Peer-to-peer transmission of value orientations in adolescence

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How do social entities secure continuity? A crucial feature of intact social entities is that members share certain values. Values define a culture at a given time (Hitlin & Piliavin, 2004). Across history, equilibrium between value continuity and value change seems to be a guarantor of the continued existence of social entities. Families are often perceived as breeding places of this balance. However, values are not only transmitted intergenerationally and not only in families, but also from peer to peer.

Three Types of Transmission

The pertinent literature (e.g., Boyd & Richerson, 1985) distinguishes three types of transmission: vertical, horizontal, and oblique transmission. Vertical transmission (VT) refers to the similarity of value orientations among parents and offspring. Horizontal transmission (HT) refers to the similarity of value orientations among same-generation peers. Oblique transmission (OT) refers to intergenerational similarity among unrelated individuals (e.g., teachers and students).

From a design perspective, studies on all transmission types need at least two measurement points to assess the transmission *process* to answer the question *how* bearers of certain value orientations impact each other. Such studies are rare in the transmission literature (cf., Kohn et al., 1997). Typically, studies on value transmission take the similarity of value orientations between two bearers of certain value preferences as evidence of transmission. However, when similarity is the measure of transmission, reasons for covariation in value orientations remain undefined. In families four sources of similarity exist: Values may be similar because parents have influenced offspring and/or because offspring have influenced parents. They may also be similar, because both parents and offspring are exposed to the same life context. Fourthly, the common genetic make-up of parents and offspring can be a source of value similarity. In OT and HT studies among unrelated peers only the first three sources of covariation play a role.

The question arises, how to disentangle the sources of similarity between different bearers of value orientations in studies that have no process element. Most transmission studies are simple one-shot studies that have surveyed a sample of parents and offspring (VT), of teachers and students (OT), or a sample of peers interacting in, e.g., a school class (HT).

For such one-shot studies, suggestions have been made how to disentangle transmission sources. Suggestions, however, regard only *VT* and *OT*. To estimate the impact of the common context on intergenerational value similarity has been made by Boehnke, Hadjar, and Baier (2007). They correlated values of parents and their offspring and then used the value preferences of randomly selected further participants from the parent and the offspring generation as a variable for assessing the impact of the common context of a family (the *zeitgeist*). The assumption behind this approach is that correlations between a person and an unrelated, randomly chosen person in a data file cannot originate from intrafamilial transmission but only from the fact that both persons live in the same social entity. With regard to HT, the central question is how to show that inter-student value similarity stands for peer-to-peer value transmission, in case no overt information is available on mutual influence.

The remainder of the paper will make a suggestion and offer empirical material to illustrate the proposed approach. Before turning to the methodological arguments, we should state what we mean when speaking of value orientations. We subscribe to Schwartz's conceptualization of values as guiding principles in people's lives. Schwartz's approach is that of a value circumplex, which originally distinguished 10 value types (Schwartz, 1992), and has recently been refined to now distinguish 19 different types of values (Schwartz et al., 2012), collapsible into the original 10. The circumplex of the 10 original value types is documented in Figure 1.
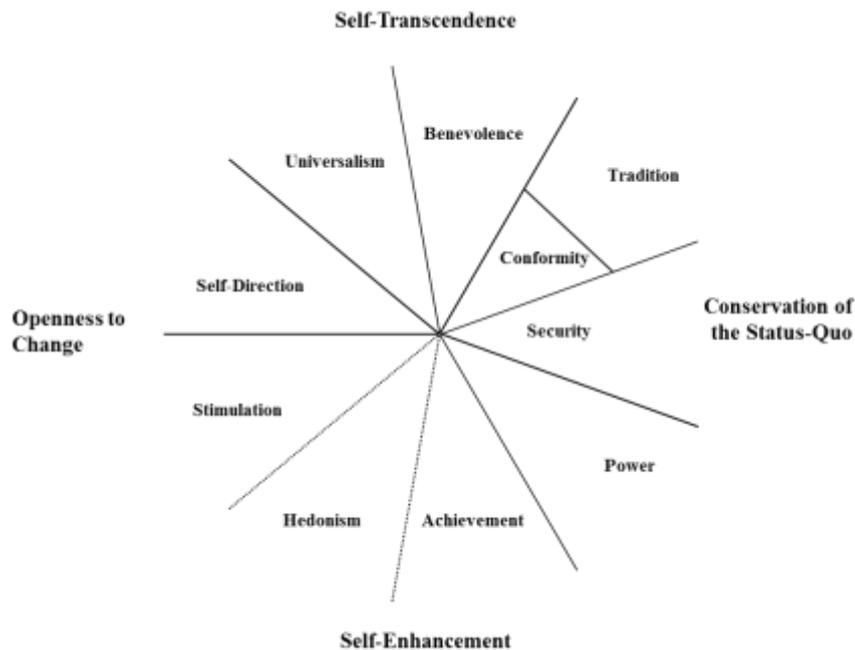
Figure 1: Schwartz Value Circumplex (10 values)

An easily accessible body of data on Schwartz value orientations is the European Social Survey (ESS)[1]. The present paper relies on own data obtained with a 25-item version of the Portrait Value Questionnaire (PVQ; Schwartz et al., 2001) that assesses individuals' preferences for the 10 value types. The instrument can be obtained from the authors.[2]

How to Assess Horizontal Transmission in Simple Survey Studies among Adolescents

Three quasi-axiomatic propositions govern our elaborations: (1) Peer-to-peer transmission among adolescents needs a common space of personal interaction. (2) The existence of HT manifests itself in the level of similarity of value preferences among members of this common interaction space. (3) HT is impacted not only by the immediate members of the interaction space, but also by the general context in which the interaction space is situated (i.e., culture/society).

Interpreting similarity data in one-shot studies as evidence for transmission requires structural data confirming that peers have interacted and, thus, had a chance to impact each other's values (*Proposition 1*). *Proposition 2* suggests interpreting homogeneity of value preferences among peers interacting in a common interaction space as evidence for transmission. *Proposition 3* refers us back to the sources of similarity addressed above, in particular the *zeitgeist* as a source of similarity. It reminds us that inter-peer value similarity can not only originate from processes of influencing each other, but also from the fact that the interaction space is part of a larger—cultural—context.

Based on *Propositions 1* and *2*, we operationalize inter-peer value similarity, our measure for HT, as the degree of value homogeneity in a given interaction space of adolescents, here, the school class. For single individuals, susceptibility to peer influence on value orientations is conceptualized as the absolute difference of a class mate to the mean of the school class. The closer the value preferences of an individual are to the average of his or her class, the more—we assume—has he or she been influenced by the value orientations of fellow students. Note that this assumption also is quasi-axiomatic, because from one-shot questionnaire studies we have no information as to whether an influence process has really taken place. We do process tracing here: From the fact that a student has value preferences similar to the preferences of the average of his/her classmates, we infer that a transmission process has taken place. We cannot prove this, but we will set out to plausibilize that such an inference is legitimate.

How do we assess homogeneity?

[1] http://www.europeansocialsurvey.org
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These are our calculation rules: In *Step 1*, after having corrected for scale use (Schwartz, 2009), we calculate subscale mean scores for the ten value types by averaging the raw scores across all items that belong to one particular value type. In *Step 2*, we calculate means of the school classes for the ten value types by averaging the scale scores across all members of a particular school class. In *Step 3*, we determine the *absolute* difference between individual scale scores for the ten value types and the respective class mean within each school class. Finally, in *Step 4*, we average the ten *absolute* difference scores across all ten values. We, thus, determine *one* score assessing the individual adolescent's inclination to join the average value climate in his or her school class. The lower this score is, the more the value preferences of the individual resemble the average of his or her school class. Subsequently, we present evidence that a low discrepancy between the values of an individual and the average values held in the school class can be seen as a measure of the size of HT.

Hypotheses

In order to plausibilize our assertion we test three hypotheses.

First, we assume that the susceptibility of an individual to be influenced by the average value climate of his or her school class depends itself on the kind of values this individual holds. We hypothesize that large differences are positively related to openness values (self-direction, stimulation, and hedonism) and negatively to conservation values (tradition, conformity, security). Whereas individuals oriented towards openness tend to emphasize individual choice and independent thought, those oriented to conservation values have a higher tendency to follow the norms and behavioral codes they are exposed to in their group. A correlation between individuals' value preferences with their distance to the class average, in turn, can, in our view, be seen as an indicator that the latter is indeed an indicator of value transmission. It would indicate that values are indeed the substantive basis of the difference measure.

Secondly, if school classes are interaction spaces for HT, homogeneity of value preferences should be more sizable in school classes than in schools, than in school types. In line with Bronfenbrenner's (1986) ecological socialization theory school classes are microsystems, where members do interact with each other continuously. Schools are so-called mesosystems, where members are able to personally interact with each other but do not do so on a regular, frequent basis. School types are exosystems, where members are subject to comparable ecological conditions but do not personally interact with each other. If school classes are indeed interactions spaces for HT, belonging to a particular school class should explain most variance in individual-group similarity scores.

Thirdly, if differences of individuals from the mean of their school class are measures of HT, they should be related linearly to the average values prevalent in the cultural environment. In other words, whether or not values of students within a class are similar, depends on how similar this class is to the value climate of the larger cultural environment. We expect school classes that exhibit more similarity with the average values of the culture to show a higher level of within-class value homogeneity. Our hypothesis is that the discrepancy between individual value preferences and the mean score of their school class (within-class homogeneity) and the discrepancy between class means and the culture mean should be linearly related: The lower the within-school-class discrepancy, the lower also the difference between the class average and the country average. We see a confirmation of this hypothesis as another piece of evidence that what we measure with the individual's absolute difference to the average value preferences in his or her school class is indeed a measure of the degree of HT that has taken place in a given class.

The Current Study

Our data stem from a study funded by the German Ministry of Education and Research (Boehnke & Knafo, 2007). Data collection took place in Bremen, Germany, and nearby areas in the surrounding state of Lower Saxony. Altogether, data from 1596 students were included in the present analysis. Students came from 97 school classes, nested under 19 schools, nested under 3 school types (*Gymnasium*—offering only the university-bound school-leaving certificate Ab*itur*; comprehensive schools—offering both university-bound and lower school-leaving certificates; other schools—offering only non-university-bound school leaving certificates). Students from Grades 5, 6, and 10 were sampled. The overall age mean was 12.3 with a range from 9 to 18 years of age (48.9 % boys, 51.1 % girls).

The current paper reports information acquired using a 25-item PVQ version of the Schwartz value survey. After the correction for scale use (Schwartz, 2009), scores for the 10 Schwartz (1992)

values were calculated in accordance with the assignment rules of the author. Subsequently two difference scores were calculated. The first one assesses the absolute difference of an individual's value preferences from the value mean of his or her school class averaged across all ten values. As spelt out, we see the resulting score as a measure of value homogeneity in a school class and want to show that (low) difference scores in a school class can be seen as an indicator for HT having taken place in that class. We label this difference score *distance to class*.

The second difference score calculates the absolute difference between the mean value ratings of a school class and the value preference score obtained for a particular value for Germany in the ESS (Round 4). Absolute differences were once again averaged across all ten values. This measure is assumed to assess the cultural prototypicality of values in a specific school class. Measuring the degree to which value preferences in a given school class are compatible with the current German *zeitgeist*. It should be noted that for this variable only 97 different scores exist (one per school class). Each student of a particular class receives the same score—the difference score of the class to the German average. We label this *distance to culture*.

Analytic Approach and Results

In *Phase 1* of our analyses, we correlated the value preferences of study participants with their *distance to class*. If difference scores measure value-related aspects of within-class processes, there should be a correlation of value preferences and difference scores that follows the predicted pattern: Negative correlations should be found with conformity and other conservation values, positive correlations with self-determination and other openness values, correlations with self-transcendence and self-enhancement values in between and close to 0.

The correlation pattern suggests that *distance to class* is indeed a reflection of individual value preferences. Students with larger distance scores prefer openness values (hedonism: $r = 0.9$, $p \leq 0.01$; stimulation: $r = .07$, $p \leq 0.05$; self-direction: $r = 0.11$, $p \leq 0.01$), whereas students with smaller distance scores exhibit conservation values (security: $r = -0.09$, $p \leq 0.01$; conformity: $r = -0.10$, $p \leq 0.01$; tradition: $r = -0.13$, $p \leq 0.01$). The correlations are not sizable, but the pattern of correlations perfectly matches expectations, so that the results clearly support the proposition that individuals' distance to class means reflect personal values.

In *Phase 2*, we checked whether individuals' *distance to class* varied across school types, schools, and school classes. In order to interpret homogeneity scores as an indicator of HT, homogeneity scores should differ between school classes more so than between schools or even school types, because it is primarily the microsystem 'school class'—in Bronfenbrennerian terminology—that is a permanent interaction space of students, relevant for HT. For the mesosystem 'school' and the exosystem 'school type' this is much less or even not at all the case.

In order to comprehensively test this assumption, we conducted a hierarchic ANOVA, in which 'school class' is nested under 'school,' which itself is nested under 'school type.' Hierarchic ANOVA fully confirms our hypothesis that *distance to class* scores differ significantly between school classes ($F_{78,1.484} = 1.358$, $p = .023$), less pronouncedly between schools ($F_{16,87.311} = 1.702$, $p = .061$), and do not differ significantly between school types ($F_{2,8.133} = .180$, $p = .839$). This again supports the proposition that *distance to class* is a measure of HT and supports the assumption that the school class is an interaction space for HT.

In *Phase 3* of our analyses, we investigate whether within-class value homogeneity varies as a function of the class' distance to culture (the mean value score of the German population). For this analytic step all 97 school classes were brought in an order according to their distance to the average value preference evident in the German population (ESS, Round 4). The class with the smallest distance to the German value mean (averaged across all 10 values) received the Number 1, so-to-speak, the one with the largest distance the Number 97. We conducted a one-way ANOVA with school class as the independent variable and consulted so-called polynomial trend components. The latter indicate the significance of linear trend: A polynomial contrast of 0.222 ($p = 0.001$) suggested that there is a significant linear relationship between a class's *distance to culture* and its within-class value homogeneity. Students from classes less prototypical for German value preferences exhibit less value homogeneity. We take this finding as another indication that value homogeneity in a class (low average *distance to class* among students) can be interpreted as an indication for HT.

Concluding Discussion

This paper set out to describe a way to assess the HT of value preferences among adolescents. We suggested that under certain circumstances the absolute difference score between the value preferences of an individual adolescent and the average value preferences of his/her classmates can be used as a proxy assessing the degree to which the adolescent has been influenced in his or her value preferences by classmates. Our line of argumentation commenced with the proviso that research on the *process* of horizontal transmission is impossible without *process data*. In the absence of such data, interindividual similarity data can indeed be used for assessing the degree of HT among adolescents. The assertion has to be qualified, however: In simple survey studies the utilization of interindividual similarity data as a proxy for HT only makes sense, when the sampling strategy of a study was that of *cluster sampling*. Only when groups of participants of a study had a common interaction space, it does make sense to interpret interindividual similarity scores as evidence for HT. It needs a common microsystem allowing peer-to-peer interaction, to trace similarity among individuals back to a transmission process that has likely taken place. In the present study, the school class sets the frame for peer-to-peer transmission. Sharing an interaction space is a necessary but not a sufficient precondition for interpreting interindividual similarity as evidence for horizontal value transmission. Only if additionally sizes of interindividual similarities of value preferences in a common interaction space are themselves related to (a) individual value preferences and (b) to the value climate in the larger cultural context, should researchers really take differences between individual values and mean values of a school class as evidence for HT. In our study, absolute differences between individual value preferences and mean value preferences of a school class can indeed be interpreted as standing for HT of values among adolescents. Peers seemingly impact each other's values in the school class, the core context of their everyday life outside the family. Our empirical evidence supports this conclusion, because (a) individual difference scores (*distance to class*) were correlated with individual value preferences (openness to change vs. conservation of the status quo), (b) homogeneity scores varied significantly by school class, much less so by school, and not at all by school type, and (c) value homogeneity in a school class covaried linearly with the size of discrepancy between a class' mean value preferences and those representative for Germany.

Concludingly, readers should be reminded that this paper sees itself as an account of a methodological inquiry, and thereby is a contribution to an ongoing discussion. Further research is obviously needed as to substantive questions of HT research: Which properties of school classes increase transmission and which properties reduce it? Can the overall finding that there is evidence for within-school-class HT be generalized to all value types equally? Does HT also take place in other adolescent interaction spaces, and if yes, are transmission effects smaller, similar, or larger in such spaces? Are there contextual and/or interindividual difference variables that enhance or impede HT in adolescence? These are just a few research questions that remain open after this introductory methodological contribution.

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