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When Is "Unity of Knowledge and Action" Possible? —— The Influence of Value Identity on Adolescents' Attentional Bias

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Research Article

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Abstract

This study explored whether adolescents' identification with social equality values influences their attentional bias toward socially unfair words. First, participants were divided into high and low social equality identity groups based on their scores on the Chinese Adolescent Values Questionnaire. Two experiments were then conducted to examine reaction time differences between the two groups in response to socially unfair words: the Stroop task (Experiment 1, N = 65, sixth-grade students) and the dot-probe task (Experiment 2, N = 71, tenth-grade students). Results of Experiment 1 showed no significant difference in reaction times to socially unfair words between the two groups, indicating that the value-reaction integration of early adolescents is not yet mature. Experiment 2 revealed that the high-identity group exhibited attentional avoidance of socially unfair words under the 1500-ms presentation condition, while the low-identity group demonstrated attentional bias and vigilance toward such words under the 500-ms presentation condition. These findings suggest that around mid-adolescence, value identity begins to modulate the attentional processing of social injustice, reflecting the gradual integration of System 1 (automatic processing) and System 2 (cognitive processing) in social cognition. The results provide insights for understanding the developmental stages in which abstract values shape social attention and for implementing targeted value education.

Introduction

Social justice perception refers to individuals' subjective evaluations of whether society is fair (Gollwitzer & van Prooijen, 2016). Perceived injustice and frustration can lead adolescents to develop vengeful attitudes, aggressive behaviors, and antisocial tendencies (Muhammad et al., 2023). Additionally, the perception of social inequality may reduce adolescents' prosocial behaviors (Mello et al., 2025) and is closely associated with public cooperative behavior, influencing individuals' motivation levels and goal achievement (Zhang, 2017). There is also a bidirectional negative correlation between the perception of social injustice and mental health: lower perceived injustice predicts higher future depression levels, and vice versa (Wei et al., 2023). Thus, adolescents' perception of social injustice is strongly linked to their social and psychological adaptation.

Currently, few studies have investigated the causes of adolescents' perception of social injustice. Research on adolescents' sensitivity to social injustice suggests that their frequent and rapid perception of unfairness may stem from a stable personality structure (Bondü et al., 2016). Therefore, identification with social equality values may be a key factor influencing adolescents' perception of social injustice. As a core human value, social equality emphasizes respecting and treating differences in human nature, dignity, and rights equally (Wang et al., 2018). Previous studies have shown that social justice values, centered on social equality, are an important component of universalist values (Schwartz et al., 2012).

In summary, this study hypothesizes that adolescents' perception of social injustice may be influenced by their stable identification with social equality values. Research on adolescents' perception of social injustice has increasingly focused on their cognitive processing of unfair behaviors and phenomena, such as moral judgment, moral behavior, and moral commitment (Daniel et al., 2014). Social cognitive processing is a complex systemic process, and the dual-system theory of social cognition has been proposed to explain it (Happé et al., 2017). System 1 is a fast, unconscious, and low-resource-consuming system (e.g., automatic recognition of others' facial expressions), whose attention allocation to external cues is immediate and spontaneous, relying primarily on experiential learning and situational triggers.

In contrast, System 2 is a slow, conscious, and high-resource-consuming system (e.g., cognitive evaluation of others' beliefs), responsible for the deep internalization, integration, and regulation of abstract thinking (such as values), and can revise the automatic responses of System 1 based on core beliefs. From a developmental perspective, the formation and development of System 1 may gradually become automated through social learning—for example, observing others' emotional expressions and behaviors, making judgments, and internalizing them (Happé et al., 2017). In contrast, the internalization of values by System 2 gradually provides a "value-oriented template" for the automatic processing of System 1 through repeated cognitive reflection and behavioral calibration. That is, when System 2 has deeply internalized social equality values, it pre-establishes evaluation criteria for "social injustice" cues, thereby regulating the attention priority of System 1 toward such cues. Existing research has begun to explore neural mechanisms (e.g., the temporo-parietal junction) that can regulate attention focus according to task demands, integrating these two systems (Happé et al., 2017).

This integration process may be the core neural basis for how value identity influences attentional bias: social equality values internalized by System 2 alter the automatic attention allocation pattern of System 1 toward social injustice cues through neural regulatory mechanisms. High-identity individuals may, through the regulation of System 2, induce automatic avoidance of social injustice cues by System 1, while low-identity individuals, due to the lack of strong value constraints from System 2, maintain spontaneous attentional vigilance toward such cues via System 1.

A key question addressed in this study is whether dual-system integration exists in adolescents' social cognitive processing of social injustice. Adolescence is a critical period for the coordinated development of values and cognitive systems, and the cognitive developmental characteristics of different age groups directly affect the maturity of value-cognition integration. Therefore, this study specifically selected sixth-grade (11–12 years old) and tenth-grade (15–16 years old) students as participants, based on the following theoretical foundations: From a cognitive developmental perspective, sixth-grade students are in the transition from late childhood to early adolescence. Previous studies have shown that children in this age group have developed a relatively stable value structure (Daniel et al., 2023), indicating that System 2 (the conscious cognitive processing system) has initially developed. However, their abstract thinking abilities are still in the early stages, making it difficult to quickly establish automatic connections between abstract values and specific social cues (Steinberg, 2005). Additionally, adolescents at this stage have limited social experience, and the automatic processing of System 1 has not undergone sufficient social learning calibration, so the connection between values and attentional bias may not yet be formed.

In contrast, tenth-grade students are in mid-adolescence, a critical period for the development of abstract logical thinking (Steinberg, 2005). They can more flexibly handle the connection between abstract concepts and specific situations, and the internalization of values by System 2 has reached a high level. Through the accumulation of rich social experience, the automatic processing of System 1 has gradually been regulated by System 2, and dual-system integration enters a stage of rapid development. Furthermore, mid-adolescence is also a critical period for the stabilization of self-concept and value identity (Erikson, 1969). Adolescents' attention to abstract issues such as social justice increases significantly, and the regulatory role of values in cognitive processing is more likely to manifest. Based on the above developmental psychology theories, selecting these two age groups with distinct developmental characteristics can clearly capture the

developmental transition of value-cognition integration, thereby identifying the key developmental node at which “unity of knowledge and action” transitions from potential possibility to gradual realization.

Attentional bias is an important component of individual cognitive processing, referring to the ability of the visual system to select information for processing, compare and integrate relevant information, and exclude and suppress irrelevant information (Yao et al., 2021). Attention is the first step in processing external stimuli, and things that enter the attentional field first have advantages in cognitive processing such as perception speed, memory depth, and emotional experience. Previous studies have shown that adolescents’ attentional bias is closely related to their cognitive, social, and emotional development. For example, excessive attention to negative information can affect adolescents’ emotional states and decision-making processes, and attentional bias toward hostile stimuli may increase aggressive behaviors (Zhao et al., 2021); attentional bias toward substance-related cues such as alcohol may increase the risk of substance abuse among adolescents (Melaugh McAteer et al., 2015). In contrast, a tendency to focus on positive information helps adolescents maintain positive emotions and enhance stress coping abilities. A study on depressed adolescents found that attentional bias modification therapy can improve their depressive symptoms (Yang et al., 2016).

Although few studies have directly explored the relationship between social equality value identity and attentional bias, existing research has shown that attentional bias is related to self-concept, with significant differences in individuals’ attentional bias toward information consistent or inconsistent with their self-concept (McArthur et al., 2020). For example, individuals with a high moral self-concept exhibit attentional avoidance of self-interested words (Nie et al., 2015). As a core component of self-concept (Arens et al., 2019), the influence of values on attentional bias is achieved through dual-system integration: System 2 internalizes values as the core of self-concept, thereby regulating the attention allocation of System 1 toward relevant cues. Individuals are more likely to attend to information consistent with their identified values (automatic approach of System 1) and ignore information related to disidentified values (automatic avoidance of System 1)—a process that reflects the synergistic effect of the two systems. Therefore, understanding the relationship between adolescents’ value identity and attentional bias helps explain their cognitive processing of social injustice and can guide adolescents’ attention toward more valuable and meaningful aspects of development through value education and guidance.

The Present Study

This study aimed to explore the influence of adolescents’ social equality value identity on their perception of social justice by examining differences in attentional bias toward socially unfair words among adolescents with different levels of social equality value identity. The Stroop task and dot-probe task are two of the most commonly used paradigms in attentional bias research (Meng et al., 2024; Li et al., 2023), so they were adopted in this study: the Stroop task was used to investigate the attentional bias of sixth-grade students toward socially unfair words, and the dot-probe paradigm was used to explore the cognitive attentional bias of tenth-grade students toward such words. The research hypotheses were as follows: Adolescents with low social equality value identity are more likely to exhibit attentional bias toward social injustice and process socially unfair words more quickly; in contrast, adolescents with high social equality value identity, due to their disapproval of social injustice, will show avoidance responses to socially unfair words.

Experiment 1

Participants

The participants of this study were sixth-grade students from a middle school in Shanghai. The total sample included 425 students, of which 221 were boys, mean age = 11.74, *SD* = 0.45. The participants completed the Chinese Youth Values Questionnaire (Wang et al., 2018), which measures eight dimensions: social equality, collective responsibility, rule-abiding, family well-being, friendship, self-improvement, fashion, and personal happiness. The internal consistency coefficients (Cronbach's αs) of the dimensions ranged from .75 to .90. The study focused on the social equality dimension of the measure, which comprises a total of six questions (e.g., "He/she believes that a society where everyone is equal is very important").

The overall total number of study participants was 72, of which 45 were male and 27 were female. Based on their scores on the social equality dimension, the participants were divided into either the high or low agreement group, according to 27% each agreement group, resulting in 42 participants (25 male, 17 female) in the high identity group and 30 in the low identity group. There was a significant difference between the two groups in terms of their social equality scores, with the high group scoring significantly higher (*M* = 5.00, *SD* = 0.00) compared to the low group (*M* = 2.72, *SD* = 0.06), *t*(29) = 21.78, Cohen's *d* = 53.74. All participants had normal visual acuity, with no reported color blindness or color weakness.

Materials

The target words used in the current experiment were either social injustice-related or neutral words. A total of 36 words were chosen, 18 per category, and all were four-letter Chinese idioms. The social injustice words included "confusing black and white" (□□□□), "reversing right and wrong" (□□□□), and "deceiving people by force" (□□□□). Sample neutral words included "crowing" (□□□□), "reciting" (□□□□), and "hearing and seeing" (□□□□).

The word selection process was as follows: First, 45 socially unfair words and 35 neutral words were initially screened. Four graduate students majoring in psychology conducted a preliminary evaluation, excluding ambiguous, repetitive, or non-conforming words, resulting in 32 socially unfair words and 32 neutral words. Subsequently, 145 first-year college students rated these 64 words. After excluding 17 invalid questionnaires, 128 students used a 5-point scale to rate the conformity and familiarity of the words, and a 7-point scale to rate their pleasantness and arousal. Words with conformity and familiarity scores below 3 were excluded, leaving 24 socially unfair words and 24 neutral words.

The ratings of the remaining words were as follows: conformity (social injustice: *M* = 3.69, *SD* = 0.63; neutral: *M* = 2.25, *SD* = 0.90); familiarity (social injustice: *M* = 4.07, *SD* = 0.46; neutral: *M* = 4.03, *SD* = 0.46); arousal (social injustice: *M* = 6.11, *SD* = 1.37); neutral: *M* = 2.56, *SD* = 0.81); pleasantness (social injustice: *M* = 2.15, *SD* = 0.83; neutral: *M* = 5.38, *SD* = 0.68). The social injustice words were significantly more likely conform to descriptions of inequities than the neutral words, *t*(127) = 14.82, *p* < .001, Cohen's *d* = 3.69. The difference between the social injustice words and the neutral words was not significant in familiarity, *t*(127) = 1.50, *p* = .14.

Finally, 20 sixth-grade students who did not participate in the formal experiment were asked to assess the familiarity of the 48 words. They were instructed to read all words (without consulting dictionaries or the internet) and mark any words they did not recognize, were unfamiliar with, or did not understand. Most students were familiar with all words, and only 4 students marked 2-3 words each. Based on this, 2 socially

unfair words and 3 neutral words were excluded, and the final experimental words were determined: 18 socially unfair words and 18 neutral words.

Design

A 2 (word type: socially unfair vs. neutral) × 2 (group: high social equality identity vs. low identity) mixed experimental design was adopted, with word type as a within-subjects variable, group as a between-subjects variable, and reaction time for judging word color as the dependent variable.

Procedure

The experiment was conducted in the school's computer lab using E-prime 2.0 software. All stimuli were presented in color on a gray background. The colors (red, green, blue) of socially unfair words and neutral words were randomly assigned using the built-in randomization program of E-prime, ensuring that each word had an equal probability of being presented in different colors and that no word was fixedly associated with a specific color to avoid practice effects from color-word associations.

The specific procedure was as follows: First, a red "+" fixation point was presented in the center of the screen for 1000 ms. Then, a stimulus word (socially unfair or neutral) was presented at the fixation point, and participants were asked to judge the color of the word as quickly and accurately as possible: press "G" for red, "H" for green, and "J" for blue. All three keys are located in the center of the keyboard, and participants could choose to use their left or right hand to avoid the impact of hand preference on response speed. The stimulus disappeared after the participant responded; if no response was made within 3000 ms, the stimulus disappeared automatically. The interval between each trial was 1000 ms. The formal experiment consisted of two blocks, each containing 144 randomly presented trials, with a 3-minute break between blocks. The experimental procedure is illustrated in Figure 1.

Before the experiment, participants adjusted their seats to a comfortable position. Researchers and research assistants explained the purpose of the experiment (a study on attention) and the complete procedure (including instructions, practice, and rest sessions). A practice session with 24 trials (12 socially unfair words and 12 neutral words, with random colors) was conducted before the formal experiment. During practice, if a participant made a wrong key press or their reaction time exceeded 3000 ms, feedback was immediately displayed on the screen ("Wrong key press, please try again" for errors, "Response timed out, please speed up" for timeouts) to help them familiarize themselves with the key-pressing rules and experimental rhythm. If the response was correct, no additional feedback was provided, and the next trial began.

Results

Data collected by E-Prime were imported into Excel to calculate the accuracy rate of each participant. Participants with reaction times exceeding three standard deviations or an accuracy rate below 90% were excluded, totaling 7 participants (2 due to keyboard malfunctions during the experiment: 3 from the high-identity group and 4 from the low-identity group). Valid data from 65 participants were finally retained.

SPSS 22.0 was used for statistical analysis. The means and standard deviations of reaction times for the two groups in response to socially unfair words and neutral words are shown in Table 1.

Table 1. Means and Standard Deviations of Identity Group Reaction Times to Social Injustice and Neutral Words (ms) *M*(*SD*)

Group	Social Injustice Words	Neutral Words
High Identification（n=39）	680.32（22.25）	678.09（21.81）
Low Identification（n=26）	750.55（27.25）	746.20（26.72）

A two-way mixed analysis of variance (ANOVA) was conducted with group and word type as independent variables and reaction time as the dependent variable. The results showed that the main effect of word type was not significant, $F(1,63)=0.21$, $p=0.65$, partial $\eta^2=0.003$; the main effect of group was significant, $F(1,63)=4.12$, $p=0.05$, partial $\eta^2=0.06$; the interaction effect between social equality identity group and word type was not significant, $F(1,63)=0.02$, $p=0.88$, partial $\eta^2<0.001$.

The results in Table 1 indicate that sixth-grade students in the high social equality identity group had significantly shorter reaction times to both socially unfair words and neutral words than those in the low-identity group. However, there was no difference in reaction times between socially unfair words and neutral words within either group. This suggests that there was no significant difference in attentional bias toward socially unfair words between the high- and low-identity groups. The possible reason is that although early adolescents have initially formed a social equality value structure, they have not yet developed a mature cognitive processing schema, making it difficult to establish a strong connection between value identity and the cognitive processing of social phenomena and experiences. When faced with informational stimuli, they cannot quickly process information related to value identity.

To explore whether this effect changes with age, Experiment 2 used tenth-grade students as participants to examine the relationship between social equality values and attentional bias in this age group. Since the experiment involved socially unfair words, participants with high social equality identity may experience psychological conflict when exposed to such stimuli, leading to avoidance tendencies. Therefore, Experiment 2 adopted the dot-probe task, which can not only examine participants' attentional bias toward socially unfair words but also identify attentional avoidance of specific words.

Experiment 2

Participants

Participants in Experiment 2 were senior high school students (10th grade) in one school of Shanghai in China, 298 in total, 126 male, mean age = 15.33, *SD* = 0.65. The participants first completed the Chinese Youth Values Questionnaire, as used in Experiment 1, after which they were divided into high and low identification groups according to their scores on the social equality dimension of the questionnaire, which were 27% higher and 27% lower. In total, there were 72 participants, 30 male and 42 female, with 46 students (18 male, 28 female) in the high identity group and 26 in the low identity group. There was a significant difference in the social equality scores between the two groups, with the high identification group scoring significantly higher ($M = 4.95$, $SD = 0.05$) than the low identification group ($M = 2.59$, $SD = 0.06$); $t(46) = 23.08$, Cohen's $d = 42.73$. All participants had normal visual acuity, with no reported color blindness or color weakness.

Materials

Experiment materials were the same as those used in Experiment 1.

Design

A 2 (group: high social equality identity vs. low identity) × 3 (cue condition: inconsistent vs. consistent vs. neutral) × 2 (presentation time: 500 ms vs. 1500 ms) mixed experimental design was adopted, with cue condition and presentation time as within-subjects variables, group as a between-subjects variable, and reaction time for judging the position of the probe point as the dependent variable. The cue conditions were defined as follows: “inconsistent” refers to the presentation of a socially unfair word or neutral word first, followed by the probe point appearing on the side of the neutral word; “consistent” refers to the probe point appearing on the side of the previously presented socially unfair word; “neutral” refers to the presentation of two neutral words first.

In the dot-probe task, attentional bias was calculated as the reaction time in the cue-consistent condition (probe point appearing on the side of the socially unfair word) minus the reaction time in the cue-inconsistent condition (probe point appearing on the side of the neutral word). A positive value indicates attentional bias toward socially unfair words. Attentional vigilance was calculated as the reaction time in the neutral condition (simultaneous presentation of two neutral words) minus the reaction time in the cue-consistent condition; a positive value indicates attentional vigilance toward socially unfair words. Difficulty in attention disengagement was calculated as the reaction time in the cue-inconsistent condition minus the reaction time in the neutral condition; a positive value indicates difficulty in disengaging attention from socially unfair words. Negative values for all three indicators indicate attentional avoidance (Wang et al., 2017; Cisler & Koster, 2010). For the statistical analysis, all three attentional bias metrics (i.e., attentional bias, attentional alertness, and attentional avoidance) were assessed at the onscreen presentation times of 500 ms and 1,500 ms.

Procedure

The experiment was conducted in the school’s computer lab using E-prime 2.0 software. All stimuli were presented as white Chinese characters on a black background. Before the experiment, participants adjusted their seats, and research assistants explained the purpose of the experiment (a study on attention) and the procedure (including practice and rest sessions), instructing participants to follow the guidance of researchers and assistants.

An adapted dot-probe paradigm was used in the experiment. The flow of a single trial is shown in Figure 2: First, a white “+” fixation point was presented in the center of the black screen for 1200 ms, followed by a 200-ms blank screen. Then, a pair of words was presented on the screen for 500 ms or 1500 ms. After the words disappeared, a probe point “□” was presented on the left or right side of the previous word position. Participants were asked to judge the position of the probe point as quickly and accurately as possible: press “G” for the left and “J” for the right. Both keys are located in the center of the keyboard and can be operated with either hand to avoid the impact of hand preference on reaction time. If no response was made within 3000 ms, the probe point disappeared automatically. After each trial, a 500-ms blank screen was presented before the next trial began.

A practice session was conducted before the formal experiment, and participants started the formal experiment only after correctly completing all practice trials. The formal experiment consisted of three blocks. Each block included 12 pairs of consistent and inconsistent presentations of socially unfair words and neutral words, with each pair randomly presented twice (corresponding to 500-ms and 1500-ms presentation times), totaling 12×2×2=48 socially unfair word-neutral word trials. Additionally, 8 neutral words were randomly selected from Experiment 1 to form 4 neutral-neutral word pairs, with each pair presented twice (corresponding to the two presentation times), totaling 4×2×2=16 neutral-neutral word trials. Each block contained 64 trials, with a 3-minute break between blocks. The total number of trials in the experiment was 192.

Results

Data collected by E-Prime were imported into Excel to calculate the accuracy rate of each participant. Participants with reaction times exceeding three standard deviations or an accuracy rate below 90% were excluded, totaling 1 participant from the low-identity group. Valid data from 71 participants were finally retained.

SPSS 22.0 was used for statistical analysis. The descriptive statistics of reaction times are shown in Table 2. A repeated-measures ANOVA was conducted with group, cue condition, and presentation time as independent variables and reaction time as the dependent variable. The results showed that the main effect of cue condition was not significant, $F(2,414)=0.05$, $p=0.96$; the main effect of presentation time was significant, $F(1,414)=44.35$, $p<0.001$; the main effect of group was significant, $F(1,414)=4.79$, $p=0.03$; all other interaction effects were not significant.

Table 2. Means and Standard Deviations of Response Times of the High and Low Identity Groups at the Different Time Intervals Under the Various Experiment Conditions (ms) *M*(*SD*)

	High Identification			Low Identification		
	Inconsistent	Consistent	Neutral	Inconsistent	Consistent	Neutral
500ms	435.15 (58.83)	431.52 (51.60)	432.09 (56.36)	423.98 (54.93)	416.89 (56.83)	426.47 (60.15)
1500ms	395.50 (50.64)	400.77 (51.16)	397.66 (52.40)	384.93 (50.33)	383.98 (51.73)	384.53 (53.42)

The means and standard deviations of attentional bias, attentional vigilance, and attention disengagement for the high and low social equality identity groups in response to socially unfair words and neutral words under different stimulus presentation times are shown in Table 3. When the presentation time was 500 ms, one-sample t-tests (compared with 0) were conducted on the three indicators of the two groups. The results showed that the attentional bias and vigilance scores of the low-identity group were significantly greater than 0, $t(24)=2.59$, $p=0.02$; $t(24)=2.99$, $p=0.01$.

The results of attentional bias indicate that participants in the low-identity group had slower reaction times when the probe point was consistent with the position of the socially unfair word—this is because attention

resources were preferentially allocated to the socially unfair word, requiring more time to shift from the word to the probe point, reflecting active attention to socially unfair words, i.e., attentional bias. The results of attentional vigilance show that the reaction time in the neutral condition was longer than that in the cue-consistent condition, because socially unfair words, as potentially threatening stimuli, quickly attracted attention at the initial presentation, enabling participants to locate the probe point faster, reflecting attentional vigilance.

When the presentation time was 1500 ms, one-sample t-tests showed that the attentional bias score of the high-identity group was significantly less than 0, $t(45)=-2.65$, $p=0.01$. This indicates that participants in the high-identity group had faster reaction times when the probe point was inconsistent with the position of the socially unfair word, meaning that attention actively avoided the socially unfair word and focused on the neutral word instead, which is consistent with the characteristics of attentional avoidance.

Table 3. Means and Standard Deviations of Attentional Bias, Attentional Alertness, and Attentional Avoidance

	Attention bias		Attention alertness		Attention avoidance	
	High Identification	Low Identification	High Identification	Low Identification	High Identification	Low Identification
500ms	3.63□22.11□	7.09** □13.68□	.56 □17.02□	9.59*□16.06□	3.07□20.39□	-2.49□12.64□
1500ms	-5.28** □13.49□	.96 □10.76□	-3.11□15.69□	.56 □13.75□	-2.16□18.11□	.40 □9.98□

Note * = $P < 0.05$ ** = $P < 0.05$

Discussion

The Effect of Social Equality Value Identity on Attentional Bias in Sixth-Grade Students

The results of Experiment 1 showed no significant difference in reaction times to socially unfair words and neutral words between sixth-grade adolescents with high and low social equality value identities. Although previous studies have shown that adolescents have roughly the same value structure as adults (Daniel et al., 2020; Daniel & Benish-Weisman, 2018), this does not mean that their value-driven cognitive, attitudinal, and behavioral patterns are consistent with those of adults. Compared with adults, the cognitive processing mechanisms between values and behavioral choices in adolescents are not yet mature. When faced with stimuli, their cognitive processing is easily disturbed by internal and external factors, leading to instability.

Previous studies on the relationship between values and behavior have shown that values are basic human needs (Daniel et al., 2020), and these needs drive behavior (Bardi & Schwartz, 2003). However, these needs are only internal motivations for behavior, and individuals' actual behaviors may also be influenced by external factors. Since behavior is often the result of the interaction between internal and external factors, there may be inconsistencies between values (as internal factors) and actual behaviors.

The perspective of social cognitive dual-system integration helps explain the inconsistencies between adolescents' values and behaviors. In the dual-system model, behavioral responses belong to System 1, which requires fast and unconscious responses. System 1 is gradually "socialized" through cultural learning (Happé et al., 2017)—for example, cultural activities such as reading novels and watching movies can strengthen automatic empathy and rapid psychological attribution (Bormann & Greitemeyer, 2015). Through repeated exposure to specific social inputs, System 1 specializes general mechanisms for social cognitive purposes (Karmiloff-Smith, 1994). For example, infants learn to recognize emotions by observing others' facial expressions, gradually transforming these recognition cues into a rapid emotion recognition system (i.e., System 1). Researchers hypothesize that the neural basis of System 1 is not inherently designed for social cognition but is gradually "recruited" for social cognitive functions through experience-dependent plasticity (Heyes, 2012).

For adolescents, a mature cognitive processing structure helps them process complex social information before and after behavior occurs. Maio et al. (2001) found that the lack of support from stable cognitive factors makes the importance of values vulnerable to external persuasion and social comparison, thereby changing the consistency between values and behaviors. These factors that affect adolescents' values can be referred to as the experiential environment. The consistency between adolescents' values and the cognition, attitudes, and behaviors they drive is influenced by the abstract processing of experiences: values closer to adolescents' real-life experiences (such as family, peer, and group-related values) may have higher consistency with their attitudes and behaviors; in contrast, values distant from their experiences (such as social equality values in this study) have lower consistency.

According to construal level theory, values are high-level abstract constructs, and acting based on personal values is an advanced human response (Eyal et al., 2009). Due to the abstract nature of values, they tend to influence long-term behavioral intentions (Eyal et al., 2009). Therefore, for adolescents to translate values into actions, they must have the ability to connect abstract values with relevant life experiences—i.e., to reduce the abstractness of values to a certain extent, establish connections with life experiences composed of behavioral elements, and then select one or more behavioral combinations. When individuals have not yet developed or cannot automate this "abstract-concrete" value-action cognitive processing chain, they are less sensitive to relevant information and cannot prioritize its processing.

The Effect of Social Equality Value Identity on Attentional Bias in Tenth-Grade Students

As adolescents mature, their construal level continues to improve, enabling them to use the "abstract-concrete" cognitive processing chain more flexibly and effectively balance and integrate relevant information in specific experiences. The results of Experiment 2 showed that there were differences in the cognitive processing of socially unfair words between tenth-grade adolescents with different value identities: the low social equality identity group showed a tendency to prioritize the processing of socially unfair words under the short presentation time condition, while the high social equality identity group showed a tendency to avoid socially unfair words under the long presentation time condition.

The priority processing of socially unfair words by individuals with low social equality identity may be related to their own experiences of social injustice. Individuals' attention always tends to focus on information deemed more valuable, and processing such information is more likely to bring benefits or avoid harm. In this study, the

presentation of experimental materials (socially unfair words or neutral words) did not require participants to process the meaning of the words but to quickly judge their positional information. However, this process still reflects individuals' priority processing of stimuli to obtain timely benefits or avoid dangers.

There may be two reasons why adolescents with low social equality identity prioritize the processing of socially unfair words: first, they or their important others benefited from injustice in their growth environment; second, they directly or indirectly experienced unfair treatment during their growth, making them more sensitive to injustice-related words. This study favors the second explanation because the first explanation requires adolescents to have sufficient experience of benefiting from injustice, which is less likely for adolescents. On the contrary, adolescents may have experienced unfair treatment from parents or teachers in their lives (direct experience) or felt hurt by observing others being treated unfairly through news, online media, etc. (indirect experience). Therefore, the priority processing of socially unfair words by adolescents with low social equality identity may be because they perceive greater harm or threat from social injustice, leading to increased sensitivity to such words.

The avoidance of socially unfair words by individuals with high social equality identity may reflect the psychological conflict they experience when facing such stimuli. Since the personal values of high-identity participants conflict with negative stimuli, self-defense mechanisms are triggered to protect their own values from negative impacts, resulting in avoidance responses. This avoidance only occurred under the long presentation time condition in Experiment 2, possibly because the conflict triggered by the short presentation time did not reach the threshold required to activate the defense response. Existing studies have shown that stimulus avoidance has adaptive significance (Yang et al., 2025), but most existing research focuses on emotion-related fields such as anxiety and depression. The results of this study indicate that stimulus avoidance also applies to belief systems including values.

The results of the two experiments show that although younger adolescents (under 12 years old) have initially formed a stable value structure—the structure for in-depth cognitive processing (System 2)—the integration between values and the response system (System 1) is not yet complete. The in-depth cognitive processing structure may not yet be able to maturely drive or dominate their attitudes and behavioral responses to specific stimuli. At this stage, adolescents are still in a state of "separation of knowledge and action." However, the coordinated integration of System 2 and System 1 is constantly developing. This study speculates that the critical period for this integration may be around 15 years old, and it continues to improve with age. This process is accompanied by the improvement of adolescents' abstract thinking abilities, enabling the value-behavior relationship to develop through continuous revision and improvement based on experience. That is, the in-depth cognitive processing structure establishes stable connections with attitudes and behavioral responses to specific stimuli, making "unity of knowledge and action" possible. This is a process in which abstract thinking and experience are indispensable for the formation and development of this relationship, and they will continue to influence its changes and development throughout an individual's life.

The results of this study have important implications for adolescents' value education. For example, based on the research findings, future studies should focus on strengthening social equality education for adolescents, especially those with low social equality identity, and explore whether value education can change adolescents' evaluations of social injustice and related behaviors. For adolescents with high social equality identity, future research can examine the threshold of the impact of "stimuli" such as social injustice on their

value structure (i.e., whether there is a critical point beyond which adolescents' identification with their original values changes significantly) and explore other ways for adolescents to cope with similar unfair situations, such as problem-solving, positive coping skills, or behavioral adjustments.

Declarations

AI Disclosure Statement

The authors declare that no generative AI or AI-assisted tools were used in the preparation or writing of this manuscript. All work is original and completed by the authors.

Authors'contribution

LL made substantial contribution to the analysis and interpretation of the data, drafted the manuscript, provided the final approval for the manuscript, and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. XW made substantial contributions to the conception and the design of the study, drafted the manuscript, provided final approval for the manuscript, and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Ethics Statement

This study was reviewed and approved by the Ethics Committee of Shanghai University of Political Science and Law, China. The study was conducted in accordance with the Declaration of Helsinki. All participants provided informed consent prior to participation.

Availability of Data and Materials

The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request.

Informed Consent Statement

Informed consent was obtained from all individual participants included in this study. All participants were informed about the purpose of the study, the voluntary nature of participation, and their right to withdraw at any time. Written informed consent was obtained prior to data collection. For participants under the age of 16, written informed consent was additionally obtained from their parents or legal guardians.

Conflict of interest The authors declare that they have no conflict of interest.

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Figures

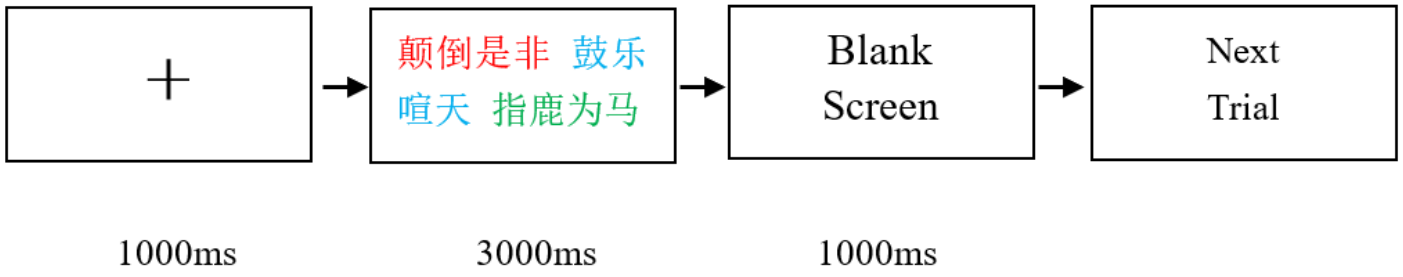


Figure 1

Experimental flow chart

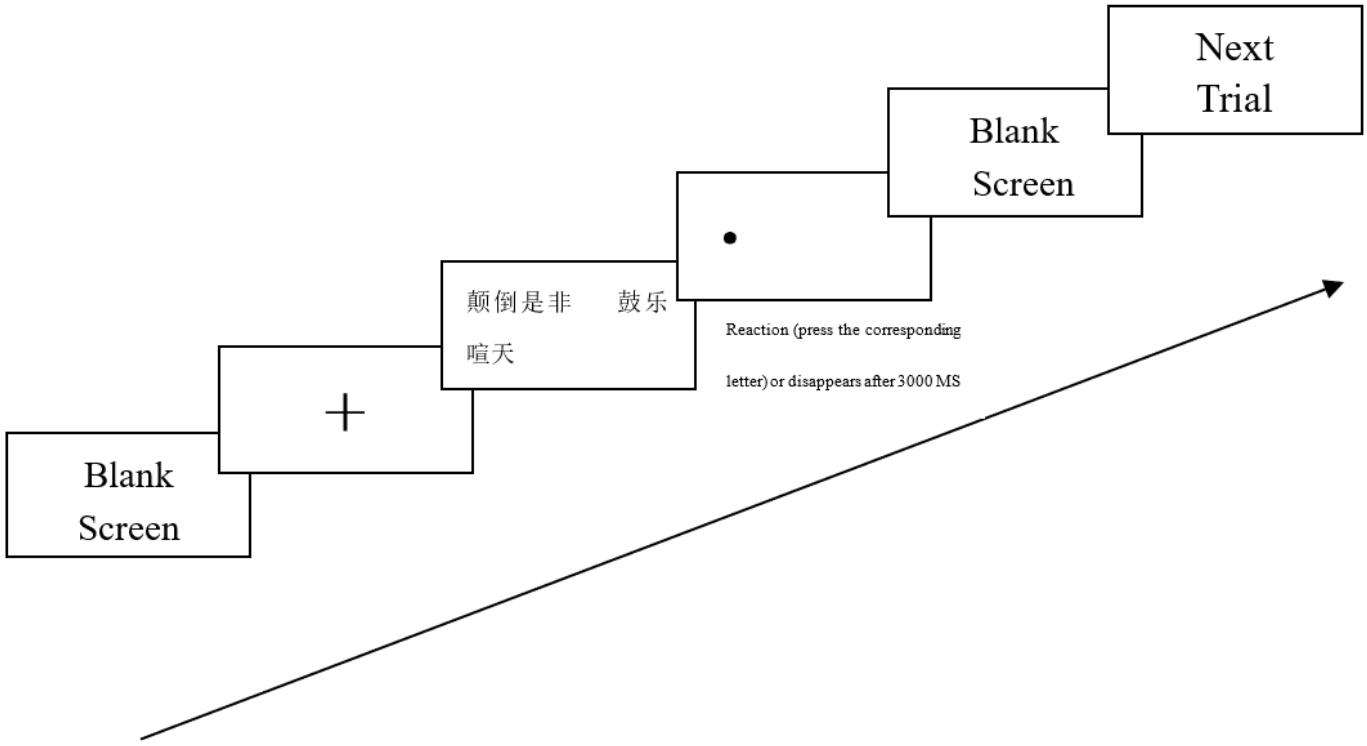


Figure 2

Experiment 2 Flow Chart