The Effects of Need for Cognitive Closure and Advice Quality on Advice Taking: Evidence from Novice Stock Market Investors

Authors: Yang Haibo, Li Yiran, Yang Haibo

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Abstract

Stock purchasing is a complex decision-making context. How are novice investors influenced by experts? The study employed a 2 (need for cognitive closure: high, low) × 2 (advice quality: high, low) × 30 (prediction order) mixed design, using 30 A-share stocks from the Shanghai and Shenzhen stock markets as experimental materials, to investigate the advice-taking characteristics of novice investors. The results revealed that: (1) is a more sensitive indicator. (2) When advice quality was low, individuals with high need for cognitive closure were more likely to accept advice; when advice quality was high, need for cognitive closure did not affect advice adoption. (3) When need for cognitive closure was low, participants under high-quality advice conditions were more likely to accept advice; however, when need for cognitive closure was high, advice quality did not affect advice adoption.

Full Text

Preamble

Influence of Need for Cognitive Closure and Advice Quality on Advice-Taking: A Study Based on Stock Market Novices

YANG Haibo[1,2], LI Yiran[1]
[1]School of Education Science, Minnan Normal University, Zhangzhou, Fujian 363000
[2]Fujian Key Laboratory of Applied Cognition and Personality, Zhangzhou, Fujian 363000

Abstract

Stock trading represents a complex decision-making context. How are stock market novices influenced by experts? This study employed a 2 (Need for Cognitive Closure: high, low) × 2 (Advice Quality: high, low) × 30 (Prediction Sequence) mixed design, using 30 A-shares from the Shanghai and Shenzhen stock markets as experimental materials to investigate advice-taking characteristics among novice investors. Results revealed that: (1) WOAlg is a more sensitive indicator than WOA. (2) When advice quality was low, individuals with high need for cognitive closure were more likely to accept advice; when advice quality was high, need for cognitive closure did not affect advice-taking. (3) Under low need for cognitive closure, participants receiving high-quality advice were more likely to accept it, whereas under high need for cognitive closure, advice quality did not influence advice-taking.

Keywords: advice-taking, need for cognitive closure, advice quality, JAS paradigm, stock market

The volatile stock market allows technical analysts to extract valuable information from colorful candlestick charts, but what about novice investors? The stock market constitutes an ambiguous decision-making environment characterized by considerable uncertainty, causing stock prices to exhibit nonlinear and asymmetric fluctuations (Billio & Caporin, 2005). In such contexts, advice from professionals becomes a crucial factor influencing novices' investment decisions.

This scenario involves the decision-making issues of advice-giving and advice-taking. Advice-taking refers to the process by which decision-makers incorporate others' suggestions into their final decisions (Xu Jingzhe & Xie Xiaofei, 2009). Research in this domain typically adopts the Judge-Advisor System (JAS) paradigm (Sniezek & Buckley, 1995; Sniezek & van Swol, 2001). In the JAS paradigm, a judge first makes an initial decision, subsequently receives advice from an advisor, then integrates environmental information with the advice content to render a final decision. This paradigm examines how individuals are influenced by others' advice during decision-making, how they modify their decisions after receiving advice, and how they ultimately decide (Gino & Schweitzer, 2008). Because this approach closely approximates real-world situations where people solicit advice before making decisions, it has gained considerable traction among researchers (Sniezek & Buckley, 1995; van Swol, 2009; Chacon, Kausel, & Reyes, 2022).

Previous research has identified advisor characteristics, decision-maker characteristics, and advice features as key factors influencing advice-taking. First, regarding advisor characteristics, advice from sources with high cognitive authority—those possessing professional knowledge and experience—is more likely to be favored by decision-makers (Pica, Milyavsky, Pierro, & Kruglanski, 2021). Advice delivered with confidence is also more readily adopted (Benjamin & Budescu, 2015). Individuals with high-level construal who employ abstract communication styles are perceived as more professional, and decision-makers are more willing to follow their advice (Reyt & Trope, 2016). Additionally, factors such as advisor age, experience, and social status variously affect advice-taking (Feng & Macgeorge, 2006). Second, concerning decision-maker characteristics, sense of power (Tost, Gino, & Larrick, 2012) and emotional states (e.g., anxiety, anticipated regret) (Gino, Brooks, & Schweitzer, 2012) influence advice-taking. Third, regarding advice characteristics, the quantity of advice (Yaniv & Milyavsky, 2007), the distance between advice and the decision-maker' s initial judgment (Schultze, Rakotoarisoa, Schulz-Hardt, & Baron, 2015), and task difficulty (Pescetelli, 2021) all impact advice acceptance.

Advice quality represents a subjective perception of advice accuracy that directly influences acceptance (Jungermann, 1999; Bonaccio & Dalal, 2006; Pica, Milyavsky, Pierro, & Kruglanski, 2021). However, when receiving advice, we cannot immediately know an advisor' s accuracy rate; we can only learn about their reliability through repeated decisions and outcome feedback. In fact, evaluating advice quality and adjusting weighting strategies constitutes a dynamic learning process (Yaniv & Kleinberger, 2000). An advisor' s performance in previous decisions influences the weight a decision-maker assigns to their current advice, and this process exhibits "asymmetry" : establishing positive credibility through high-quality advice occurs very slowly, whereas a few instances of low-quality advice can rapidly destroy an advisor' s reputation, causing decision-makers to quickly reduce the weight assigned to their advice. Therefore, how advice quality learned during the decision-making process influences advice-taking represents a key focus of this study.

Need for cognitive closure (NFCC) is defined as a motivation to find a definitive answer to a question and terminate ambiguous and confusing states (Webster & Kruglanski, 1994). When facing ambiguous situations, individuals with high NFCC experience strong motivation to seek certainty and definitive answers, even in the absence of clear evidence, in order to eliminate the pressure and anxiety caused by ambiguity. Conversely, individuals with low NFCC exhibit higher tolerance for ambiguity and less preference for immediately resolving ambiguous and uncertain states, thus demonstrating stronger motivation to gather additional information or conduct deeper analysis of available information (Kashima & Loh, 2006; Liu Xuefeng & Zhang Zhixue, 2007). We therefore hypothesize that in the JAS paradigm, decision-makers with high NFCC will be more likely to accept advice from advisors, while those with low NFCC will tend to maintain their original judgments. Moreover, since evaluating advice quality is a dynamic adjustment process (Yaniv & Kleinberger, 2000), will this cause high-NFCC individuals to rely more heavily on advice information? For instance, even when presented with low-quality advice, high-NFCC individuals may still be more inclined to accept it.

How should advice-taking be measured? Harvey and Fischer (1997) employed formula (1) for measurement, where VoF represents the final decision value, VoI represents the initial decision value, and VoA represents the advice value.

VoF-VoI VoA-VoI ·····················(1)

Subsequently, Yaniv (2004a) proposed a weight-of-advice (WOA) measurement method that adds absolute values to Harvey and Fischer' s formula, representing the weight of others' advice in the decision-maker' s final decision. When the final decision shows no change from the initial decision, WOA equals 0; when the final decision completely matches the advice, WOA equals 1 (Yaniv, 2004b; Gino, 2008).

VoF-VoI VoA-VoI ··················..(2)

We contend that WOA has certain limitations. When a decision-maker' s initial decision value equals the advice value, WOA' s denominator becomes zero, making it impossible to measure advice-taking and requiring data deletion, which results in information loss. Additionally, because WOA has a lower bound but no upper bound, in some cases where decisions "over-adjust" beyond the advice direction into abnormal ranges, WOA values exceeding 1 may occur. Previous literature has employed two approaches for handling WOA > 1 data: either deleting such data or recoding them as 1 (Gino, 2008; Yaniv, 2004a, 2004b). However, simply deleting or recoding WOA > 1 data still results in information loss.

WOA constitutes ratio data. On one hand, the scale intervals between 0 and 1 differ from those between 1 and $+\infty$. On the other hand, although the proportion of WOA > 1 data may not be large, their values can substantially influence WOA means. Referencing logarithmic function properties, we transformed formula (2) via logarithmic conversion as a measure of advice-taking, shown in formula (3).

WOA =lg 1+ ············..(3) VoF-VoI VoA-VoI

Formula (3) holds if and only if VoA$\neq$VoI; otherwise, WOA $= 0$. The addition of lg 1 in formula (3) ensures that when the final decision maintains the initial value, WOA $= 0$. When the final decision "positively and excessively deviates" from the advice value, it indicates the decision-maker remains influenced by the advice. In summary, logarithmic transformation does not alter data properties or relationships but reduces absolute numerical values, making data more stable and effectively compensating for information loss problems in previous methods —this is also a standard approach for handling ratio data that violate normal distribution assumptions. Therefore, in lg WOA, values closer to 0 indicate greater maintenance of the initial decision, while larger values indicate greater reliance on others' advice.

To enhance ecological validity, we selected 80 stocks from the Shanghai and Shenzhen A-share markets based on recent trading volume from high to low, then extracted 15 stocks with rising closing prices and 15 with falling closing prices in week 37 (the prediction week) as formal experimental materials. For NFCC manipulation, we employed time pressure methods (Webster & Kruglanski, 1998; Chiu et al., 2000), determining average decision time based on participants' reading time of experimental materials as the standard for time pressure manipulation.

2. Pilot Study—Determining Average Decision Time

We randomly recruited 13 participants from a university (age: 21–26 years, M = 23.23, SD = 1.31), including 5 males. All participants had no stock trading experience. Informed consent was obtained, and participants received modest compensation upon completion.

The experimental procedure was as follows: (1) The initial decision interface was presented (see left panel of Figure 1). Participants were required to input their predicted price for week 37 based on the stock' s K-line chart by pressing the R key. (2) Participants rated their prediction confidence on a scale from 0 (no confidence) to 10 (very confident). (3) A prompt interface appeared: "Next, the advisor' s suggestion will be presented. Please predict the price again based on the suggested price. Press the spacebar to continue!" (4) The final decision interface was presented, requiring participants to make a final decision based on both the K-line chart and the advisor' s suggestion. (5) Participants rated their prediction confidence again. (6) The feedback interface was presented (see right panel of Figure 1 [Figure 1: see original paper]).

The experiment comprised 30 stock prediction tasks, with 15 stocks rising and 15 falling in week 37. To minimize extraneous variables, stock names and codes were concealed, with uniform labeling as "Stock 01," "Stock 02," etc. Referencing the Shanghai and Shenzhen A-share market fluctuation mechanisms, the prediction accuracy criterion in the experimental program was defined as: when a stock rose/fell, the participant correctly predicted the rise/fall, and the predicted price deviated less than 10% from the actual week 37 price; all other scenarios were considered incorrect predictions. Participants began the formal experiment with 500 points, earning 10 points for each correct prediction and losing 10 points for each incorrect prediction, with total points displayed at the experiment' s conclusion.

The experimental program was developed using E-prime 2.0.

2.3 Determining Average Decision Time

Response times collected from the appearance of the initial decision interface to participants' input of week 37 predictions were 14912.00 $\pm$ 10589.31 ms. We ultimately determined 15 seconds as the time pressure manipulation standard (Webster & Kruglanski, 1998; Chiu et al., 2000).

Note: The left panel shows the initial decision interface without "Advisor' s suggestion: 5.32" ; this content appears in the final decision interface. The right panel shows the feedback interface.

Figure 1. Decision and feedback interfaces in the JAS paradigm

Using F-tests, based on $p^2 = 0.09$ (Pescetelli & Yeung, 2021) and Power = 0.95, we estimated the total sample size for a 2$\times$2 between-subjects design using G*Power 3.1 to be 134 participants. We randomly recruited 145 participants from a university (age: 17-28 years, M = 19.88, SD = 2.019), including 38 males. All participants had no stock trading experience. Informed consent was obtained, and participants received modest compensation upon completion.

3.2 Experimental Design

A 2 (Need for Cognitive Closure: high, low) × 2 (Advice Quality: high, low) × 30 (Prediction Sequence) mixed design was employed, with NFCC and advice quality as between-subjects factors and prediction sequence (the order of 30 stock predictions) as a within-subject factor. Dependent variables included prediction accuracy, total points, advice-taking (WOA and WOAlg), confidence in both decisions, and accuracy ratings for advisors. The high-NFCC condition displayed a 15-second countdown timer in the upper right corner of both initial and final decision interfaces; the low-NFCC condition had no countdown display. Both conditions required participants to input predictions within 15 seconds, after which a blank screen appeared if no input was made. Advice quality manipulation followed Pescetelli and Yeung (2021), defining 80% accuracy as high quality and 60% accuracy as low quality.

Specifically, among the 30 stocks, the high-quality advisor correctly predicted 12 rising and 12 falling stocks, and incorrectly predicted 3 rising and 3 falling stocks; the low-quality advisor correctly predicted 9 rising and 9 falling stocks, and incorrectly predicted 6 rising and 6 falling stocks. The 30 stock predictions appeared in random order.

3.3 Experimental Materials

Identical to the pilot study.

4.1 Sensitivity Comparison of WOA and WOAlg Indicators

Separate 2 (Need for Cognitive Closure: high, low) × 2 (Advice Quality: high, low) ANOVAs were conducted with WOA and WOAlg as dependent variables. When using WOA as the dependent variable, the main effect of NFCC was non-significant, $F(1, 4333) = 0.440$, $p = 0.507$, $p^2 = 0.000$, Power = 0.102; the main effect of advice quality was non-significant, $F(1, 4333) = 0.946$, $p = 0.331$, $p^2 = 0.000$, Power = 0.163; and the NFCC × advice quality interaction was non-significant, $F(1, 4333) = 0.313$, $p = 0.576$, $p^2 = 0.000$, Power = 0.087, as shown in Figure 2 Figure 2: see original paper. When using WOAlg as the dependent variable, the main effect of NFCC was non-significant, $F(1, 4346) = 0.811$, $p = 0.368$, $p^2 = 0.000$, Power = 0.147; the main effect of advice quality was non-significant, $F(1, 4346) = 1.023$, $p = 0.312$, $p^2 = 0.000$, Power = 0.173; and the NFCC × advice quality interaction was significant, $F(1, 4346) = 9.392$, $p = 0.002$, $p^2 = 0.002$, Power = 0.865, as shown in Figure 2(b). These results demonstrate that WOAlg exhibits higher sensitivity than WOA.

4.2 Process Analysis of WOAlg

A 2 (Need for Cognitive Closure: high, low) × 2 (Advice Quality: high, low) × 30 (Prediction Sequence) ANOVA with WOAlg as the dependent variable revealed that the main effects of NFCC, advice quality, and prediction sequence were all non-significant. The NFCC × advice quality interaction was significant, $F(1, 4230) = 9.338$, $p = 0.002$, $p^2 = 0.002$, Power = 0.863. Simple effects tests showed that when advice quality was low, participants with high NFCC demonstrated greater advice-taking than those with low NFCC, $F(1, 4230) = 8.094$, $p = 0.004$, $p^2 = 0.002$, Power = 0.812, as shown in Figure 3 Figure 3: see original paper. When advice quality was high, NFCC did not affect advice-taking, as shown in Figure 3(c). Under low NFCC, participants receiving high-quality advice showed greater advice-taking than those receiving low-quality advice, $F(1, 4230) = 7.768$, $p = 0.005$, $p^2 = 0.002$, Power = 0.796, as shown in Figure 3(a). Under high NFCC, advice quality did not influence advice-taking, as shown in Figure 3(b). All other two-way and three-way interactions were non-significant.

Note: QOAH = high advice quality, QOAL = low advice quality, NFCCL = low need for cognitive closure, NFCCH = high need for cognitive closure, trials = prediction sequence of 30 stocks, dependent variable = WOAlg.

Figure 3. Process of WOAlg changes under the influence of need for cognitive closure and advice quality

4.3 Process Analysis Based on Points and Prediction Accuracy

A 2 (Need for Cognitive Closure: high, low) × 2 (Advice Quality: high, low) × 30 (Prediction Sequence) ANOVA with total points as the dependent variable revealed a significant main effect of advice quality, $F(1, 4230) = 1030.392$, $p < 0.001$, $p^2 = 0.196$, Power = 1.000, with high-quality advice yielding more points (530.32 ± 44.20) than low-quality advice (495.72 ± 30.83). The main effect of NFCC was significant, $F(1, 4230) = 75.528$, $p < 0.001$, $p^2 = 0.018$, Power = 1.000, with low-NFCC participants earning more points (501.78 ± 30.26) than high-NFCC participants (489.67 ± 30.20). The main effect of prediction sequence was significant, $F(1, 4230) = 5.034$, $p < 0.001$, $p^2 = 0.033$, Power = 1.000. The advice quality × NFCC interaction was significant, $F(1, 4230) = 6.265$, $p = 0.012$, $p^2 = 0.001$, Power = 0.706, as shown in Figure 4 [Figure 4: see original paper]. The effect of NFCC on low-quality advice ($F(1, 4230) = 62.273$, $p < 0.001$, $p^2 = 0.015$, Power = 1.000) was greater than its effect on high-quality advice ($F(1, 4230) = 19.260$, $p < 0.001$, $p^2 = 0.005$, Power = 0.992). The effect of advice quality on high-NFCC participants ($F(1, 4230) = 611.158$, $p < 0.001$, $p^2 = 0.126$, Power = 1.000) was greater than its effect on low-NFCC participants ($F(1, 4230) = 429.21$, $p < 0.001$, $p^2 = 0.092$, Power = 1.000). The advice quality × prediction sequence interaction was significant, $F(1, 4230) = 16.665$, $p < 0.001$, $p^2 = 0.103$, Power = 1.000, as shown in Figure 5 [Figure

5: see original paper]. Simple effects tests revealed that high-quality advice began to marginally significantly exceed low-quality advice in points at the 6th ($p = 0.083$) and 7th ($p = 0.098$) trials, after which it consistently remained significantly higher, indicating that participants required at least six learning trials to acquire the difference in advisor quality. Under high-quality advice, points became significantly higher than the first prediction starting from the 8th trial; under low-quality advice, points only became significantly higher than the first prediction after the 21st trial.

Figure 4. Total points under high and low need for cognitive closure and advice quality

Figure 5. Trial-by-trial point comparison under high and low advice quality

A 2 (Need for Cognitive Closure: high, low) × 2 (Advice Quality: high, low) × 30 (Prediction Sequence) ANOVA with prediction accuracy as the dependent variable revealed a significant main effect of advice quality, $F(1, 4230) = 217.180$, $p < 0.001$, $p^2 = 0.049$, Power = 1.000, as shown in Figures 6 Figure 6: see original paper and 6(b). The main effects of NFCC and prediction sequence were non-significant; all two-way and three-way interactions were also non-significant.

Note: QOAH = high advice quality, QOAL = low advice quality, NFCCL = low need for cognitive closure, NFCCH = high need for cognitive closure, trials = prediction sequence of 30 stocks, dependent variable = prediction accuracy.

Figure 6. Process of prediction accuracy changes under the influence of need for cognitive closure and advice quality

4.4 Prediction Confidence Ratings

A 2 (Judgment Sequence: first, second) × 2 (Need for Cognitive Closure: high, low) × 2 (Advice Quality: high, low) × 30 (Prediction Sequence) mixed-design repeated measures ANOVA with prediction confidence as the dependent variable revealed only a significant main effect of judgment sequence, $F(1, 4230) = 182.885$, $p < 0.001$, $p^2 = 0.041$, Power = 1.000, with second predictions ($M = 6.185$, $SD = 2.255$) showing significantly higher confidence than first predictions ($M = 5.889$, $SD = 2.191$). All other main effects and interactions were non-significant.

4.5 Perceived Accuracy Analysis of Advisor Advice

A 2 (Need for Cognitive Closure: high, low) × 2 (Advice Quality: high, low) ANOVA with advisor ratings as the dependent variable revealed a significant main effect of advice quality, with high-quality advice receiving higher ratings ($M = 6.58$, $SD = 1.13$) than low-quality advice ($M = 5.67$, $SD = 1.61$), $F(1, 141) = 15.22$, $p < 0.001$, $p^2 = 0.097$, Power = 0.972. All other main effects and interactions were non-significant.

5. Discussion

Based on previous research paradigms (Webster & Kruglanski, 1998; Chiu et al., 2000), this study employed a pilot experiment to determine decision time and manipulated time pressure to induce NFCC, while directly adopting Pescetelli and Yeung' s (2021) approach to manipulate advice quality. Analysis using the WOAlg indicator revealed a significant NFCC × advice quality interaction, confirming successful manipulation of both key independent variables. Additionally, post-experimental accuracy perception ratings of advisor advice confirmed successful manipulation of advice quality.

WOA represents ratio data and serves as a traditional research indicator for advice-taking (Yaniv, 2004a, 2004b; Gino, 2008; Reyt, Wiesenfeld, & Trope, 2016; Kim, Lee, & Jun, 2020). However, this indicator has two major flaws: (1) WOA employs a non-equal-interval scale, where scale intervals between 0 and 1 differ from those between 1 and $+\infty$. (2) Direct data processing distorts true results. For WOA > 1 data, direct use inflates the mean, artificially "amplifying" the effect of advice-taking, whereas recoding such data as 1 deflates the mean, artificially "diminishing" the effect. Consequently, this study applied logarithmic transformation (WOAlg). The sensitivity comparison between WOAlg and WOA showed that the former was more sensitive to independent variables, yielding a significant NFCC × advice quality interaction, while the latter was insensitive, showing non-significant main effects and interactions, as illustrated in Figure 2. This indicates that WOAlg is a more sensitive measurement indicator (Yang Hexiong & Wang Liangyuan, 1998).

Given the unpredictable nature of stock price fluctuations, this study used real stocks as experimental materials, creating a complex and ambiguous decision-making context that effectively immersed participants in a realistic scenario. Results strongly supported our hypotheses. Under low advice quality, high-NFCC individuals relied more heavily on advice (showed greater advice acceptance), as shown in Figure 3(d). Under high advice quality, no difference in advice reliance emerged between high- and low-NFCC individuals, as shown in Figure 3(c). Low-NFCC individuals facing ambiguous situations do not seek immediate decisions. They believe sufficient time exists to analyze information in the environment (K-line charts) before making their initial judgments. They comprehensively consider the distance between advice and their initial decisions along with the advisor' s historical accuracy to evaluate whether to accept the advice. This is corroborated by Figure 3(d). Previous research has found that regardless of advisor accuracy, decision-makers never fully adopt advisor advice at the expense of their own initial judgments. People exhibit a strong tendency to overestimate their own judgments while underestimating others' opinions, a phenomenon known as advice discounting (Yaniv, 2004a, 2004b; Yaniv & Kleinberger, 2000). Due to advice discounting, even when people know they are receiving high-quality advice, they rarely abandon their own judgments completely. Our study confirms this: overall advice acceptance did not approach 1 (WOAlg = 1 would indicate complete advice acceptance), but rather showed a mean of 0.1429. The highest advice acceptance occurred under high-quality advice and low NFCC (M = 0.1449), while the lowest occurred under low-quality advice and low NFCC (M = 0.1322). Nevertheless, advice discounting also reflects people' s perception of advice accuracy. Research demonstrates that high-quality advice is more readily adopted by judges. Despite the ubiquity of advice discounting, inaccurate advice receives lower weight in final decisions (Gardner & Berry, 1995; Lim & O' Connor, 1995; Yaniv & Kleinberger, 2000). Figure 3(d) reveals that although the main effect of prediction sequence and its interactions with NFCC and advice quality were non-significant, differences in advice reliance between high- and low-NFCC individuals began emerging at the 10th trial. Under high-quality advice, high- and low-NFCC individuals showed no differences throughout the experiment, as shown in Figure 3(c). This finding aligns with Kruglanski and Webster (1996): decision-makers can find information and evidence in the environment supporting their decisions, leading to greater confidence in their initial judgments after careful deliberation and consequently higher advice discounting rates. Advice discounting partly stems from people' s tendency to justify their own judgments as correct while typically lacking justification for others' advice. Additionally, people generally perceive their own judgments as superior to others' (Krueger, 2003). Therefore, even after accepting advice, their judgments merely anchor on their initial decisions while making partial adjustments.

The influence of advice-taking on decision-making ultimately manifested in participants' point totals. Successful post-advice predictions increased points, while failures decreased them. The effect of NFCC on advice-taking under low-quality advice was greater than under high-quality advice, with effect sizes ($p^2 = 0.015$) three times larger than under high-quality advice ($p^2 = 0.005$). In terms of points, NFCC affected outcomes under both high- and low-quality advice conditions. NFCC had a greater impact on low-quality advice than on high-quality advice, while advice quality had a greater impact on high-NFCC participants than on low-NFCC participants. We can infer that during early trials, participants were unaware of advice quality but gradually learned the advisor' s accuracy level through successive feedback. They assigned greater weight to high-accuracy advisors and less weight to low-accuracy advisors. As shown in Figure 6(a), after 5–6 exploratory trials, advice acceptance under high-quality advice began to exceed that under low-quality advice. This aligns with Leong and Zaki (2018), who found that over time and with repeated feedback, decision-makers can learn advice quality and continuously adjust their expectations of advisors, increasingly relying on historically accurate advisors while gradually losing trust in historically inaccurate advisors. We therefore speculate that low-NFCC participants, lacking strong motivation to resolve ambiguity, possess stronger motivation to search for and analyze environmental information than high-NFCC participants, enabling more autonomous learning about advisor quality during the experiment and better discrimination between quality levels to determine whether advice should be adopted. Consequently, low-NFCC participants achieved higher total points than high-NFCC participants regardless of advice quality. Under high NFCC, decision-makers informed that they had less time than average to complete decisions tended to decide immediately, leading to greater reliance on external advice, less independent thinking, and simplified, one-sided information processing that prevented learning about advisor quality. This resulted in no significant difference in advice acceptance between 80% and 60% accurate advisors, preventing learning how to achieve higher point totals.

Results showed that at the 6th and 7th decisions, points under high-quality advice began to marginally significantly exceed those under low-quality advice, indicating that participants had essentially learned advice quality levels through the first six decisions and feedback, and could use this learning to determine whether and how much to trust advice. Under high-quality advice, points became significantly higher than the first prediction starting from the 8th trial; under low-quality advice, points only became significantly higher than the first prediction after the 21st trial. This demonstrates that advice quality significantly impacts decision accuracy.

Furthermore, regardless of NFCC level, decision-makers rated high-accuracy advisors significantly higher than low-accuracy advisors, indicating that decision-makers could perceive advisor accuracy levels through repeated interactions and feedback, continuously adjusting their expectations of advisors and advice acceptance to achieve optimal decision outcomes. This represents a dynamic learning process based on observational feedback (Pescetelli & Yeung, 2020). As shown in Figure 3, under different NFCC levels, prediction accuracy after receiving high-quality advice exceeded that after receiving low-quality advice, with the accuracy gap between high- and low-quality advice conditions gradually widening across trials. Data analysis also revealed that decision-makers' ratings of advisors were lower than advisors' actual accuracy rates, particularly for high-accuracy advisors, likely due to advice discounting. Decision-makers tend to assign greater weight to their own judgments and less weight to others' advice. As Bellucci and Park (2020) found, feedback can facilitate decision-makers' learning of advisor quality and reputation formation. Consistent with the negativity bias in impression formation, bad advice impacts advisor reputation more than good advice, and losing reputation is easier than gaining it. As shown in Figure 3(a), low-NFCC participants better perceived differences in advice quality. Additionally, high-NFCC participants rated both advisors' accuracy higher than low-NFCC participants. This may be because, under time pressure manipulation, high-NFCC participants perceived higher task difficulty than low-NFCC participants. Previous research has demonstrated that decision-makers assign greater weight to advice when facing difficult tasks (Gino & Moore, 2007). From an information processing perspective, decision-makers in difficult tasks struggle to obtain accurate cues and information due to ambiguous decision contexts, leading to less confidence in their own decisions and consequently greater trust in adopted advice and higher advisor ratings. For low-NFCC participants who perceived lower task difficulty, they were more willing to trust their own judgments and more attentive to low-quality advice, resulting in lower advisor ratings.

Regardless of advice quality received, post-advice decision confidence was significantly higher than initial decision confidence. This aligns with Gino and Moore (2007): when decision-makers face ambiguous situations where their existing knowledge cannot support a definitively correct answer, they tend to believe others are more expert than themselves. Therefore, upon receiving advisor advice, decision-makers' confidence increases significantly. According to Pleskac and Busemeyer' s (2010) two-stage dynamic signal detection (2DSD) model of decision confidence, confidence changes dynamically as information accumulates, including evidence accumulated during both the selection phase and post-decision phase. Decision confidence is a function of evidence collected at decision time plus evidence collected after the decision. For decision-makers, advice fills information gaps in the situation, and receiving advice information increases accumulated information, reducing situational ambiguity and thereby increasing decision confidence.

In this study, we treated NFCC as an environmental variable manipulated through time pressure (Webster & Kruglanski, 1997). However, NFCC as a cognitive motive possesses relative stability (Webster & Kruglanski, 1994). We can anticipate that individuals with NFCC traits may exhibit even more pronounced differences in environmental information processing than those observed through our manipulation. Although the three-way interaction among prediction sequence, advice quality, and NFCC was non-significant, trends shown in Figures 3 and 6 nevertheless reveal that advice-taking is a dynamic learning process moderated by NFCC. Future research could increase experimental trials or employ longitudinal designs to better capture learning process characteristics in stock purchasing.

Regarding advice-taking measurement, WOAlg is a more sensitive indicator than WOA. In the simulated Shanghai and Shenzhen A-share market context, advice quality only affected advice acceptance among low-NFCC participants: when advice quality was low, high-NFCC participants were more likely to accept advice; when advice quality was high, NFCC did not affect advice-taking. NFCC had a greater impact on advice-taking and points under low-quality advice than under high-quality advice: under low NFCC, participants receiving high-quality advice were more likely to accept it, whereas under high NFCC, advice quality did not influence advice-taking. Advisor advice indeed improved participants' stock prediction accuracy; however, participants underestimated the accuracy of high-quality advisors.

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