. The panel data covering two full decades enables us to further corroborate our test of the value formation in terms of the permanence of effects of the preadult environment.

2 Theory

2.1 Value Formation in Young Adults

Inglehart's notion that individuals possess stable value preferences, which are a function of the environment they experienced during a formative period of their youth, is often accepted in the value change research. A classic account of this socialization hypothesis was succinctly formulated by Mannheim (1928):

> "[E]ven if the rest of one's life consisted in one long process of negation and destruction of the natural world view acquired in youth, the determining influence of these early impressions would still be predominant."

A view that ascribes the primacy of value preference formation to the preadult environment is not without criticism. Alternative approaches focus

[2]Comparable studies exist, for instance, in the US (Panel Study of Income Dynamics, PSID) and the UK (British Household Panel Survey, BHPS). Due to the wealth of data on post-materialism, the SOEP represents the most appropriate data source for this paper's research question. Established in West Germany in 1984 with regular refresher samples since, this ongoing survey currently consists of a representative national sample of 24,000 individuals in 12,000 households (Spiess & Kroh 2008).

either on typical life-course trajectories in the development of value preferences or on exposed period-specific events. According to the first school of thought, individuals become more materialistic, for instance, when they take on adult responsibilities (Marsh 1975, Klages, Hippler & Herbert 1992). According to the second school of thought, individuals (no matter what their age) become more materialistic when they experience a difficult economic situation, either personally or on a broader scale (Dalton 1977, Flanagan 1982).

One strategy for testing the socialization hypothesis uses estimates of the stability of value preferences over time, and concludes their responsiveness to life-course and period-specific events from this. An alternative strategy estimates the effects of key events experienced at different stages of the life-course to determine individuals' value preferences. Both of these strategies for testing the socialization hypothesis have been subjected to some amount of criticism.

Empirical evidence of the stability of post-materialistic value preferences over time often turns out to be inconclusive. Some authors report low (van Deth 1983*a*) and others high stability estimates (De Graaf, Hagenaars & Luijkx 1989). These differences may be attributed partly to the differing methodologies used to disentangle the stability in the concept and measurement of post-materialism, and partly to the conflicting interpretations of the magnitude of correlations over time as reflecting 'stability'. Furthermore, estimates of stability in value preferences can be called into question from a conceptual point of view as well. As Fiorina (1981) and Achen (1992) have argued in the context of party identification, the preadult origins of political orientations are not the only possible explanation for their life-long stability.

Such stability can also emerge from a constant updating of values in relation to current experiences, an idea that is perfectly in line with life-cycle and period-specific approaches to value preference formation. This notion of the accumulation of past experiences is in line, for instance, with previous research showing a decreasing responsiveness of political orientations by age (Krosnick & Alwin 1989, Alwin & Krosnick 1991).

The alternative strategy used to test the socialization hypothesis –that of estimating the effects of national events experienced at various stages of the life-course on time-tested value preferences– is plagued by problems of unobserved heterogeneity. The difficulty of this design lies in its identification of all relevant experiences of value preference formation, incidents that are in all likelihood highly idiosyncratic. Any test that shows that individuals' value preferences as being unrelated to, for instance, inflation rates during their formative years (Duch & Taylor 1993) is vulnerable to the critique of not considering the appropriate economic indices (Inglehart & Abramson 1994). Not only conceptually but also empirically, reproducing personal experiences during political maturation is an extremely complex task since most sources of data on value preferences do not cover characteristics of the individual's preadult environment.

In many cases, cohort membership is used as omnibus proxy for similar experiences during the formative years. However, it is highly unlikely that all members of a certain cohort in a certain society experience the same national events uniformly, let alone the same events at a regional, local, or family level. This problem is acknowledged by Inglehart & Abramson (1994), who call for the analysis of experiences at the lowest level of preadult

personal networks, i.e., within the parental household. To meet this demand, we employ an alternative strategy to test the socialization hypothesis. By analyzing siblings, we consider the similarity of their value preferences to represent the sum of their shared preadult environment. If this environment – which may include events at all levels: personal, local, regional, and national– is important for individual's value formation, the similarity in siblings' value preferences should generally be high. If not, agreement on value preferences between siblings will scarcely be higher than between unrelated individuals.

2.2 Preadult Determinants of Values

For simplicity, the previous section alludes to the environment during political maturation that determines value preferences without explicitly naming the nature of these circumstances. Inglehart's post-materialism thesis involves, however, an additional hypothesis on the set of incidents that are relevant for the formation of value preferences. The scarcity hypothesis states that experiences of physical insecurity and socioeconomic instability abet the development of materialistic values, while the opposite terms facilitate preferences for postmaterialistic values. This hypothesis builds on the idea of Maslow's (1954) need hierarchy, according to which individuals try to satisfy their basic security and material needs first and foremost, and only if these are met will they pursue social needs. Only then, on the condition that both security and material needs as well as social needs have been met, will they try to satisfy higher-order intellectual needs.

The socioeconomic environment is only one plausible determinant of emerg-

ing value preferences during childhood and youth, however (see e.g., Marks 1997). An intergenerational transmission of value preferences is an often cited alternative explanation for similarities in sibling values, and this account has found support in the literature on social learning. The parental education argument states that socializing agents, above all parents, transmit their value preferences–consciously or unconsciously–to their children. As early as 1928 Mannheim discussed the important role of parental upbringing in value formation, describing it as a 'constant transmission of the cultural heritage' (see also Inglehart & Welzel 2005).

Evidence of parental transmission of political orientations was reported in many of the early socialization studies (cf. Searing, Wright & Rabinowitz 1976). These findings were interpreted to suggest that political orientations originate at a stage of childhood before the ability to understand political issues and evaluate political events is fully developed (Easton & Dennis 1969, Greenstein 1965, Hess & Torney 1967), and that children frequently share their parents' political preferences (Campbell et al. 1960, Levin 1961). Numerous qualifications have since been placed on the finding of strong parent-child congruencies in political orientations. For example, Jennings & Niemi (1968, 1981) showed that previous studies overrated the degree of similarity between parents and children due to projection effects in surveys of adolescents alone (see also Westholm 1999). However, the data they had collected from parents and children independently still revealed a substantial level of partisan congruency (see also Zuckerman, Dasovic & Fitzgerald 2007). Moreover, Glass, Bengtson & Dunham (1986) demonstrated that parental political orientations continue to contribute significantly to young adults' affilia-

tions even if intergenerational persistence in socioeconomic status–a prominent rival explanation–is taken into account (see also Cassel 1982, Knoke & Hout 1974, Tedin 1974).

In light of the evidence that suggests that political orientations in young adults are shaped by social learning, it is important to note the one-sided focus on parental economic position of Inglehart's original thesis on post-materialistic value formation in young adults. Furthermore, his theory stresses differences in value preferences between generations rather than similarities. Allowing for the intergenerational transmission of value preferences not only has consequences for the validity of the thesis but also for its aggregate predictions: the higher the intergenerational transmission of values, the smaller the immediate effects of exogenous shocks on the current population's political orientations but the larger the durable effects on later cohorts.

Critique has been directed not only at the strategy of testing the scarcity hypothesis using national socioeconomic indices pertaining to the formative years of adult respondents, but also at the strategy of using recall information on parental characteristics at a time when the respondents were in their formative years. The problem of recall data in this context is that the concepts measured are either very general and stable in nature but easy to recall, or that they are proper measures of the formative security at a specific point in time but difficult to recall. Abramson & Inglehart (1996), for instance, choose the first option and operationalize formative security as a function of parental education and occupation. On the one hand, however, education has a unique conceptual status with respect to value preference formation; on the other hand, occupational prestige is a different concept

than financial worries and economic scarcity. Using recall questions to measure indicators of precarious economic situations such as parents' receipt of social benefits or job worries is likely to produce unreliable answers due to projection and memory effects, and possibly also answers endogenous with respondents' current economic position.

The research of this paper aims to avoid these problems by drawing on longitudinal household data. The paper uses direct and very detailed measures of the household's economic situation when the siblings were in their formative years, and it estimates the effect of these indicators of economic security on value preferences of siblings as adults. The SOEP data also include measures of parents' post-materialist values before the siblings reached adulthood. We are thus able to compare the estimated effects of parents' economic scarcity on their children's later value preferences with the estimated effects of parental value preferences, i.e. social learning.

3 Analysis

Post-materialstic value preferences are surveyed in the SOEP at ten-year intervals: so far, in the years 1986, 1996, and 2006. We consider only information on those sets of siblings interviewed successfully at least twice at a ten-year interval. Moreover, we draw on a social rather than biological definition of siblings (and also parenthood), whereby if at least two individuals name the same person(s) as their parent(s), we consider these individuals siblings. Before turning to empirical tests of the socialization hypothesis, the scarcity hypothesis, and the social learning hypothesis we discuss measures

of post-materialism in the following.

Although the so-called Inglehart-items have been an established part of surveys for more than thirty years, scholars continue to disagree on their suitability as an instrument and how they can be implemented into an adequate measurement model. The SOEP uses the standard short version of the post-materialism instrument proposed by Inglehart (1971) and fielded in many other international surveys such as the World Value Surveys and the International Social Science Programme. The first and third item represent materialistic policies and the second and fourth item postmaterialistic policies. Respondents are asked to rank all four policy goals in terms of their perceived priority.

> In politics, you can't have everything right away. We now name four goals that can be pursued in political policy. If you had to choose, which of these goals do you see as having first, second, third and fourth priority (in order of importance)?
>
> A Maintaining order in the nation
>
> B Giving people more say in important government decisions
>
> C Fighting rising prices
>
> D Protecting freedom of speech

Inglehart's post-materialism instrument has been the subject of much debate on both a conceptual and a methodological level. Some authors object to the choice of items. Duch & Taylor (1993) and Warwick (1998), for instance, argue that the two items 'giving people more say in important government decisions' and 'protecting freedom of speech' do not tap democratic values but rather postmaterialism. Clarke & Dutt (1991), for instance, criticizes that the sensitivity of the item 'fighting rising prices' to actual inflation and

unemployment rates predisposes it to failure as a measure of time-invariant value preferences. Other researchers have questioned the choice of a ranking instead of a rating format (e.g., van Deth 1983*b*). Yet others doubt that a unidimensional latent variable called 'post-materialism' elicits the observed ranking answers (e.g., Sacchi 1998), and some authors even deny the internal consistency of the above measure (Davis & Davenport 1999). Although not designed to test the validity of the instrument, the analysis presented below argues that the fundamental criticisms voiced by Davis & Davenport (1999) are unwarranted.

3.1 Response Model of Post-Materialism

Some of the contention over the instrument for measuring postmaterialism may be attributed to the lack of a generally accepted response model that allows analysis of ranking data. Inglehart classifies the data obtained at face value of the item formulations into three categories: a postmaterialistic category (items B and D ranked highest), a materialistic category (items A and C ranked highest), and a mixed category (all other rank patterns). However, in their rankings of four policy goals, respondents provide versatile information on their level of post-materialism, which is ignored to some extent when analyzing only three (latent) groups.

Within the frameworks of both structural equation modeling (Maydeu-Olivares & Böckenholt 2005) and generalized linear modeling (Skrondal & Rabe-Hesketh 2003), the formulation of a factor choice model has proven to be a valuable approach to the analysis of ranking data. Given that Inglehart

describes post-materialism as a unidimensional latent construct that ranges from (extreme) materialism to (extreme) postmaterialism, we will fit a single-factor choice model to the ranking data surveyed by the SOEP.[3]

The task of respondents to rank the four policy goals of 'maintaining order in the nation' [alternative A], 'giving people more say in important government decisions' [alternative B], 'fighting rising prices' [alternative C], and 'protecting freedom of speech' [alternative D] according to their importance can be described as a series of $c = 3$ consecutive discrete choice situations. In the first step, individual i selects the policy goal p that elicits the highest unobserved utility, u_{ip} from among four alternatives {A,B,C,D}. In the second step, a (first) choice is made again from the remaining three alternatives, and in the final step, respondents choose the policy goals from the last two alternatives that, again, elicits the highest utility (Luce 1959). That is, for all $p \neq q$,

$$y_c^* = \begin{cases} 1 \text{ if } u_{ip} \geq u_{iq} \\ 0 \text{ if } u_{ip} < u_{iq} \end{cases}$$

The unobserved utility u_{ip} is assumed to consist of a linear predictor of observed utility v_{ip}, a common factor underlying the responses that represents individual i's unobserved level of post-materialism η_i, and unique factors

[3]Alternatively one could estimate an unrestricted, discrete, or multi-factor covariance structure (Croon 1989, Maydeu-Olivares & Böckenholt 2005). However, as this paper is designed to test Inglehart's behavioral model and not his measurement model, we accept the single factor assumption of the measurement model and do not test it against rival latent structures. Note that this paper analyzes complete rankings. For partial rankings, refer, for instance, to Francis et al. (2002).

ϵ_{ip}. Each policy goal is associated to the individual-specific level of post-materialism η_i with a specific loading λ_p.

$$u_{ip} - u_{iq} = (v_{ip} - v_{iq}) + (\lambda_p - \lambda_q)\,\eta_i + (\epsilon_{ip} - \epsilon_{iq}) > 0 \tag{1}$$

We further assume that the unobserved post-materialism η_i is normally distributed in our sample, and we restrict the factor loadings $\lambda_A = 0$ and $\lambda_D = 1$ for identification reasons. If the error term ϵ_{ip} has an extreme value distribution, then the differences $u_{ip} - u_{iq}$ have a logistic distribution (McFadden 1974) and it follows in the case of a complete ranking $R_i = (r_i^1, r_i^2, r_i^3, r_i^4)$ that the probability of observing the ranking data has the following form (Luce & Suppes 1965):

$$P(R_i) = \prod_{c=1}^{3} \frac{\exp(v_{r_i^c} + \lambda_{r_i^c}\,\eta_i)}{\sum_{s=c}^{4} \exp(v_{r_i^c} + \lambda_{r^s}\,\eta_i)} \tag{2}$$

Table 1 reports the estimates of the response model described above for all complete rankings observed for siblings who participated in at least two of the three SOEP waves of 1986, 1996, and 2006 that included the Inglehart items. We can identify 2'209 observations of individuals who faced three consecutive choice situations with four, then three, and finally two choice alternatives from which to choose, i.e., our data contain $(4 + 3 + 2) \times 2'209 = 19'881$ rank-choices. The first set of estimates denoted β_A through β_D indicates the differences in frequency with which these four items were selected. The item

of 'maintaining order' is the most popular statement, while 'fighting rising prices' and 'freedom of speech' are the least important items in our sample.[4]

The second set of estimates denoted λ_A through λ_D indicate the location of these policy goals in terms of the common factor 'post-materialism': in our sample 'maintaining order' is the most materialistic item and 'freedom of speech' the most postmaterialistic. 'Fighting rising prices' is located closer to the materialistic pole and the item 'citizen influence' closer to the post-materialistic end of the common factor. In other words, the order of the items in terms of their post-materialistic content seems to suggest the validity of the one-factor model. Finally, the σ^2 parameters denote the variance of latent post-materialism, $\sigma^2_{\eta_{it}}$, and the residual measurement error in the ranking data, $\sigma^2_{\epsilon_{itj}}$. The latter is restricted, as in every logit model, to $\pi^2/3$ = 3.29. The variance parameters suggest that a considerable fraction of the variance in the ranking data can be attributed to a unidimensional latent construct called 'post-materialism' and that this common factor significantly varies between interviews.

< Table 1 >

From a ranking of four policy goals {A,B,C,D}, one obtains 4! = 24 unique rank patterns which are each associated with a certain factor score of post-materialism. Figure 1 reports these values of η_{it}, which have been transformed to a 0 to 1 scale for ease of interpretation. Entries in Figure 1

[4]The popularity of items seems to decline as a function of their order of presentation, which may be interpreted as indicative of an order–more specifically–a primacy effect (cf. Tourangeau, Rips & Rasinski 2000).

indicate that the most materialistic ranking pattern is R = (A,C,B,D) and the most postmaterialistic ranking pattern conversely R = (D,B,C,A).

< Figure 1 >

3.2 The Similarity in Siblings' Values

If the socialization hypothesis of Mannheim, Inglehart and others is correct, the similarity in siblings' value preferences should generally be high. However, any measure of the association between siblings' value preferences at a single observation would still underestimate the true level of agreement due to transitory fluctuations in latent post-materialism, even if measurement error is controlled for through the use of an appropriate response model. Solon (1992) has elaborated this idea in the context of the parent-offspring persistence of income positions, and Solon et al. (1991) have done the same for the similarity in siblings' economic positions.

The lower estimates of sibling (or, parent-child) similarity for data surveyed at a single point in time arises from temporary changes in individual value preferences that spuriously suggest disagreement between siblings. Only repeated observations of siblings over a considerable time span allow us to disentangle transitory fluctuations from time-invariant components of value preferences. The only case in which cross-sectional data on siblings would produce an unbiased estimate of similarity would be the unlikely case in which value preferences are perfectly stable throughout the life course.

In more formal terms, controlling for temporal fluctuations means decomposing the latent post-materialism value of individual i from sibling set j at

time point t, η_{ijt}, into a time-invariant sibling-set-specific factor, φ_j, a time-invariant individual-specific factor, ϑ_{ij}, and a factor of temporal fluctuations ε_{ijt}[5] (Solon 1992, Solon et al. 1991).

$$\eta_{ijt} = \varphi_j + \vartheta_{ij} + \varepsilon_{ijt} \tag{3}$$

Hence, the population variance of latent post-materialism, σ^2_η, can be viewed as the sum of variance of the permanent sibling-specific factor σ^2_φ, the variance of the permanent individual-specific factor σ^2_ϑ, and transitory variance σ^2_ε. Hierarchical regression modeling permits such a decomposition of variances (e.g., Snijders & Bosker 1999).

$$\sigma^2_\eta = \sigma^2_\varphi + \sigma^2_\vartheta + \sigma^2_\varepsilon \tag{4}$$

Similarity in siblings' permanent value preferences, ρ, thus demonstrates the importance of the stationary sibling factor relative to the stationary individual factor. In hierarchical regression modeling, ρ is often referred to as the intraclass correlation.

$$\rho = \frac{\sigma^2_\varphi}{\sigma^2_\varphi + \sigma^2_\vartheta} \tag{5}$$

[5]Plus the variance of the measurement error in the response model ϵ_{ijtp}, which for simplicity reasons is not mentioned in the main text but is considered in all empirical analyses reported in this paper.

The first hierarchical regression model of Table 2, Model 2, reports the decomposition of variance in η_{jit}: The 2'209 time-specific reports of post-materialistic value preferences pertain to 948 individuals, who are again nested in 425 sets of siblings. As described in the previous section, each report of post-materialistic value preferences is comprised of nine choice alternatives in our response model, i.e., the lowest level of the hierarchical regression model contains 2'209 $\times$ 9 = 19'881 discrete choices between the four policy goals of 'maintaining order in the nation', 'giving people more say in important government decisions', 'fighting rising prices', and 'protecting freedom of speech'.

The share of sibling similarity in the permanent component of value preferences is $\rho = \frac{0.580}{0.580+0.357} = 0.618$. If we consider ρ as a general measure of the importance of preadult background in political values, one may interpret our results as supporting the socialization hypothesis formulated by Inglehart and others. More than 60 per cent of the stationary variance in post-materialism is shared by siblings. The empirical results also provide a post hoc justification for the design of the study that controls for both measurement and transitory fluctuations. If we based our analysis on cross-sectional data, we would obtain a sibling similarity of $\rho_t = \frac{0.580}{0.580+0.357+1.271} = 0.263$.

< Table 2 >

Having established that individual value preferences are indeed to a large extent a function of commonalities between siblings, the 'acid test' of the socialization hypothesis is the rate by which effects of this preadult environment decay over the life course. We are thus interested in the proportion

of permanent sibling variance in value preferences of individuals at different ages. This means technically that in contrast to the Model 2 reported in Table 2, which assumes homoscedastic variance at level 4, the Model 3 replaces this assumption with a weaker one that leaves these variances dependent on three age groups.

The results of the variance decomposition indicate that the sibling-specific permanent component loses importance with increasing age. While the sibling component dominates value preferences up to the age of 25, it decreases for siblings in the 25+ age group, producing a sibling similarity of $\rho_{17-25} = \frac{1.611}{1.611+0.788} = 0.672$ for the first age group, $\rho_{26-35} = \frac{0.553}{0.553+0.788} = 0.403$ for the second age group, and $\rho_{35-70} = \frac{0.589}{0.589+0.788} = 0.428$ for the third age group. While socialization indeed appears crucial for value preference formation, its importance seems to disappear over time.

3.3 The Lasting Effects of Parental Characteristics

This section seeks the elements of preadult background that are conducive to the development of either materialistic or postmaterialistic values. Inglehart stresses the socioeconomic position of the parental household as primarily responsible for the development of certain value priorities. This section tests this scarcity hypothesis against one of the central objections raised against it: namely, the social learning hypothesis.

If Inglehart's scarcity hypothesis holds true, indicators of socioeconomic experiences during political maturation should exert a strong effect on time-invariant preferences for materialistic or postmaterialistic values. More specif-

ically, measures of economic scarcity should be positively associated with materialistic values. If the social learning hypothesis holds true, the level of post-materialism measured in parents during their children's formative period should be positively related to the level of post-materialism measured in the children when they have reached adulthood.[6]

Model 4 reported in Table 3 regresses the individual's value preferences on indicators of economic scarcity for his or her parental household, and Model 5 uses measures of social status. In both cases, parents' value preferences are also added to the right-hand side of the equation. Note that while the dependent variable is measured for the adult respondents, both sets of explanatory variables in this regression model were measured during the individual's political maturation and are therefore, in contrast to many other studies, beyond any doubt of endogeneity. This restriction reduces the size of the sibling sample considerably and Table 3 therefore considers all young adults in the SOEP who participated at least twice in the 1986, 1996, and 2006 waves, irrespective of whether siblings are observed or not.

The level of parental post-materialism is measured in three steps. First, we estimate a response model for the ranking of Inglehart items in the sample of parents,[7] and derive the posterior means of latent post-materialism from

[6]However, as argued before, it is impossible to capture all the experiences of young adults that affect the formation of their value preferences. We therefore do not expect to explain all of the variance in sibling similarities attributable to the joint effects of economic scarcity and parental education with our limited number of indicators, and consider any residual heterogeneity to come from unobserved experiences.

[7]The estimates are very similar to the ones reported for the sample of siblings reported in Table 1 and therefore not displayed in a table.

them. Second, we give preference to parents' reports when their children were age 15. If we do not observe post-materialism of the father and mother when the children were age 15, we replace it where possible with consecutive measures of parental post-materialism at adjacent ages. Finally, if we have estimates of both paternal and maternal post-materialism, we consider the mean of both measures. As indicators of economic scarcity, we chose household poverty, parental unemployment, parental dependency on social benefits, and parental financial concerns.[8] These parental indicators, again measured when individuals are age 15, in our view, speak most directly to the aspect of formative economic (in)security.

Alternatively, a number of previous research studies have used parental background variables like occupational prestige and educational level as measures of formative security. Despite our reservations against these measures as proxies for formative security, we replicated the analysis of Table 3 with the alternative economic indicators income, education, and job prestige in Model 5.[9]

[8]Poverty means a household structure-weighted (new OECD scale) post-government income of less than sixty percent of the median income of that year in Germany. Unemployment is indicated by parents being registered unemployed in the years of their children's political maturation. Receipt of social benefits (which is, with the exception of the subsistence allowance, a household concept in Germany) is indicated by the receipt of housing benefits, social assistances, or a subsistence allowance. Financial concerns are surveyed in the SOEP by the question 'What is your attitude towards your own economic situation – are you concerned about it?'. Responding 'very concerned' is considered indicative of a precarious financial situation.

[9]Income is purchasing power adjusted, household structure weighted (new OECD scale), post-government log household income. Job prestige is the magnitude prestige

< Table 3 >

The regression estimates of Model 4 suggest that objective indicators of preadult economic scarcity such as poverty, receipt of social benefits, unemployment, and economic concerns do not significantly affect the stable component of individuals' political values (see also Marks 1997). However, children from a (post)materialistic background are likely to be (post)materialistic in adulthood as well.

Comparable patterns of findings emerge from Model 5. Objective socioeconomic indicators like parental education and income do not exert a lasting effect on children's values. Again, we find intergenerational persistence in postmaterialism. We do find, however, that the more prestigious a parental occupation, the more likely it is that children will become postmaterialists. In our view, it is not clear from the literature what may explain this effect. As argued before, we do not consider job prestige, particularly after controlling for income, as an appropriate indicator for (the absence of) economic scarcity.

Note that these results also emerge if we control for indicators of economic scarcity and social status of the offspring as adults (not reported in form of a table). That is, the intergenerational transmission of post-materialism is more than a mere reflection of the transmission of social position but is likely to be the result of social learning.

scale by Wegener (1992).

4 Conclusions

The main aim of this study has been, first, to empirically test the behavioral model of individual value formation, which represents the theoretical underpinning of Inglehart's theory of the 'silent revolution' and, second, to further develop the model by considering the intergenerational transmission of value preferences. The message contained in the empirical results for Inglehart's original thesis is twofold: while the findings support the socialization hypothesis, they qualify the scarcity hypothesis.

One aspect of the formation of value preferences that appears to have been underestimated in Inglehart's early versions of his thesis is the intergenerational persistence in value preferences. Inglehart's original claim was that the distribution of value preferences in a society at a certain time point is basically a function of the preadult socioeconomic experiences of the members of this society weighted by the share of the different birth cohorts. Replacing cohorts that grew up in unstable periods with cohorts that grew up in affluent periods will subtly change the dominant value orientation in the society in question from materialism to postmaterialism. The picture of intergenerational persistence in values that emerges from the findings reported here implies that processes of value change proceed not only gradually and subtly, with a considerable time lag after the objective socioeconomic conditions have changed, but that such processes slow down over time. Thus, the impact of cataclysmic events on societal value preferences may be relatively small in magnitude, but may produce more lasting effects than anticipated by Inglehart's original thesis.

As always, the conclusions drawn from the empirical findings depend on the validity of the assumptions underlying the analysis. This paper's aim of rigorously testing a clearly defined theoretical model of value preference formation also means above all neglecting alternative conceptions to some degree. For instance, Flanagan (1982) replaces Inglehart's assumption of a unidimensional concept of post-materialism with a two-dimensional concept of authoritarianism and acquisitive values (see also e.g., Klages, Hippler & Herbert 1992, Bean & Papadakis 1994, Schwartz & Sagiv 1995). Likewise, Inglehart pursues an individual-level interpretation of the relevance of socioeconomic environment. Of high importance for preadult political maturation is the socioeconomic position of the parental household. Conversely, Flanagan (1982) argues in favor of an aggregate-level, or, across-the-board interpretation of the socioeconomic environment: not the concrete situation of the household but the general sense of material security and stability at the societal level is important for individual value preference formation. Such societal consciousness is basically a function of welfare state expansion entailing advances in health care, social security benefits, etc. Yet our choice of the indicators of economic (in)security–unemployment, poverty, dependence on social benefits, financial concerns–speaks directly to Inglehart's original claim that characteristics of the parental household determine preadult value preference formation. Hence, our conclusions on the socialization, the scarcity, and the social learning hypothesis are to some extent bound to conceptual assumptions in Inglehart's thesis.

An important aspect of this analysis is the assumption that the similarity in siblings' values reflects their shared preadult background. It is likely that

the intraclass correlation ρ does not completely measure all shared experiences. For instance, siblings with a certain age gap may have experienced different levels of economic scarcity during their formative years in the same parental household. Moreover, parents may treat their children differently. There is a another, more technical reason why the true ρ may be underestimated: our sample contains different numbers of siblings I_j per family and different numbers of observations T_{ji} on persons, both of which may lead to serial correlation in the residual term. As our data contain a maximum of three observations on respondents, we are unable to control for such serial correlations by introducing a lagged term of postmaterialism into the analysis. Both problems–parents treating children differently and serial correlations–thus suggest that our reported similarity in permanent value preferences is at best underestimated, and our test of the socialization hypothesis may therefore be regarded as conservative.

The interpretation of sibling similarity as the expression of shared experiences and of similarity between parents and children as the product of social learning represent the dominating paradigms in the literature on value formation and political orientations in young adults. However, there are also two alternative interpretations of sibling similarity and parent-offspring similarity apart from shared experiences and parental education. First, Zuckerman (2005) and Zuckerman, Dasovic & Fitzgerald (2007) stress the importance of intimate social networks for the formation political orientations and behaviors. According to this view, similarity in siblings' values may arise from interactions between them and not necessarily from their uniform experience of the same environment. Similarities between parents and children

may also emanate from their interactions and not from unidirectional transmission from parents to children. Also a combined interpretation of shared environment and interaction between siblings is conceivable: due to their social background, they have a similar predisposition toward certain value preferences, which tend to be reinforced by their mutual interaction. Empirically, it is very difficult to disentangle the two phenomena since indicators of interaction between siblings are confounded with shared experiences. When studying siblings being brought up separately, for example, one may interpret the separation as indicative either of low communication between them or of differences in their environments.

The second alternative interpretation of sibling and parent-offspring similarity that we cannot exclude with certainty is heritability. The growing body of behavioral genetics literature suggests that political orientations are to a considerable extent the product of biological predispositions (e.g., Alford & Hibbing 2005, Carmen 2007). We can identify thirty sets of twins in the SOEP data with valid information on post-materialism, twenty of which are dizygotic twins and ten monozygotic twins, which in principle permits us to obtain an estimate of the heritability of post-materialism.[10] Due to the small numbers of observations, we are unable to calculate any robust ρ values. If one were to calculate those values on the basis of the SOEP data nonethe-

[10]The underlying logic of twin studies is that the different rates of genetic similarity in monozygotic twins as opposed to dizygotic twins represents the only difference between the two groups. Assuming that the rate of shared social environment during their formative years is identical for both types of twins, it follows that the extent to which monozygotic twins display higher levels of similarity than dizygotic twins serves as a measure of the weight of heritability relative to the shared environment.

less, one would be surprised to find a somewhat higher ρ-value for dizygotic than for monozygotic twins, suggesting that parental education is primarily responsible for sibling similarity in value preferences, and not heritability. Again, the reliability of the comparison between monozygotic and dizygotic twins is clearly restricted by the extremely small number of observations.

Another analysis that was reported in a table but tentatively corroborates the parental education hypothesis compares siblings according to their age differences. The heritability argument implies a constant similarity in sibling values irrespective of age differences, while the hypotheses of a shared preadult environment and mutual reinforcement suggest a decreasing similarity in sibling values with increasing differences in age. In the empirical data we find the second pattern of findings. Similarly, results presented in Table 2 suggest an attenuation of sibling similarity by age, which again is in line with the hypotheses of a shared environment and mutual reinforcement. Due to the small number of observations on twins and the indirect means of testing heritability by comparing siblings with different age gaps, any conclusions on the (absence of) heritability in post-materialism are highly speculative and are presented here only as a suggestion for future research, not as a tested hypothesis.

These uncertainties in the interpretation of sibling similarity in post-materialism notwithstanding, the present study unequivocally establishes that the individual formation of value preferences largely dates from preadult background and is thus not a completely deliberate consideration of the current political events and information. Consequently, value change may to a certain extent only be a lagged function of social change. The phenomenon

of intergenerational transmission examined here also suggests a decelerated value change by generational replacement, since each generation tends to adopt more reject the value preferences of its predecessors.

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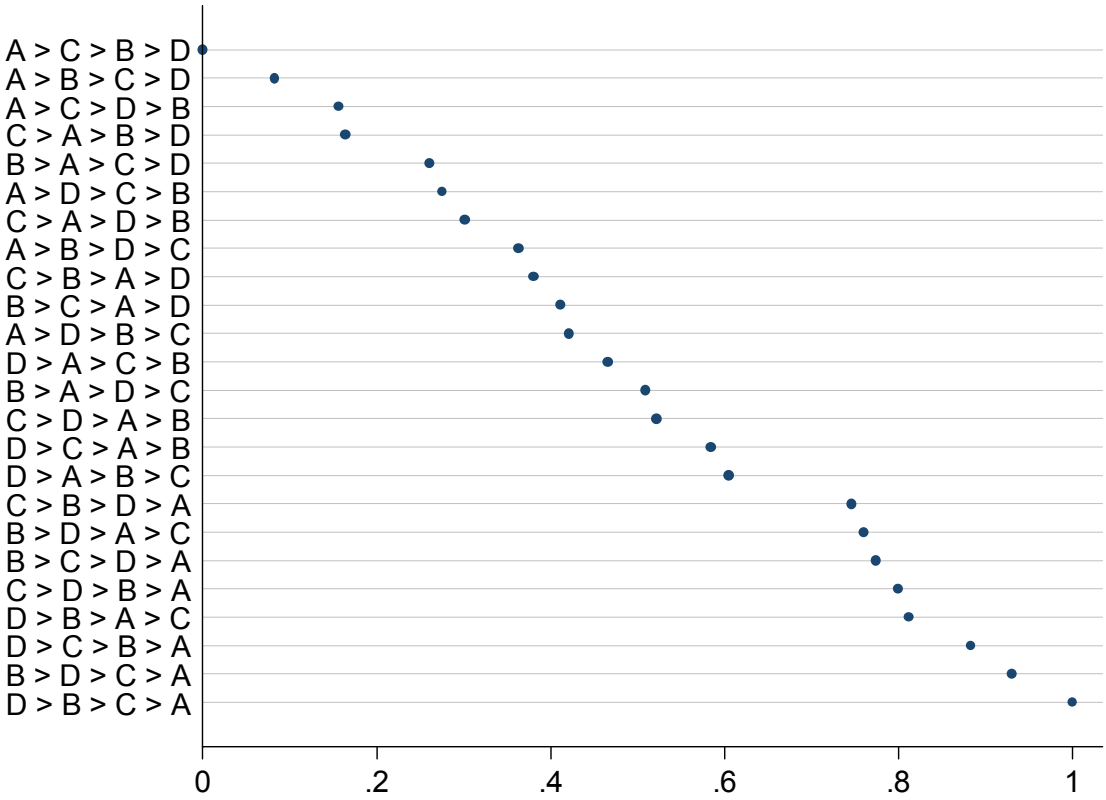
Table 1: The Response Model of Post-Materialism. A Factorial Choice Model of the Ranking of Four Policy Goals.

	Model 1	
	coef.	s.e.
Intercepts		
β_A Maintaining Order	0.729	(0.054)***
β_B Citizen Influence	0.389	(0.041)***
β_C Rising Prizes	-0.061	(0.045)
β_D Freedom of Speech	0.000	–
Factor Loadings		
λ_A Maintaining Order	0.000	–
λ_B Citizen Influence	0.656	(0.066)***
λ_C Rising Prizes	0.370	(0.067)***
λ_D Freedom of Speech	1.000	–
Variances		
σ_1^2 Rank-Choices (ϵ_{itp})	3.290	–
σ_2^2 Postmaterialism (η_{it})	1.779	(0.230)***
Number of Cases		
N_1 Rank-Choices	19'881	
N_2 Observations	2'209	

Note. *** p < 0.01; ** p < 0.05; * p < 0.10. *Data Source.* SOEP 1986, 1996, and 2006.

Figure 1: The Estimated Post-Materialistc Content of 4! Rankings.



Note. Low value indicate materialism and high values indicate postmaterialsm. The post-materialism scores are derived from Model 1 reported in Table 1.

Table 2: Decomposition of Variance in Latent Post-Materialism by Families, Individuals, and Observations.

	Model 2		Model 3	
	coef.	s.e.	coef.	s.e.
Intercepts				
β_A Maintaining Order	0.773	(0.069)***	0.884	(0.074)***
β_B Citizen Influence	0.378	(0.060)***	0.453	(0.064)***
β_C Rising Prizes	-0.099	(0.060)	-0.057	(0.064)
β_D Freedom of Speech	0.000	–	0.000	–
Factor Loadings			0.841	(0.077)***
λ_A Maintaining Order	0.000	–	0.000	–
λ_B Citizen Influence	1.054	(0.090)***	1.159	(0.083)***
λ_C Rising Prizes	0.762	(0.084)***	0.847	(0.078)***
λ_D Freedom of Speech	1.000	–	1.000	–
Variances				
σ_1^2 Rank-Choices (ϵ_{ijtp})	3.290	–	3.290	–
σ_2^2 Observations (ε_{ijt})	1.271	(0.230)***	1.408	(0.240)***
σ_3^2 Individuals (ϑ_{ij})	0.357	(0.111)***	0.788	(0.142)***
σ_4^2 Siblings (φ_j)	0.580	(0.104)***	–	–
σ_4^2 Siblings, Age 16–25 ($\varphi_j^{(1)}$)	–	–	1.611	(0.355)***
σ_4^2 Siblings, Age 26–35 ($\varphi_j^{(2)}$)	–	–	0.553	(0.193)***
σ_4^2 Siblings, Age 36–75 ($\varphi_j^{(3)}$)	–	–	0.589	(0.281)***
Number of Cases				
N_1 Rank-Choices	19'881		19'881	
N_2 Observations	2'209		2'209	
N_3 Individuals	948		948	
N_4 Siblings	425		425	

Note. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$. *Data Source.* SOEP 1986, 1996, and 2006.

Table 3: The Effects of Parental Characteristics on Offsprings' Post-Materialism as Adults.

	Model 4		Model 5	
	coef.	s.e.	coef.	s.e.
Regression Estimates				
β_A Maintaining Order	0.902	(0.167)***	2.803	(1.680)*
β_B Citizen Influence	0.546	(0.160)***	2.444	(1.680)
β_C Rising Prizes	0.126	(0.162)	2.008	(1.680)
β_D Freedom of Speech	0.000	–	0.000	–
β Parental Poverty	-0.315	(0.200)	–	–
β Parental Unemployment	-0.109	(0.245)	–	–
β Parental Social Benefits	-0.158	(0.237)	–	–
β Parental Economic Concerns	-0.068	(0.151)	–	–
β Parental Job Prestige	–	–	0.011	(0.004)***
β Parental Education	–	–	-0.035	(0.040)
β Parental Income	–	–	0.145	(0.187)
β Parental Postmaterialism	0.870	(0.357)**	0.729	(0.389)**
Factor Loadings				
λ_A Maintaining Order	0.000	–	0.000	–
λ_B Citizen Influence	1.288	(0.244)***	1.401	(0.275)***
λ_C Rising Prizes	1.184	(0.264)***	1.226	(0.277)***
λ_D Freedom of Speech	1.000	–	1.000	–
Variances				
σ_1^2 Rank-Choices (ϵ_{itp})	3.290	–	3.290	–
σ_2^2 Observations (ε_{it})	0.623	(0.271)***	0.568	(0.257)***
σ_3^2 Individuals (ϑ_i)	0.578	(0.163)***	0.563	(0.162)***
Number of Cases				
N_1 Rank-Choices	8'163		7'722	
N_2 Observations	907		858	
N_3 Individuals	422		365	

Note. *** p < 0.01; ** p < 0.05; * p < 0.10. *Data Source.* SOEP 1986, 1996, and 2006.