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THE RELATIONSHIP BETWEEN SPONTANEOUS TRAIT INFERENCES AND SPONTANEOUS SITUATIONAL INFERENCES: A DEVELOPMENTAL APPROACH

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Using a recognition probe paradigm, we examined the relationship between the strength of tendency to make spontaneous trait inferences (STIs) and the strength of tendency to make spontaneous situational inferences (SSIs) among 3 groups of Chinese children and adolescents (N = 144) aged 8, 11, and 14 years, respectively. The results showed that the children could make both STIs and SSIs simultaneously from the age of 8 years. Both 8- and 11-year-olds were more likely to make SSIs than STIs, but for the 11-year-olds there was no difference between the strength of tendency to make STIs and the strength of tendency to make SSIs. These results are discussed in the light of social judgment processes, and of cultural differences in spontaneous impression formation.

Keywords: spontaneous trait inferences, spontaneous situational inferences, human development, cultural difference.

Findings in a long history of social perception research have revealed that, when observing others' actions, people who are perceivers often make inferences spontaneously (unintentionally and unconsciously). For instance, there is a

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large body of research in which the results have shown that people who are observers often form *spontaneous trait inferences* (STIs) from brief observations of trait-implying behaviors (Carlston, 2014; Schneid, Carlston, & Skowronski, 2015; Wang, Xia, & Yang, 2015; Yan, Wang, & Zhang, 2012). In addition, findings reported in studies have shown that perceivers readily extract situational information from behaviors, a process called *spontaneous situational inferences* (SSIs; see e.g., Ham & Vonk, 2003). More importantly, in recent studies it has been shown that STIs and SSIs can co-occur for the same behavior, implying both trait and situational properties (Kestemont, Vandekerckhove, Ma, Van Hoeck, & Van Overwalle, 2013; Ramos, Garcia-Marques, Hamilton, Ferreira, & Van Acker, 2012; Uleman, Rim, Saribay, & Kressel, 2012). Thus, when reading that X got full marks in the test, people activate both "smart" and "easy" spontaneously.

However, studies on the co-occurrence of STIs and SSIs have been performed only with adults, and little attention has been given to why and how spontaneous inferences develop. Some researchers (Shimizu, 2012; Uleman, Newman, & Moskowitz, 1996) have argued that long-term practice with specific social judgments leads to their automatization and proceduralization. Consistent with this claim, it is certainly possible that social inferences become progressively more automatic through practice (Pomerantz & Newman, 2000). In other words, scholars consider that the development of STIs and SSIs is contingent on the experience of the individual in using traits and situations to interpret behaviors.

The findings in studies generally have indicated that, for young children (that is, before the age of 7 or 8 years; see Gonzalez, Zosuls, & Ruble, 2010), traits play a less significant role in person perception than when the child is older. Instead, young children are sensitive to situational determinants of behavior (Gonzalez et al., 2010). Starting around the age of 7 or 8 years, children begin to understand traits in relation to mental entities (Yuill & Pearson, 1998). Zhang and Wang (2013) demonstrated that Chinese children could make STIs from the age of 8 years. From these findings, together with the co-occurrence of STIs and SSIs, we reasoned that it could be proposed that SSIs develop by the age of 8 at the latest. By 10 or 11 years, children are particularly rigid trait theorists (Shantz, 1983). Children at this age have a strong tendency to engage in trait inferences from behaviors and are more prone to neglecting situational constraints in their inferences compared to earlier or later in their lives (Pomerantz & Newman, 2000). But after middle childhood (10–11 years), adolescents do not perceive unreasonable high correlations between behavior and traits and they make attributions incorporating information about both dispositional and situational factors (see Newman, 1991). It is possible that adolescents make attributions using information about both trait and situational factors. Given age differences observed in how a person behaves, we reasoned that, unlike adolescents, children aged 10 or 11 years may be more likely to make STIs than they would be to make SSIs.

Expanding on the previous research, we examined the relationship between the strength of tendency to make STIs and the strength of tendency to make SSIs among three groups of Chinese children and adolescents aged 8, 11, and 14 years, respectively. Our aim was to establish at what age children start to spontaneously infer situations from behavior. We expected that the 8-year-olds would make both STIs and SSIs; that the children aged 11 years would be more likely to make STIs than SSIs; and that the differences between the tendency to make STIs and SSIs might disappear or be reversed among the 14-year-old adolescent group. In light of the literature, we predicted that age would moderate the relationship between the strength of tendency to make STIs and SSIs.

Method

Participants

The participants were 47 children aged 8 years (24 boys, 23 girls; M_{age} = 8.5 years, SD = 0.28); 47 children aged 11 years (24 boys, 23 girls, M_{age} = 11.5 years, SD = 0.32); and 50 adolescents aged 14 years (27 boys, 23 girls, M_{age} = 14.5 years, SD = 0.28). The sample (N = 144) was recruited from a primary school and a middle school located in Shandong Province, China. We contacted one teacher in each school to obtain permission to conduct the study with the students. The teachers randomly selected two classes at the schools in each age group. In addition, all parents gave permission for their children to participate in the study.

Stimuli

We selected 10 experimental behavior sentences from a range used by Ham and Vonk (2003) and Yan and Wang (2011). In these experimental sentences both trait and situational properties are implied. In the present study, the Cronbach alpha coefficients were .78 for the trait trials and .67 for the situational trials. Additionally, we created a control version of each of the experimental sentences, in which most of the same words were used as had been used in the experimental sentences, but in which the same trait and situational properties were not implied.

Each of the behavior sentences was followed by two probe words. For the experimental sentences, the probe words were those implied by the behavior (e.g., ''X gets full marks in the test'' was succeeded by ''smart'' and "easy"). However, the probes that followed the control sentences were the same trait and situational words that were used for the experimental sentences. Thus, the control sentence "X supervises the test" was also succeeded by the words "smart'' and "easy".

In a pilot study, 75 participants, consisting of 32 children aged 8 years (M_{age} = 8.8 years, SD = 0.4), 21 children aged 11 years (M_{age} = 11.5 years, SD = 0.36); and 22 adolescents aged 14 years (M_{age} = 14.5 years, SD = 0.26), were asked

to rate on a 5-point scale (1 = *not at all*, 5 = *extremely*) to what extent each of the 10 experimental sentences implied the corresponding trait and situational properties. Results indicated that scores for trait words (M = 4.35 for 8-year-olds, 4.34 for 11-year-olds, and 4.30 for 14-year-olds) and situational words (M = 4.33 for 8-year-olds, 4.29 for 11-year-olds, and 4.31 for 14-year-olds) did not differ according to age (8-year-olds: $t_{31} = 0.38$, $p > .05$; 11-year-olds: $t_{20} = 0.80$, $p > .05$; 14-year-olds: $t_{21} = -0.25$, $p > .05$). In the same pilot study, the 8-year-olds were also asked to indicate on a 5-point scale (1 = *not very easy*, 5 = *very easy*) how easy it was for them to understand each of the 20 behavior sentences. Results indicated that they rated the experimental sentences (M = 4.88, SD = 0.12) similarly to the control sentences (M = 4.89, SD = 0.10), $t_{31} = -0.33$, $p > .05$.

In addition to the 20 experimental trials, we included 30 filler trials developed by Yan and Wang (2011).

Procedure

Participants completed a recognition probe paradigm, modeled closely on one used in previous research (Ham & Vonk, 2003, Experiment 1). They were each seated at a computer and went through the instructions and tasks individually in a laboratory. Following the procedure used by Zhang and Wang in 2013, the paradigm began with a stimulus sentence displayed briefly in the center of the computer screen; for 8-year-olds the stimulus sentence was displayed for 2000ms and for the two other age groups it was displayed for 1500ms. After each sentence the participant was asked to respond to two probe words. For each probe, participants were simply to indicate as quickly and accurately as possible whether or not these words were present in the preceding sentence, using designated keys (F for YES and J for NO). To familiarize participants with the procedure, before the actual experiment each did four practice trials.

Data Analysis

We performed mixed analysis of variance (ANOVA) and t tests with the data, using SPSS version 20.0.

Results

Reaction Time

In our experiment, incorrect answers were infrequent, so responses from all participants were retained for analysis. Incorrect "Yes" responses to experimental trials were removed from the reaction time (RT) analysis. Additionally, within each age group, RTs for an item that biased at a standard deviation of 2.5 were regarded as outliers. In total, the average exclusion rate for all data was 8.67% for 8-year-olds, 5.37% for 11-year-olds, and 6.30% for 14-year-olds.

The RTs were submitted to a 3 (age group: 8-year-olds, 11-year-olds, 14-year-olds) × 2 (sentence type: experiment or control) × 2 (probe type: trait or situational property) mixed ANOVA. This analysis yielded a main effect for sentence type, $F(1,141) = 92.09$, $p < .001$, partial $\eta^2 = 0.40$, further qualified by three-way interaction with probe type and age group, $F(2,140) = 3.36$, $p < .05$, partial $\eta^2 = 0.05$. To explore these interactions and to confirm our hypothesis—that STIs and SSIs would occur in all age groups—we examined the difference between sentence type in each probe type for each age group. The results of follow-up analyses indicated that for all age groups RT for correct responses to trait words was longer than RT for control words, $F(1,46) = 5.88$, $p < .01$ for 8-year-olds, $F(1,46) = 16.76$, $p < .001$ for 11-year-olds, $F(1,49) = 5.06$, $p < .05$ for 14-year-olds, and likewise that, for all age groups, RT for situational words was longer than it was for control words, $F(1,46) = 37.07$, $p < .001$ for 8-year-olds, $F(1,46) = 21.94$, $p < .001$ for 11-year-olds, $F(1,49) = 32.89$, $p < .001$ for 14-year-olds. Overall, results of RT analysis demonstrated that STIs and SSIs occurred in all age groups (see Figure 1).

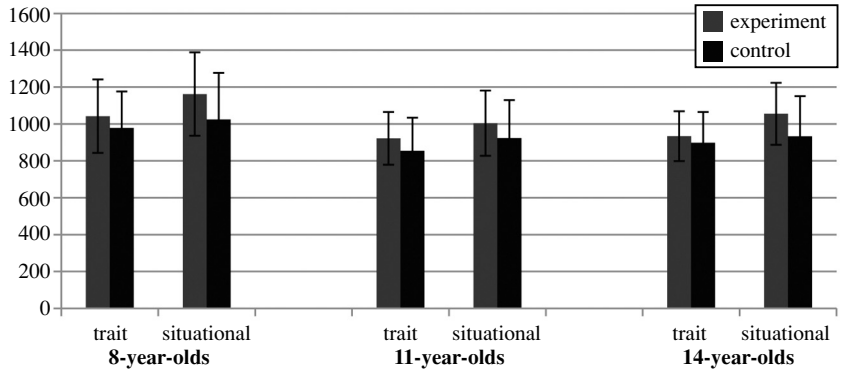

Figure 1. *Mean reaction times in milliseconds to trait and situational probes as a function of sentence type and age.*
Note. Error bars depict standard errors.

In order to compare the strength of the tendency to make STIs and the strength of tendency to make SSIs in each age group, we calculated a strength tendency score for each participant by subtracting the RT for probes following control sentences from the RT for those following experimental sentences (Zhang & Wang, 2013). Then we performed a 3 (age group) × 2 (inference strength: STIs or SSIs) mixed ANOVA on the strength tendency score. This analysis produced a main effect for inference strength tendency, $F(1,141) = 21.55$, $p < .001$, partial

η^2 = .13, and a reliable two-way interaction between age group and inference strength tendency, $F(2,141) = 3.56$, $p < .05$, partial $\eta^2 = .05$. After further analysis we found that the score for SSIs was higher than it was for STIs for 8-year-olds and 14-year-olds (8-year-olds: $t_{46} = 3.68$, $p < .001$; 14-year-olds: $t_{49} = 3.46$, $p < .001$), but not for 11-year-olds ($t_{46} = 0.63$, $p > .05$).

Error Rates

As error rates were highly skewed, a square root transformation was used to reduce skew (Ham & Vonk, 2003). The resulting data were analyzed in a 3 (age group) × 2 (sentence type) × 2 (probe type) mixed ANOVA. As indicated in Figure 2, this analysis yielded a main effect for probe type, $F(1,141) = 16.70$, $p < .001$, partial $\eta^2 = .11$, indicating that error rates for trait probes were higher ($M = 0.11$, $SD = 0.12$) than they were for situational probes ($M = 0.07$, $SD = 0.10$). No other statistically significant effects were found. The results of error rate analysis indicated that participants in all age groups did not make both STIs and SSIs.

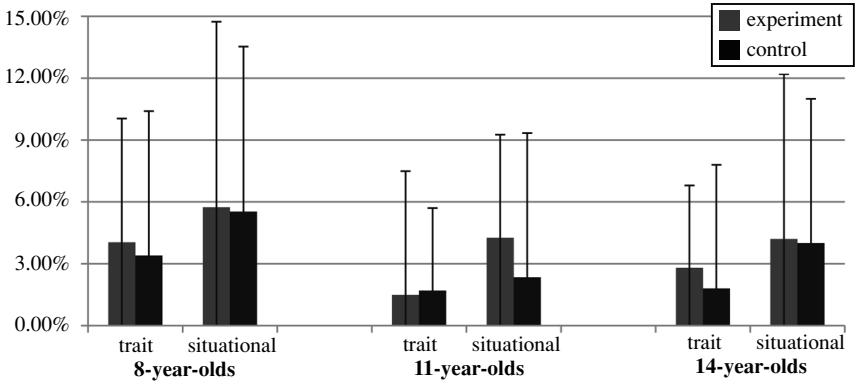

Figure 2. *Mean error rates for trait and situational probes as a function of sentence type and age.*

Note. Error bars depict standard errors.

Although we did not find evidence of spontaneous inferences, as reflected by higher error rates, the results showed significant differences on reaction times, which are considered to be sufficient evidence of spontaneous inferences (Chen, Banerji, Moons, & Sherman, 2014; Todd, Molden, Ham, & Vonk, 2011).

Discussion

Our purpose in this study was to examine the relationship between STIs and SSIs among Chinese children and adolescents. In line with our expectations,

we found that children could make both STIs and SSIs simultaneously from the age of 8 years, as reflected by longer reaction time (relative to controls) when responding to the probes following experimental sentences. Moreover, both 8- and 14-year-olds were more likely to make SSIs than they were to make STIs, whereas, for 11-year-olds, there was no difference between the strength of tendency to make STIs and the strength of tendency to make SSIs.

To our knowledge this is the first study in which an investigation has been conducted into the co-occurring activation of both STIs and SSIs from the age of 8 years among Chinese children. There is a growing body of evidence that even young children (aged between 3 and 5 years) can make some trait-like inferences (see Giles & Heyman, 2005). However, the finding that the children in our study were making both trait and situational spontaneous inferences at the same time extends the understanding of social cognitive development. This finding also dovetails well with the existing knowledge about social judgments. In previous work scholars have proposed that spontaneous inference occurs at the first stage of social judgment, which is generally thought of as a multiple-stage process according to the three-stage model of social inference (see Gilbert & Malone, 1995; Gilbert, Pelham, & Krull, 1988). In this stage, the individual activates multiple possible interpretations of concepts, such as trait and situational properties, which may be unrelated (see Ham & Vonk, 2003). It is, therefore, possible that, from the developmental approach, our findings in the current study reinforce this idea.

We consider that the results of most importance in our study were those that indicated that both 8- and 14-year-olds were more likely to make SSIs than they were to make STIs. In our view, perhaps this difference between STIs and SSIs is not surprising, especially considering that the study was conducted in China, which is a typically collectivistic culture. In a few studies with Western adult samples it was demonstrated that both STIs and SSIs were activated to an equivalent degree (Saribay, Rim, & Uleman, 2012; Todd et al., 2011), and cultural psychological researchers have documented that Asians are more likely to use situations or social contexts in accounting for the person's behavior relative to Europeans and Americans. As such, we think that people in China are more likely to make SSIs than they are to make STIs. As described in the introduction, Uleman et al. (1996) proposed that practice with specific inferences accounted for the spontaneity of these inferences. According to their view, people in the cultural context of China, who are more likely to emphasize situational contexts than they are to emphasize trait contexts as a cause of behavior, should be more prone to making SSIs than STIs. Researchers have shown that Western people tend to emphasize personal aspects, such as traits, as the cause of social behaviors, and that Asian people tend to emphasize situational aspects (Fiske, Kitayama, Markus, & Nisbett, 1998; Kitayama, Duffy, Kawamura, & Larsen,

2003; Na & Kitayama, 2011; Nisbett, Peng, Choi, & Norenzayan, 2001). In addition, we found that there was no difference between the tendency to make STIs or SSIs for 11-year-olds. This may be because children at this age are more likely to make behavior-trait inferences than they are either later or earlier in their lives, which results in their being more likely to make STIs (Zhang & Wang, 2013). Uleman et al. (1996) suggested that STIs seem to develop by intentional, repeated, and consistent inference of traits from behaviors.

A limitation of the present research is that we revealed only part of the course of development of SSIs and STIs in the cultural context of China. Future researchers should attempt to elucidate the relationship between STIs and SSIs more systematically, by including younger participants and cultural variations.

References

Carlston, D. E. (2014). Events, inferences, and impression formation. In R. Hastie, T. M. Ostrom, E. B. Ebbesen, R. S. Wyer, Jr., D. L. Hamilton, & D. E. Carlston (Eds.), *Person memory: The cognitive basis of social perception* (pp. 89–119). New York: Psychology Press.

Chen, J. M., Banerji, I., Moons, W. G., & Sherman, J. W. (2014). Spontaneous social role inferences. *Journal of Experimental Social Psychology*, *55*, 146–153. **http://doi.org/664**

Fiske, A. P., Kitayama, S., Markus, H. R., & Nisbett, R. E. (1998). The cultural matrix of social psychology. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology* (Vols. 1 and 2, pp. 915–981). New York, NY: McGraw-Hill.

Gilbert, D. T., & Malone, P. S. (1995). The correspondence bias. *Psychological Bulletin*, *117*, 21–38. **http://doi.org/c2p476**

Gilbert, D. T., Pelham, B. W., & Krull, D. S. (1988). On cognitive busyness: When person perceivers meet persons perceived. *Journal of Personality and Social Psychology*, *54*, 733–740. **http://doi.org/fkf2s6**

Giles, J. W., & Heyman, G. D. (2005). Young children's beliefs about the relationship between gender and aggressive behavior. *Child Development*, *76*, 107–121. **http://doi.org/dfjbmw**

Gonzalez, C. M., Zosuls, K. M., & Ruble, D. N. (2010). Traits as dimensions or categories? Developmental change in the understanding of trait terms. *Developmental Psychology*, *46*, 1078–1088. **http://doi.org/crh2np**

Ham, J., & Vonk, R. (2003). Smart and easy: Co-occurring activation of spontaneous trait inferences and spontaneous situational inferences. *Journal of Experimental Social Psychology*, *39*, 434–447. **http://doi.org/bdk63n**

Kestemont, J., Vandekerckhove, M., Ma, N., Van Hoeck, N., & Van Overwalle, F. (2013). Situation and person attributions under spontaneous and intentional instructions: An fMRI study. *Social Cognitive and Affective Neuroscience*, *8*, 481–493. **http://doi.org/665**

Kitayama, S., Duffy, S., Kawamura, T., & Larsen, J. T. (2003). Perceiving an object and its context in different cultures: A cultural look at new look. *Psychological Science*, *14*, 201–206. **http://doi.org/djvkd5**

Na, J., & Kitayama, S. (2011). Spontaneous trait inference is culture-specific: Behavioral and neural evidence. *Psychological Science*, *22*, 1025–1032. **http://doi.org/c3wgm5**

Newman, L. S. (1991). Why are traits inferred spontaneously? A developmental approach. *Social Cognition*, *9*, 221–253. **http://doi.org/c35cxr**

Nisbett, R. E., Peng, K., Choi, I., & Norenzayan, A. (2001). Culture and systems of thought: Holistic versus analytic cognition. *Psychological Review*, *108*, 291–310. **http://doi.org/fqdnc6**

Pomerantz, E. M., & Newman, L. S. (2000). Looking in on the children: Using developmental psychology as a tool for hypothesis testing and model building in social psychology. *Personality and Social Psychology Review*, *4*, 300–316. **http://doi.org/cd7mfh**

Ramos, T., Garcia-Marques, L., Hamilton, D. L., Ferreira, M., & Van Acker, K. (2012). What I infer depends on who you are: The influence of stereotypes on trait and situational spontaneous inferences. *Journal of Experimental Social Psychology*, *48*, 1247–1256. **http://doi.org/667**

Saribay, S. A., Rim, S., & Uleman, J. S. (2012). Primed self-construal, culture, and stages of impression formation. *Social Psychology*, *43*, 196–204. **http://doi.org/669**

Schneid, E. D., Carlston, D. E., & Skowronski, J. J. (2015). Spontaneous evaluative inferences and their relationship to spontaneous trait inferences. *Journal of Personality and Social Psychology*, *108*, 681–696. **http://doi.org/67b**

Shantz, C. U. (1983). Social cognition. In P. H. Mussen (Ed.), *Handbook of child psychology* (Vol. 3, pp. 495–555). New York, NY: Wiley.

Shimizu, Y. (2012). Spontaneous trait inferences among Japanese children and adults: A developmental approach. *Asian Journal of Social Psychology*, *15*, 112–121. **http://doi.org/67c**

Todd, A. R., Molden, D. C., Ham, J., & Vonk, R. (2011). The automatic and co-occurring activation of multiple social inferences. *Journal of Experimental Social Psychology*, *47*, 37–49. **http://doi.org/d7wwq8**

Uleman, J. S., Newman, L. S., & Moskowitz, G. B. (1996). People as flexible interpreters: Evidence and issues from spontaneous trait inference. *Advances in Experimental Social Psychology*, *28*, 211–279. **http://doi.org/dwxjm8**

Uleman, J. S., Rim, S., Saribay, S. A., & Kressel, L. M. (2012). Controversies, questions, and prospects for spontaneous social inferences. *Social & Personality Psychology Compass*, *6*, 657–673. **http://doi.org/67d**

Wang, M., Xia, J., & Yang, F. (2015). Flexibility of spontaneous trait inferences: The interactive effects of mood and gender stereotypes. *Social Cognition*, *33*, 1–14. **http://doi.org/67f**

Yan, X. M., & Wang, M. F. (2011). The relationship between conscious attribution and spontaneous trait inferences and spontaneous situational inferences [In Chinese]. *Psychological Science*, *34*, 155–159.

Yan, X., Wang, M., & Zhang, Q. (2012). Effects of gender stereotypes on spontaneous trait inferences and the moderating role of gender schematicity: Evidence from Chinese undergraduates. *Social Cognition*, *30*, 220–231. **http://doi.org/67g**

Yuill, N., & Pearson, A. (1998). The development of bases for trait attribution: Children's understanding of traits as causal mechanisms based on desire. *Developmental Psychology*, *34*, 574–586. **http://doi.org/b9cw6k**

Zhang, Q., & Wang, M. F. (2013). The development of spontaneous trait inferences: Evidence from Chinese children. *Psychological Reports*, *112*, 887–899. **http://doi.org/67t**