Latent Profiles and Transitions of Adolescent Time Perspective: The Predictive Role of Subjective Socioeconomic Status and Its Impact on Academic Achievement

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Abstract

A half-year longitudinal study was conducted with 539 eighth-grade students as participants. Latent Profile Analysis and Latent Transition Analysis were employed to examine different subgroups and transition patterns of adolescent time perspective, and to further investigate their influencing factors and impact on academic achievement. The results revealed: (1) Three distinct subgroups of adolescent time perspective were identified: “high-positive group,” “low-future group,” and “high-nihilism group.” The “low-future group” exhibited the highest stability, the “high-nihilism group” showed the lowest stability, and both the “high-positive group” and “high-nihilism group” were more likely to transition to the “low-future group.” (2) Subjective socioeconomic status significantly predicted transitions between adolescent time perspective subgroups; higher subjective socioeconomic status was associated with a lower probability of transitioning from the “high-positive group” to the “high-nihilism group” and a higher probability of transitioning from the “high-nihilism group” to the “high-positive group.” Academic achievement demonstrated a marginally significant predictive effect when the “high-positive group” transitioned to the “low-future group.” The predictive effects of gender and objective socioeconomic status were not significant. (3) Academic achievement differed across subgroups, with the “high-positive group” maintaining the best academic performance at both time points. Transition patterns influenced academic achievement; adolescents who transitioned from the “high-positive group” to the “low-future group,” from the “high-nihilism group” to the “low-future group,” or remained in the “low-future group” all experienced significant declines in academic achievement. These findings deepen researchers’ understanding of individual differences in adolescent time perspective and the diversity of change patterns, suggesting that educational practitioners should implement group classification and dynamic moni-

toring of time perspective to facilitate targeted cognitive and behavioral interventions and enhance adolescents' academic achievement.

Full Text

Self-Check Report for *Acta Psychologica Sinica*

1. Innovation and Contribution

Acta Psychologica Sinica publishes cutting-edge psychological research that is "both scientifically excellent and of particularly broad interest and significance." Studies with only minor incremental contributions, those that do not pioneer new areas of inquiry or propose unique and innovative perspectives, or work that purely investigates algorithms or techniques without addressing clear psychological questions, have low acceptance probability and should be submitted elsewhere.

Response: This study makes the following innovative contributions beyond previous research:

First, we are the first to examine the latent classes and transitions of time perspective among Chinese adolescents. Our findings demonstrate individual differences in time perspective, with three identified profiles and the absence of a "balanced group"—both of which attest to the influence of cultural background on the formation of adolescent time perspective. Second, the observed transitions in time perspective profiles validate developmental contextualism: as time progresses, contextual influences shape distinct developmental trajectories for adolescent time perspective categories.

Second, this study is the first to employ a longitudinal design to investigate the predictive role of socioeconomic status in transitions between adolescent time perspective profiles, providing deeper evidence for social class cognitive theory and the importance of subjective socioeconomic status. However, we found differential predictive effects of objective versus subjective socioeconomic status on profile transitions, which contradicts previous findings. Additionally, we discovered that academic achievement also influences time perspective profile transitions.

Third, we examined how time perspective affects changes in academic achievement. While previous research has focused primarily on future time perspective, our analysis of time perspective profiles reveals that both the "high nihility group" and "low future group" exhibit poor academic performance, suggesting that researchers should broaden their temporal lens when investigating effects on academic achievement.

2. Use of Identical Data in Other Submissions

Have you published or submitted other articles using the same data? (We discourage publishing multiple articles with identical variables from the same

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Response: The data used in this study have not been used in any other submitted or published articles.

3. Common Method Bias

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Response: The primary variable in this study is time perspective, while academic achievement data were provided by the school. Thus, common method bias from self-report questionnaires is not an issue.

4. Effect Sizes and Confidence Intervals

Did you report and analyze effect sizes (e.g., Cohen's d for t-tests, ^{2} or ^{2}p for ANOVA)? (Many studies mechanically report effect sizes without necessary analysis or explanation, such as whether the effect is small, medium, or large, or its theoretical/applied significance.) Did you report 95% CIs for statistical analyses (e.g., 95% CI for differences, correlation/regression coefficients)? (For calculation and graphing, see https://thenewstatistics.com/itns/esci/)

Response: This study reports effect sizes (d values) and 95% CIs for t-tests, ANOVA, and other statistical results.

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Please report planned versus actual sample size. If they differ, explain why. Low statistical power due to insufficient sample size is a widespread problem in psychological research. We recommend explaining your sample size calculation rationale in the Methods section, determining sample size based on justified effect sizes and desired power, and reporting the software/program used. For guidance, see https://osf.io/5awp4/

Response: The actual sample size was 541 at Time 1. Due to absences and other reasons, 2 participants were lost, resulting in 539 participants at Time 2 (0.37% attrition). This is reported in the manuscript.

6. p-Values

(Note: The journal requires exact p-values for all values ≥ 0.001; other values should be reported as precise p-values.) Does your paper meet this requirement? For Bayes factors, have you reported sensitivity to prior distribution assumptions?

Response: This study reports exact p-values for all values ≥ 0.001.

7. Data Reporting Completeness

If you excluded data in statistical analyses, did you report this in the text? Why? How would results change if included? How did you handle missing data? Did you delete individual items from scales? Why? How would results change if included? Are there unreported measures or variables? Why? Please indicate where in the paper this is addressed.

Response: This is reported in Sections 2.1 (Participants), 2.2 (Measures), and 2.4 (Data Processing).

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Have you written a 400-500 word English abstract following the "English Abstract Writing Guidelines" on the editorial website? Has the English title and

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Response: The English abstract has been written according to requirements and reviewed by an English professional.

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If the first author is a student, the advisor must email the editorial office (xuebao@psych.ac.cn) separately to confirm they have read and carefully reviewed the manuscript. Has the advisor been reminded to email? (The editorial office will only consider manuscripts after receiving the advisor's email.)

Response: The first author is the project team's advisor.

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Latent Profiles and Transitions of Adolescent Time Perspective: The Predictive Role of Subjective Socioeconomic Status and Its Effect on Academic Achievement

Abstract

This six-month longitudinal study tracked 539 eighth-grade students, employing latent profile analysis and latent transition analysis to examine distinct subgroups and transitions in adolescent time perspective, investigate their influencing factors, and assess effects on academic achievement. Results revealed: (1) Three distinct time perspective profiles among adolescents: "high positive," "low future," and "high nihility." The "low future" profile showed the strongest stability, the "high nihility" profile the weakest, with both "high positive" and "high nihility" profiles more likely to transition to "low future." (2) Subjective socioeconomic status (SSS) significantly predicted profile transitions: higher SSS decreased the probability of transitioning from "high positive" to "high nihility" and increased the probability of transitioning from "high nihility" to "high positive." Academic achievement marginally predicted transitions from "high positive" to "low future." Gender and objective socioeconomic status showed no significant predictive effects. (3) Academic achievement differed across profiles, with the "high positive" group consistently performing best. Transitions to "low future"—whether from "high positive," from "high nihility," or remaining in "low future"—were associated with significant declines in academic achievement. These findings deepen understanding of individual differences and di-

verse change patterns in adolescent time perspective, suggesting that educators should implement profile-based classification and dynamic monitoring to develop targeted cognitive and behavioral interventions that improve academic achievement.

Keywords: adolescent, time perspective, academic achievement, subjective socioeconomic status, latent transition analysis

Time perspective refers to individuals' experiences and concepts of past, present, and future time, which powerfully influence cognition, behavior, and emotional experience (Huang, 2004). It has long been a research focus in time psychology, defining personality characteristics (Zimbardo & Boyd, 1999) and correlating with risk behaviors (Mello et al., 2019), internet addiction (Barnett et al., 2020), mental health (Andretta et al., 2014), and playing important roles in motivation and goal setting (Bilde et al., 2011), academic engagement (King, 2016), and academic achievement (Joanna et al., 2021). Time is a continuous entity without beginning or end, and understanding it requires holistic grasp of past-present-future (Huang, 2004). However, previous research has focused primarily on future time perspective (Du & Lyu, 2017; Zhao et al., 2022), relatively neglecting holistic investigation. Analytically, prior studies have predominantly adopted variable-centered approaches, overlooking person-centered analyses. To our knowledge, only a few studies have examined individual differences in time perspective (Zimbardo et al., 1997; Kossewska et al., 2023). Notably, no research has investigated individual differences and developmental changes in time perspective among adolescents. Therefore, this study examines junior high school students through a six-month longitudinal design to explore distinct time perspective profiles, transition patterns, influencing factors, and effects on academic achievement. Academic achievement is a crucial indicator of school performance (Yang et al., 2014), and falling behind academically is a typical adaptation problem during junior high (Pan et al., 2016). Thus, investigating how time perspective profiles and transitions affect academic achievement during this period has significant practical value for educators seeking to improve student outcomes.

1.1 Time Perspective

The most widely accepted definition of time perspective comes from Time Perspective Theory (TPT) (Zimbardo & Boyd, 1999), which divides psychological time into three frames (past, present, future) and classifies time perspective into five independent dimensions based on attitudes toward each frame: past-positive, past-negative, present-hedonistic, present-fatalistic, and future time perspective.

Past time perspective (past-positive and past-negative) reflects orientation toward the past. Past-positive involves positive attitudes toward past events, learning from experience, and showing higher positive emotion (Zhang & Howell, 2011) and life satisfaction (Przepiorka & Sobol-Kwapinska, 2021). Past-

negative individuals dwell on painful experiences and face more social conflict with less support (Holman & Zimbardo, 2009). Present time perspective (present-hedonistic and present-fatalistic) reflects orientation toward the present. Present-hedonistic individuals balance life, work, and study while finding enjoyment in effort; excessive hedonism may lead to risky behaviors due to neglect of future consequences (Barnett et al., 2020) and correlates with negative academic motivation (Bilde et al., 2011). Present-fatalistic individuals believe everything is predetermined. Present-fatalism negatively correlates with extraversion, self-esteem (Zhang & Howell, 2011), and academic achievement (Joanna et al., 2021), and increases vulnerability to stress-related problems like anxiety (Papastamatelou et al., 2015) and allostatic load (Bourdon et al., 2020). Future time perspective reflects orientation toward the future, characterized by awareness of upcoming goals and benefits, and relates to realistic goal setting, internal control, and proactive lifestyles (Olivera-Figueroa et al., 2023). Research shows future time perspective correlates with academic achievement across elementary (Chen & Moro, 2016), secondary (Zhao et al., 2019), and university students (Sim & Kim, 2020), with cross-cultural consistency (Andre et al., 2019).

Recently, researchers have focused on Balanced Time Perspective (BTP)—seeking balance among past, present, and future orientations, considered an ideal, healthier temporal pattern (Boniwell & Zimbardo, 2004). BTP features high past-positive and future, moderate present-hedonistic, and low past-negative and present-fatalistic levels. Individuals with BTP flexibly switch among temporal orientations, showing positive outcomes like higher life satisfaction (Zhang & Howell, 2011), emotional intelligence (Stolarski et al., 2011), and mindfulness (Rönnlund et al., 2019). Thus, BTP is viewed as a protective factor and optimal predictor of mental health (Li & Lyu, 2024).

1.2 Time Perspective Profiles and Transitions

Time perspective is a relatively stable individual characteristic originally proposed as an individual difference variable (Zimbardo & Boyd, 1999). Recent studies have integrated multiple dimensions using latent profile and cluster analyses to investigate inter-individual differences (Boniwell et al., 2010; McKay et al., 2014; Braitman & Henson, 2015; Kee et al., 2018; Kossewska et al., 2023). However, these studies focused primarily on university students. For example, Boniwell et al. (2010) identified four time perspective profiles among British (n=179) and Russian (n=289) university students: present-hedonistic, future, negative, and balanced, with a risk group additionally found in the Russian sample. Braitman and Henson (2015) identified three profiles among 431 American university students: high-risk, moderate, and protective. Kee et al. (2018) found balanced, maladaptive, and apathetic profiles among 221 Hong Kong and Singapore university students.

Only two studies have examined individual differences in adolescent time perspective. McKay et al. (2014) identified four profiles among 1,620 British

adolescents: present-hedonistic (19.1%, high present-hedonistic, low future), future (31.4%, high future, moderate past-positive), balanced (33.7%), and past-negative (15.8%, high past-negative, low past-positive, moderate present-hedonistic/fatalistic/future). Kossewska et al. (2023) identified five profiles among 668 Polish adolescents: present-focused hedonistic (50%, high present-hedonistic, moderate future/fatalistic), present-and-future hedonistic (25.3%, high present-hedonistic and future, low fatalistic), present-and-past-negative fatalistic (17.1%, high past-negative and present-fatalistic, higher present-hedonistic, moderate future, low past-positive), past-positive future (4.3%, high future and past-positive), and present-hedonistic with slight past negativity/positivity (3.3%, moderate past-positive/fatalistic, low present-hedonistic/future/past-negative). This study found that even with high future orientation, adolescents under severe stress still experienced negative emotions and anxiety. Both studies identified future and present-hedonistic groups, though the latter did not find a balanced group.

These studies demonstrate substantial individual differences in adolescent time perspective, but all were conducted in Western cultural contexts. What profiles characterize Chinese adolescents? Research shows that social-cultural context shapes time perspective (Lyu & Huang, 2005). East Asians tend toward holistic thinking, focusing on relationships and contextual influences (Kitayama et al., 2003), whereas European North Americans favor analytic thinking, separating objects from context (Nisbett et al., 2001). Correspondingly, Huang & Chen (2019) found that 66.7% of Chinese-speaking participants represented past, present, and future as overlapping circles, with present perception extending minutes to hours—contrasting sharply with English speakers whose "present" lasted only seconds. This indicates Chinese have more extended, continuous, and integrated present perception. Additionally, Chinese show stronger future orientation (Cheng et al., 1995; Lee et al., 2011). Hofstede (2001) found Chinese score significantly higher on long-term orientation than Western countries. Shechter et al. (2011) showed East Asians are more motivated to learn technologies serving long-term goals, while Westerners prefer near-term usefulness. Ji et al. (2019) found Chinese students perceive future events as closer than Canadian students. Chinese also attend to the past (Cheng et al., 1995; Ji et al., 2009), viewing it as foundational with higher value (Guo et al., 2012). Chinese value past objects more than Americans (Levinson & Peng, 2007), and Chinese TV ads emphasize historical experience more than American ads (Lee et al., 2022). Ji et al. (2019) also found Chinese students perceive past events as closer than Canadians. These variable-oriented studies suggest Chinese adolescent time perspective profiles and individual differences remain unexplored. Our first aim is to identify distinct time perspective profiles among Chinese adolescents.

Developmental contextualism posits that individual differences and person-context interactions create diverse developmental trajectories over time (Lerner & Miller, 1993; Ji & Zhang, 2011). Zimbardo and Boyd (1999) noted time perspective is context-dependent, with contextual forces capable of altering

individual differences. Time perspectives show stability or change over time (Hall & Fong, 2007), and adolescents may transition between profiles. No studies have examined profile transitions over time, though several longitudinal studies investigated time attitude development (Morgan et al., 2017; Wells et al., 2018). Time attitudes refer to subjective emotional experiences toward past, present, and future (six dimensions: past-positive, past-negative, present-positive, present-negative, future-positive, future-negative). Morgan et al. (2017) tracked 1,968 adolescents for one year, identifying four time attitude profiles: positive, ambivalent, negative, and negative-future. Only 44% remained stable, with others trending toward more negative profiles. Wells et al. (2018) conducted a two-year study of 1,932 adolescents, finding four profiles: positive, ambivalent, moderately negative, and negative. Again, profiles were unstable, with only 47.3% retaining their original profile.

These results show adolescent time attitude profiles exhibit varying stability and change. However, these studies focused on time attitudes (affective dimension) rather than time perspective, which encompasses broader cognitive understanding, emotional experience, and action tendencies (Lyu & Huang, 2005). Moreover, most studies on adolescent time perspective individual differences used cross-sectional designs, precluding examination of profile transitions. Our second aim is to conduct a six-month longitudinal study of junior high students to investigate stability and transition patterns of Chinese adolescent time perspective profiles.

1.3 Influencing Factors of Profile Transitions and Relationship with Academic Achievement

Time perspective is shaped by interactions among personal, social, and contextual factors (Zimbardo & Boyd, 1999). First, gender influences time perspective (Lyu & Huang, 2005): males focus more on the future temporally, while females hold more positive temporal attitudes. Second, cross-sectional studies show socioeconomic status affects future time perspective (Kooij et al., 2018; Chen et al., 2021). Social class cognitive theory (Kraus et al., 2012) suggests high-SES individuals have abundant resources and support to pursue chosen goals, while low-SES individuals face resource scarcity and status constraints that shape future cognition and goal setting. Socioeconomic status has subjective (SSS) and objective (SES) components. SSS reflects subjective evaluations of one's status, while SES comprises actual valuable resources (education, occupation, wealth). We examine both SSS and SES effects on profile transitions. Third, academic achievement predicts time perspective. Hao et al. (2024) found academic achievement at Time 2 longitudinally predicted future time perspective at Time 3 among 373 adolescents. However, previous research on influencing factors has used variable-centered approaches. Our third aim uses a person-centered longitudinal design to examine whether gender, socioeconomic status, and academic achievement predict transitions between time perspective profiles.

Numerous studies have examined time perspective effects on academic achieve-

ment (Barber et al., 2009; Zhang et al., 2016; Du & Lyu, 2017; Jiang & Lyu, 2017; Peetsma & Veen, 2011; Li et al., 2021). Barber et al. (2009) found future orientation correlated with higher GPA and present-hedonistic orientation with lower GPA among American university students. Cross-sectional studies show future time perspective predicts adolescent academic achievement (Zhang et al., 2016; Du & Lyu, 2017; Jiang & Lyu, 2017). Longitudinal studies demonstrate future time perspective predicts academic achievement (Peetsma & Veen, 2011; Li et al., 2021). Peetsma and Veen (2011) tracked 584 adolescents for two years, finding that initial levels and growth rates of future time perspective influenced achievement through increased learning engagement. However, these studies used variable-centered approaches and examined only one or a few dimensions, neglecting person-centered examination of time perspective effects. Our study uses a longitudinal person-centered approach to compare academic achievement across profiles and changes across transition patterns, revealing time perspective effects on academic achievement.

In summary, we conducted two waves of data collection among eighth-grade students, using latent profile and latent transition analyses to examine individual differences and six-month transitions in adolescent time perspective. We analyzed effects of gender, socioeconomic status, and Time 1 academic achievement on transitions, and examined academic achievement across profiles and transition patterns. Based on the literature, we hypothesize: (1) Adolescent time perspective is heterogeneous with three profiles that transition over time; (2) Gender, socioeconomic status, and academic achievement predict profile transitions; (3) Profiles and transition patterns affect academic achievement.

2.1 Participants

We used cluster sampling to recruit eighth-grade students from a middle school in Dongcheng District, Beijing for two waves of questionnaire surveys. Time 1 was July 2021, Time 2 was January 2022 (six-month interval). At Time 1, 541 students participated (267 males, 274 females). By Time 2, 2 participants were lost due to transfer/absence (0.37% attrition), yielding 539 valid questionnaires (265 males, 274 females). We analyzed data from 539 participants with valid responses at both time points. Tests revealed no significant differences between retained and lost participants on gender [$^2(1) = 0.51$, $p = 0.475$], SSS, or other variables ($|t|s < 0.73$, $ps > 0.465$).

2.2 Measures

2.2.1 Subjective Socioeconomic Status

We used the MacArthur Scale of Subjective Socioeconomic Status (SSS) revised by Goodman et al. (2001). Participants viewed a 10-rung ladder and reported their family's position in society (10 = highest, 1 = lowest). The MacArthur scale shows good reliability and validity internationally, with six-month test-retest reliability $\alpha = 0.62$ (Adler et al., 2000).

2.2.2 Objective Socioeconomic Status

Objective family SES (Social Economic Status) typically comprises family income, parental education, and occupation. Since students often lack accurate income data, we included only parental education and occupation. Parental education was coded 1-5 (1 = junior high, 2 = high school/vocational, 3 = college, 4 = bachelor's, 5 = graduate). Parental occupation was similarly coded 1-5 (1 = temporary/unemployed, 2 = manual labor/technical worker, 3 = general manager, 4 = middle manager, 5 = senior manager). Scores were standardized and subjected to principal component analysis to obtain factor loadings. Objective SES was computed as: SES = (β_1×Z_{{{father}}*{{education}}*} + β_2×*Z*{{{father}}*{{occupation}}*} + β_3×*Z*{{{mother}}*{{education}}*} + β_4×*Z*{{{mother}}_{{occupation}}})/ f, where β_1-β_4 are factor loadings and f is the first factor's eigenvalue. Higher scores indicate higher SES.

2.2.3 Time Perspective

We used the Zimbardo Time Perspective Inventory (ZTPI) developed by Zimbardo and Boyd (1999), comprising 5 dimensions and 56 items: past-negative (10 items), past-positive (9), present-hedonistic (15), future (13), and present-fatalistic (9). Items use 5-point scales, with 5 reverse-scored items (9, 24, 25, 41, 56). Internal consistency coefficients were 0.91 and 0.90 for the total scale at Times 1 and 2, respectively, with dimension coefficients ranging from [values not completed in original].

2.2.4 Academic Achievement

We used final exam scores in Chinese, mathematics, and English from the second semester of seventh grade and first semester of eighth grade as indicators of academic achievement at Times 1 and 2.

2.3 Procedure

After obtaining informed consent from the school, parents, and students, we administered two waves of group testing by class. Time 1 assessed demographics, socioeconomic status, and time perspective; Time 2 reassessed time perspective. Academic achievement data were provided by the school. Trained graduate students in psychology administered the surveys, with two proctors per class reading standardized instructions, ensuring independent completion, and monitoring comprehension. Questionnaires were collected immediately after completion.

2.4 Data Processing

We used SPSS 27.0 and Mplus 8.3 for data management and analysis in five steps: (1) Multiple imputation for missing values, longitudinal measurement invariance testing, descriptive statistics, and Pearson correlations between time perspective dimensions and other variables at both time points; (2) Latent profile models using five time perspective dimensions at each time point, with

AIC/BIC/aBIC determining optimal profile number; (3) Latent transition models examining profile changes across time points via transition probabilities; (4) Logistic regression with gender, SSS, SES, and Time 1 academic achievement as predictors of profile transitions; (5) ANOVA and paired-samples t-tests examining profile differences in academic achievement and achievement changes across transition patterns.

3.1 Longitudinal Measurement Invariance

We tested longitudinal measurement invariance of the time perspective scale using Mplus 8.3. Results in Table 1 show configural, weak, and strong invariance models all fit well, with ΔCFI and ΔRMSEA below recommended cutoffs (CFI $\leq$ 0.01, RMSEA $\leq$ 0.015; Cheung & Rensvold, 2002), establishing longitudinal measurement invariance.

3.2 Descriptive Statistics and Correlations

Descriptive statistics and correlations appear in Table 2 . Gender and SES correlated positively with Time 1 and Time 2 academic achievement ($0.15 \leq r \leq 0.19$, $ps < 0.001$). SSS correlated positively with Time 1 and Time 2 future orientation ($0.08 \leq r \leq 0.10$, $ps < 0.05$). Time 1 academic achievement correlated significantly with Time 1 past-negative, present-hedonistic, present-fatalistic, and future ($-0.23 \leq r \leq 0.11$, $ps < 0.05$) and with Time 2 past-negative, past-positive, present-fatalistic, and future ($-0.18 \leq r \leq 0.24$, $ps < 0.05$). Time 2 academic achievement correlated significantly with all Time 1 and Time 2 time perspective dimensions ($-0.24 \leq r \leq 0.24$, $ps < 0.05$).

3.3 Latent Profile Analysis

We conducted latent profile analysis on five time perspective dimensions at both time points. Fit indices appear in Table 3 . We used AIC, BIC, aBIC, Entropy, LMRT, and BLRT as fit criteria (lower AIC/BIC/aBIC = better fit; Entropy > 0.80 indicates >90% classification accuracy; significant LMRT/BLRT p-values indicate k-profile model differs from k-1 profile model). At Time 1, the 3-profile model showed substantial AIC/BIC/aBIC reduction from the 2-profile model. Entropy $\geq$ 0.76 indicates >90% accuracy for 3 profiles (Wang et al., 2017). LMRT and BLRT were significant, and the smallest class exceeded 0.5% of the sample, supporting the 3-profile model. Time 2 showed similar patterns, with the 3-profile LMRT non-significant but model 3 being the maximum selected, supporting the 3-profile solution.

Based on scores and differences across past-negative, present-hedonistic, future, past-positive, and present-fatalistic dimensions (Table 4 , Figure 1 [Figure 1: see original paper], Figure 2 [Figure 2: see original paper]), we labeled profiles as “high positive,” “low future,” and “high nihility.” The “high positive” profile scored highest on future and past-positive and lowest on past-negative, present-fatalistic, and present-hedonistic dimensions, comprising 37.9% (Time

1) and 36.0% (Time 2) of the sample. The "low future" profile scored lowest on future with moderate past-negative, present-fatalistic, and present-hedonistic levels, comprising 52.0% (Time 1) and 57.6% (Time 2). The "high nihility" profile scored highest on past-negative, present-fatalistic, and present-hedonistic dimensions with moderate future orientation, comprising 10.1% (Time 1) and 6.4% (Time 2).

MANOVA revealed significant profile main effects at both time points, Fs(5,533) $\geq$ 304.25, ps $<$ 0.001, ^{2}p $\geq$ 0.74. Bonferroni post-hoc comparisons (Table 4) showed significant differences across all three profiles on future orientation (ps $<$ 0.001). The "high positive" profile scored significantly higher than "high nihility" on future and past-positive, while "high nihility" scored significantly higher than "low future" on future. The "high nihility" profile scored significantly higher than both other profiles on past-negative, present-hedonistic, and present-fatalistic dimensions (ps $<$ 0.001).

3.4 Latent Transition Analysis

Transition probabilities from Time 1 to Time 2 appear in Table 5 . Diagonal values represent stability probabilities. The "low future" profile showed highest stability (82.6%), followed by "high positive" (74.6%), while "high nihility" showed lowest stability (38.6%). Among those who transitioned, adolescents from "high positive" (23.0%) and "high nihility" (51.7%) were most likely to move to "low future."

3.5 Predictors of Profile Transitions

We examined predictors by constructing a latent transition model with gender, SSS, SES, and Time 1 academic achievement as covariates. Multinomial logistic regression compared transition odds ratios (OR) against staying in the same profile. OR $>$ 1 indicates increased transition likelihood. Results in Table 6 show that compared to "high positive $\rightarrow$ high positive," SSS decreased the probability of "high positive $\rightarrow$ high nihility" transitions (OR = 0.32, p = 0.022). Conversely, compared to "high nihility $\rightarrow$ high nihility," SSS increased "high nihility $\rightarrow$ high positive" transitions (OR = 2.48, p = 0.024). Higher SSS thus protects against negative transitions. Compared to "high positive $\rightarrow$ high positive," Time 1 academic achievement marginally predicted "high positive $\rightarrow$ low future" transitions (OR = 0.99, p = 0.060), suggesting better achievement reduces transition likelihood. Gender did not predict transitions.

3.6 Effects of Profiles and Transitions on Academic Achievement

We first compared academic achievement across profiles, controlling for gender, SES, and SSS. ANOVA results (Table 7) showed significant profile differences at both time points, Fs(2,533) $\geq$ 8.93, p $<$ 0.001, ^{2}p $\geq$ 0.03. Post-hoc tests revealed at Time 1, "high positive" $>$ "low future" $>$ "high nihility" in academic

achievement. At Time 2, "high positive" remained highest, while "low future" and "high nihility" did not differ significantly.

Second, paired-samples t-tests examined achievement changes across transition patterns (Table 8). Achievement declined significantly when: "high positive" transitioned to "low future" ($\Delta M = -3.26$, $t = -3.07$, $p = 0.003$, Cohen's $d = 0.13$); "low future" remained stable ($\Delta M = -3.09$, $t = -3.44$, $p = 0.001$, $d = 0.12$); and "high nihility" transitioned to "low future" ($\Delta M = -7.17$, $t = -3.86$, $p = 0.001$, $d = 0.23$). Other transition patterns showed no significant achievement changes.

4.1 Adolescent Time Perspective Profiles and Transitions

This study identified three time perspective profiles among Chinese adolescents at both time points: high positive (37.9%/36.0%), low future (51.4%/57.6%), and high nihility (10.6%/6.4%), confirming heterogeneity and adding evidence for substantial individual differences. The "high positive" profile—characterized by high future and past-positive orientation—aligns with the "future group" (31.4%) in British adolescents (McKay et al., 2014) and "past-positive future group" (4.3%) in Polish adolescents (Kossewska et al., 2023), suggesting cross-cultural universality. The smaller "future group" in Polish adolescents may reflect COVID-19 context, which made positive past attitudes and future planning difficult.

The "high nihility" profile—high past-negative, present-hedonistic, and present-fatalistic with moderate future—partially resembles the British "past-negative group" (15.8%) (McKay et al., 2014) but differs in having the highest present-hedonistic and fatalistic scores. It closely matches the Polish "past-negative and present-fatalistic group" (17.1%) (Kossewska et al., 2023), possibly due to similar pandemic contexts. Such crises challenge meaning-making (Velez & Herteen, 2024), and focusing on negative past experiences may strongly influence current behavior (Zimbardo & Boyd, 1999). This supports the close Chinese connection between present and history (Huang, 2006). Notably, this group's future orientation is moderate, suggesting temporary 迷茫 but change potential—they still prepare for and positively plan the future, warranting attention and guidance toward the "positive" profile.

The "low future" profile—low future orientation with moderate past-negative, present-hedonistic, and present-fatalistic levels—comprised over half the sample at both time points. This resembles the British high-hedonistic/low-future group (McKay et al., 2014) but with lower present-hedonistic levels. Culturally, Westerners emphasize temporal impact on individuals and immediate feelings (Ji et al., 2023), whereas Chinese present orientation focuses on grounded, practical work/study (Hao et al., 2023) rather than hedonism. Facing high school entrance exams, Chinese adolescents experience limited pleasure from studying. This reflects stronger Chinese integration between present and future (Huang & Chen, 2019), consistent with holistic thinking. The large proportion (50%)

showing unclear future goals warrants educational attention to enhance future confidence and planning.

We did not find a "balanced" profile (high past-positive/future, moderate present-hedonistic, low past-negative/fatalistic) reported in previous research (McKay et al., 2014; Worrell et al., 2015). This may reflect greater academic pressure among Chinese adolescents (Liu & Lu, 2011), making high present-hedonistic enjoyment alongside high future planning unlikely. With >50% of Chinese adolescents' daily stress related to academics (Wang et al., 2020) and most time spent studying, many cannot derive hedonistic pleasure from learning, preventing balance between future planning and present enjoyment.

Latent transition analysis revealed "low future" showed strongest stability, followed by "high positive," while "high nihility" was least stable. Notably, 23% of "high positive" and 51.7% of "high nihility" transitioned to "low future," supporting developmental contextualism and showing time perspective changes over time. The strong stability of "low future" indicates adolescents remained goal-unplanned over six months. The predominance of transitions toward "low future" suggests negative shifts from seventh to eighth grade, consistent with Morgan et al. (2017) who found adolescent time attitudes trending negative, possibly due to high school entrance exam pressures and life uncertainties.

4.2 Influencing Factors of Profile Transitions

Consistent with hypotheses, our longitudinal design confirmed SSS significantly predicts time perspective profile transitions. Specifically, high-SSS adolescents most likely remained in "high positive," while low-SSS adolescents were more likely to transition from "high positive" to "high nihility" and less likely to transition from "high nihility" to "high positive." This aligns with social class cognitive theory (Kraus et al., 2012): high-SES individuals with abundant resources can freely pursue goals and hold positive future attitudes. However, we found no SES prediction effect, possibly because our SES assessment included only parental education and occupation, not income or other objective indicators like home library size. Future research with more comprehensive SES indicators may detect effects.

SSS and SES showed inconsistent predictive patterns, with SSS having stronger effects. Because subjective status reflects psychological traits and cognitive tendencies, it more strongly influences self, other, and social perceptions (Kraus et al., 2012). Growing evidence shows SSS is distinct from SES, capturing unique dimensions beyond objective measures (Zhao et al., 2023). SSS better predicts health outcomes than SES (Demakakos et al., 2018). When adolescents subjectively evaluate family status, they may incorporate psychological factors like personal goals, attitudes (Lee et al., 2018), and future expectations (Manstead, 2018) that drive transition effects.

Academic achievement marginally predicted transitions from "high positive" to "low future," suggesting achievement influences time perspective. Andre

et al. (2019) noted that high-achieving students better grasp long-term consequences and show greater persistence. In Chinese culture, academic achievement links closely to social status and career success (Zhao et al., 2019). High achievers gain recognition from teachers, parents, and peers (Wentzel et al., 2021), enhancing positive mood and life satisfaction (Datu & King, 2018). Positive learning environments foster future positive attitudes (Fredrickson & Joiner, 2002), while poor achievement reduces satisfaction and hinders future aspirations (Marroquín et al., 2016). These findings warrant further investigation.

4.3 Effects of Time Perspective on Academic Achievement

We found "high positive" adolescents achieved best at both time points. Transitions to "low future"—whether from "high positive," from "high nihility," or remaining stable—were associated with significant achievement declines. These results highlight the protective role of future time perspective, consistent with variable-centered research (Zhang et al., 2016; Du & Lyu, 2017; Jiang & Lyu, 2017; Peetsma & Veen, 2011). For adolescents, higher future time perspective correlates with stronger motivation (Husman & Lens, 1999), greater perseverance (Hill et al., 2016), and better learning strategies (Bilde et al., 2011; Janeiro et al., 2017). Low future orientation reduces engagement (Burns et al., 2021) and increases procrastination (Li et al., 2023).

Notably, at Time 1, "high nihility" outperformed "low future," but by Time 2 they did not differ. This suggests high nihility's detrimental effects become equivalent to low future orientation over time. Since "high nihility" adolescents have moderate future orientation, this warns that high past-negative, present-hedonistic, and present-fatalistic dimensions harm achievement as much as low future orientation. Variable-centered research also found high past-negative and present-negative dimensions correlate with low achievement (Janeiro et al., 2017). High present-hedonistic and fatalistic individuals show lower self-control (Barber et al., 2009; Price et al., 2017; Baird et al., 2021), indirectly hindering achievement. Kossewska et al. (2023) found high past-negative/present-fatalistic adolescents experienced high academic burnout, particularly among exam-preparing graduates. Academic burnout reduces interest, generates negative emotions, and decreases achievement (Bask & Salmela-Aro, 2013).

4.4 Limitations

Two limitations require improvement. First, we examined few transition predictors, finding only SSS effects. Future research should include additional variables. Second, with only two waves and relatively few participants, future studies should increase measurement occasions and sample size to explore stability and achievement trajectories more thoroughly.

Conclusions

1. Adolescent time perspective is heterogeneous, comprising "high positive," "low future," and "high nihility" profiles. Over time, "low future" shows strongest stability, "high nihility" weakest stability, with "high positive" and "high nihility" most likely to transition to "low future."

2. SSS is a protective factor for time perspective. High SSS reduces "high positive" to "high nihility" transitions, while low SSS increases them. Academic achievement marginally predicts "high positive" to "low future" transitions. Gender and SES do not predict profile transitions.

3. Academic achievement differs across profiles, with "high positive" students performing best at both time points. Achievement declines significantly when transitioning to "low future" (from "high positive" or "high nihility") or remaining in "low future."

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Profile and Changes in Time Perspective among Chinese Adolescents: Examining the Prediction of Subjective Socioeconomic Status and Its Effect on Academic Achievement

Abstract

Time perspective is an individual's experience and concept of past, present, and future time, and has always been a research focus in the field of time psychology. Studies abroad have proved that the development of adolescents' time perspective is heterogeneous. With the constant change of individual factors and environmental factors, the development trajectory of time perspective is also dynamic. However, there is no studies to investigate the individual heterogeneity and transition of adolescents' time perspective in China. Studies have shown that the socio-economic status can predict future orientation, but mainly based on cross-sectional studies. Furthermore, most domestic researches on the causal relationship between future time perspective and academic achievement ignore the continuity of time and the dynamic change of academic achievement. In order to solve the above problems, this study adopts a people-oriented approach to explore the individual heterogeneity, transition, the influence of socioeconomic status on the transition of Chinese adolescents' time perspective, and the influence on the academic achievement.

A sample of 539 junior middle school students was recruited as participants and measured twice. In both tests, the adolescents independently completed the demographic variables and Time Perspective Scale, and the school provided the participants' final exam scores. In this study, latent profile analysis and latent transition analysis were used to explore the profiles and changes of adolescents' time perspective. Multiple logistic regression was used to study the effects of socioeconomic status and academic achievement on the changes of different profiles of time perspective. Finally, paired-samples T test was used to explore the changes of academic performance during the changes of different profiles.

The results showed that there are three different profiles of Chinese adolescents' time perspective: "high positive profile", "low future profile" and "high nihility profile". Among them, the "low future profile" has the strongest stability, the "high nihility profile" has the worst stability, and the "high positive profile", "high nihility profile" were more likely to transition to the "low future profile". SSS plays a significant role in predicting the transition of time perspective profiles. Adolescents with high SSS level are less likely to change from "high positive profile" to "high nihility profile", while adolescents with low SSS level are more likely to change from "high positive profile" to "high nihility profile". In the transition from "high positive profile" to "low future profile", the predictive effect of academic achievement is marginal significant. Gender and SES do not predict the transition of time perspective profiles. The "high positive profile" consistently had the best academic achievement. When all three profiles changed to a lower future, there was a significant decline in academic achievement.

This study is the first to explore the heterogeneity and dynamic changes of Chinese adolescents' time perspective. Its profile characteristics and transition patterns deepen researchers' understanding of the individual differences and diversity of change patterns of adolescents' time perspective, and inspire educational practitioners to carry out the classification and dynamic monitoring of time perspective in order to carry out targeted cognitive and behavioral interventions to improve adolescents' academic achievement.

Key words: adolescent, time perspective, academic achievement, subjective socioeconomic status, latent transition analysis

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