

## Dynamic Changes in Generalized Trust Among the Chinese Public: An Age-Period-Cohort Analysis

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### Abstract

Using data from the Chinese General Social Survey (2003–2021), this study provides a descriptive analysis of the dynamic evolution trends in generalized trust among Chinese citizens and their influencing factors. The findings reveal that generalized trust exhibits a “U”-shaped curvilinear trend with individual aging (age effect), an overall upward trend across different measurement periods (period effect), and simultaneously, an inverted “U”-shaped trend across different cohorts (cohort effect): beginning with the 1925 cohort, it gradually rises and turns from negative to positive in the 1940 cohort, subsequently entering a relatively stable plateau period between the 1945 and 1970 cohorts, then declining rapidly after the 1975 cohort, reaching its lowest value since the founding of the PRC in the 1990 cohort, and slowly recovering thereafter. The study also finds that kinship relations and income inequality exert significant negative effects on the evolution of generalized trust, while variables such as the marketization coefficient, population mobility rate, number of social organizations, average years of education, and government trust index exert positive effects. The paper situates the diachronic evolution characteristics of generalized trust within the different stages of China’s social development over the past century and the corresponding trust patterns generated thereby for interpretation, with the research findings enriching the academic community’s description and theoretical explanation of the evolution trends of generalized trust among Chinese citizens.

### Full Text

#### Changing Trends of Generalized Trust Among the Chinese Public: An Analysis Based on Age-Period-Cohort Effects

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**Abstract**

Using data from the Chinese General Social Survey (2003–2021), this study describes and analyzes the dynamic trends and influencing factors of generalized trust among the Chinese public. The findings reveal that generalized trust follows a U-shaped curve with individual age (age effect), shows an overall upward trend across different measurement periods (period effect), and exhibits an inverted U-shaped pattern across birth cohorts (cohort effect): rising gradually from the 1925 cohort, turning positive by the 1940 cohort, entering a relatively stable plateau between the 1945 and 1970 cohorts, declining rapidly after the 1975 cohort, reaching its post-1949 nadir with the 1990 cohort, and recovering slowly thereafter. The study also finds that kinship relations and income inequality exert significant negative effects on the evolution of generalized trust, while variables such as the marketization coefficient, population mobility rate, number of social organizations, average years of education, and government trust index have positive effects. By embedding the diachronic characteristics of generalized trust within different stages of China's social development over the past century and the corresponding trust patterns that emerged, this paper enriches academic descriptions and theoretical explanations of trust trends among Chinese citizens.

**Keywords:** generalized trust, age-period-cohort effect, social change

**1 Introduction**

Trust is intimately connected with the development of human society and has accompanied humanity throughout its history. From the Chinese Revolution in the early 20th century to the founding of the People's Republic and the current drive toward building a moderately prosperous society through Chinese-style modernization, China has undergone profound transformations across political, economic, social, cultural, and technological domains. These changes have simultaneously triggered significant shifts in the micro-level values and social mentality of the Chinese people, disrupted the trust environment among social members, and consequently led to changes in public trust. An in-depth analysis of the history and logic underlying these shifts in generalized trust among Chinese citizens holds important practical significance for advancing the modernization of social governance and helps consolidate the social-psychological foundation for Chinese-style modernization (Chen, 2023).

Current academic research on the status and changing characteristics of generalized trust in China has primarily employed cross-sectional data to compare regional differences (Ao et al., 2013; Zhao & Feng, 2011) and urban-rural disparities (Hu & Hu, 2008). In recent years, a small number of studies have conducted longitudinal analyses of trust stocks and trends (Hu, 2015; Yang et al., 2011; Li & Guo, 2022). Although existing research helps us understand the basic patterns of generalized trust in China, several limitations remain: First, the limited number of longitudinal studies on trust changes have been constrained by insufficient data sources or inconsistent variable measurement methods, leading to

divergent or even contradictory findings across studies and making it difficult to obtain a comprehensive understanding of the overall picture of generalized trust and its evolution. Second, most existing studies have directly applied theories of trust derived from relatively stable Western social structures to explain the characteristics of generalized trust changes in contemporary China, neglecting the structural realities that shape the social facts of trust in the Chinese context. Third, the few existing studies have merely provided descriptive examinations of changes in generalized trust among Chinese citizens, lacking in-depth exploration of the mechanisms or influencing factors behind these changes.

To address these limitations, this study employs the Hierarchical Age-Period-Cohort (HAPC) model and large-scale representative sample data from the CGSS spanning nearly two decades (2003–2021, N=95,283). The HAPC model overcomes the problem of confounding age effects (differences between age groups), period effects (changes over time affecting all age groups simultaneously), and cohort effects (differences between groups born in different eras) that plagues traditional trend analysis, providing precise estimates and trend depictions of these effects. The core of this research is to examine the changing trends of generalized trust among Chinese citizens and their underlying influencing factors. From a genetic and diachronic perspective, we investigate the specific characteristics of trust changes, particularly by embedding these patterns within the different stages of China’s social development over the past century.

### 1.1 Conceptualizing Generalized Trust

Understanding generalized trust is typically situated within the broader framework of trust concepts. Trust is generally defined as an individual’s belief or expectation in the goodwill of others (Erikson, 1950). These “others” may be members of one’s own group or face-to-face interaction partners (Mayer et al., 1995; Uslaner, 2002), or they may be “people we do not know and who are different from us” or individuals “without any specific information” in broad social contexts (Warren, 2004; Rotter, 1967). Trust directed toward the former is termed particularized trust, while trust toward the latter is called generalized trust. Robinson and Jackson (2001) define generalized trust as people’s estimates of the trustworthiness of “most people.” Similar concepts include social trust and stranger trust, with differences primarily in the scope of trust objects. Social trust generally refers to trust in the vast majority of society, stranger trust specifically targets strangers, while generalized trust encompasses a more diverse range of objects, including all others beyond particularized trust targets. However, many scholars do not strictly distinguish between these concepts in their research; for instance, Dincer and Uslaner (2010) directly define generalized trust as “trust in strangers.”

### 1.2.1 Overall Trends and Theoretical Explanations of Generalized Trust Among Chinese Citizens

Research on changing trends in generalized trust can be traced back to Putnam's pioneering work, which documented a significant decline in trust in American society over the past quarter-century or more (Putnam, 1995a). This research inspired extensive discussions about trust changes in American society, with many studies confirming a gradual decline over time (Paxton, 1999; Brehm & Rahn, 1997; Trzesniewski & Donnellan, 2010; Twenge et al., 2014). Regarding China, most studies have concluded that generalized trust is "generally declining" (Li & Wang, 2018; Xin, 2019; Xin & Xin, 2017; Zhai, 2008; Yu & Wang, 2016). Based on this, our first hypothesis is that generalized trust among Chinese citizens may show a declining trend over time (Hypothesis 1). This overall hypothesis is primarily based on existing theoretical explanations and literature: First, cultural theories of trust posit that trust is built upon cultural mechanisms such as tradition, religion, and historical customs, originating from a shared value system within groups. Cross-cultural comparative studies have found that individuals in Confucian cultural circles (e.g., East Asia) exhibit lower levels of generalized trust compared to citizens in Western societies (Delhey et al., 2011; Inglehart & Wayne, 2000), and recent empirical research has also found negative effects of Confucian culture on generalized trust (Hu & Zhou, 2013). Second, the fairness explanation model suggests that generalized trust is closely related to fairness, with numerous studies finding a strong negative correlation between income inequality and social trust (Bjørnskov, 2007; Alesina & Ferrara, 2002; Morselli & Glaeser, 2018; Twenge et al., 2014). Since the reform and opening-up, rapid economic development and significant improvements in living standards have been accompanied by increasing income inequality (Xie & Zhou, 2014), leading to a notable decline in social trust (Shen & Zhang, 2016; Ding et al., 2020; Lin et al., 2023).

Although most discussions on trust changes have focused on declining trends, some studies have found evidence of increasing trust over time (Smith, 1997; Yuan et al., 2022). Some research on China has found that respondents' generalized trust shows characteristics of increasing over time (Han, 2021a; Yu, 2017). This leads to our alternative judgment that generalized trust among Chinese citizens may show an upward trend over time (Hypothesis 2). This hypothesis is well-supported by the following trust theories and literature: First, explanations of generalized trust and its changing mechanisms must consider the social context and environment (Barber, 1983). In the Chinese context, urbanization and marketization have brought frequent population mobility, which has enhanced residents' generalized trust to some extent (Han, 2021b; Romano et al., 2021; Thomson et al., 2018). Meanwhile, with modernization changes globally, individualism has become increasingly prevalent among the populace (Cai et al., 2020; Hamamura & Xu, 2015), and societies with higher levels of individualism exhibit higher levels of generalized trust (Jing et al., 2021). Second, the institutionalist perspective on trust points out that specific institutional envi-

ronments and their effectiveness have important impacts on generalized trust (Freitag & Traunmueller, 2009; Rothstein & Dietlind, 2003). For contemporary Chinese society, enhancing generalized trust through institutional constraints is a consensus among scholars and government administrators (Zhao & Dong, 2019; Zhong & Su, 2022; Yang & Huang, 2022). Third, social capital theory posits that active participation in social organizations and volunteer activities helps generate cooperative experiences across group boundaries and thereby enhances trust in others (Putnam, 2001). Yuan et al. (2024) found that cooperation among strangers in Chinese society has increased over time, and such cooperation is closely related to generalized trust (Balliet & Van Lange, 2013; Pletzer et al., 2018). Finally, the evolutionary emancipation theory of trust suggests that due to humanity's emancipatory impulse toward empowerment, trust extends to external groups (Welzel, 2014). In this empowerment process, education level and skill acquisition are important drivers of generalized trust, with increasing research finding that improved education levels in the Chinese context can significantly empower social trust (Huang et al., 2011; Huang & Deng, 2012; Cai, 2017).

### **1.2.2 Social Transformation and Stage-Specific Characteristics of Generalized Trust Changes in China**

Trust is closely connected to its social environment and is “embedded” in and profoundly constrained by the social context in which specific actors exist (Luhmann, 1979). Particularly, certain structural social changes inevitably bring about changes in trust (Barber, 1983). Only by employing a holistic, contextualized approach that embeds the analysis of generalized trust changes within its generative social and historical background can we obtain a complete picture of age, period, and cohort effects on generalized trust among Chinese citizens. This paper argues that the emergence of generalized trust in China can be broadly situated within three major historical stages, with generalized trust exhibiting different characteristics in each.

The first stage is traditional Chinese society before the founding of the PRC. The trust model in this stage was relational trust built upon tradition and custom, characterized by family-centered patterns based on blood and geographical ties. In traditional society, people lived in homogeneous communities with little or no mobility, interacting primarily with acquaintances. Interpersonal relationships featured long-term temporal continuity and low spatial selectivity (Zhai, 2023). In such an interactional environment, the risk of trust violations was extremely low. During this process, particularized trust dominated, leaving little space for generalized trust. Therefore, we predict that cohorts born in this stage would have relatively low overall levels of generalized trust.

The second stage spans from the founding of the PRC to the early reform and opening-up period. The trust model in this stage was work-unit trust built around protection and distribution, accompanying the prevalence of the planned economy. As the basic social structure of Chinese society since 1949, the

work-unit system is considered a typical institution for social integration and management in new China, cultivating shared moral concepts and value systems among unit members (Lv & Mei, 2016), which holds special significance for establishing generalized trust in Chinese society. This stage can be divided into three important sub-periods: First, the early 1950s, when the communist revolution led to the decline of personal exchange relationships, and universalistic ethics in the name of “comradeship” gradually replaced the particularistic ethics based on kinship in traditional Chinese society (Vogel, 1965). Second, the mid-1960s to late 1970s, when the influence of the Cultural Revolution overshadowed the importance of traditional social relationships, transforming personal relationships among friends, relatives, and colleagues into political relationships (Li & Guo, 2022). Third, the early reform and opening-up period (1980s), when the sprouting of market economy, reconstruction of the higher education system, and advancement of reform and opening-up created more opportunities for citizens to interact with people from different social backgrounds, while the social integration function of the work-unit system had not yet completely faded. Based on this analysis, we predict that cohorts born in this stage would show relatively high levels of generalized trust overall.

The third stage is the post-reform and opening-up period, particularly after the 1990s. The trust model in this stage is institutional trust based on contracts and rationality, accompanying marketization development. The deepening of reform and opening-up and the establishment of the socialist market economy system accelerated urbanization and population mobility. People entered a modern discourse system of “organic solidarity” in Durkheim’s sense, fundamentally different from tradition. The original acquaintance society and work-unit society transformed into a stranger society, with increasing anonymity and brevity of social interactions and expanding interaction scope. Risks and uncertainties in social exchanges grew, making trust between people more dependent on contracts and institutions. However, during this stage, weak trust mechanisms at the market and institutional levels were far from established (Zhai, 2013), while the constraining effect of traditional rural acquaintance networks on individual behavior gradually weakened, and the social publicness formerly carried by work-unit organizations inevitably experienced serious shrinkage (Tian & Lv, 2009). These factors created great uncertainty in the temporal and spatial environment of generalized trust. Based on this judgment, we predict that cohorts born in this stage would have lower levels of generalized trust compared to the second stage.

After systematically organizing and summarizing the trust characteristics of these three stages, we present Table 1, which more clearly shows the trust models and features across different social development stages, along with our predictions for generalized trust levels among cohorts born in each stage.

### **Table 1 Trust Models and Characteristics Across Different Social Development Stages**

Stage	Trust Model	Core Features	Predicted Trust Level
Pre-1949 (Traditional Society)	Relational Trust	Based on tradition and custom; blood and geographical ties	Low
1949–Reform & Opening-up Early	Work-unit Trust	Based on protection and distribution; comradeship ethics	High
Post-Reform & Opening-up	Institutional Trust	Based on contracts and rationality; high uncertainty	Declining

### 1.3 Age, Period, and Cohort Effects on Generalized Trust

The age effect of generalized trust reflects how changes in physical function dominated by biological age, as well as changes in social roles and status, affect trust levels in “generalized others.” Most existing literature has found a roughly positive relationship between age and generalized trust (Hu, 2015; Yang et al., 2011), a phenomenon also confirmed in samples from other countries (Li & Fung, 2013; Robinson & Jackson, 2001; Clark & Eisenstein, 2013). However, is the relationship between age and generalized trust truly this simple? Most previous studies have only reached generalized conclusions that older people trust others more while younger people trust less, paying insufficient attention to the characteristics of specific age groups (such as middle-aged individuals). When considering different life cycle stages, generalized trust may exhibit more complex patterns. For instance, Lin et al. (2010) found that the proportion of positive responses to generalized trust items among young Chinese groups was significantly higher than among elderly groups, while middle-aged groups showed more complex patterns. Survey results on generalized trust among American citizens have also found non-linear aging effects (Robinson & Jackson, 2001; Twenge et al., 2014). We predict that the relationship between age and generalized trust is not simply linear, and that the changing trend of generalized trust may show different patterns of increase or decrease across different age groups.

The period effect of generalized trust reflects how exogenous contextual changes in socioeconomic environment, cultural atmosphere, and historical events during specific periods affect trust in “generalized others” for all individuals in that period. Research on period effects has concentrated on American samples, with numerous studies finding a declining trend in generalized trust over time (Putnam, 1995b; Paxton, 1999; Twenge et al., 2014). Compared with the de-

clining trend of generalized trust over periods in American society, changing trends in Chinese society show more complex characteristics, with both “rising” and “falling” trends having corresponding empirical evidence and theoretical support, as discussed in detail in Section 1.2.1. Therefore, this study will use long-term, homogeneous, large-scale, representative sample data to re-examine the period effect of generalized trust, providing more robust empirical conclusions.

The cohort effect hypothesis posits that individuals born in different historical stages, having experienced different childhood education and social changes, form differential “collective memories” or “habits” (Hu, 2015), which affect their trust perceptions. Research on cohort effects of generalized trust among Chinese citizens is just beginning. From the literature we could gather, only two articles have used longitudinal data for targeted research (Yang et al., 2011; Hu, 2015), showing substantial result differences. Yang et al. (2011) found that social trust levels gradually decreased with successive birth cohorts, while Hu (2015) found that the cohort effect on generalized trust among Chinese citizens roughly followed a U-shaped pattern. Further comparison reveals that the difference between the two studies mainly concerns trust differences between cohorts born between the founding of the PRC and the reform and opening-up period versus those born after. Yang et al. found that the latter had lower trust than the former, while Hu found the opposite conclusion—that those who experienced the Mao era trusted others less than those who grew up in the reform era. These empirical results should be viewed cautiously as they may be influenced by sample data quality: Yang et al. mixed multiple survey data types, while Hu used homogeneous World Values Survey data, with each having only four survey waves and relatively small data scope. The divergent conclusions in existing research await further verification using multi-period homogeneous data. Additionally, Hu’s explanation for the findings warrants further discussion. Hu attributed the lower generalized trust among those who experienced the Mao era to a series of social-historical events in mainland China from the 1950s to 1970s (such as the redistributive economic system and the Cultural Revolution). However, as analyzed in Section 1.2.2, this may overlook the strengthening effects of communist “comradeship” and the work-unit system on generalized trust during that period.

## 2 Data and Methods

### 2.1 Data Sources

This study uses data from the Chinese General Social Survey (CGSS) database. CGSS is China’s earliest nationwide, comprehensive, and continuous academic survey project. As of 2021, CGSS has conducted 12 waves of social surveys across 31 provinces, municipalities, and autonomous regions, obtaining rich sample data. With its broad survey scope, long time span, and consistent content across waves, CGSS offers good representativeness, span, and continuity, well-suited for APC analysis. Since the 2006, 2008, and 2011 waves did not include

relevant measurement items for generalized trust, these data were excluded from the research database. Ultimately, the study selected data from nine waves conducted in 2003, 2005, 2010, 2012, 2013, 2015, 2017, 2018, and 2021, spanning 19 years. After merging the nine waves, the original sample database contained 95,737 cases. After excluding samples with missing data on some variables, 95,283 valid samples were obtained.

### 2.2.1 Outcome Variable

The outcome variable in this study is individual generalized trust level. From the 2010–2021 CGSS questionnaires, the selected item was: “Generally speaking, do you agree or disagree that most people in this society can be trusted?” For the 2003 and 2005 waves, similar alternative items were used for measurement.\* The items were: “Trust in strangers” and “In general social interactions not directly involving monetary interests, do you think there are many strangers who can be trusted?” Given the differences in wording, this study will consider the differential impact of these three textual formulations when interpreting results. All items used a 5-point Likert scale ranging from “1—Strongly disagree” to “5—Strongly agree.”

### 2.2.2 Explanatory Variables

The main explanatory variables in this study include age, period, and cohort variables to explain the evolution of generalized trust from three perspectives. Following Yang and Land’s (2013) recommendations, age is treated as a fixed-effect variable and included in quadratic functional form. The period variable contains nine unequally spaced values (2003, 2005, 2010, 2012, 2013, 2015, 2017, 2018, 2021) corresponding to survey years. The cohort variable uses 5-year intervals, comprising 17 cohort groups from 1925–2005.

Additionally, this study considers three control variables at the individual level: household registration (hukou), education level, and kinship relations, to further explore differential patterns of trust changes across groups. In China, the urban-rural dual structure is pronounced, with significant differences between urban and rural social environments. Therefore, the hukou variable reflects institutional factors’ influence on generalized trust. Higher education is regarded by Putnam as the most important factor affecting individual trust formation, as educational resources can be transformed into economic resources and social status through social activities, constituting important social support for trust formation. Kinship relations reflect the traditional Confucian culture’s “differential mode of association” centered social relationships, where strong distinctions between close and distant relations lead individuals to favor trust in blood or geographically based ascribed or quasi-ascribed relationships, thereby rejecting generalized trust. Given the importance of these variables, previous studies have typically included factors such as hukou as general control variables in APC models, treating their relationship with the outcome variable as a static correlation that does not change over time. Such treatment overlooks possible

differential trends in APC effects across groups. Therefore, this study not only includes these variables as controls but also constructs interaction terms between these variables and age, period, and cohort, embedding them within the APC change process to further observe the dynamic effects of these factors on generalized trust across time, examining unique characteristics of different groups in APC effects from institutional, social, and cultural perspectives. Gender, ethnicity, political affiliation, and marital status are included as conventional control variables.

Finally, to examine influencing factors of generalized trust changes, this study includes several explanatory variables at the macro level. Macro variables measure society as a whole, capturing the overall social environment in different periods (or cohorts) and reflecting macro factors affecting trust changes during those times. Specifically, at the period level, this study includes seven macro variables: marketization coefficient, population mobility rate, number of social organizations, government trust index, Gini coefficient, period kinship relations, and period average years of education. At the cohort level, three macro variables are included: cohort average years of education, cohort kinship relations, and cohort birth population size. By observing whether macro variables partially explain period and cohort variance, the study can verify to some extent whether trust changes align with the proposed theoretical hypotheses. Data sources and processing methods for these variables are detailed in the Appendix.

**Table 2 Descriptive Statistics of Basic Variables**

Variable	Frequency/Percentage	Mean (SD)
<b>Cohort Variables</b>		
Cohort average years of education		6.15% (1.5997)
Cohort birth population size		10.76% (2.5055)
Cohort kinship relations		12.33% (0.0905)
<b>Period Variables</b>		
Marketization coefficient		12.33% (0.7987)
Population mobility rate		11.98% (4.9867)
Number of social organizations		11.46% (0.1564)
Government trust index		13.14% (7.5404)
Period average years of education		13.36% (0.0070)
Period kinship relations		8.47% (0.6382)
<b>Control Variables</b>		
Rural hukou	48.00%	
Urban hukou	52.00%	
Han ethnicity	92.30%	
Minority ethnicity	7.70%	
Non-higher education	88.40%	
Higher education	11.60%	
Low kinship relations	78.30%	
High kinship relations	21.70%	

Variable	Frequency/Percentage	Mean (SD)
Male	49.40%	
Female	50.60%	
Unmarried and others	17.00%	
Married	83.00%	
Non-Party members	63.80%	
Party members	36.20%	
Age		16.440 (???)

### 2.3 Analytical Model

The core of this study is to examine the changing trends and influencing factors of generalized trust among Chinese citizens. These changes include historical changes (period and cohort effects) as well as individual and group-level changes with age (age effects), together constituting the analytical dimensions of APC effects. However, since age, period, and cohort changes all act on individual and group trust changes simultaneously, the three variables are perfectly collinear (age = period - cohort). Traditional statistical methods cannot separate their independent effects on the outcome variable. For example, when a sample of 60-year-olds born in the 1960 cohort shows high generalized trust, traditional methods cannot determine whether this high trust stems from age or cohort effects. In this context, the Age-Period-Cohort (APC) model emerged, generating multiple solution strategies that provide methodological foundations for separating APC effects. Existing methods include: Constrained Generalized Linear Regression (CGLM), proxy variable method, Intrinsic Estimator (IE), Hierarchical APC Crossed-Classified Random-Effect Model (HAPC-CREM), and Age-Period-Cohort Interaction Model (APC-I) (Xu et al., 2022). Compared with traditional CGLM and proxy variable methods, the HAPC-CREM model's significant advantage is that it does not require theoretical assumptions as constraints to solve the model. By placing age and period/cohort at two different levels, it estimates age's fixed effects and period/cohort random effects separately, effectively solving the collinearity problem and obtaining independent effects of age, period, and cohort on the outcome variable. Additionally, the HAPC model is suitable for unequally spaced data, offering good adaptability to this study's theoretical content and data type, and is more widely used in academia. Therefore, after comprehensive consideration, this study selects the HAPC model as the APC analysis method and uses IE and CGLM methods for robustness checks.

Specifically, the functional form of the model used in this study can be expressed as:

#### Fixed-effects model:

$$TRUST_{ijk} = \beta_{0jk} + \beta_1 AGE + \beta_2 AGE^2 + \sum \beta_n X_n + \beta_7 X_p * AGE + \beta_8 X_p * AGE^2 + \beta_{9jk} X_p + e_{ijk}$$

$$e_{ijk} \sim N(0, \sigma^2) \quad (1)$$

**Random-effects model:**

Main effects:

$$\beta_{0jk} = \gamma_0 + u_{0j} + v_{0k} + u_{mj} + v_{nk}, \quad u_{0j} \sim N(0, \tau_{0u}), \quad v_{0k} \sim N(0, \tau_{0v}) \quad (2)$$

Differential effects:

$$\beta_{9jk} = \gamma_9 + u_{9j} + v_{9k}, \quad u_{9j} \sim N(0, \tau_{9u}), \quad v_{9k} \sim N(0, \tau_{9v}) \quad (3)$$

As shown above, the HAPC model consists of two parts: Equation (1) is an individual-level linear regression of the outcome variable on explanatory variables, where  $TRUST_{ijk}$  represents individual generalized trust level—the model's outcome variable.  $\beta_{0jk}$  represents the average level of generalized trust for individuals in period  $j$  and cohort  $k$ . Equation (2) uses regression coefficient  $\beta_{0jk}$  as the outcome to further estimate random effects of period and cohort.  $\gamma_0$  is the overall intercept,  $u_{0j}$  represents period trends in generalized trust, and  $v_{0k}$  represents cohort trends.  $\beta_1$  and  $\beta_2$  represent fixed effects of age and age-squared terms, i.e., the age effect on generalized trust. These represent the changing trends of generalized trust by age, period, and cohort without controlling for other confounding factors. Variable  $X_n$  enters the model as control variables.  $e_{ijk}$  represents individual-level residuals, assumed to follow a normal distribution with mean 0 and variance  $\sigma^2$ . Furthermore, introducing macro variables can explain the sources of period and cohort effects.  $u_{mj}$  and  $v_{nk}$  represent the effects of period-level macro variables (e.g., population mobility rate) and cohort-level macro variables (e.g., cohort birth population size) on generalized trust, respectively.

Finally, if group differences are allowed in age, period, and cohort trends, group variable  $X_p$  enters the model. In Equation (1),  $\beta_7$  and  $\beta_8$  represent interaction effects between group variable  $X_p$  and age, indicating group differences in age effects.  $\beta_{9jk}$  represents other effects of control variable  $X_p$  on the outcome variable. At this point, the fixed effect of variable  $X_p$  is represented as  $\gamma_9$  in Equation (3), group differences in period effects as  $u_{9j}$ , and group differences in cohort effects as  $v_{9k}$ . By hierarchically estimating age effects and period/cohort effects, the HAPC model effectively solves the collinearity among age, period, and cohort, obtaining main effects while also capturing differential trends across groups in age, period, and cohort.

This study first constructs a baseline HPAC model to obtain main changing trends of individual generalized trust across the three dimensions of age, period, and cohort. Subsequently, all macro variables are added to construct Model 1, observing the comprehensive impact of macro variables on period-cohort effects and initially testing the theoretical hypotheses proposed. Finally, using hukou type, education level, and kinship relations as criteria to distinguish sample groups, Models 2, 3, and 4 are constructed separately to explore differences in generalized trust levels across different groups.

### 3 Empirical Results

This study used SAS Studio for HAPC model analysis, obtaining the following results:

**Table 3 Results of Age-Period-Cohort Hierarchical Random-Effects Model**

Variable	Coefficient
<b>Age Main Effects</b>	
Intercept	3.0442***
Age	0.0041***
Age <sup>2</sup>	0.0002***
<b>Period Main Effects</b>	
Period variance	0.0236***
<b>Cohort Main Effects</b>	
Cohort variance	0.1209***
<b>Control Variables</b>	
Hukou (urban)	-0.0400**
Education (higher)	0.0390***
Kinship (high)	-0.2741***
<b>Age Interactions</b>	
Age × Hukou	0.4214*
Age <sup>2</sup> × Hukou	0.0070*
Age × Education	0.0016*
Age <sup>2</sup> × Education	0.4176*
Age × Kinship	0.0033*
Age <sup>2</sup> × Kinship	0.0027+
<b>Period Covariates</b>	
Period kinship relations	-1.3748***
Marketization coefficient	6.8659+
Population mobility rate	-0.0722***
Number of social organizations	-0.2223**
Period average education years	0.0155**
Government trust index	0.0918**
<b>Cohort Covariates</b>	
Cohort average education years	0.0048***
Cohort kinship relations	-0.0001**
Birth population size	-0.0051***

Note: \*\*\* p < 0.001, \*\* p < 0.01, \* p < 0.05, + p < 0.1

#### 3.1.1 Age Main Effects

Table 3 shows that both the linear and quadratic age coefficients are significant. Based on coefficients  $\beta_1$  and  $\beta_2$ , substituting age variables into the model yields

the age main effect shown in Figure 1 [Figure 1: see original paper].

Figure 1 [Figure 1: see original paper] shows that age's impact on individual generalized trust follows a U-shaped curve. Trust declines rapidly during youth (ages 15–30), with the age effect turning from positive to negative at age 30. During middle age (30–50), the decline slows, reaching its lowest point around age 40 before slowly recovering. As individuals enter later life (after 50), the age effect turns from negative to positive, and generalized trust begins to rise more rapidly.

This result differs from previous Chinese studies that found a linear relationship between age and generalized trust (Hu, 2015; Yang et al., 2011). Explaining this result may require returning to individual life courses. In early life (ages 15–25), individuals transition from carefree teenagers to tentative young adults, with interpersonal concepts rapidly transformed through life experiences. As individuals mature, their personality independence strengthens rapidly, accompanied by increased distrust of others, leading to a rapid decline in generalized trust. Youth appears to be a critical period for forming interpersonal concepts, with life experiences having a greater impact on generalized trust levels than in other periods.

Around age 30, most individuals complete their education, enter the workforce, and begin forming families. Occupational and family relationships bring new interpersonal environments and corresponding trust challenges. From the individual's perspective, the external world shifts from resource provider to resource competitor during this period, thus losing its trustworthy attributes. This represents a shift from passively receiving resources to independently acquiring them, a life course transition from family protection to social competition. Generalized trust formed during childhood and adolescence is challenged and rapidly weakened in this process, with the age effect turning from positive to negative. During middle age, individuals are in critical stages of career development and family establishment. As life experience accumulates, interpersonal conflicts of interest intensify, reducing trust in society and others. However, as career and family structures gradually stabilize, this “distrust” also eases. After age 50, individuals' careers enter later stages, and their children have mostly grown up. Interpersonal environments become more stable, conflicts of interest relatively decrease, and vigilance against interpersonal deception and betrayal is no longer necessary. The age effect on generalized trust turns positive and accelerates upward. In later life, individuals tend toward higher levels of generalized trust.

### 3.1.2 Group Differences in Age Effects

Figures 2–4 show differences in age effects across groups. Overall, urban hukou respondents show a more pronounced U-shaped trend in generalized trust with age, while rural hukou respondents' trust gradually accumulates with age. The generalized trust advantage conferred by higher education in early life gradually

diminishes with age, eventually reversing. High-kinship individuals show greater fluctuations in trust levels across age groups, while low-kinship individuals show relatively more stable trust throughout the age range.\*

### 3.2.1 Period Main Effects

Figure 5 [Figure 5: see original paper] shows the impact of different periods from 2003 to 2021 on individual generalized trust levels. The period effect shows an overall upward trend, indicating that individuals' trust in others gradually increased over time.

Two key points deserve attention: First, between 2003 and 2005, generalized trust experienced a brief decline, but from 2005 to 2010, trust levels shifted from decline to significant growth. This finding is relatively consistent with previous research. Second, after a brief stable period between 2010 and 2015, the period effect trend shifted from relative stability to a clear upward trajectory from 2017 onward. Between 2017 and 2021, the period effect increased year by year, showing that individuals' generalized trust levels improved over time. Hypothesis 2 is supported, while Hypothesis 1 is not.

### 3.2.2 Group Differences in Period Effects

Figures 6–8 show period effect differences by hukou, education level, and kinship relations, respectively. Rural hukou respondents' period effects on generalized trust are generally higher than those of urban hukou respondents, but the gap between them narrows over time. In the education and kinship dimensions, period effect differences between the two groups are relatively small, but their trends show high overlap, suggesting that trust level changes across different social groups may be influenced by similar period factors.

### 3.3.1 Cohort Main Effects

Figure 9 [Figure 9: see original paper] shows changes in generalized trust levels between the 1925 and 2005 cohorts. The cohort effect shows a more significant changing trend, following an overall inverted U-shape: trust levels rose gradually from the 1925 cohort, turned positive by the 1940 cohort, entered a relatively stable plateau between the 1945 and 1970 cohorts, declined rapidly after the 1975 cohort, reached its post-1949 lowest point with the 1990 cohort, and recovered slowly thereafter. This result largely matches our predictions and can be explained in depth by combining it with the different stages of China's social development and resulting trust models presented in Table 1.

Looking at specific historical periods, the cohort effect remained negative in the pre-1949 period with relatively higher rates of change. The social environment from 1925–1940 had long-term negative impacts on corresponding cohorts' generalized trust, with more severe negative effects for earlier times that gradually weakened in newer cohorts. Notably, this trend did not show major shifts due to

domestic political changes. From the relatively stable decade of civil war (1927–1937) to the chaotic early period of total war (1937–1940), generalized trust levels continued to rise. This suggests that macro-cultural changes beyond political and social transformations may have driven the continuous upward trend in trust. This stage may have featured two trust patterns due to varying degrees of social change. In the early period with less dramatic change (e.g., 1927–1937), the social trust model still featured characteristics of relational trust from traditional society, based on blood and geographical ties where particularized trust dominated and generalized trust had little space. However, in the later period with more dramatic change (e.g., total war and civil war), traditional relational trust gradually weakened, and people were forced by war or livelihood needs to leave their original acquaintance circles and establish new connections with strangers—likely an important reason for the gradual rise in generalized trust among newer cohorts in this stage.

From the founding of the PRC to the early reform period, generalized trust remained at relatively stable high levels across cohorts, meaning that cohorts born during the “Mao era” could trust others more. Moreover, cohorts born between 1945 and 1970 showed almost identical cohort effects, indicating this was a great era of relatively stable generalized trust. This result contradicts existing research conclusions (Hu, 2015). How can we explain this phenomenon? As discussed in Section 1.2.2 on “Social Change and Generalized Trust,” the trust model from the founding of the PRC to the early reform period was work-unit trust built around protection and distribution, accompanying the planned economy. In this process, universalistic ethics in the name of “comradeship” gradually replaced the particularistic ethics based on kinship in traditional Chinese society (Vogel, 1965), transforming personal relationships among friends, relatives, and colleagues into more universalistic political relationships (Li & Guo, 2022). Combined with the work-unit system’s “protection-constraint” mechanism for members (Jie, 2000), these were important reasons why generalized trust could be generated and maintained at high levels during this stage.

Entering the new reform era, generalized trust among cohorts from 1975 to 1990 experienced a cliff-like decline. By the 1985 cohort, the cohort effect turned from positive to negative, and the 1990 cohort became the lowest point for generalized trust since 1949. This phenomenon may be related to the dramatic social transformation and changes during this stage. Reform and opening-up, population mobility, market competition, and internet popularization brought entirely new interpersonal relationships, impacting the traditional “local society.” Meanwhile, modern market and institutional trust mechanisms were far from established (Zhai, 2017), creating more uncertainty in interpersonal interactions and consequently leading to the decline of generalized trust.

Notably, generalized trust among cohorts born after 1990 has slowly recovered. After short-term turbulence from institutional changes, new interpersonal relationships are gradually taking shape alongside rapid economic growth, slowly shaping individuals’ trust perceptions. Viewed together with period effects,

generalized trust levels are currently in an upward trend. Although we cannot assert whether individual trust levels will gradually return to their highest levels or even usher in an era of “trusting others more than ever in history,” one thing is certain: social change means growing “uncertainty,” which has historically been the key factor repeatedly driving changes in generalized trust levels.

### 3.3.2 Group Differences in Cohort Effects

The study finds more pronounced group differences in cohort effects between rural and urban hukou respondents (see Figure 10). Rural hukou individuals across cohorts show higher generalized trust levels than urban hukou individuals, but rural hukou shows stronger sensitivity to temporal changes—rural cohorts born in relatively stable eras trust others more, while those born in rapidly changing eras show larger differences from adjacent cohorts and approach urban hukou levels. In the kinship dimension, low-kinship individuals gradually develop relatively higher generalized trust levels among cohorts born during dramatic social changes (e.g., pre-1945 cohorts), while the opposite occurs among cohorts born during social stability (e.g., 1945–1980 cohorts). As cohort variance in the education dimension is not significant, it will not be discussed further here.

### 3.4 Analysis of Influencing Factors on Generalized Trust Changes

Model 1 includes macro variables to explain influencing factors of period and cohort effects. In constructing Model 1, this study first analyzed each macro variable individually to obtain its independent impact. Since this step used 10 models corresponding to 10 macro variables with many results, only those relevant to the analytical purpose are presented below:

**Table 4 Main Results of Adding Individual Macro Variables to the Model**

Variable	Coefficient	Variance Explained
<b>Period Covariates</b>		
Marketization coefficient	0.5279**	54.96%
Population mobility rate	0.0882***	66.52%
Number of social organizations	2.9720***	64.97%
Period kinship relations	-1.0571***	98.93%
Period average education years	0.7740***	76.78%
Government trust index	0.0622***	63.53%
<b>Cohort Covariates</b>		
Cohort average education years	-60.1118**	43.62%
Cohort kinship relations	-0.0722***	72.12%
Birth population size	0.0155**	41.67%

Note: \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ , +  $p < 0.1$

The “coefficient” indicates the direction of influence of individual macro variables on period or cohort effects without considering other macro variables. As Table 4 shows, period kinship relations and Gini coefficient show significant negative effects on generalized trust, indicating that at the macro-social level, strengthened kinship relations and expanded income disparities hinder generalized trust. Stronger kinship relations reflect China’s traditional “differential mode of association” interpersonal relationships, characterized by strong particularized trust and weak generalized trust. Income inequality directly affects people’s perceptions of social system fairness and reflects economic stratification differences in society. Societies with more unfair distribution and greater wealth gaps are more prone to opposition and suspicion. Conversely, variables such as marketization coefficient, population mobility rate, number of social organizations, period average education years, and government trust index show positive effects, primarily reflecting China’s social and institutional development. This indicates that social progress and institutional improvement constitute sources of gradually strengthening generalized trust in period effects. In cohort effects, cohort average education years and cohort kinship relations show negative effects. This may be because after reform and opening-up, rapid education improvement and generalized trust decline occurred simultaneously; education did not directly lead to trust increase and partially proxies other cohort changes, ultimately showing negative effects.

“Model variance” is the period or cohort variance output under single-macro-variable models, while “variance change” indicates the proportion of variance explained compared to the baseline model, relatively measuring macro variables’ explanatory power for trends. In period effects, period kinship relations can explain the vast majority of period variance in the baseline model ( $\Delta = 98.93\%$ ), making it the most important macro variable. In cohort effects, explanatory power from high to low is cohort average education years, birth population size, and cohort kinship relations. Notably, kinship relations have almost no effect in cohort effects, indicating that over long historical periods, kinship relations do not constitute an influencing factor for cohort changes in generalized trust.

After including all macro variables in Model 1, more interesting findings emerged. First, adding multiple macro variables further reduced model period and cohort variance, outperforming single-macro-variable models. Second, variables such as population mobility rate, period average education years, Gini coefficient, and government trust index became non-significant, while period kinship relations, marketization coefficient, and number of social organizations remained significant or marginally significant. This suggests that some macro variables’ explanatory power was replaced by collinear variables with stronger explanatory power, again proving kinship relations as the most important influencing factor for period effects. Third, after adding other macro variables, the marketization coefficient’s effect direction changed from positive to negative. This indicates that although marketization development and generalized trust increase share the same direction in broad trends, when combined with other social and institutional factors, marketization’s advancement may outpace

social progress and institutional improvement. This disconnection between economic and social development leads to the marketization coefficient's negative effect on generalized trust. Cohort effect macro variable results are basically consistent with single-variable models and will not be repeated here. Macro variable analysis results partially reflect influencing factors behind period and cohort changes, corroborating the theoretical hypotheses proposed, but these findings remain exploratory.

## 4 Conclusion and Discussion

With the acceleration of China's reform, opening-up, marketization, industrialization, and urbanization, generalized trust based on stranger interactions has increasingly attracted academic attention. Based on nine waves of CGSS data from 2003–2021, this study uses an age-period-cohort model to assess changing trends in generalized trust among Chinese citizens over the past two decades. Four main conclusions are drawn.

First, generalized trust shows a U-shaped curve with individual age. This result differs from previous Chinese studies that found linear age-trust relationships. Explaining this requires returning to individual life courses. Second, period effects show an overall upward trend. This supports Hypothesis 2 that “generalized trust among Chinese citizens shows an upward trend over time,” challenging mainstream views. The reason is that Hypothesis 1, predicting decline, primarily rests on cultural theories positing that Chinese interpersonal relationships centered on Confucian culture and differential mode of association would strengthen particularized trust while weakening generalized trust. The causal relationship itself is valid, and as our macro variable tests show, kinship relations are indeed negatively correlated with generalized trust. However, contemporary Chinese society has deviated from the context of traditional theoretical analysis. With accelerating marketization and increasing interpersonal interactions, the overall strength of “kinship relations” in society has continuously weakened from 2003–2021, and the traditional “close-inside, distant-outside” concept is in fact decomposing. This weakening of differential mode of association has created space for generalized trust to strengthen, ultimately yielding empirical results supporting Hypothesis 2. This reminds researchers that Chinese society is undergoing rapid development and requires dynamic perspectives to track the latest realities, sensitively capture key variables hidden in temporal changes, and update theoretical explanations accordingly.

Third, the cohort effect on generalized trust shows an inverted U-shape: rising gradually from the 1925 cohort, turning positive by the 1940 cohort, entering a stable plateau between the 1945–1970 cohorts, declining rapidly after the 1975 cohort, reaching its post-1949 nadir with the 1990 cohort, and recovering slowly thereafter. The cohort effect analysis basically supports our theoretical predictions for the three stages, providing more empirical evidence for understanding the changing process of generalized trust among Chinese citizens. These results reveal to some extent that generalized trust shows certain cyclical pat-

terns of change with the “uncertainty” of social transformation, and that social order changes caused by social transformation may be deeper reasons for trust changes.

Fourth, from the macro social environment perspective, factors influencing generalized trust changes are diverse. Kinship relations and income inequality have significant negative effects, while marketization coefficient, population mobility rate, number of social organizations, period average education years, and government trust index have positive effects. Cultural, social, and institutional factors actually constitute an organic system affecting generalized trust. When culture changes too rapidly while institutional and social improvements cannot keep pace, generalized trust will also be weakened. This reminds researchers to examine influencing factors of generalized trust changes with systems thinking, embedding analysis of the roots of trust change characteristics within their generative cultural, social, and institutional contexts.

This study also examined the effects of hukou, education level, and kinship relations on APC effects of generalized trust. Regarding hukou effects, rural hukou experiences have greater impacts on age effects than urban hukou; rural hukou also has greater impacts on period effects, though the gap narrows over time; rural hukou shows stronger sensitivity to cohort changes, with rural cohorts born in relatively stable eras trusting others more. Regarding education effects, the generalized trust advantage conferred by higher education in early life gradually diminishes with age; period effect differences across education levels are disappearing; education’s cohort effect shows no independent trend. Regarding kinship effects, high-kinship individuals show greater trust fluctuations across age groups, while low-kinship individuals show more stable trust; period effects across kinship groups gradually converge after 2013; among cohorts born during dramatic social changes, low-kinship individuals have higher generalized trust, while the opposite occurs among cohorts born during social stability.

This study overcomes the inaccuracies in previous research conclusions caused by insufficient data sources or inconsistent variable measurement methods by using long-term homogeneous data, providing a comprehensive grasp of the overall picture of generalized trust and its changes among Chinese citizens over the past two decades. Particularly, conclusions and explanations regarding cohort and age effects break through the oversimplified tendencies of existing research, advancing scientific rigor and interpretive caution. Simultaneously, by employing holistic, contextualized analytical thinking that embeds generalized trust change characteristics within social transformation and historical development backgrounds, this study examines trust change features from both “continuous” and “stage” perspectives. Particularly, it places cohort effects within different stages of China’s social development over the past century and the resulting trust models for explanation, and uses empirical data to examine influencing factors from cultural, institutional, and social perspectives. This is significant for understanding the diachronic change characteristics of generalized trust among different generations of Chinese people born during the transition from tradi-

tional to modern society, and enriches theoretical explanatory perspectives on trust change trends among Chinese citizens.

Moreover, as a cutting-edge analytical method for understanding social change trends, the HAPC model overcomes parameter identification problems in traditional APC models, effectively separating the pure effects of age, period, and cohort dimensions to precisely grasp how macro-social factors affect individual generalized trust. Robustness checks using IE and CGLM methods further strengthen the scientific validity of the analytical results.

Nevertheless, this study has limitations requiring further development. First, while we attempted to explore potential influencing factors of APC effects from institutional, social, and cultural contexts of trust emergence, obtaining some valuable conclusions, these efforts remain supplementary and exploratory. Future research needs more specialized studies on the mechanisms influencing trust changes. Second, due to this study's core purpose and length constraints, we did not deeply analyze possible reasons why hukou, education, and kinship affect APC effects; subsequent research could specifically analyze group differences in APC effects. Third, although this study used the HAPC model to separate age, period, and cohort effects, it still cannot completely solve model identification problems caused by collinearity among the three. Additionally, the grouping of cohorts in the HAPC model implies strong theoretical assumptions—that random effects are the same within cohorts—which may cause slight statistical biases. Therefore, interpretation of model results should be more cautious.

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## Appendix 1: Variable Measurement

**Macro Covariates.** The marketization coefficient comes from the “China Marketization Index Database” website of the National Economic Research Institute; population mobility rate, number of social organizations, Gini coefficient, and birth population size data all come from the National Bureau of Statistics official website (with social organization numbers log-transformed); the government trust index comes from the Edelman Trust Barometer project website of Edelman International Public Relations Company; period average education years come from the “China Human Capital Index Project” website of the China Center for Human Capital and Labor Market Research. Due to data limitations, variables such as period kinship relations, cohort kinship relations, and cohort average education years were calculated from CGSS micro-sample data following the approach of Wang Junxiu and Liu Yangyang (2023). For example, period kinship relations are obtained by summing and averaging all sample kinship relation scores in one wave, reflecting the overall strength of

kinship relations in society during that period. Given CGSS data's good representativeness, this processing method is basically reliable. Similarly, cohort kinship relations and cohort average education years are obtained by calculating the mean scores of all samples within a cohort (e.g., 1925 cohort) on “kinship relations” and “education level” items, serving as macro indicators reflecting kinship relations and education levels within cohorts.

**Control Variables: Hukou, Education Level, and Kinship Relations.**

In measurement, hukou type is divided into rural and urban hukou. Education level is divided into higher education and non-higher education. The kinship relations measurement item is: “In the past year, have you often spent free time on the following activity—gathering with relatives not living together?” Response options range from “1—Never” to “5—Daily” on a 5-point scale. The 2003 and 2005 waves lack corresponding items, so alternative items were used: “Contact with relatives/friends” and “How close is your contact and connection with relatives/friends?” with response options from “1—Very distant” to “5—Very close.” Based on data distribution, 1–2 are coded as low kinship relations and 3–5 as high kinship relations.

**Appendix 2: Robustness Checks**

Given that the HAPC method, while currently mainstream, still has limitations (e.g., cohort effect estimates tend toward non-significance), this study used IE and CGLM methods to estimate the baseline model for robustness. Notably, since the IE method requires equally spaced age-period-cohort data and does not allow empty cells in the age-period-cohort matrix, the original data were processed to equal intervals: age and period were coded in 5-year intervals  $\pm 2$  years to minimize data processing impact on periods, with cohorts calculated as period minus age. Results show that while specific coefficients differ, the general trends of generalized trust across age, period, and cohort are largely consistent, indicating that the main analysis conclusions are basically robust. Comparison results across methods are shown in Supplementary Table 1 and Supplementary Figures 1–3.

**Supplementary Table 1 Comparison of HAPC, IE, and CGLM Method Results for Baseline Model**

Effect	HAPC	IE	CGLM
<b>Age Effect</b>			
Intercept	3.0442***	2.9691***	3.8079***
Age	0.0236***	0.0181**	0.0235***
Age <sup>2</sup>	0.1209***	0.1083***	0.1218***
<b>Period Effect</b>	-0.040**	-0.0334**	-0.0395**
<b>Cohort Effect</b>	0.0390***	0.0391***	0.0391***
(omitted)	(omitted)	(omitted)	(omitted)

Note: \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ , +  $p < 0.1$

**Supplementary Figure 1 Age Effect Comparison**

**Supplementary Figure 2 Period Effect Comparison**

**Supplementary Figure 3 Cohort Effect Comparison**

*Note: Figure translations are in progress. See original paper for figures.*

*Source: ChinaXiv — Machine translation. Verify with original.*