Individuals' values over the lifecycle: does consistency matter?*

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Abstract

Values mirror what is important to every individual and characterize the motivational bases of attitudes and preferences, hence, economic behaviors. Yet, no attention has been paid to the fact that individuals hold a variety of values and that there may be costs when these are not consistent with each other. This paper shows that differences in values dynamics between individuals can be addressed by analyzing the role of consistency in a context where experiences throughout the lifecycle shape values. Individuals adjust their own values simultaneously, rather than independently, whenever an experience occurs in their life, thus, leading to spillover effects among values. Based on both theoretical and empirical frameworks, I quantify the impact of several life events—parenthood, sickness and unemployment—on values, taking into account that the latter are endogenous. The results suggest that values are linked to each other in a non-reciprocal way, that they change over the lifecycle due to life events, and that spillover effects exist and are important.

Keywords: Values dynamics; Cognitive consistency; Spillover effects; Simultaneous equations model.

JEL Classification: A13, D63, D91, Z10.

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1 Introduction

Values mirror what is important to every human being, and therefore, characterize the motivational bases of attitudes and preferences (Schwartz 1992, 2012). Those latter influence individuals' behaviors such as social interactions, voting preferences and economic decisions (Enke et al. 2020). Studying values dynamics is therefore crucial to understand what objectives economic agents pursue in their decision-making process.

Throughout our lives, we live a sequence of events that affect us and change our perception of what matters in life, namely, our values. For instance, the loss—or the illness—of a loved one is among the most difficult periods we have to go through. In addition to the grief they cause, this event can directly affect one of our values, e.g. benevolence. Yet, we embody several values at a time from which we are psychologically more comfortable when they are not in conflict, hence, consistent. Can a value change, such as benevolence, also trigger changes in other values as we seek to be consistent in our values? Broadly speaking, how do life events (e.g. unemployment, parenthood, illness, discrimination, etc.) affect our values over the lifecycle? Does consistency matter in this context?

This paper shows that differences in values dynamics between individuals can be addressed by analyzing the role of consistency in a context where experiences throughout the lifecycle shape values. The basic idea is that individuals adjust their values *simultaneously*, rather than independently, whenever an experience occurs in their life, thus, leading to spillover effects among values. These adjustments are motivated by the will of individuals to be consistent both within and between their values. My approach is based on the concept of cognitive dissonance, introduced by Festinger (1957). To illustrate the role of consistency, I provide both theoretical and empirical frameworks to show how individuals change values subsequent to a life event.

The theoretical framework is as follows. There is an agent (she hereafter) that belongs to one group or the other depending on whether the event occurred or not, e.g. having ever been unemployed or not. There are only two values and the agent has a position within the distributions of both values. The agent derives utility from three types of consistency. First, the agent prefers to have values that are close to the norms of the group to whom she belongs—this is the *group consistency*. Second, the agent also prefers her current values to be close to her previous values—this is the *time consistency*. Third, she derives utility by having values that are not in conflict between them, hence, not cognitively dissonant—this is the *cognitive consistency*.

The three types of consistency compete with each other. On the one hand, the group consistency and the time consistency motivate changes in order to be consistent *within* both

values, but independently. On the other hand, the cognitive consistency spurs the agent to be consistent *between* her values. This latter consistency is exogenous for the agent and reflects the inter-dependency between values in the society; see Roccas and Sagiv (2010) for the importance of the cultural context in the value-behavior relation. When the life event occurs, the agent moves from her group to the other. Therefore, she changes her values toward the norms of her new group. But she does not totally shift because of the rooting due to her previous values. Meanwhile, she also adjusts both values simultaneously by seeking consistency between them.

Life events can be endogenous to values. The probability that the life event occurs, which is captured by the transition probability from one group to the other, depends on previous values. This mechanism can explain diverging patterns between individuals in terms of values based on their previous life experiences and their initial values. Although it helps to explain values dynamics from a theoretical point of view, the endogeneity becomes an issue once I turn to the empirical framework because it introduces a bias in the estimate of the effect of life events on values.

My empirical work examines the relevance of the theoretical framework and its implications. Using data from two mature British cohort studies, in which I measure individuals' attitudes at several ages, I derive the two-dimensional structure of motivational types of values, introduced by Schwartz (1992, 2012). The first dimension of the structure captures, in terms of the original paper, the *conservation* versus *openness to change*—the preference for stability, security, tradition and conformity versus the openness to new experiences related to self-direction and stimulation. The second dimension reflects the *self-transcendence* versus *self-enhancement*—values associated to care for and concern about others such as universalism and benevolence versus the self-interest and ambition linked to achievement and power.

The empirical framework relies on simultaneous equations models. Using two-stage least squares, I estimate the effect of several life events on conservation and self-transcendence. The identification relies on exclusion restrictions which assume that one value is not directly affected by the lag of the other value. This assumption is in line with the theoretical framework in which the agent adjust simultaneously all her values before getting to the next period. Thus, one value can be affected—by the lag of the other—only through its own lag.

This paper provides three main results. First, consistency does play a role and links values in a *non-reciprocal* way. Life events affect values directly, but also indirectly through spillover effects. The adjustment process between values exhibits a *spiral pattern*. Thus, an increase in self-transcendence generates a *positive* spillover effect on conservation, whereas an increase in conservation fosters a *negative* spillover effect in self-transcendence. To show the

presence of adjustment processes between values based on consistency, I test the existence of spillover effects in the simultaneous equations model. I use two life events that are exogenous and non-reversible: to have a girl, rather than a boy, as first child conditional on having a baby; and to have ever had cancer. Both life events show the existence of spillover effects, hence, the seek for consistency between values.

Second, having ever been unemployed directly raises self-transcendence by 0.204 sd. and declines conservation by -0.064 sd., however, the latter effect is offset by the positive spillover effect of the former—which is equal to 0.071 sd. As a result, unemployment increases self-transcendence values by 0.227 sd. without any change on the conservation versus openness-to-change dimension. These magnitudes are lower-bound estimates because, in this context, the endogeneity issue biases the estimate toward zero. This is owing to the fact that individuals with initial high self-transcendence and low conservation are more likely to be unemployed. Nonetheless, this issue do not bias the relative share of the direct effect versus the spillover effect since the bias act as a scale factor of the total effect.

Third, the two-dimensional structure of motivational types of values can be derived from statements about attitudes using dimension reduction techniques. I use a principal component analysis on attitudes which provide a transformation of data and regroup attitudes according to their proximity between each other. This proximity captures the structure of values that motivate attitudes, hence, behaviors.

The paper contributes to several strands of the literature. First, I relate to the literature on the psychological determinants of economic behaviors which focuses more on personality traits (Borghans et al. 2008, Almlund et al. 2011, Ferguson et al. 2011, Becker et al. 2012, Flinn et al. 2018, Todd and Zhang 2020). The big-five personality traits are stable over the lifecycle (Terracciano et al. 2006, 2010, Cobb-Clark and Schurer 2012) and therefore can hardly explain changes in individuals' decision-marking process. Thus, I introduce motivational types of values as novel determinants of economic behaviors, which are more volatile with respect to personality traits because of the impact of life experiences. This paper builds a framework that links values and life events taking account endogeneity. Yet, personality traits and values are related (Caprara et al. 2009, Fischer and Boer 2015, Parks-Leduc et al. 2015) as they look at the same object, individuals, from different perspectives which are therefore complementary.

Second, I also contribute to the literature on the relationship between attitudes, beliefs, preferences, values and behaviors by describing the role of consistency within and between values. An additional mechanism that must be taken into account in addition to the roles of cultural values (Ichino and Maggi 2000, Fernández et al. 2004, Guiso et al. 2006, Fernández 2007, Giuliano 2007, Chen 2013, Alesina and Giuliano 2014), norms (Fehr and Falk 2002,

Bardi and Schwartz 2003, Tabellini 2008) and identity Akerlof and Kranton 2005, 2010, Shayo 2009, Bénabou and Tirole 2011, Kranton 2016, Bonomi et al. 2021). Although the role of psychological mechanisms such as the cognitive dissonance has already been studied in the economic literature (Akerlof and Dickens 1982, Konow 2000, Bénabou and Tirole 2006) to explain the belief-behaviors relationship, I rather consider the close concept of cognitive consistency to reveal an hidden pattern in the understanding of the between-values relation. Thus, individuals adjust their own values *simultaneously* rather than independently, hence, spillover effects among values do exist.

Third, this paper fits into the literature about the formation and dynamics of beliefs. Although pioneered by the role of the inter-generational transmission to explain how people form their beliefs (Bisin and Verdier 2001, 2011, Montgomery 2010, Hiller and Baudin 2016, Alan et al. 2017), recent works show their development in childhood (Fehr et al. 2013, Doepke and Zilibotti 2017, Bašić et al. 2020). Building on those who highlight the role of life experiences to explain beliefs formation (Piketty 1995, Mayda 2006, Lönnqvist et al. 2011, Daniel et al. 2021, Zimmermann 2020), I provide an additional mechanism to explain differences in beliefs between individual based on the latter combined with consistency.

Fourth, I also relate to the literature on unemployment scarring by opening the path to an other potential explanation. Unemployment is known to be harmful with consequences on well-being and health (Clark and Oswald 1994, Knabe et al. 2010, Nordt et al. 2015). Scarring emphasizes the depreciation of human capital and firm-specific skills as an explanation of future employment (Arulampalam et al. 2001, Clark et al. 2001, Gregg and Tominey 2005). I show that having ever been unemployed increases self-transcendence. As people with high self-transcendence are more likely to be unemployed, the framework provide a novel mechanism in which past unemployment could affect future employment through values.

The paper is organized as follows. Section 2 discusses the different types of consistency and presents the theoretical framework. Section 3 describes the cohort data and derive values from statements about attitudes. Section 4 defines the empirical framework with the simultaneous equations model. Section 5 presents the results and discusses the effect of unemployment. Section 6 summarizes and concludes.

2 Theoretical framework

Consider an agent that is characterized by two motivational types of values $V_t = (a_t, b_t) \in \mathbb{R}^2$ in period t. Suppose the population is sufficiently large in order to ensure *anonymity*,

meaning that any change of values from the agent does not change the distribution of values.[1] The agent considers her values with respect to norms, namely, the average values within the reference population.[2] Hence, values are normalized to the population level, so that the mean of each value in the population is equal to zero, i.e. $\bar{a} = \bar{b} = 0$. Let the agent be in status $s \in \{\underline{s}, \bar{s}\}$ and therefore belonging to the group of individuals in this status. The average values within the group are $\bar{a}^s$ and $\bar{b}^s$, $\forall s \in \{\underline{s}, \bar{s}\}$.[3]

Utility. In any period t, the agent solves the following maximization program in order to determine her values:

$$\begin{aligned}\max_{a_t, b_t} U_t(a_t, b_t, s_t) = &- \phi_a \frac{(\bar{a}^{s_t} - a_t)^2}{2} - \eta_a \frac{(a_t - a_{t-1})^2}{2} - \frac{(b_t^\star - \rho_a a_t)^2}{2} \\ &- \phi_b \frac{(\bar{b}^{s_t} - b_t)^2}{2} - \eta_b \frac{(b_t - b_{t-1})^2}{2} - \frac{(a_t^\star - \rho_b b_t)^2}{2}\end{aligned} \tag{1}$$

where $(\phi_a, \phi_b, \eta_a, \eta_b) \in (\mathbb{R}_+^\star)^4$ are parameters that account for the relative importance of each utility components; $v_t^\star \in V_t$ are the target values for which values are perfectly consistent; and $(\rho_a, \rho_b) \in [-1, 1]^2$ capture the exogenous inter-dependency between both values within the population. Note that both inter-dependency parameters, i.e. ρ_a and ρ_b, are not necessarily equal. For instance, the former can be equal to zero while the latter is different from zero, meaning that the agent only cares about the consistency of the value b_t given the value a_t.

This utility function has three components which are all expressed in squared Euclidean distance. First, the agent prefers to hold values that are close to norms within the group to whom she belongs, hence, having a disutility the further her value is from the average value within her group, i.e. $\bar{v}^{s_t} - v_t$. I define this as the *group consistency* which can be interpreted as a social cost for the agent to hold different values with respect to her peers.[4]

[1] Relaxing this hypothesis would relate the theoretical framework to the literature on network. Considering, for instance, that some individuals are more influential than others according to their position within the network. Such a framework could lead to a new approach in linking behaviors, values and networks in a context of inter-dependency between values. Although, I do not consider this approach in this paper, I intend to explore it in future works.

[2] The reference population can be defined at several levels such as the city, the region, the country or, more broadly, the shared culture. See Roccas and Sagiv (2010) for the importance of the cultural context in the value-behavior relation. See, also, Bisin and Verdier (2011) for a survey on the economics of cultural transmission and Rapport (2014) for a survey on cultural heterogeneity in cultural anthropology.

[3] So far, I focus on individual life events, hence, the model is a partial equilibrium model. Thus, I suppose that average values within each groups are time invariant. An extension of the model would be to make them time-dependent, hence, sufficiently large shocks in one period, such as economic crises or global pandemic, would affect the average values. However, this extension goes beyond the scope of the paper and is intentionally left for future research.

[4] The group consistency refers to the concept of conformity warp in the social economics literature, meaning that individuals are warped away from their optimal behavior, here values, because they have to conform to the norm. See Burke and Young (2011) for a survey on the role of social norms and individual behaviors in presence of norms.

Second, the agent also prefers when her today's values are close from her yesterday's values, thus, she suffers from a utility loss the further her value in period t is from her value in period $t-1$, i.e. $v_t - v_{t-1}$. I define this as the *time consistency* which refers to the psychological cost for the agent to change her values.[5]

Third, the agent derives utility from the between-values consistency because she is psychologically more comfortable when two values are not in conflict, thus, she has a disutility the further her value is from the optimal pairwise value, e.g. $b_t^\star - \rho_a a_t$. Since ρ_a and ρ_b capture the inter-dependency between values within the population, the agent is comfortable if her values diverge as much as in the population as a whole. I define this as the *cognitive consistency* which reflects a psychological cost due to the cognitive dissonance of having values that are inconsistent with each other. The parameters $(\phi_a, \phi_b, \eta_a, \eta_b)$ account for the relative importance of each utility component relative to the cognitive consistency one.[6]

Optimal values. The first-order conditions solving the maximization program (1) are

$$\begin{aligned}\phi_a(\bar{a}^{s_t} - a_t) - \eta_a(a_{t-1} - a_t) + \rho_a(b_t^\star - \rho_{ab} a_t) = 0,\\ \phi_b(\bar{b}^{s_t} - b_t) - \eta_b(b_{t-1} - b_t) + \rho_b(a_t^\star - \rho_{ba} b_t) = 0.\end{aligned}$$

With $a_t^\star = a_t$ and $b_t^\star = b_t$, the optimal values become functions of the current status s_t and previous values V_{t-1}, hence,

$$a_t(s_t, V_{t-1}) = \frac{\gamma_b(\phi_a \bar{a}^{s_t} + \eta_a a_{t-1}) + \rho_a(\phi_b \bar{b}^{s_t} + \eta_b b_{t-1})}{\gamma}, \tag{2}$$

$$b_t(s_t, V_{t-1}) = \frac{\gamma_a(\phi_b \bar{b}^{s_t} + \eta_b b_{t-1}) + \rho_b(\phi_a \bar{a}^{s_t} + \eta_a a_{t-1})}{\gamma}, \tag{3}$$

where $\gamma_v \equiv \phi_v + \eta_v + \rho_v^2 \ \forall v \in (a, b)$ and $\gamma \equiv \gamma_a \gamma_b - \rho_a \rho_b$.[7] When both values are independent, i.e. $\rho_v = 0 \ \forall v \in (a, b)$, then, it is straightforward to show that each optimal value is the weighted average between the group-average value and the value in the previous period. Hence,

$$v_t(s_t, v_{t-1}) = \frac{\phi_v \bar{v}^{s_t} + \eta_v v_{t-1}}{\phi_v + \eta_v},$$

[5] The literature on social psychology shows that individuals tend to resist to change their attitudes, beliefs and values through behaviors such as cognitive inertia or belief perseverance, providing empirical evidences of such a component in agent's utility. See Kunda (1990) for review of biased information processing through which people maintain their beliefs.

[6] These parameters are assumed to be homogeneous within the population, although they might differ across groups of individuals. More extensively, the emergence of heterogeneity in the relative importance of each component would be an interesting point that I leave for future research.

[7] It can be shown that $\gamma > 0, \ \forall(\rho_a, \rho_b) \in [-1, 1]^2$ if $(\phi_a + \eta_a)(\phi_b + \eta_b) > 1/16$. This condition is satisfied as long as the relative weight in utility of the group and time consistencies (with respect to the cognitive consistency) are large enough.

Let rewrite equations (2) and (3) in terms of v and $-v$ since optimal values for a and b are symmetrical, thus,

$$v_t(s_t, V_{t-1}) = \frac{\gamma_{-v}}{\gamma}\left[\phi_v \overline{v}^{s_t} + \eta_v v_{t-1}\right] + \frac{\rho_v}{\gamma}\left[\phi_{-v}\overline{(-v)}^{s_t} + \eta_{-v}(-v)_{t-1}\right]. \tag{4}$$

Change in status. Using equation (4), I derive the marginal effect of an upgrading of status, from $\underline{s}$ to $\overline{s}$, on both values such that $\Delta v^s \equiv v(\overline{s}, V_{t-1}) - v(\underline{s}, V_{t-1})$. Thus,

$$\Delta v^s = \underbrace{\frac{\gamma_{-v}}{\gamma}\phi_v\left[\overline{v}^{\overline{s}} - \overline{v}^{\underline{s}}\right]}_{\text{Direct effect}} + \underbrace{\frac{\rho_v}{\gamma}\phi_{-v}\left[\overline{(-v)}^{\overline{s}} - \overline{(-v)}^{\underline{s}}\right]}_{\text{Indirect effect}}. \tag{5}$$

The marginal effect of an upgrading of status on the value v, given the same set of values in previous period, consists of a direct effect and an indirect effect. On the one hand, the direct effect is motivated by the group consistency and its magnitude is driven by the between-group gap in value v. On the other hand, the indirect effect captures the combination of two mechanisms, namely, the group consistency and the cognitive consistency. The magnitude of this latter effect is driven by the product of the between-group gap in value $-v$ and the level of inter-dependency of v with respect to $-v$, i.e. ρ_v. Conversely, in the case of a downgrading of status, from $\underline{s}$ to $\overline{s}$, the marginal effect would be $-\Delta v^s$.

Transition probabilities. Once the marginal effect of changing status can be decomposed. One must define when these changes occur. Among the main issues that this paper has to deal with, the fact that transition probabilities are hardly ever exogenous to values, but rather endogenous, is by far one of the main ones. For instance, when thinking about unemployed and employed people, one does not need to be economist to argue that the probability of quitting or getting fired from a job along with the probability to success in finding a job are more than likely to be endogenous to values.[8]

Suppose that transition probabilities between status are as follows. The probability of having an upgrading of status, hence, of being in status $\overline{s}$ in period t while in $\underline{s}$ in the previous period, is a function of values in previous period such that

$$Pr(s_t = \overline{s} \mid s_{t-1} = \underline{s}) = \overline{\pi}(V_{t-1}). \tag{6}$$

Therefore, the complement of this event is the probability to remain in status $\underline{s}$, namely, $Pr(s_t = \underline{s} \mid s_{t-1} = \underline{s}) = 1 - \overline{\pi}(V_{t-1})$. Similarly, the probability of having a downgrading of

[8]See, for instance, Alesina et al. (2015) who show that individuals with stronger family ties are less mobile because moving away is costly, thus, they choose regulated labor markets and therefore experience higher unemployment.

status corresponds to

$$Pr(s_t = \underline{s} \mid s_{t-1} = \bar{s}) = \underline{\pi}(V_{t-1}), \tag{7}$$

with $Pr(s_t = \bar{s} \mid s_{t-1} = \bar{s}) = 1 - \underline{\pi}(V_{t-1})$ being the complement.

Expected values. As we are interested in the effect of a life event, occurring in period $t-1$, on values in period t, let define $\mathbb{E}v_t$ as the expected value of v_t which is a function of the previous status s_{t-1} and the previous of set of values V_{t-1}, such that,

$$\mathbb{E}v_t(s_{t-1}, V_{t-1}) = Pr(s_t = \bar{s})v_t(\bar{s}, V_{t-1}) + Pr(s_t = \underline{s})v_t(\underline{s}, V_{t-1}),$$

where $\mathbb{E}$ is the expectation operator. Using transition probabilities from equations (6) and (7),

$$\begin{aligned}\mathbb{E}v_t(s_{t-1}, V_{t-1}) = &\Big[\overline{\pi}(V_{t-1})Pr(s_{t-1} = \underline{s}) + (1 - \underline{\pi}(V_{t-1}))Pr(s_{t-1} = \bar{s})\Big]v_t(\bar{s}, V_{t-1}) \\ &+ \Big[\underline{\pi}(V_{t-1})Pr(s_{t-1} = \bar{s}) + (1 - \overline{\pi}(V_{t-1}))Pr(s_{t-1} = \underline{s})\Big]v_t(\underline{s}, V_{t-1}).\end{aligned}$$

Regrouping terms,

$$\begin{aligned}\mathbb{E}v_t(s_{t-1}, V_{t-1}) = &\, Pr(s_{t-1} = \bar{s})v_t(\bar{s}, V_{t-1}) + Pr(s_{t-1} = \underline{s})v_t(\underline{s}, V_{t-1}) \\ &+ \Delta v^s \Big[\overline{\pi}(V_{t-1})Pr(s_{t-1} = \underline{s}) - \underline{\pi}(V_{t-1})Pr(s_{t-1} = \bar{s})\Big]\end{aligned} \tag{8}$$

where v_t and Δv^s are respectively defined in equations (4) and (5).

To understand the effect of life events on values, we want to compare individuals on the basis of their life trajectories and values. Thus, suppose there exist two individuals i and j respectively characterized by their status in previous period, i.e. s^i_{t-1} and s^j_{t-1}, and their values in previous period, i.e. V^i_{t-1} and V^j_{t-1}. Let $\Delta\mathbb{E}v_t$ be the difference in expected value v_t between both individuals, namely,

$$\Delta\mathbb{E}v_t \equiv \mathbb{E}v_t(s^i_{t-1}, V^i_{t-1}) - \mathbb{E}v_t(s^j_{t-1}, V^j_{t-1}),$$

where $\mathbb{E}v_t$ corresponds to equation (8). Suppose both individuals have the same status and values in period $t-1$, i.e. $s^i_{t-1} = s^j_{t-1}$ and $V^i_{t-1} = V^j_{t-1}$. Then, it is straightforward to show that $\Delta\mathbb{E}v_t = 0$ which means they have the same expected value in period t.

Endogeneity issue. Now, suppose they still have the same status, say $\bar{s}$, but they do not share the same values in $t-1$, i.e. $s^i_{t-1} = s^j_{t-1} = \bar{s}$ and $V^i_{t-1} \neq V^j_{t-1}$. For instance, two individuals may have the same employed status (e.g. employed), although one is conservative

and the other one progressive. Thus, the difference in expected value v_t becomes

$$\Delta \mathbb{E} v_t = \underbrace{v_t^i - v_t^j}_{\text{True effect}} - \underbrace{\Delta v^s \times \Delta \underline{\pi}}_{\text{Bias}}, \tag{9}$$

where

$$v_t^i - v_t^j = \Delta v_{t-1} \equiv \frac{\gamma_{-v}}{\gamma} \eta_v \Big[v_{t-1}^i - v_{t-1}^j \Big] + \frac{\rho_v}{\gamma} \eta_{-v} \Big[(-v)_{t-1}^i - (-v)_{t-1}^j \Big], \tag{10}$$

$-\Delta v^s$ is the marginal effect of a downgrading of status defined in equation (5), and $\Delta \underline{\pi} \equiv \underline{\pi}(V_{t-1}^i) - \underline{\pi}(V_{t-1}^j)$ the difference in probability of having a downgrading of status between both individuals.

If employment status dynamics were exogenous to values, then transition probabilities would not depend on values, i.e. $\partial \overline{\pi} / \partial v_{t-1} = \partial \underline{\pi} / \partial v_{t-1} = 0 \; \forall v \in V$, which implies that there would be no difference in probabilities between both individuals, i.e. $\Delta \underline{\pi} = 0$. Thus, equation (9) would only be a linear function of both values' gaps in previous period, i.e. Δv_{t-1}. However, in many cases such as unemployment, transition probabilities are endogenous, hence $\Delta \underline{\pi} \neq 0$, which, therefore, leads to a bias when gauging the effect of a life event on values.

General case. In order to understand the role of the bias, let us consider the most general case in which individuals do not share the same values in $t-1$, i.e. $V_{t-1}^i \neq V_{t-1}^j$, neither they have the same status such that $s_{t-1}^i = \underline{s}$ and $s_{t-1}^j = \overline{s}$. Thus, the difference in expected value v_t becomes

$$\Delta \mathbb{E} v_t = v_t^i(\underline{s}, V_{t-1}^i) - v_t^j(\overline{s}, V_{t-1}^j) + \Delta v^s \Big[\overline{\pi}(V_{t-1}^i) + \underline{\pi}(V_{t-1}^j) \Big],$$

Rewriting the expression,

$$\Delta \mathbb{E} v_t = \Delta v_{t-1} + \Delta v^s \Big[1 + \Delta \pi \Big] \tag{11}$$

where Δv_{t-1} and Δv^s are respectively defined in equations (10) and (5), and $\Delta \pi = \overline{\pi}(V_{t-1}^i) + \underline{\pi}(V_{t-1}^j)$.

Bias identification. For simplicity, suppose that $\overline{\pi}$ and $\underline{\pi}$ are linear probability functions such that

$$\overline{\pi}(V_{t-1}) = \overline{\mu} + \overline{\alpha} a_{t-1} + \overline{\beta} b_{t-1} \tag{12}$$

$$\underline{\pi}(V_{t-1}) = \underline{\mu} + \underline{\alpha} a_{t-1} + \underline{\beta} b_{t-1} \tag{13}$$

In the case where transition probabilities are exogenous, all α and β parameters in equations (12) and (13) would be equal to zero, which implies that $\Delta\pi = \overline{\mu} - \underline{\mu}$. Thus, the difference in expected value v_t is composed of, on the one hand, the total effect of a change in status $\Delta v^s[1 + \overline{\mu} + \underline{\mu}]$, on the other hand, the reproduction of the difference in values in previous period Δv_{t-1}.

In the case of an endogenous life event, the difference in transition probabilities from equation (11) depends on values in previous period. Thus, using equations (12) and (13), we can write the bias as

$$\Delta\pi - \overline{\mu} - \underline{\mu} = \overline{\alpha} a^i_{t-1} + \underline{\alpha} a^j_{t-1} + \overline{\beta} b^i_{t-1} + \underline{\beta} b^j_{t-1}. \tag{14}$$

By determining the parameters of equation (14) and therefore its sign, it is possible to understand how the bias affect the difference in expected values, due to a life event, between two individuals from two different backgrounds. When equation (14) is positive (resp. negative), it means that the observed total effect of a downgrading of status on values is biased upward (resp. downward). Note that, the values of these parameters along with the marginal effect of a change in status depend on the life event that we consider.

3 Data

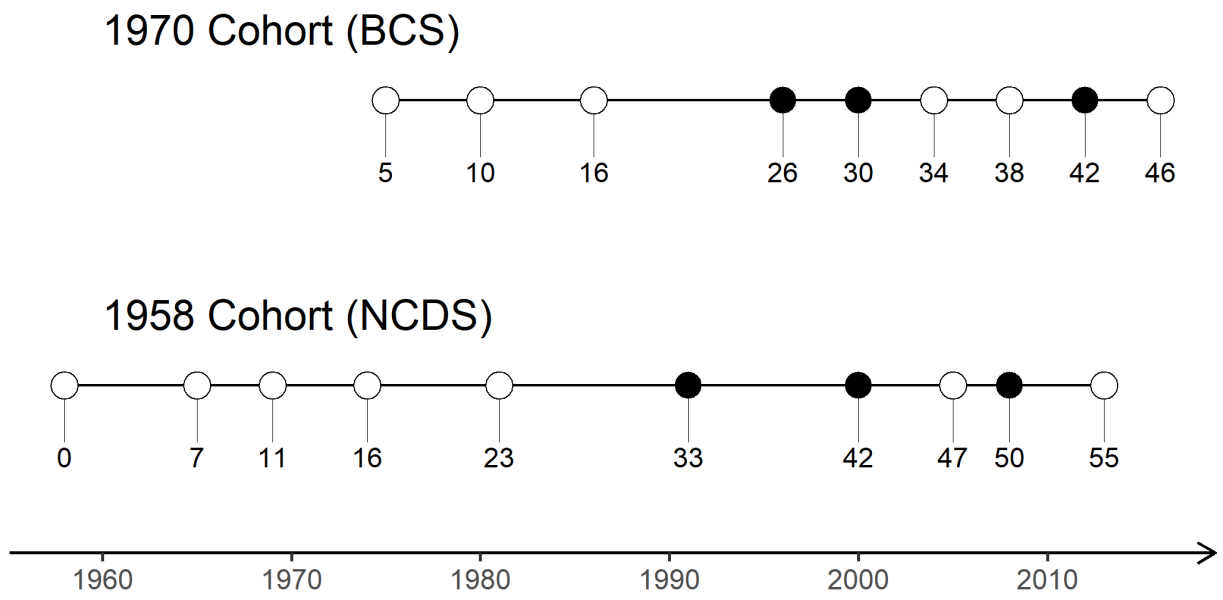
3.1 Sample

I use two mature British cohort studies that have been widely used in social sciences-related works. The National Child Development Study (NCDS58) is a cohort of individuals born during a same week in March 1958. The British Cohort Study (BCS70) is composed of those born during a same week in April 1970. Cohort members were born in England, Scotland and Wales.

Both cohorts participated to several interviews at different ages. Figure 1 presents the ages at which cohort members may have been interviewed and the corresponding years. The black circles on the figure indicate interviews from which attitudes can be derived, thus I will focus on those years for the remaining of the paper. I define four periods according to the decade in which individuals belong, i.e. their twenties, thirties, forties or fifties. For the BCS70 cohort, I refer to period 1 for the interview at the age of 26, to period 2 for the one at 30, and to period 3 for the one at 42. For the NCDS58 cohort, periods start at period 2 for the interview at the age of 33, then period 3 corresponds to the one at 42 and period 4 refers to the one at 50.

One of the main issue with cohort studies is attrition. Cohort members do not participate

Figure 1: Timing of interviews.



Notes: This figure presents the timing of interviews for the NCDS58 and BCS70 cohorts. Circles correspond to interviews and numbers under them indicate the age of cohort members during this interview. Black circles correspond to interviews for which attitudes can be derived. The horizontal arrow at the bottom of the figure represents the years.

Table 1: Number of individuals and response rates by periods.

	BCS	NCDS
Initial	19006 (100%)	17885 (100%)
Period 1	9003 (47.4%)	
Period 2	11261 (59.2%)	11469 (64.1%)
Period 3	9841 (51.8%)	11419 (63.8%)
Period 4		9790 (54.7%)
All	6115 (32.2%)	8107 (45.3%)

Notes: Response rates between parentheses. The last row corresponds to individuals who have been interviewed at all periods.

at every interviews and therefore some individuals are either missing at some interviews or lost definitely at some point. Table 1 presents the responses rates by periods of interest. The second period interview is the one with the greater response rate, i.e. with 64.1% for the NCDS58 cohort and 59.2% for the BCS70 one. This latter, when BCS70 cohort members are 30, has been conducted at the same time as the third period interview for the NCDS58 cohort, when they are 42, so in year 2000. Thus, they share the same set of statements about

attitudes.

3.2 From statements to attitudes

I derive attitudes from individuals' answers to statements. These statements cover several topics and can be grouped into categories that correspond to attitudes towards (in alphabetical order): Anti-Racism (AR), Authority (A), Children (C), Environment (E), Inequality Aversion (IA), Information Technology (IT), Learning (L), Morale (MOR), Political Cynicism (PC), Work-Ethic (WE), and Working Mother (WM). The full list of statements are reported in Appendix A. Some examples of statements are the following:

(A2) *For some crimes the death penalty is the most appropriate sentence*;

(MOR3) *Couples who have children should not separate*;

(PC1) *None of the political parties would do anything to benefit me*;

(WE1) *Having almost any job is better than being unemployed.*

At each interview, cohort members answer to these statements using a 5-level scale (strongly disagree/disagree/neither agree nor disagree/agree/strongly agree). I attribute them a score for each statement between -2 and 2 according to the answer. I compute the average score among all the statements by attitude categories for each individual at each period. I standardize each attitude score at the cohort and period level. Thus, each individual belongs to a cohort and has, for each period, a standardized score for each attitude.

Nonetheless, the number of available statements depends on the cohort and the period. Table 2 summarizes the number of available statements at each interview. Thus, interviews do not necessary share the same set of statements, except when the BCS70 are 30 and the NCDS58 are 42 because interviews were performed using the same questionnaires.

3.3 From attitudes to motivational types of values

I derive motivational types of values from attitudes. I focus on the five attitudes that are available in all interviews in order to have the same baseline for each period of both cohorts. These attitudes are Authority (A), Inequality Aversion (IA), Morale (MOR), Political Cynicism (PC) and Work Ethic (WE).

I use a Principal Component Analysis (PCA) to reduce the dimension of attitudes. PCA increases the interpretability of vectors while minimizing the information loss. By focusing on the two first components, which are orthogonal due to the PCA, I can interpret them as the two main values that discriminate and, therefore, characterize individuals in their attitudes.

Table 2: Number of available statements at each interview

	BCS70			NCDS58		
Attitude	26	30	42	33	42	50
Authority	4	6	3	6	6	3
Anti-Racism		5	2	5	5	3
Children		4	2	2	4	
Environment		3	2	3	3	3
Inequality Aversion	1	7	5	7	7	3
Info. Techno.		4			4	
Learning		4			4	
Morale	3	6	3	6	6	3
Political Cynicism	3	3	3	3	3	3
Work Ethic	2	3	3	3	3	3
Working Mother		5	2		5	

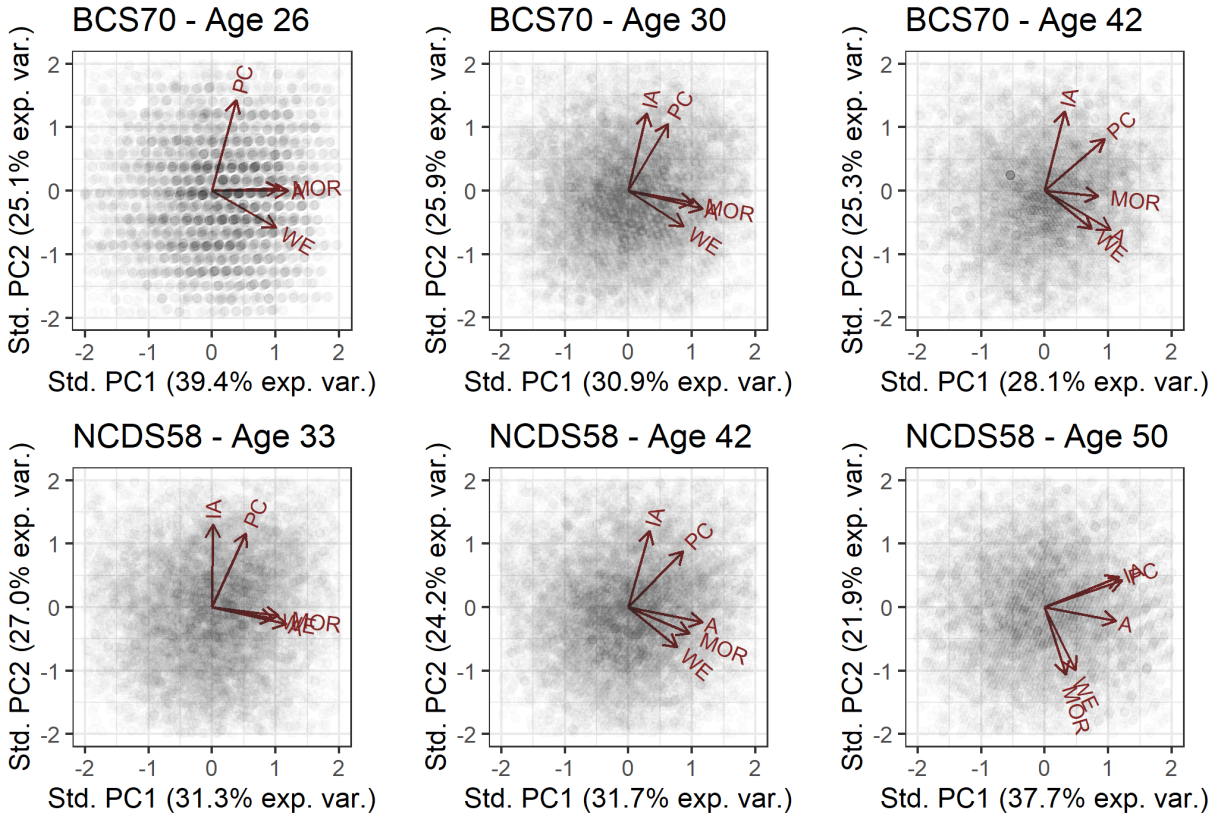
Notes: This table presents the number of available statements in each attitudes at each age for the NCDS58 and BCS70 cohorts. Details on statements are reported in the appendix, see tables A.1, A.2 and A.3 in appendix A.

The other principal components act as a kind of residuals, but they could be incorporated to the analysis although their interpretability is much more difficult. Thus, PCA allows to determine values by summarizing attitudes through dimension reduction which reduces the noise in attitudes, hence, this noise is relegated to the unused components that explain the smaller part of the variance.

I perform PCA at the cohort and period level. Figure 2 presents the eigenvectors of the two first principal components. Links between attitudes are fairly stable across cohorts and periods. These principal components explain more than 50% of the variance in attitudes. I interpret both of them as the two-dimensional structure of universal motivational types of values, as introduced by Schwartz (1992, 2012).

Focusing on the first principal component (PC1), the x-axis directions of vectors highlight attitudes that characterize *conservation*, in the terms of Schwartz (1992), which is the preference for stability, security, tradition and conformity. In terms of attitudes in the data, they reflect taste for Authority, Morale and Work Ethic. Thus, the value which discriminates the most between individuals is *conservation* (versus *openness to change*). The second principal component (PC2) is orthogonal to the previous dimension of values at the cohort-period level. Focusing on the y-axis directions of vectors, they indicate attitudes that characterize *self-transcendence*. This motivational type of values refers to the care and concern about others, reflecting universalism and benevolence. In these data, this value is associated with attitudes toward Political Cynicism and aversion for Inequality and Work Ethic. There-

Figure 2: Two first principal components of the PCA to derive values from attitudes.



Notes: This figure presents the direction of the two first principal components. Details on the eigenvectors are available in tables B.1 and B.2, respectively for the BCS70 and NCDS58 cohorts. The attitude toward Inequality Aversion (IA) is removed for the PCA on the BCS70 cohort at the age of 26 years because only one statement is available.

fore, the second value that discriminates the most individuals is *self-transcendence* (versus *self-enhancement*).

I make a projection of both principal components for all individuals at each period. Thus, each cohort member has a Conservation score ($Cons$) and a Self-Transcendence score ($Trans$) at each period. By construction, both scores are standardized at the cohort-period level and orthogonal. Thus, the cognitive consistency that creates the inter-dependency between values does not exist *per se* but is rather driven by socio-economic characteristics such as gender, education, etc. once they are introduced as control variables.

3.4 Socio-economic characteristics and life events

I consider several socio-economic characteristics as control variables that will introduce the inter-dependency between values. Among them, I use the sex at birth of cohort members and their level of education based on the highest academic qualification they obtained.

Table 3: Descriptive statistics.

	NCDS58 - N = 30,552					BCS70 - N = 27,906				
Variable	Mean	SD	Min	Max	NA	Mean	SD	Min	Max	NA
Period 1 - Twenties						0.31	0.46	0	1	0
Period 2 - Thirties	0.35	0.48	0	1	0	0.40	0.49	0	1	0
Period 3 - Forties	0.37	0.48	0	1	0	0.29	0.45	0	1	0
Period 4 - Fifties	0.28	0.45	0	1	0					
Female	0.51	0.50	0	1	0	0.53	0.50	0	1	0
Education - Primary	0.62	0.49	0	1	0	0.52	0.50	0	1	0
Education - Secondary	0.19	0.39	0	1	0	0.19	0.39	0	1	0
Education - Tertiary	0.20	0.40	0	1	0	0.29	0.46	0	1	0
Girl First	0.49	0.50	0	1	7199	0.48	0.50	0	1	14789
Got Cancer	0.03	0.16	0	1	0	0.01	0.12	0	1	0
Been Unemployed	0.34	0.48	0	1	0	0.21	0.41	0	1	0

Notes: This table presents the descriptive statistics of variables used in the study. Values and attitudes are not displayed in this table because they are standardized.

Female is a dummy variable that equals one if the cohort member is born as a female. I regroup education levels into three categories that characterize primary, secondary and tertiary education levels (*Educ*).

For life events, I focus on three of them: to have ever had cancer, to have had a girl as first child and to have ever been unemployed. *GotCancer* is a dummy variable that equals one if the individual has ever had a cancer by the time of the interview. *GirlFirst* is also a dummy variable that equals one if the sex of the first child is female, and 0 if it is a male. *BeenUnemp* is a dummy variable that equals one if the individual has ever been unemployed at least one month by the time of the interview. Activity status are derived from the full activity histories to the nearest month since cohort members are 16 years old. These data are available for all cohort members until the last interview they have participated in. When individuals were missing in previous interviews, interviewers asked them about their activities during the period until then.

Table 3 presents the descriptive statistics for the NCDS58 and BCS70 cohorts. Both cohorts contain respectively 30,552 and 27,906 observations. Period variables corresponds to dummy variables to determine the decade in which individuals are.

4 Empirical framework

4.1 What life events?

We are interested in the effect of a life event Z on conservation ($Cons$) and self-transcendence ($Trans$) in order show whether spillover effects on values exist or not. The type of life events that I have to consider to test this hypothesis requires two properties: *exogeneity* and *non-reversibility*. On the one hand, the life event has to be *exogenous* so that values at previous period do not influence the likelihood that the life event occurs. On the other hand, the life event has to be *non-reversible*. Otherwise, the probability to reverse the event is likely to be endogenous which would bias the estimate of individual's values at the time of interviews.

Although I am going to study the role of unemployment on values, I cannot use it as a life event to show the existence of spillover effects among values because it does not satisfy both properties. First, individuals change their activity status quite often and, therefore, the effect of unemployment on values is all the time affected by these changes in status. Second, the likelihood to be unemployed is clearly endogenous to values. For instance, individuals with high work ethic, so high conservation and low self-transcendence, have a lower probability to be unemployed as they are less likely to quit their job with respect to people with low work ethic.

In this regard, I focus on two life events that are as *exogenous* as possible and *non-reversible*, namely, to have ever had cancer and to have a girl as first child conditional on having a baby. The former life event is exogenous in the sense that values, such as conservation and self-transcendence, do not affect the probability to have cancer and is also non-reversible because I compare individuals who have *ever* had cancer with respect to people who never had one.

For the latter life event, I consider a sub-sample that contains only individuals who have at least one baby, hence, I compare those who gave birth to a girl as a first child with those who got a boy. Thus, the life event is exogenous to values because the probabilities of child's sex at birth are fifty-fifty, assuming that sex-selective abortion is very rare in the UK.[9] Once the baby is born, the life event is non-reversible because it has occurred and remains for ever. I do not also consider adopted child because the sex may be decided by parents and therefore linked to values and preferences (Dahl and Moretti 2008). I also exclude stillborn babies because the socialization of parents from the baby does not occur.

[9] Dubuc and Coleman (2007) argue that sex-selective abortion occurs among mothers born in India and living in Britain. They show that sex ratios at birth have always been one point lower for Asian groups in England and Wales before 1990. Although this issue raises several social and economic concerns, I do not believe that it statistically affects my results because it represents a minority in the data.

Table 4: Values according to first child's sex.

	Linear regression - 5-attitude Principal Comp.					
	Conservative (Cons)			Self-Transcendence (Trans)		
	(1)	(2)	(3)	(1)	(2)	(3)
Intercept	0.263***	0.455***	0.217***	0.035**	0.135***	−0.064**
	(0.016)	(0.016)	(0.027)	(0.014)	(0.014)	(0.027)
Female	−0.293***	−0.289***	−0.194***	0.001	0.007	0.063***
	(0.013)	(0.013)	(0.013)	(0.012)	(0.012)	(0.013)
Girl first	0.026*	0.026**	0.032**	−0.010	−0.011	−0.002
	(0.013)	(0.013)	(0.013)	(0.012)	(0.012)	(0.013)
Educ. Secondary		−0.404***	−0.286***		−0.345***	−0.139***
		(0.017)	(0.017)		(0.015)	(0.017)
Educ. Tertiary		−0.890***	−0.522***		−0.308***	−0.126***
		(0.016)	(0.017)		(0.015)	(0.016)
Value_{t-1}			0.545***			0.350***
			(0.006)			(0.006)
R^2	0.016	0.098	0.371	0.001	0.022	0.144
Adj. R^2	0.016	0.097	0.371	0.001	0.022	0.144
Num. obs.	34440	34440	23354	34440	34440	23354

Notes: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors between parentheses. Male in the NCDS cohort with primary education and a boy as first child as the reference group.

I only focus on the first child as fertility decisions for the following children might be linked to the sex of the eldest child and values, e.g. a preference for diversity in children birth sex. Moreover, some parents may have a boy as first child and a girl thereafter. Some changes in values may be specific to have had a girl which includes the event to have a girl first. Thus, this is likely to produce a lower-bound estimate and also to reduce the statistical power of the effect of this life event on values.

4.2 Effect of life events on values

I estimate independently with OLS the effect of the life event $Z \in \{GotCancer, GirlFirst\}$ on values $V = (Cons, Trans)$ for an individual i in period t with the following equations:

$$Cons_{it} = \alpha_1 + \beta_1 \times Z_{it} + \eta_1 \times Cons_{i,t-1} + X_i\delta_1 + u_{it}$$
$$Trans_{it} = \alpha_2 + \beta_2 \times Z_{it} + \eta_2 \times Trans_{i,t-1} + X_i\delta_2 + u_{it}$$

where X are control variables including gender and education. Table 4 and 5 summarize the coefficients for, respectively, having a girl as first child and having ever had cancer.

The coefficient associated to $GirlFirst$ in table 4 is positive and significant for $Cons$

Table 5: Values according to getting cancer.

	Linear regression - 5-attitude Principal Comp.					
	Conservative (Cons)			Self-Transcendence (Trans)		
	(1)	(2)	(3)	(1)	(2)	(3)
Intercept	0.090***	0.312***	0.181***	0.034**	0.105***	−0.028
	(0.019)	(0.019)	(0.020)	(0.017)	(0.017)	(0.022)
Female	−0.164***	−0.150***	−0.172***	−0.057***	−0.050***	−0.022*
	(0.010)	(0.010)	(0.011)	(0.009)	(0.009)	(0.012)
Got cancer	0.111***	0.073**	0.088***	0.107***	0.096***	0.045
	(0.037)	(0.036)	(0.034)	(0.033)	(0.033)	(0.036)
Educ. Secondary		−0.370***	−0.278***		−0.241***	−0.169***
		(0.013)	(0.014)		(0.012)	(0.015)
Educ. Tertiary		−0.866***	−0.501***		−0.169***	−0.166***
		(0.012)	(0.014)		(0.011)	(0.014)
Value_{t-1}			0.560***			0.275***
			(0.005)			(0.005)
R^2	0.004	0.084	0.392	0.001	0.009	0.090
Adj. R^2	0.004	0.084	0.392	0.001	0.009	0.089
Num. obs.	58216	58216	32885	58216	58216	32885

Notes: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors between parentheses. Male in the NCDS cohort with primary education and who never had cancer as the reference group.

while it is negative but non-significant for $Trans$. Thus, individuals who have had a girl as first child instead of a boy tend also to have more conservative values without change in their values about self-transcendence. The former effect is even more stronger once we introduce controls about education and lag of conservation. On average, parents who have had a girl instead of a boy as first child hold more conservative values by 0.032 sd.

Focusing on the levels of education, coefficients reveal two patterns. First, a higher level of education is associated with lower conservative values, hence, greater openness to change. Coefficients are significantly different between the three levels of education. Second, individuals with secondary and tertiary levels of education hold more self-enhanced values with respect to those with primary education. Although, coefficients of the secondary and tertiary levels are not statistically different from each other. These patterns point out the fact that conservative values are much more discriminatory than self-transcendence according to the educational level, which is consistent with the ranking of principal components based on the explained variance.

In table 5, the coefficient associated to $GotCancer$ is positive and significant for $Cons$ and $Trans$, except for the latter once I introduce the lag of the value. Thus, individuals who have ever had a cancer tend to hold more conservative and self-transcendent values. On

Table 6: Attitudes according to first child's sex.

	Linear regression - Attitudes				
	(A)	(IA)	(MOR)	(PC)	(WE)
Intercept	0.133***	0.067***	0.136***	0.064***	0.071***
	(0.021)	(0.022)	(0.023)	(0.023)	(0.024)
Female	−0.083***	−0.040***	−0.171***	−0.132***	−0.070***
	(0.010)	(0.011)	(0.011)	(0.011)	(0.012)
GirlFirst	0.038***	0.009	0.004	0.002	0.007
	(0.010)	(0.011)	(0.011)	(0.011)	(0.012)
Educ. Secondary	−0.144***	−0.154***	−0.033**	−0.147***	−0.024
	(0.013)	(0.014)	(0.014)	(0.014)	(0.015)
Educ. Tertiary	−0.338***	−0.237***	−0.049***	−0.314***	−0.078***
	(0.013)	(0.013)	(0.014)	(0.014)	(0.015)
Attitude_{t-1}	0.558***	0.535***	0.533***	0.467***	0.405***
	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)
R^2	0.378	0.321	0.301	0.271	0.173
Adj. R^2	0.378	0.321	0.300	0.271	0.172
Num. obs.	23483	23443	23460	23458	23408

Notes: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors between parentheses. Male in the NCDS cohort with primary education and a boy as first child as the reference group.

average, individuals who went through this life event becomes more conservative by 0.088 sd. Coefficients associated to the level of education are close to those obtained in the previous table, showing once again the difference in terms of values between less and more educated individuals.

4.3 Effect of life events on attitudes

Since values are derived from attitudes, I look at the effect of these life events on attitudes in order to understand which attitudes drive the observed shifts in values. Hence, I estimate independently with OLS the effect of the life event $Z \in \{GotCancer, GirlFirst\}$ on attitudes Y^j with $j \in \{A, IA, MOR, PC, WE\}$ for an individual i in period t with the following equation:

$$Y_{it}^j = \alpha_j + \beta_j \times Z_{it} + \eta_j \times Y_{it-1}^j + X_i \delta_j + u_{it}$$

where X are control variables. Table 6 and 7 summarize the coefficients for, respectively, having a girl as first child and having ever had cancer.

Table 6 indicates that having a girl as first child is associated with an increase in attitudes towards Authority (A) by 0.038 sd. One mechanism explaining this could be that parents internalize that their girl is more likely to be exposed to abuse or bad behaviors with respect

Table 7: Attitudes according to getting cancer.

	Linear regression - Attitudes				
	(A)	(IA)	(MOR)	(PC)	(WE)
Intercept	0.105***	0.027	0.073***	0.089***	0.046**
	(0.016)	(0.017)	(0.017)	(0.017)	(0.018)
Female	−0.057***	−0.062***	−0.143***	−0.120***	−0.041***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.010)
GotCancer	0.037	0.043	0.014	0.057**	0.006
	(0.026)	(0.028)	(0.029)	(0.029)	(0.031)
Educ. Secondary	−0.139***	−0.155***	−0.043***	−0.137***	−0.022*
	(0.011)	(0.012)	(0.012)	(0.012)	(0.013)
Educ. Tertiary	−0.325***	−0.251***	−0.065***	−0.297***	−0.089***
	(0.011)	(0.011)	(0.011)	(0.012)	(0.012)
Attitude_{t-1}	0.585***	0.535***	0.538***	0.473***	0.429***
	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)
R^2	0.408	0.317	0.305	0.273	0.189
Adj. R^2	0.408	0.317	0.305	0.273	0.189
Num. obs.	33094	33017	33062	33066	32986

Notes: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors between parentheses. Male in the NCDS cohort with primary education and who never had cancer as the reference group.

to a boy, therefore, they increase their support towards a more authoritarian society. Other coefficients are also positive but not significantly different from zero. Since authority is strongly associated with conservation and much less with self-transcendence, see figure 2, it is consistent with the fact that we observe only a shift in the former and not in the latter in table 4.

Table 7 shows that individuals who have ever had a cancer tend also to increase their attitudes towards Inequality Aversion (IA) by 0.043 sd., although not significant, and towards Political Cynicism (PC) by 0.057 sd. Sick individuals may become more dependent and rely more on institutions, they increase their support towards redistribution and scepticism about politicians who lead these institutions. The effect on other attitudes is not significantly different from zero. Since both attitudes are strongly associated with self-transcendence and slightly associated with conservation, see figure 2, it explains the increase we observe in both values for individuals who went through this life event in table 5.

4.4 Simultaneous equations model

So far, *exogenous* and *non-reversible* life events affect the values of individuals who went through. Having a girl as a first child instead of a boy increases support for authority, hence, increasing conservation without having an effect on self-transcendence. Having ever

had cancer increases inequality aversion and cynicism towards politicians which, therefore, increase both conservation and self-transcendence. Although, these effects show how life events can shape values, they do not take into account any type of inter-dependency between values due to the cognitive consistency.

Structural and reduced forms. In order to account for a potential inter-dependency between values, I consider a Simultaneous Equations Model (SEM) in which individuals' values are jointly determined, also determined by their own previous values and related to individual characteristics. Each observation consists in an individual i observed in period t. With two values, the structural form of the SEM can be written in matrix notation as

$$V_{i,t}\Gamma = z_{i,t}\Theta + V_{i,t-1}H + X_iB + U_{i,t} \tag{15}$$

where $V_{i,t} = \begin{bmatrix} Cons_t & Trans_t \end{bmatrix}$ is the matrix of dependent values in period t; $\Gamma = \begin{pmatrix} 1 & -\gamma_2^1 \\ -\gamma_1^2 & 1 \end{pmatrix}$ describes the relation between values; z is a dummy vector which indicates whether the life event Z occurred; $\Theta = \begin{pmatrix} \theta_1 \\ \theta_2 \end{pmatrix}$ captures the effect of the life event on each value; $H = \begin{pmatrix} \eta_1 & 0 \\ 0 & \eta_2 \end{pmatrix}$ describes the relation between a value in period t and this same value in period $t-1$; X are the individual characteristics vector including the intercept; B corresponds to all coefficients that are associated to X; and U is a matrix of the error terms.

Multiplying equation (15) by the inverse of the Γ matrix leads to the reduced form of the SEM such as

$$V_{i,t} = z_{i,t}\Phi + V_{i,t-1}\Psi + X_i\Pi + \epsilon_{i,t}, \tag{16}$$

where $\Phi = \Theta\Gamma^{-1}$, $\Psi = H\Gamma^{-1}$, $\Pi = B\Gamma^{-1}$, and $\epsilon = U\Gamma^{-1}$.

Identification. The *rank condition* is satisfied for both equations because the number of excluded endogenous variables in the reduced form, i.e. either $Cons_t$ or $Trans_t$, is equal to the number of excluded exogenous variables in the structural form, i.e. either $Trans_{t-1}$ or $Cons_{t-1}$. Thus, the SEM can be identified. The identification relies on the assumption that $Cons_{t-1}$ does not affect $Trans_t$ and that $Trans_{t-1}$ does not affect $Cons_t$. As we suppose that values are permanently adjusted over time in order to have consistent values, it implies that, for instance, any change in $Trans_{t-1}$ can affect $Cons_t$ only through $Cons_{t-1}$. In addition, the *order condition* is also satisfied for both equations because the number of excluded exogenous variables, i.e. $Cons_{t-1}$ and $Trans_{t-1}$, is also equal to the number of included endogenous variables, i.e. $Cons_t$ and $Trans_t$. Therefore, the SEM is exactly identified.

Decomposition of the total effect. From the reduced form equation (16), it is possible to decompose the total effect of the life event Z on value $v \in V = \{v, -v\}$ as the sum of a direct effect and an indirect effect, namely

$$\phi_v = \underbrace{\tilde{\gamma}_v^v \times \theta_v}_{\text{Direct effect}} + \underbrace{\tilde{\gamma}_v^{-v} \times \theta_{-v}}_{\text{Indirect effect}} \tag{17}$$

where ϕ_v is the total effect of the life event Z on value v, $\tilde{\gamma}_v^v$ is the element on the diagonal of Γ^{-1} associated to the value v, $\tilde{\gamma}_v^{-v}$ is the off-diagonal element of Γ^{-1} on the same column, while θ_v and θ_{-v} are respectively the marginal effects of the life event Z on values v and $-v$ from the structural form.

In the terms of the theoretical framework, the empirical decomposition of equation (17), refers to the general case from equation (11). Therefore, when the life event is exogenous, it is possible to properly estimate the magnitudes and the relative shares of the direct and indirect effects that compose the marginal effect of the life event on values, as described in equation (5). However, when the life event is endogenous, the magnitudes of the direct and indirect effects are biased, either upward or downward, but their relative shares in the marginal effect are not.

Estimation method. I use a two-stage least squares (2SLS) estimation method to estimate the SEM. Thus, I instrument the endogenous variables of each equation with all exogenous variables from all equations. In a first step, I estimate the reduced form in equation (16) and obtain the predicted values, i.e. $\widehat{Cons}_t$ and $\widehat{Trans}_t$.

In a second step, I estimate the structural form in equation (15) in which I replace the endogenous variables with the predicted values obtained in the first step. Thus, I estimate the following system of equations:

$$\widetilde{V}_{i,t}\Gamma = z_{i,t}\Theta + V_{i,t-1}H + X_iB + U_{i,t}$$

where $\widetilde{V}_{i,t} = \begin{bmatrix} v_t & -\hat{v}_t \end{bmatrix}$ in which v_t is the dependent value and $-\hat{v}_t$ encompasses the predictions of the endogenous value from the first step estimate. The 2SLS estimates of the simultaneous equations model for all the life events, which are analyzed below, are available in Appendix C.

Table 8: Decomposition of the effect of having a girl first on values.

Value (v)	Direct and indirect effects		Total effect
	$\tilde{\gamma}_v^{Cons} \times \theta_{Cons}$	$\tilde{\gamma}_v^{Trans} \times \theta_{Trans}$	ϕ_v
Conservation ($Cons$)	**0.030**	0.003	0.033
	(100.0)	(9.9)	(109.9)
Self-Transcendence ($Trans$)	-0.010	**0.008**	-0.002
	(-120.9)	**(100.0)**	(-20.9)

Notes: Magnitudes in standard deviations. Direct effects in bold. Relative share with respect to the direct effect in percent between parentheses.

5 Results and discussion

5.1 Effect of exogenous life events on values

I start by examining the decomposition of the total effect for both exogenous and non-reversible life events. First, I decompose the total effect of having a girl, instead of a boy, as first child on values, using the methodology described in section 4.4. Second, I also decompose the total effect of having ever had a cancer on values.

Girl first. Table 8 summarizes the decomposition of the effect of having a girl as first child on values. Having a girl as first child directly increases conservative values by 0.03 sd. and self-transcendence by 0.008 sd. Due to the consistency of values, about 10% of the increase in conservation is amplified by the raise in self-transcendence that has a positive impact on conservatism. Meanwhile, the increase in conservation totally offsets the increase in self-transcendence, leading to a total effect that is negative although close to zero. Thus, due to the consistency of values and therefore the offsetting effect, self-transcendence does not increase when an individual gets a girl as first child rather than a boy, while conservation does increase.

Got cancer. Table 9 summarizes the decomposition of the effect of having ever had a cancer on values. Having ever had cancer increases conservation by 0.054 sd. and self-transcendence by 0.075 sd. Due to values consistency, the increase in self-transcendence also increases conservative values through the spillover effect by 0.025 sd., which represents almost a third of the total effect of the life event on conservation. Meanwhile, part of the effect on self-transcendence is offset by the spillover effect of the life event through conservation. As conservation raises, it also decreases self-transcendence by -0.02 sd. which corresponds to a fourth of the total effect of having ever had a cancer on self-transcendence. Thus, without the consistency of values, the increase in self-transcendence would have been 26.8% much larger.

Table 9: Decomposition of the effect of having ever had a cancer on values.

Value (v)	Direct and indirect effects		Total effect
	$\tilde{\gamma}_v^{Cons} \times \theta_{Cons}$	$\tilde{\gamma}_v^{Trans} \times \theta_{Trans}$	ϕ_v
Conservation ($Cons$)	**0.054**	0.025	0.079
	(100.0)	(46.6)	(146.6)
Self-Transcendence ($Trans$)	-0.020	**0.075**	0.055
	(-26.8)	**(100.0)**	(73.2)

Notes: Magnitudes in standard deviations. Direct effects in bold. Relative share with respect to the direct effect in percent between parentheses.

5.2 Role of the consistency of values

Values consistency drives the magnitude of the spillover effects of life events on values. In the simultaneous equations model, the matrix Γ captures the relation between values within the structural form. Once we consider the estimated reduced form for the decomposition, the spillover effects appear through Γ^{-1}. For instance, in the case of the girl-first life event, the Γ matrix corresponds to

$$\Gamma = \begin{pmatrix} 1 & 0.329 \\ -0.365 & 1 \end{pmatrix} \implies \Gamma^{-1} = \begin{pmatrix} 0.893 & -0.294 \\ 0.326 & 0.893 \end{pmatrix}.$$

In the case of the other life events, the coefficients associated to the matrix Γ are very close to these ones.[10] Thus, the effect of the life event Z on values is derived from the matrix product of $\Theta = \begin{pmatrix} \theta_{Cons} & \theta_{Trans} \end{pmatrix}$ and the propagation matrix Γ^{-1} that accounts for spillover effects. Considering the effect of the life event Z on both values as a homogeneous system of first-order linear differential equations leads to

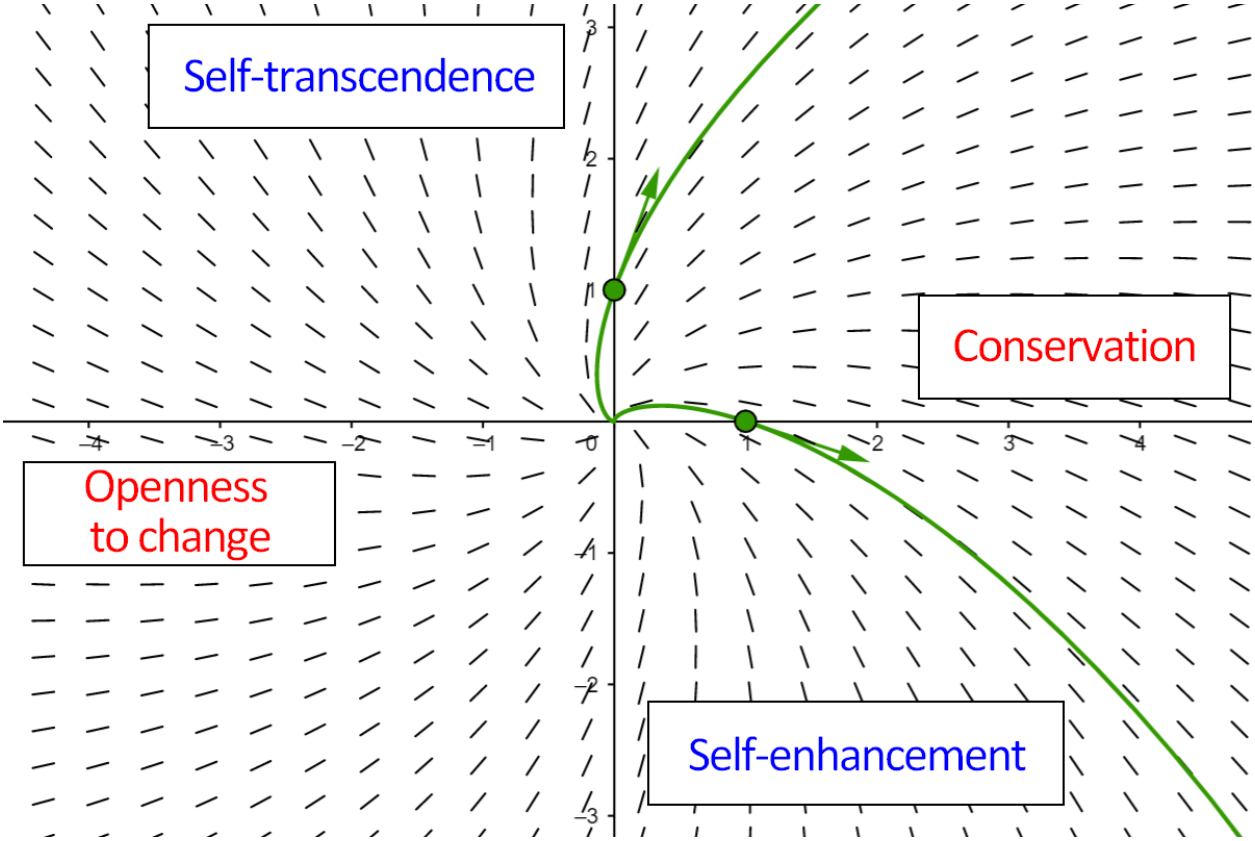
$$\begin{aligned} x' &= 0.893x + 0.326y, \\ y' &= -0.294x + 0.893y, \end{aligned}$$

where x and y are the magnitudes of both gross effects from Θ, whereas x' and y' corresponds to the net effects on values from Φ.

Solving this system, it leads to complex eigenvalues with positive real parts. This is due to the facts that, in Γ, the coefficients on the diagonal are equal to one and both off-diagonal coefficients have opposite signs. Figure 3 describes the phase plane of this system. Green dots are set to 1 on both axis, thus, the green arrows describes what happens for a marginal

[10] See tables C.2 and C.3 in the appendix.

Figure 3: Phase plane of the relation between values.



Notes: This figure presents the phase plane of the homogeneous system of first-order linear differential equations that describes the relationship between conservation (versus openness to change) and self-transcendence (versus self-enhancement) values. Green arrows decompose the direct effect and the indirect effect, i.e. spillover effect, due to an increase of 1 sd. in each value.

increase of 1 sd. on either the x-axis or the y-axis, i.e. in conservation or in self-transcendence. An increase in conservatism has a negative spillover effect on self-transcendence while an increase in self-transcendence has a positive spillover effect on conservatism. Thus, the relationship between values is *not reciprocal* because of the spiral pattern in the system of first-order linear differential equations that is derived from the propagation matrix Γ.

5.3 Effect of unemployment on values

In the theoretical framework, I show that there is a bias when measuring the effect of an endogenous life event on values and I derive its expression. The main issue is to determine whether the estimate of the effect, here having known unemployment, is a lower- or an upper-bound estimate. I start by discussing the sign of the bias before estimating the effect.

5.3.1 Sign of the bias

As previously mentioned, the probability to become unemployed or to find a job is endogenous to values. Attitudes toward work ethic are likely to be the main determinant to predict employment status dynamics. Figure 2 displays the direction of the eigenvector that is associated to work ethic. Work ethic attitudes are associated to greater conservation and lower self-transcendence. These correlations help to determine the signs of the parameters in the linear probability functions; and to define what are the values that two individuals are likely to hold to generate a bias.

Starting with the linear probability functions, remind equations (12) and (13), which are the probabilities to, respectively, either upgrade or downgrade in terms of status, namely,

$$\overline{\pi}(V_{t-1}) = \overline{\mu} + \overline{\alpha} a_{t-1} + \overline{\beta} b_{t-1},$$
$$\underline{\pi}(V_{t-1}) = \underline{\mu} + \underline{\alpha} a_{t-1} + \underline{\beta} b_{t-1}.$$

In the case of employment dynamics, an upgrading (resp. downgrading) of status refers to finding (resp. losing) a job. As individuals with higher conservation are *more* likely to find a job and to not lose it, we expect $\overline{\alpha} > 0$ and $\underline{\alpha} < 0$. Conversely, supposing that individuals with higher self-transcendence are *less* likely to find a job and not lose it, we also expect $\overline{\beta} < 0$ and $\underline{\beta} > 0$.

Let rewrite the expression of the bias from equation (14) as

$$Bias_t = \overline{\alpha} a^i_{t-1} + \underline{\alpha} a^j_{t-1} + \overline{\beta} b^i_{t-1} + \underline{\beta} b^j_{t-1},$$

where individual i is the one who has been unemployed while individual j has never been unemployed. For the ease of the exercise, I suppose that both individuals have opposite values in previous period that lie at one standard deviation. Let suppose that individual i has low conservation and high self-transcendence, hence $V^i_{t-1} = (-1, 1)$, which explains why he was more likely to be unemployed; and that individual j, who has never been unemployed, has high conservation and low self-transcendence, hence $V^j_{t-1} = (1, -1)$. Thus, the bias becomes

$$Bias_t = -\overline{\alpha} + \underline{\alpha} + \overline{\beta} - \underline{\beta} < 0,$$

and is negative according to parameter values discussed before.

Reminding the expression of the difference in expected value from equation (11),

$$\Delta \mathbb{E} v_t = \Delta v_{t-1} + \Delta v^s \Big[1 + \underline{\mu} + \overline{\mu} + Bias_t \Big]$$

Table 10: Decomposition of the effect of having ever been unemployed on values.

Value (v)	Direct and indirect effects		Total effect
	$\tilde{\gamma}_v^{Cons} \times \theta_{Cons}$	$\tilde{\gamma}_v^{Trans} \times \theta_{Trans}$	ϕ_v
Conservation ($Cons$)	**-0.064**	0.071	0.006
	(100.0)	(-110.1)	(-10.1)
Self-Transcendence ($Trans$)	0.023	**0.204**	0.227
	(11.2)	**(100.0)**	(111.2)

Notes: Magnitudes in standard deviations. Direct effects in bold. Relative share with respect to the direct effect in percent between parentheses.

Since $Bias_t < 0$, it indicates that, regardless of the sign of Δv^s, the effect of having ever been unemployed on the value v is biased toward zero. Therefore, the magnitudes are lower-bound estimates. Note that, the relative share of the direct and indirect effects are not biased because the bias acts only as multiplier of Δv^s.

5.3.2 Lower-bound estimate

Table 10 summarizes the decomposition of the effect of having ever been unemployed on values. For those who have ever been unemployed, they experience a direct decline in conservatism, i.e. an increase in openness to change, by -0.064 sd. and an self-transcendence by 0.204 sd. The spillover effect of the decline in conservatism increases the self-transcendence by 0.023 sd. Thus, the self-transcendence raises by 11.2% due to the spillover effect. Meanwhile, the increase in self-transcendence leads to a positive spillover effect on conservative values which totally offset the direct raise in openness to change. As a result, conservation does not change whereas self-transcendence increases substantively. Note that, all the magnitudes are lower-bound estimates. Thus, the positive effect of having ever been unemployed on self-transcendence is likely to be more important.

6 Summary and concluding remarks

I present a theoretical framework that jointly analyzes the dynamics of values and life events over the lifecycle in a context of inter-dependency between values. To avoid any psychological cost due to the cognitive dissonance, individuals seek to hold consistent values. Thus, they can shift their values after a given life event occurs: some values directly change due to this event, while other values can change but indirectly due to spillover effects when seeking consistency between values. The framework accounts for the endogeneity of life events and therefore provides dynamics to explain several patterns in individuals' values. Bringing the

framework to the data, I use a dimension reduction technique to derive the motivational types of values as introduced by Schwartz (1992, 2012). I show that these values are linked to each other in a non-reciprocal way and that spillover effects among values do exist.

This paper has two important limitations. First, the theoretical framework does not incorporate any decision about agents' behavior yet. One might argue that agent's decisions and therefore actions are key mechanisms through which a person can change her status to be in line with her values, hence, allowing for self-selection. Second, although the fact that spillover effects can be interpreted as the result of several forces among individual's values which try to achieve consistency; it still acts a kind of black box.

This paper raises an issue that as not been considered yet, namely, the consistency among values at the individual level which could be incorporated in future works in order to study the complex effects of socio-economic decisions (labor supply decisions, educational choices, i.a.) or life events (disease, global pandemic, discrimination, i.a.) on values and vice-versa. This matter of consistency may also be the ground for future research to investigate the mechanisms of the rising polarization in beliefs, values and preferences.

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Appendixes

A Statement details

This appendix presents the details of statements according to attitudes. These details have been split into three tables, namely, tables A.1, A.2 and A.3.

Table A.1: Statements details by attitudes - Part 1/3.

Variable	Question	Rev
Authority (A)		
A1	The law should be obeyed, even if a particular law is wrong?	
A2	For some crimes the death penalty is the most appropriate sentence?	
A3	Censorship of films and magazines is necessary to uphold moral standards?	
A4	People who break the law should be given stiffer sentences?	
A5	Young people today don't have enough respect for traditional British values?	
A6	Schools should teach children to obey authority?	
Anti-Racism (AR)		
AR1	It is alright for people from different races to get married?	
AR2	I would not mind if a family from another race moved in next door to me?	
AR3	I would not mind if my child went to a school where half the children were of another race?	
AR4	I would not mind working with people from other races?	
AR5	I would not want a person from another race to be my boss?	X
Children (C)		
C1	Unless you have children you'll be lonely when you get old?	
C2	People can have a fulfilling life without having children?	X
C3	Having children seriously interferes with the freedom of their parents?	X
C4	People who never have children are missing an important part of life?	
Environment (E)		
E1	Problems in the environment are not as serious as people claim?	X
E2	We should tackle problems in the environment even if this means slower economic growth?	
E3	Preserving the environment is more important than any other political issue today?	

Notes: The *Rev* column indicates whether the scale has been reversed in the analysis.

Table A.2: Statements details by attitudes - Part 2/3.

Variable	Question	Rev
Inequality Aversion (IA)		
IA1	Big business benefits owners at the expense of the workers?	
IA2	Private schools should be abolished?	
IA3	Management will always try to get the better of employees if it gets the chance?	
IA4	The time has come for everyone to arrange their own private health care and stop relying on the NHS?	X
IA5	Ordinary working people do not get their fair share of the nation's wealth?	
IA6	Government should redistribute income from the better off to those who are less well off?	
IA7	There is one law for the rich and one for the poor?	
Information Technology (IT)		
IT1	Computers at work are destroying people's skills?	X
IT2	Computers enrich the lives of those who use them?	
IT3	Every family should have a computer?	
IT4	Learning to use a computer is more trouble than it's worth?	X
Learning (L)		
L1	You are more likely to get a better job if you do some learning, training or education?	
L2	For getting jobs, knowing the right people is more important than the qualifications?	X
L3	Learning about new things boosts your confidence?	
L4	The effort of getting qualifications is more trouble than it's worth?	X
Morale (MOR)		
MOR1	Divorce is too easy to get these days?	
MOR2	Married people are generally happier than unmarried people?	
MOR3	Couples who have children should not separate?	
MOR4	Marriage is for life?	
MOR5	All women should have the right to choose an abortion if they wish?	X
MOR6	It is alright for people to have children without being married?	X

Notes: The *Rev* column indicates whether the scale has been reversed in the analysis.

Table A.3: Statements details by attitudes - Part 3/3.

Variable	Question	Rev
Political Cynicism (PC)		
PC1	None of the political parties would do anything to benefit me?	
PC2	It does not really make much difference which political party is in power in Britain?	
PC3	Politicians are mainly in politics for their own benefit and not for the benefit of the community?	
Work-Ethic (WE)		
WE1	Having almost any job is better than being unemployed?	
WE2	If I didn't like a job I'd pack it in, even if there was no other job to go to?	X
WE3	Once you've got a job it's important to hang on to it even if you don't really like it?	
Working Mother (WM)		
WM1	A pre-school child is likely to suffer if his or her mother works?	X
WM2	All in all, family life suffers when the mother has a full time job?	X
WM3	Children benefit if their mother has a job outside the home?	
WM4	A mother and her family will all be happier if she goes out to work?	
WM5	A father's job is to earn money; a mother's job is to look after the home and family?	X

Notes: The *Rev* column indicates whether the scale has been reversed in the analysis.

B Principal component analysis

This appendix presents the principal components eigenvectors from the Principal Component Analysis (PCA) in section B. Table B.1 presents the eigenvectors for the BCS70 cohort, while table B.2 displays those for the NCDS58 cohort.

Table B.1: Principal components eigenvectors for the BCS70 cohort.

	PC1	PC2	PC3	PC4	PC5
Age 26					
Authority	0.620	0.001	0.053	-0.783	
Inequality Aversion					
Morale	0.551	0.025	-0.739	0.387	
Political Cynicism	0.197	0.926	0.270	0.176	
Work Ethic	0.523	-0.377	0.615	0.455	
Standard deviation	1.255	1.003	0.883	0.800	
Proportion of Variance	0.394	0.251	0.195	0.160	
Cumulative Proportion	0.394	0.645	0.840	1.000	
Age 30					
Authority	0.614	-0.162	0.050	-0.281	0.718
Inequality Aversion	0.153	0.702	-0.013	0.638	0.278
Morale	0.534	-0.109	0.678	0.202	-0.450
Political Cynicism	0.326	0.605	-0.221	-0.592	-0.359
Work Ethic	0.456	-0.321	-0.699	0.351	-0.276
Standard deviation	1.243	1.137	0.918	0.827	0.797
Proportion of Variance	0.309	0.259	0.169	0.137	0.127
Cumulative Proportion	0.309	0.568	0.736	0.873	1.000
Age 42					
Authority	0.570	-0.360	0.004	0.519	0.526
Inequality Aversion	0.172	0.722	-0.172	-0.280	0.584
Morale	0.462	-0.048	0.749	-0.466	-0.079
Political Cynicism	0.517	0.474	-0.122	0.368	-0.598
Work Ethic	0.406	-0.350	-0.628	-0.548	-0.135
Standard deviation	1.184	1.124	0.968	0.882	0.787
Proportion of Variance	0.281	0.253	0.187	0.156	0.124
Cumulative Proportion	0.281	0.533	0.721	0.876	1.000

Notes: Signs of eigenvectors have been inverted for age 30 and age 42 in order to have the same axis direction for the first principal component.. The attitude toward Inequality Aversion (IA) is removed for the PCA on the BCS70 cohort at the age of 26 years because only one statement is available.

Table B.2: Principal components eigenvectors for the NCDS58 cohort.

	PC1	PC2	PC3	PC4	PC5
Age 33					
Authority	0.607	-0.150	0.155	-0.546	0.535
Inequality Aversion	0.006	0.730	-0.072	0.353	0.580
Morale	0.548	-0.077	0.551	0.591	-0.201
Political Cynicism	0.276	0.654	0.053	-0.414	-0.567
Work Ethic	0.504	-0.102	-0.815	0.237	-0.122
Standard deviation	1.250	1.162	0.901	0.851	0.741
Proportion of Variance	0.313	0.270	0.162	0.145	0.110
Cumulative Proportion	0.313	0.583	0.745	0.890	1.000
Age 42					
Authority	0.605	-0.141	0.156	-0.369	-0.674
Inequality Aversion	0.173	0.713	-0.178	0.559	-0.342
Morale	0.500	-0.245	0.542	0.534	0.333
Political Cynicism	0.446	0.521	-0.038	-0.480	0.546
Work Ethic	0.395	-0.375	-0.805	0.187	0.144
Standard deviation	1.258	1.101	0.916	0.875	0.775
Proportion of Variance	0.317	0.242	0.168	0.153	0.120
Cumulative Proportion	0.317	0.559	0.727	0.880	1.000
Age 50					
Authority	0.531	-0.134	0.063	-0.816	-0.173
Inequality Aversion	0.554	0.296	-0.075	0.441	-0.637
Morale	0.157	-0.663	-0.716	0.152	0.018
Political Cynicism	0.578	0.264	-0.063	0.170	0.750
Work Ethic	0.229	-0.620	0.689	0.296	0.033
Standard deviation	1.373	1.046	0.945	0.804	0.694
Proportion of Variance	0.377	0.219	0.179	0.129	0.096
Cumulative Proportion	0.377	0.596	0.775	0.904	1.000

Notes: Signs of eigenvectors have been inverted for age 33 and age 50 in order to have the same axis direction for the first principal component.

C Estimates with 2SLS

This appendix presents the 2SLS estimates of the SEM for the different life events. Table C.1 presents the one for the girl-first life event; table C.2 for the got-cancer life event and table C.3 for the been-unemployed life event.

Table C.1: 2SLS estimate of the SEM for the girl-first life event.

	2SLS regression			
	Reduced form (Stage 1)		Structural form (Stage 2)	
	(Cons)	(Trans)	(Cons)	(Trans)
GirlFirst	0.033^{***}	-0.002	0.034^{***}	0.009
	(0.013)	(0.013)	(0.013)	(0.013)
Cons_{t-1}	0.546^{***}	-0.180^{***}	0.612^{***}	
	(0.005)	(0.005)	(0.006)	
Trans_{t-1}	0.127^{***}	0.348^{***}		0.389^{***}
	(0.006)	(0.006)		(0.006)
$\widehat{\text{Cons}}_t$				-0.329^{***}
				(0.010)
$\widehat{\text{Trans}}_t$			0.365^{***}	
			(0.017)	
R^2	0.384	0.182	0.384	0.182
Adj. R^2	0.384	0.182	0.384	0.182
Num. obs.	23354	23354	23354	23354

Notes: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors between parentheses. Control variables in all regressions include cohort, period, gender and education.

Table C.2: 2SLS estimate of the SEM for the got-cancer life event.

	2SLS regression			
	Reduced form (Stage 1)		Structural form (Stage 2)	
	(Cons)	(Trans)	(Cons)	(Trans)
GotCancer	0.079^{**}	0.055	0.061^{*}	0.084^{**}
	(0.034)	(0.035)	(0.034)	(0.035)
Cons_{t-1}	0.562^{***}	-0.209^{***}	0.632^{***}	
	(0.004)	(0.005)	(0.006)	
Trans_{t-1}	0.090^{***}	0.269^{***}		0.302^{***}
	(0.005)	(0.005)		(0.005)
$\widehat{\text{Cons}}_t$				-0.372^{***}
				(0.008)
$\widehat{\text{Trans}}_t$			0.336^{***}	
			(0.018)	
R^2	0.399	0.143	0.399	0.143
Adj. R^2	0.398	0.143	0.398	0.143
Num. obs.	32885	32885	32885	32885

Notes: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors between parentheses. Control variables in all regressions include cohort, period, gender and education.

Table C.3: 2SLS estimate of the SEM for the been-unemployed life event.

	2SLS regression			
	Reduced form (Stage 1)		Structural form (Stage 2)	
	(Cons)	(Trans)	(Cons)	(Trans)
BeenUnemp	0.006	0.227^{***}	-0.072^{***}	0.230^{***}
	(0.012)	(0.012)	(0.013)	(0.012)
Cons_{t-1}	0.562^{***}	-0.201^{***}	0.632^{***}	
	(0.005)	(0.005)	(0.006)	
Trans_{t-1}	0.090^{***}	0.261^{***}		0.293^{***}
	(0.005)	(0.005)		(0.005)
$\widehat{\text{Cons}}_t$				-0.357^{***}
				(0.008)
$\widehat{\text{Trans}}_t$			0.345^{***}	
			(0.019)	
R^2	0.399	0.152	0.399	0.152
Adj. R^2	0.398	0.151	0.398	0.151
Num. obs.	32885	32885	32885	32885

Notes: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors between parentheses. Control variables in all regressions include cohort, period, gender and education.