REFERENCE GROUP PERSPECTIVE ON INDIVIDUAL INVESTORS’ HERD BEHAVIOR: THE EFFECTS OF SELF-ESTEEM AND TRAIT ANXIETY

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Although past research suggests that reference groups induce follow-up and imitation behavior, the mechanisms of how and when reference groups become effective drivers of herd behavior remain unclear. Using a sample of individual investors in the Chinese stock market, this study proposes and empirically tests a theoretical framework for understanding the effect of reference group type on herd behavior and the boundary conditions that limit or enhance its effectiveness. The results, based on 306 valid questionnaires, show that herd behavior resulting from peers, friends, and experts exhibits a growth trend. This trend is gradual in individual investors with low self-esteem or high trait anxiety in buying or selling behavior, or when the reference group’s prediction is consistent with the subject’s prediction. Furthermore, trait anxiety acts as a mediator in the multilevel moderating effect of self-esteem on the relationship between reference group type and herd behavior. However, multilevel mediated moderation is not significant when the subject’s prediction is inconsistent with that of the reference group. In addition, the results indicate that evaluations of others reduce or even obscure the respective and joint effects of self-esteem and trait anxiety.

Key words: individual investor, herd behavior, self-esteem, trait anxiety, reference group

INTRODUCTION

Herd behavior, an irrational type of behavior by stock market investors, stems from the interaction of cognitive and emotional systems. On the one hand, because of the limitations of attention, information-acquisition capability, and processing, investors often rely on specific information to make decisions (Kameda & Nakanishi, 2003). On the other hand, to overcome the significant anxiety, fear, and other negative emotions caused by stock market uncertainty, investors usually follow a strategy of making decisions consistent with those of the masses (Burger & Lynn, 2005); thus, herd behavior is common. Song and Wu (2001) showed that there have been different degrees of herd behavior in China’s emerging stock markets, which have a specific investment structure, and that herd behavior occurs significantly more often in China than in the United States and other mature stock markets. Not only is herd behavior closely related to inefficient

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phenomena such as market volatility clustering, bubbles, and crashes, it also results in the lack of a long-term investment philosophy among stock market investors (Bikhchandani & Sharma, 2000). Therefore, studies of the mechanism through which herd behavior is formed and its boundary conditions in Chinese investors have great theoretical and practical significance.

Research on herd behavior at the micro level has primarily analyzed the formation and influence of institutional investors’ herd behavior (e.g., Dougal, Parsons, & Titman, 2015). Nowadays, as the Chinese stock market develops, greater numbers of people are investing in stocks, and individual investors have become an important part of the stock market, constituting a considerable proportion of the investor structure. The psychological and cognitive bias of individual investors is particularly prominent in the market. However, few studies have focused on the internal mechanism of individual investors’ herd behavior, and this research aims to further develop this field of study. Existing studies have shown that reference groups, as external cues for individual decision-making, could induce herd behavior (Hawkins & Mothersbaugh, 2012). Individual heterogeneity (e.g., emotion and personality), as well as the specific decision-making situation, are important factors that affect herd behavior (Lascu & Zinkhan, 1999; Tong, C. R. M. Tan, Latheef, Selamat, & D. K. B. Tan, 2008). Therefore, from the new perspective of reference groups, this study reveals the formation mechanism of individual investors’ herd behavior, and expounds on the respective and joint effects of the external decision-making situation and individual internal heterogeneity on that mechanism.

This study makes the following three major contributions. First, from the perspective of reference groups, this study identifies the mechanism through which herd behavior is formed. Stock price predictions are based on processing relevant information; information sources and the degree to which an individual relies on those sources directly influences the decision-making process of individual investors because of information uncertainty (Jungermann, Pfister, & Fischer, 1996). When making decisions, individuals often follow a reference group that supplies information. An individual investor’s degree of confidence in the reference group has great influence on his/her analyses and judgment, causing cognitive and psychological bias, and resulting in following and imitating behavior (Hawkins & Mothersbaugh, 2012). However, no research has yet studied herd behavior from the perspective undertaken in this study.

Second, this study reveals how others’ evaluations interfere with the multilevel mediated moderation1 of self-esteem and trait anxiety on the relationship between reference group type and herd behavior. Scholars have proposed that individual heterogeneity interferes with investors’ dependence on external cues (J. Y. Zhang & Du, 2009); thus, the relationship between reference groups and individual decision-making varies with individual heterogeneity. Among the factors of individual heterogeneity, trait anxiety is a common and inevitable emotional experience encountered by individual investors in the high-risk securities investment environment, while self-esteem level is a major factor determining whether investors seek external cues. Meanwhile, trait anxiety is greatly influenced by self-esteem (Greenberg et al., 1992). Therefore, we hypothesize

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1 Mediated moderation is present when a moderating effect is explained by a mediating process.
that trait anxiety significantly mediates the multilevel moderation of self-esteem on the formation of herd behavior. In addition, attentional bias and susceptibility to external evaluations differ among individuals with different levels of trait anxiety (Gambetti & Giusberti, 2012). Meanwhile, individuals with lower self-esteem feel a stronger desire to be accepted by others than those with higher self-esteem, and are more likely to be affected by others’ evaluations (Rudich & Vallacher, 1999). Given these considerations, we speculate that others’ evaluations influence the multilevel mediated moderation of self-esteem and trait anxiety. This study conducts a theoretical analysis as well as empirical tests to examine this aspect.

Third, the study addresses whether trait anxiety significantly mediates the multilevel moderating effect of self-esteem on the relationship between reference group type and herd behavior when distinguishing buying behavior and selling behavior, and when distinguishing consistency and inconsistency between the subject’s and reference group’s predictions. In previous studies, researchers have studied individual risky asset transactions from the perspective of aggregate demand. These studies have suggested that individual buying and selling decision-making mechanisms are the same (e.g., Kyle, 1985). However, some scholars have questioned this (e.g., Barber & Odean, 2008), suggesting that individual buying and selling decision-making mechanisms are different. At the same time, in the process of accepting the reference group’s suggestion, whether individual predictions are consistent with the reference group’s prediction affects the interference mechanism of self-esteem and trait anxiety. Thus, the influence of decision-making situations (with or without others’ evaluations, buying or selling behavior, and consistency or inconsistency) and individual heterogeneity (trait anxiety and self-esteem) on multilevel mediated moderation constitutes one of the research priorities of our study.

Fig. 1 graphically depicts our proposed model. The reference group is a new and suitable perspective that helps us obtain a deeper and more thorough understanding of the joint effect of external decision situations and individual heterogeneity on the relationship between reference group type and herd behavior. The results of this research make important contributions to both the development of herd behavior theories and practice guidance for the China Securities Regulation Commission.
THEORY AND HYPOTHESES

Reference Groups and Herd Behavior

Bikhchandani and Sharma (2000) defined herd behavior as the conduct of some members of a group that mimics the behavior of other members of higher status, for which individuals might have an inner preference. Wang (2014) extended the concept of conformity (herd behavior) in stock investments, and considered herd behavior as individual reactions or behavior that is consistent with information content (other peoples’ behavior or attitudes). Based on this idea, the current study defines herd behavior as individual reactions or behaviors that are consistent with prediction information from reference groups. Regardless of whether herd behavior involves changing an individual’s original attitude or behavior to maintain consistency with others or directly make a decision that is consistent with other peoples’ attitudes or behavior, the two types have a common response that is consistent with the information content.

The uncertainty of the security investment environment and the limitations of cognitive capability make it impossible for individual investors to comprehensively and systematically cope with related information; thus, when making decisions, individual investors always need to seek external cues as a heuristic information-processing strategy and to reduce cognitive resource cost. Moreover, the reciprocity between individuals and the group structure enables psychological connections between individuals; a herd behavior strategy satisfies individual psychological needs for acceptance, a sense of belonging, and support. These characteristics are consistent with sociology’s view that individuals consciously or unconsciously accept the influence of reference groups (Lu, 2008). Here, a reference group is defined as actual or imaginary institutions, individuals, or groups perceived to have significant relevance to an individual’s evaluations, aspirations, or behavior (Park & Lessig, 1977). A reference group, which is the object of individual heuristic thinking and establishment of psychological connections, can become a leading guide for individual behavior under certain circumstances. We infer that the inner mechanism of reference groups’ influence on herd behavior lies in individual investors forming in-group favoritism and out-group prejudice through three steps: individual identification; social identification and self-categorization; and psychologization of group preferences. Thus, individual social cognition and behaviors connect with those of groups, forming attitudes and a willingness to follow others’ behavior when making stock investment decisions.

This study considers the impact on herd behavior of decision-making information sources; this frequently and easily used information comes from experts, peers, and friends. Reference groups act as different information sources, and change the mechanism of individual investors’ herd behavior. On the one hand, when individuals take the ideas and behavior of reference groups as potentially useful reference information, the extent of influence depends on the expertise of the reference group and the similarity between the individual and the reference group. Studies show that knowledge, experience, and quality of advice all have an impact on the decision maker, and the information source most readily internalized is the one perceived as credible.
(Park & Lessig, 1977; Sniezek, Schrah, & Dalal, 2004). Therefore, because of its authority, herd behavior as a result of experts’ advice is stronger than that resulting from the advice of peers. At the same time, since group members comprise friends who are more similar to each other than to peers, herd behavior is more often seen in a group of friends.

On the other hand, individuals have a need for a sense of acceptance, value, and belonging in the process of making psychological and behavioral connections with a group (Park & Lessig, 1977; Van Bavel, Swencionis, O’Connor, & Cunningham, 2012). When the expert group is internalized, an individual’s need to make connections that feel similar or homogeneous to experts is satisfied. This process, which stems from experts, results in stronger senses of acceptance, value, and belonging to individuals than that from peers. There is less psychological distance between friends, and herd behavior resulting from friends is stronger than that from peers.

The above analysis shows that experts and friends are more influential than peers are. Furthermore, in decision-making situations particular to the securities market, the information-processing strategy of consensus heuristics and competence heuristics is the main reason for investors’ herd behavior (Quiamzade & L’Huillier, 2009). Consensus heuristics means that when investors are faced with a high degree of consensus, they imitate the decisions of others in a group; competence heuristics refers to accepting experts’ opinions because investors consider experts to be more competent. In this study, in the consideration of herd behavior caused by peers, friends, and expert groups, there is no difference in the degree of consensus among different reference groups. Therefore, the decision situation considered in this study is mainly influenced by competence heuristics: expert groups are more influential than other groups. This is consistent with Yin’s (2014) study on the spread of financial information in China. With the wide use of We media, the vast majority of individual investors tends to believe expert judgments, based on the illusion of expertise. On this basis, the following hypothesis is proposed.

**H1.** Herd behavior resulting from peers, friends, and experts exhibits a growth trend.

**Multilevel Mediated Moderation in Buying and Selling Behavior**

**Decision situations without evaluation effects. Multilevel moderation of self-esteem in buying behavior.** Psychology offers a number of definitions of self-esteem. In general, self-esteem is considered the degree to which a person likes, values, and accepts himself or herself, and reflects an individual’s overall subjective emotional evaluation of his or her own value (Rosenberg, 1965). Scholars have undertaken studies to identify the relationship between self-esteem and herd behavior. Bernardo and Welch (2001) found that overconfidence significantly influences entrepreneurial herd behavior, while Arndt, Schimel, Greenberg, and Pyszczynski (2002) found that low self-esteem leads to compliance with authority and following behavior. Since no research has been undertaken about the interference of self-esteem in the formation mechanism of investors’ herd behavior, this study analyzes how self-esteem affects the trend of individual investors’ herd behavior by type of reference group.

Specifically, after investors have adopted the external cues provided by different
reference group types, self-esteem functions as a boundary condition for the herd behavior mechanism: investors’ confidence in different types of reference groups transforms into their own confidence for choosing and accepting a certain reference group, and the herd behavior formation mechanism changes with different levels of self-esteem. Since high self-esteem investors undoubtedly believe in their internalized ideas and decisions (Gervais & Odean, 2001), the degree of variance in herd behavior is greater than for low self-esteem investors; this suggests that the relative value of herd behavior is greater when the reference group type changes. Meanwhile, according to a study of the relationship between self-esteem and risk preferences, failure caused by risk-taking behavior evokes decision-makers’ self-doubt (Josephs, Larrick, Steele, & Nisbett, 1992). Low self-esteem individuals are more likely than high self-esteem individuals to have negative self-relevant feedback interference; therefore, they choose risk-averse strategies for self-protection. In contrast, high self-esteem individuals adopt a more positive and risk-taking attitude toward buying stocks, which, in turn, leads to high market volume (Gervais & Odean, 2001). Therefore, the growth trend in the herd behavior of high self-esteem individual investors is more significant as the reference group type changes, with the opposite effect for low self-esteem individual investors. Thus, we hypothesize as follows.

**H2a.** In buying behavior without others’ evaluations, the positive relationship between reference group type and herd behavior is stronger among individual investors with higher levels of self-esteem.

*Multilevel moderation of trait anxiety in buying behavior.* According to Spielberger (1983), trait anxiety is defined as an individual’s generalized and enduring predisposition to react to many situations in a consistently anxious manner, while state anxiety is defined as a transitory emotion characterized by physiological arousal and consciously perceived feelings of apprehension, dread, and tension. Burger and Lynn (2005) suggested that individual investors with high levels of trait anxiety are more likely to follow others than are investors with low levels of trait anxiety. Their analysis showed that the level of trait anxiety directly affects individual herd behavior. Furthermore, the intrinsic neural mechanism of decision-making in the process of completing an uncertain task is very different between individuals with high levels of trait anxiety and those with low levels of trait anxiety (Krain et al., 2008), and the two groups of people process information differently when obtaining external cues. Thus, the present study proposes that the level of anxiety not only directly influences individual investors’ herd behavior, but also forms a boundary condition for the herd behavior mechanism.

On the one hand, under different levels of trait anxiety, the difference in cognitive processing modes in information processing leads to a difference in the mechanism of a reference group’s influence on individual investors’ herd behavior. When making decisions in a stock market filled with a myriad of uncertain information, individual investors with high levels of trait anxiety focus on threatening information and tend to follow a strategy of risk aversion to eliminate the influence of subconscious alertness evoked by such information (Gambetti & Giusberti, 2012). The strengthening effect of trait anxiety on risk averse behavior results in investors with high levels of trait anxiety
being more conservative and cautious when buying stocks than those with low levels of trait anxiety. This decision-making attitude makes the individual less susceptible to changes in herd behavior when faced with different external reference groups.

On the other hand, the metacognition\(^2\) of information processing influences the effect of trait anxiety on the changing trend of herd behavior. Individual investors with higher levels of trait anxiety have higher confidence thresholds in their metacognition, so their levels of confidence are lower when making judgments and decisions (Hudlicka, 2006). In the stock market, the process for investors to consider and accept external cues is accompanied by internalizing the reference group. Reference group recommendations on stock investment decisions are internalized as part of an investor’s own decision-making when faced with a choice of different types of reference groups. This means that, after considering reference group’s advice, changing trends of individual investors’ herd behavior depend on how strongly individuals believe they can choose the right reference group. It is clear that individual investors with high levels of trait anxiety have lower degrees of confidence in their own decisions, and the growth trend for their herd behavior on reference group type is slower. Consequently, we hypothesize as follows.

**H2b.** In buying behavior without others’ evaluations, the uptrend of herd behavior of individual investors with high levels of trait anxiety is slower than that of individual investors with low levels of trait anxiety.

*Multilevel mediated moderation in buying behavior.* Research has shown that self-esteem, acting as a buffer between external shocks, threats, and anxiety emotions, can induce an individual’s defense mechanism and ease anxiety and other negative emotional experiences (Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004). This view is in line with studies suggesting that if an individual’s self-esteem were maintained and respected, it would be possible to reduce his or her anxiety experience (e.g., Bennett & Holmes, 1975). Furthermore, research on the relationship between self-esteem and trait anxiety has shown that individuals with low self-esteem have higher trait anxiety (Greenberg et al., 1992).

Owing to the absence of others’ evaluations, self-esteem positively moderates the relationship between reference group type and herd behavior; meanwhile, trait anxiety, which is greatly influenced by self-esteem, negatively moderates the relationship between reference group type and herd behavior. Therefore, this study considers that the multilevel moderating effect of self-esteem on the relationship between reference group type and herd behavior is mediated by trait anxiety. This is consistent with Wray and Stone (2005), who suggested that probability-estimation bias and a risk-aversion tendency in the decision-making of individuals with high levels of trait anxiety are derived from the influencing factor of self-esteem, suggesting that the risk-aversion tendency of individuals with high levels of trait anxiety could be a strategy for protecting these individuals’ self-esteem. In addition, individual investors with higher trait anxiety levels have a higher confidence threshold in their metacognition, and a lower confidence level when making investment decisions (Hudlicka, 2006). Thus, higher trait anxiety

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\(^2\) Metacognition is the cognition of cognition, including metacognitive knowledge, experience, and supervision.
individuals have lower levels of confidence in their choice of reference group type, and the trend of their herd behavior is more gradual. As the level of individual confidence in their own decision-making must be affected by self-esteem, the multilevel moderation of trait anxiety is affected by self-esteem. Thus, this study hypothesizes as follows.

**H2c.** In buying behavior without others’ evaluations, individual investor trait anxiety mediates the multilevel moderating effect of self-esteem on the relationship between reference group type and herd behavior.

*Multilevel mediated moderation in selling behavior.* An issue hotly debated among scholars is whether the same decision-making process is used for buying as for selling risky assets. In past studies, scholars have analyzed individual behavior related to risky assets from the perspective of aggregate demand. These scholars considered the buying and selling decision-making mechanisms of individuals to be the same, differing mainly in the inconsistency of demand direction (e.g., Kyle, 1985). However, some scholars have questioned this assumption (e.g., Barber & Odean, 2008), suggesting that the buying and selling decision-making mechanisms of individuals are different.

The decision-making mechanisms for selling and buying are different because, when selling their own stocks, investors tend to believe that their buying decisions are correct (over-confidence), and that the price of the stock is likely to increase in the future. Therefore, when selling stocks, investors are less affected by reference groups than when buying stocks, and choose to hold their stock. However, in the decision-making situation in this study, individual investors reassess the stock price and the price is expected to fall when the stock is sold. At this point, there is no over-confidence effect and the decision-making mechanisms of buying and selling behavior should be the same. According to the above analysis, the following hypothesis is obtained.

**H2d.** In selling behavior without others’ evaluations, individual investor trait anxiety mediates the multilevel moderating effect of self-esteem on the relationship between reference group type and herd behavior.

*Decision situations with evaluation effect.* People are aware of their own and others’ behavior, and they simultaneously seek feedback or evaluation from others. Cooley (1902) considered that others form certain opinions about an individual’s purpose, behavior, and character; further, the individual forms certain images of these views and their behavior is often influenced by these images. Therefore, in this study, after subjects predicted the stock price, the stock price predictions of the reference groups were provided to them, allowing them to assess those evaluations (e.g., whether the reference groups agreed with and supported the subject’s prediction), potentially influencing their subsequent investment decisions.

*Multilevel moderation of self-esteem in buying behavior.* According to social identification theory, the individual comprises a “person self” and many “group selves,” and he or she tends to identify himself or herself and enjoy positive self-esteem with respect to every aspect of “the self” (Tajfel, 1978). By internalizing the identity of reference groups into part of their self-concept, individuals acquire their own identity and positive experiences. This process of in-group favoritism is influenced by others’ evaluations, because people are not only conscious of their own and others’ behavior, but
also seek feedback evaluations from others. Therefore, self-esteem and others’ evaluations work together to influence the formation mechanism of in-group favoritism.

Inferred from the deduction of the self-esteem hypothesis of social identification theory, individuals’ need for self-esteem results in low self-esteem individuals showing enhanced levels of in-group favoritism; the self-esteem level is increased if the operation of in-group favoritism is successful (Hunter et al., 2005). In this process, low self-esteem individuals, whose degree of social needs satisfaction is lower than that of high self-esteem individuals, are likely to have stronger aspirations to obtain others’ acceptance, and therefore, these low self-esteem individuals are more easily influenced by others’ evaluation information (Rudich & Vallacher, 1999). Thus, in the process of internalizing reference groups and obtaining psychological and behavioral connections, the sense of belonging to an in-group results in more confidence for individuals with low self-esteem. The evaluation effect more markedly strengthens the confidence of low self-esteem individual investors, changing their investment attitude from conservative and pessimistic to positive and optimistic; therefore, others’ evaluations reduce or even blur the differences in final decision-making confidence and investment willingness among individuals with different levels of self-esteem. This study proposes the following hypothesis.

H3a. In buying behavior with others’ evaluations, the multilevel moderating effect of self-esteem on the relationship between reference group type and herd behavior is insignificant.

Multilevel moderation of trait anxiety in buying behavior. In the process of seeking feedback evaluations from others, attentional bias and susceptibility to external evaluation cues are different among individuals with different degrees of trait anxiety (Gambetti & Giusberti, 2012), as are their perceptions of and responses to external evaluations. Specifically, individuals with a high degree of trait anxiety have higher metacognition confidence thresholds than those with a low degree of trait anxiety, so the monitoring and control functions of their metacognitive processes are triggered more frequently to improve the confidence level of the module to reach the threshold (Hudlicka, 2006). This process is accompanied by seeking and adopting external evaluations. Under such circumstances, with the effect of others’ evaluations, individual investors with high levels of trait anxiety have stronger motives for seeking external evaluation information from reference groups than those with low levels. This results from their insufficient confidence level when making decisions, which they improve by making psychological and behavioral connections with reference groups. As their level of confidence is greatly improved relative to individuals with low trait anxiety, the investment attitude of individuals with high trait anxiety are optimistic. This change in attitude is reflected in stock trading as follows: the difference in the degree of change in herd behavior on the reference group type of individuals with different trait anxiety levels decreases or disappears. Consequently, we hypothesize as follows.

H3b. In buying behavior with others’ evaluations, the multilevel moderating effect of trait anxiety on the relationship between reference group type and herd behavior is insignificant.
**Multilevel Mediated moderation in buying behavior.** When others’ evaluations are considered, the theoretical analysis of hypotheses H3a and H3b show that self-esteem and trait anxiety do not affect the random slope of herd behavior. Thus, we propose the following hypothesis.

**H3c.** When others’ evaluations are considered in buying behavior, there is no multilevel mediated moderation of the relationship between reference group type and herd behavior.

**Multilevel Mediated moderation in selling behavior.** In this study, since the decision-making mechanism for buying and selling behavior should be the same, we hypothesize as follows.

**H3d.** When others’ evaluations are considered in selling behavior, there is no multilevel mediated moderation of the relationship between reference group type and herd behavior.

**Multilevel Mediated Moderation in Consistent and Inconsistent Situations**

**Decision situations without evaluation effect.** When subjects receive the reference group’s prediction before forming their own stock price prediction, the reference group’s influence can result in two situations: consistency or inconsistency. “Consistency” is the situation where the subject’s prediction is consistent with the reference group’s prediction; “inconsistency” occurs when the subject’s prediction is inconsistent with that of the reference group.

When consistency occurs, the influencing mechanism of the individual investor’s trait anxiety and self-esteem on the relationship between reference group type and herd behavior is similar to the theoretical analysis of buying behavior. However, unlike consistency, an inconsistent situation is one in which the subject makes a stock price prediction different from that of the reference group after receiving the reference group prediction. This situation indicates that the subject is very confident of his/her own prediction. In other words, when faced with advice from different reference groups, the high confidence of subjects in their own decision leads them to disregard the identity of the advisors, regardless of their self-esteem level. Thus, there is no difference in the trend of variation in herd behavior of individuals with high or low self-esteem and the multilevel mediation model does not hold. Based on this discussion, we propose the following hypotheses.

**H4a.** When the reference group’s prediction and subject’s prediction are consistent and there is no evaluation effect, individual investor trait anxiety mediates the multilevel moderating effect of self-esteem on the relationship between reference group type and herd behavior.

**H4b.** When the reference group’s prediction and subject’s prediction are inconsistent and there is no evaluation effect, there is no multilevel mediated moderation of the relationship between reference group type and herd behavior.

**Decision situations with evaluation effect.** When others’ evaluations exist, “consistency” indicates that subjects first form their own stock price prediction, and then obtain the reference group’s prediction, which is the same as the subject’s prediction. At
this point, the evaluation effect of the reference group is positive. “Inconsistency” indicates that, after the subjects form their own prediction, they find that the reference group’s prediction is in the opposite direction of their own prediction and, thus, the evaluation effect of the reference groups is negative.

Fu and Lv (2013) summarized the literature on how self-esteem level affects an individual’s sensitivity to others’ evaluations and found scholars generally believe that people with low self-esteem are more sensitive to negative evaluative information than those with high self-esteem (e.g., Jussim, Yen, & Aiello, 1995). However, there is some debate on how self-esteem affects the way individuals respond to positive evaluation. Brown and Dutton (1995) showed that self-esteem level had no effect on an individual’s response to positive evaluation. Some researchers, however, have reached the opposite conclusion. They have suggested that a tendency toward individual self-enhancement (which means people try to find a positive evaluation to enhance their self-esteem) may be more than a tendency toward self-verification (seeking feedback consistent with self-evaluation to maintain the original self-concept; Anseel & Lievens, 2006). Furthermore, people with low self-esteem show more positive emotions toward success than people with high self-esteem, which means they need more self-enhancement (Fu & Lv, 2013). Shrauger (1975) found that people with a negative self-concept often tend to obtain a more negative evaluation than people with a positive self-concept. Therefore, in the process of gathering information to compensate for this deficiency, people with a negative self-concept are more likely to be motivated toward self-enhancement and prefer positive evaluation to improve their sense of self-worth.

This study suggests that individual investors with low self-esteem are more sensitive to evaluation information during the process of stock trading than those with high self-esteem, regardless of whether the evaluation is positive or negative. The evaluation effect of others more markedly strengthens the confidence of low self-esteem individual investors when their original attitude or behavior changes in line with the direction suggested by reference groups, changing their investment attitude from conservative and pessimistic to positive and optimistic. Moreover, the difference in the degree of change in the herd behavior of individuals with different self-esteem levels decreases or disappears. In such circumstances, there is no multilevel mediated moderation of the relationship between reference group type and herd behavior, leading to the following hypotheses.

**H5a.** When a positive evaluation effect is present, there is no multilevel mediated moderation of the relationship between reference group type and herd behavior.

**H5b.** When a negative evaluation effect is present, there is no multilevel mediated moderation of the relationship between reference group type and herd behavior.

**Method**

Sample and Procedures

This study primarily considers how individual heterogeneity (trait anxiety and self-esteem) affects the
relationship between reference group type (peers, friends, and experts) and individual investors’ herd behavior in different decision situations. The observations show some internal correlation; therefore, a two-level nested regression model composed of individual levels of analysis and measured levels of analysis was developed using repeated measurements of participants’ stock trading influenced by reference groups. The measured level of analysis describes a situation in which an investor’s herd behavior changes as the reference group changes, and the individual level of analysis measures the multilevel moderation and multilevel mediated moderation of individual heterogeneity on the mechanism of herd behavior.

The study issued and received responses to 337 questionnaires by e-channel (Questionnaire Star) and on-site completion (securities companies and classrooms of working MBA students); 31 invalid questionnaires were removed from the sample. Thus, a feedback ratio of 91% was achieved, comprising 306 valid questionnaires. The participants were from Chengdu, Shenzhen, Changsha, Wuhan, and Hefei, and their average age was 37 years, with male participants accounting for 64% of the valid feedback, and experienced participants accounting for 46%. All participants provided informed consent prior to the study and their participation was voluntary.

Participants completed the Self-Esteem Scale (SES) and Trait-Anxiety Inventory (TAI) in a counterbalanced manner, that is, either before or after completing the investment questionnaire. They were encouraged to answer as honestly as possible, told that there were no right or wrong answers, and assured that their answers would remain confidential. The scenarios were presented randomly to eliminate order effects.

Measures

The SES, compiled by the famous American psychologist Rosenberg in 1965 (Rosenberg, 1965), is broadly used in China and abroad, and has high reliability and validity. The present study adopted the Chinese translated version by Yang and Z. X. Zhang (Robinson, Shaver, & Wrightsman, 1997/1991). The scale includes 10 items, and responses to each of these items were based on a 4-point Likert-type scale, where 1 = strongly disagree and 4 = strongly agree; therefore, a higher score indicates a higher level of self-esteem. An example of the items is: “My ability to do things is as good as that of most other people.”

The TAI is a subscale of the State-Trait Anxiety Inventory (STAI) Form Y; it was revised by Spielberger (1983) based on the first edition of STAI Form X. The TAI is used to assess people’s general feelings, and reflects the level of an individual’s trait anxiety. It is composed of 20 items, and responses are recorded on a four-point Likert-type scale. Scores for each individual were added to obtain an overall TAI score, ranging from a minimum of 20 to a maximum of 80 points. The scale has demonstrated good internal consistency as well as convergent and discriminant validity, and the validity and reliability of the Chinese version were found to be good and applicable in China (W. Li & Qian, 1995). An example of an item is: “I feel uneasy and neurotic.”

The herd behavior questionnaire consisted of two parts—indipendent decision-making and decision-making under the influence of reference groups. This questionnaire used a 7-point scale, in which 1 = strongly disagree and 7 = strongly agree. Higher points infer stronger willingness to buy and sell stocks. The first part described individual investors’ willingness to buy or sell shares independently (the questions are A1: When I think that a stock price is going to go up, I choose to buy it, and A2: When I think that a stock price is going to fall, I choose to sell it). Based on the first part, the second part assessed individual investors’ stock trading under the influence of peers, friends, and expert groups. Herd behavior is the difference between the willingness to buy or sell stocks under the influence of the reference groups and the willingness of the decision made independently. In particular, the measured level of analysis describes the effect of different reference group types on herd behavior. As the purpose of this study is to carry out a trend test to observe whether herd behavior is more obvious as the degree of influence of reference group is greater, peers, friends, and experts were assigned 0, 1, and 2, respectively, according to the reference group’s degree of influence. The influence of reference groups was divided into two situations: with and without others’ evaluations. “With others’ evaluations” is the situation in which the stock price is predicted by reference groups, and feedback is given to an individual investor after the prediction is made by the investor himself or herself. The sample questions are as follows:

B1: After my assessment, if I think a stock price will go up, and I find that experts also predict that the stock price will rise, I choose to buy the stock.

B2: After my assessment, if I think a stock price will go up, and I find that experts predict that the
stock price will fall, I choose to buy the stock.

B3: After my assessment, if I think a stock price will fall, and I find that experts predict that the stock price will fall, I choose to sell the stock.

B4: After my assessment, if I think a stock price will fall, and I find that experts predict that the stock price will go up, I choose to sell the stock.

B1 minus A1 yields buy-herding when the expert’s prediction is consistent with the subject’s prediction, and A1 minus B2 yields buy-herding when the expert’s prediction is inconsistent with the subject’s prediction. Buy-herding under the influence of experts with others’ evaluations is measured as the arithmetic mean. B3 minus A2 yields sell-herding under the influence of experts in a consistent situation; and A2 minus B4 yields sell-herding under the influence of the experts in an inconsistent situation. Sell-herding under the influence of experts with others’ evaluations is measured as the arithmetic mean. Buy-herding and sell-herding under the influence of friends and peers with others’ evaluations are obtained in the same way. In addition, the arithmetic mean of B1 minus A1 and B3 minus A2 yields herd behavior under the influence of experts with a positive evaluation effect. The arithmetic mean of A1 minus B2 and A2 minus B4 yields the measurement of herd behavior under the influence of experts with a negative evaluation effect. The same approach is used to obtain herd behavior under the influence of friends and peers when the evaluation effect is positive and negative. “Without others’ evaluations” indicates the situation where the stock price is predicted by reference groups, and feedback is given to an individual investor before he or she makes a prediction. A sample question is “C: When experts predict that a stock price will fall and, after my assessment, I believe that the stock price will rise, I choose to buy the stock.” Similar to the situation of others’ evaluations, this study obtained herd behavior under the influence of experts, friends, and peers in buying and selling behavior as well as for consistent and inconsistent situations when others’ evaluations do not exist.

With regard to the control variables, existing research shows that such factors as gender (Skitka & Maslach, 1996) and experience (Keswani & Stolin, 2008) influence herd behavior. Thus, this study used these two factors as control variables.

Data Analysis

This study used SPSS 19.0, HLM, Mplus 6.12, and MATLAB for data analysis. First, statistical software SPSS 19.0 was used to analyze the reliability of the TAI and SES. Thereafter, HLM was adopted to perform cross-level analysis, effectively distinguishing within-subject and between-subject differences in the relationships between variables, and examining the multilevel moderating effect of trait anxiety and self-esteem. Following that, Mplus 6.12 was used to verify the multilevel mediated moderating effect by directly (not in a stepwise manner) estimating the relationships between variables. Finally, because the indirect effect estimated by the cross-level analysis method usually does not follow a normal distribution, MATLAB was used to perform parametric bootstrapping and generate confidence intervals for the indirect effect.

Results

Testing for Reliability and Descriptive Statistics

The Cronbach’s alpha coefficients of the SES and TAI were 0.77 and 0.83, respectively (Table 1).

Table 1 provides the means, standard deviations, and correlation coefficients of the variables in this study, from which we can conclude the following. (1) Self-esteem and trait anxiety were significantly negatively correlated ($r = -0.62, p < 0.01$). (2) Without others’ evaluations, reference group type and herd behavior were positively correlated ($r = 0.14, p < 0.01$), while self-esteem and herd behavior were negatively correlated ($r = -0.11, p < 0.01$). The relationship between trait anxiety and herd behavior was not significant ($r = 0.03$, n.s.). (3) With others’ evaluations, reference group type positively
Table 1. Means, Standard Deviations, Scale Reliabilities, and Correlations

| Variables                              | M    | SD  | 1    | 2    | 3    | 4    | 5    | 6    |
|----------------------------------------|------|-----|------|------|------|------|------|------|
| 1 Gender                               | 0.36 | 0.48|      |      |      |      |      |      |
| 2 Experience                           | 1.06 | 1.46| -0.21** |      |      |      |      |      |
| 3 Trait anxiety                        | 43.75| 6.74| -0.02| -0.11** | 0.83 |      |      |      |
| 4 Self-esteem                          | 27.70| 3.67| 0.08* | 0.11** | -0.62** | 0.77 |      |      |
| 5 Reference group type                 | 1.00 | 0.82| 0    | 0    | 0    | 0    | 0    |      |
| 6 Herd behavior without others' evaluations | 0.09 | 0.97| 0.12** | -0.06| 0.03 | -0.11** | 0.14** |      |
| 7 Herd behavior with others' evaluations | 0.23 | 0.77| 0.11** | -0.01| -0.02| 0.01 | 0.11** | 0.30** |

Note. Level-1 n = 918, Level-2 n = 306. M stands for mean. SD stands for standard deviation. Gender: male = 0, female = 1. *p < 0.05, **p < 0.01, ***p < 0.001. Bold numbers on the diagonal indicate the questionnaire’s Cronbach’s alpha coefficients. Data are available upon request.

forecast herd behavior (γ = 0.11, p < 0.01), although the relationship between self-esteem (γ = 0.01, n.s.), trait anxiety (γ = −0.02, n.s.), and herd behavior was not significant. These results are consistent with the research hypotheses, and provide support for hypotheses testing.

Hypotheses Tests

Buying behavior without others’ evaluations. Using HLM, before cross-level analysis, the null model (Table 2, model 0) was constructed to test if there was a difference among individuals. The results show that between-individual variance in herd behavior was significant in buying behavior without others’ evaluations (χ²(305) = 539.92, p < 0.001, ICC (1) = 0.21), accounting for 21% of the total variance. This result reached the empirical standard for cross-level analysis.

HLM was used to analyze the main effect and moderation in a cross-level data model. The results, shown in Table 2, reveal that the reference group type was positively correlated with herd behavior of individual investors (γ = 0.14, p < 0.001) in buying behavior without others’ evaluations and controlling for the factors of gender and experience. Thus, the herd behavior of individual investors shows an increasing trend with change of reference groups, verifying H1 (Table 2, model 2).

When adding the variable reference group type, the variance of the intercept and slope were both significant (Table 2, model 2; τ₀ = 0.34, χ²(303) = 483.78, p < 0.001; τ₁ = 0.05, χ²(305) = 349.99, p < 0.05). This result indicates between-individual variance in herd behavior, and the relationship between group type and herd behavior had significant between-individual variance. This provided a basis for testing the multilevel moderating effect of self-esteem and trait anxiety.

As reported in Table 2, the coefficient γ₁ in model 5 indicates a multilevel moderation effect of self-esteem in buying behavior without others’ evaluation, and self-esteem had a
### Table 2. Hierarchical Linear Modeling Results for Herd Behavior

| Model  | Equation | Parameter estimates | $\gamma_0$ | $\gamma_1$ | $\gamma_2$ | $\gamma_3$ | $\gamma_4$ | $\gamma_5$ | $\delta^2$ | $\tau_0$ | $\tau_1$ | $R^2$ |
|--------|----------|---------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------|---------|-------|
| M0     | $L1: HB = \beta_0 + r$ | $L2: \beta_0 = \gamma_0 + \gamma_1(G) + \gamma_2(E) + \mu_0$ | 0.15***  | 0.76      | 0.20***   | 0.10      | 0.02      | 0.25**    | 0.10      | 0.18***  | 0.10    | 0.10    | 0.10 |
| M1     | $L1: HB = \beta_0 + r$ | $L2: \beta_0 = \gamma_0 + \gamma_1(G) + \gamma_2(E) + \mu_0$ | 0.02     | 0.76      | 0.18***   | 0.10      | 0.02      | 0.25**    | 0.10      | 0.18***  | 0.10    | 0.10    | 0.10 |
| M2     | $L1: HB = \beta_0 + \beta_1(RGT) + r$ | $L2: \beta_0 = \gamma_0 + \gamma_1(G) + \gamma_2(E) + \gamma_3(TA) + \mu_0$ | -0.12    | 0.76      | 0.34***   | 0.10      | 0.02      | 0.24**    | 0.14***   | 0.05*   | 0.12    | 0.12 |
| M3     | $L1: HB = \beta_0 + \beta_1(RGT) + r$ | $L2: \beta_0 = \gamma_0 + \gamma_1(G) + \gamma_2(E) + \gamma_3(TA) + \mu_0$ | -0.13    | 0.76      | 0.34***   | 0.10      | 0.02      | 0.26**    | 0.11 -0.10* 0.14***   | 0.05*   | 0.12    | 0.12 |
| M4     | $L1: HB = \beta_0 + \beta_1(RGT) + r$ | $L2: \beta_0 = \gamma_0 + \gamma_1(G) + \gamma_2(E) + \gamma_3(TA) + \mu_0$ | -0.12    | 0.76      | 0.34***   | 0.10      | 0.02      | 0.24**    | 0.10 0.01 0.14***   | 0.05*   | 0.12    | 0.12 |
| M5     | $L1: HB = \beta_0 + \beta_1(RGT) + r$ | $L2: \beta_0 = \gamma_0 + \gamma_1(G) + \gamma_2(E) + \gamma_3(TA) + \mu_0$ | -0.13    | 0.76      | 0.27***   | 0.10      | 0.02      | 0.26**    | 0.11 -0.26*** 0.14*** 0.16***   | 0.03    | 0.40    | 0.40 |
| M6     | $L1: HB = \beta_0 + \beta_1(RGT) + r$ | $L2: \beta_0 = \gamma_0 + \gamma_1(G) + \gamma_2(E) + \gamma_3(TA) + \mu_0$ | -0.12    | 0.76      | 0.31***   | 0.10      | 0.02      | 0.24**    | 0.10 0.19** 0.14*** -0.16*** 0.69   | 0.03    | 0.40    | 0.40 |

**Note.** *p < 0.05, **p < 0.01, ***p < 0.001. $R^2$ is the proportion of reduction in the error variances of the two levels due to the addition of a new predictive variable. RGT is an abbreviation for reference group type. G is an abbreviation for gender. E is an abbreviation for experience. Se is an abbreviation for self-esteem. TA is an abbreviation for trait anxiety. HB is an abbreviation for herd behavior. $\gamma_0$ represents a mean effect. For $i \in \{1,2,3\}$, $\gamma_i$ represents the main effect of its corresponding variable in the equation. $\gamma_0$ represents the main effect of RGT. $\gamma_1$ represents the multilevel moderating effect of its corresponding variable in the equation. $\delta^2 = Var(r)$ represents the error variance in level-1. $\tau_0 = Var(\mu_0)$ represents the true variance of the intercept in level-2. $\tau_1 = Var(\mu_1)$ represents the true variance of the slope in level-2.
positive effect on the random slope of reference group type and herd behavior ($γ = 0.16$, $p < 0.001$), supporting H2a. The coefficient $γ_{ii}$ in model 6 indicates a multilevel moderation effect of trait anxiety, and trait anxiety had a negative multilevel moderating effect on the relationship between reference group type and herd behavior ($γ = -0.16, p < 0.001$), thereby verifying H2b.

Controlling for gender and experience using HLM, Mplus 6.12, and MATLAB, we tested the multilevel mediated moderating effect. The test results show that self-esteem had a positive multilevel effect on the random slope of reference group type and herd behavior, and trait anxiety negatively moderated the relationship between reference group type and herd behavior. Furthermore, self-esteem was negatively related to trait anxiety. Therefore, we hypothesized that trait anxiety transferred the multilevel moderating effect of self-esteem on the relationship between reference group type and herd behavior. Based on this argument and hypothesis, a model was constructed that describes the process through which trait anxiety mediates the multilevel moderating effect of self-esteem on the relationship between reference group type and herd behavior. This multilevel mediated moderating effect consists of two coefficients, namely, the influence of self-esteem on trait anxiety and the multilevel moderating effect of trait anxiety, which were estimated using Mplus 6.12. As reported in Table 3, the first-half coefficient of the mediation effect was $a$ ($γ = -0.62, p < 0.001$), indicating a significant negative relationship between self-esteem and trait anxiety; the second-half coefficient of the mediation effect, $b$ ($γ = -0.10, p < 0.01$), implied that trait anxiety negatively moderated the relationship between reference group type and herd behavior. The entire multilevel mediated moderating effect is the indirect effect of the two coefficients multiplied by each other. Since the confidence interval of the composite coefficient cannot currently be generated by bootstrapping, the study used MATLAB programming to perform parametric bootstrapping. By influencing trait anxiety, self-esteem moderated the relationship between reference group type and herd behavior. As reported in Table 3, the 95% confidence interval of the total effect was [0.02, 0.11], excluding 0; thus, H2c is supported by the data.

Selling behavior without others’ evaluations. As reported in Table 3, in selling behavior without others’ evaluation, self-esteem had a positive multilevel effect on the random slope of reference group type ($γ = 0.09, p < 0.05$). Trait anxiety negatively moderated the relationship between reference group type and herd behavior ($γ = -0.14, p < 0.001$). The first-half coefficient of the multilevel mediated moderating effect was $a$ ($γ = -0.62, p < 0.001$), while the second-half coefficient was $b$ ($γ = -0.16, p < 0.001$), and the 95% confidence interval of the total effect was [0.04, 0.16], excluding 0. Thus, H2d is supported by the data.

Buying behavior with others’ evaluations. The results in Table 3 show that, in buying behavior, when others’ evaluations were present, self-esteem ($γ = 0.05$, n.s.) had an insignificant effect on the random slope of reference group type and herd behavior, which supports H3a. The effect of trait anxiety ($γ = -0.01$, n.s.) on the random slope of herd behavior was insignificant, supporting H3b. The 95% confidence interval of the multilevel mediated moderation was [−0.04, 0.07], including 0. Therefore, H3c is
verified.

*Selling behavior with others’ evaluations.* As reported in Table 3, in selling behavior with others’ evaluations, self-esteem ($\gamma = 0.01$, n.s.) had an insignificant effect on the random slope of reference group type and herd behavior, and thus, multilevel mediated moderation was insignificant, which supports H3d.

The test results mentioned above indicate that others’ evaluations interfered with the multilevel moderation of self-esteem and trait anxiety. Since this interference mechanism did not differ between buying and selling behavior, this study showed only the interference mechanism of others’ evaluations in buying behavior. Specifically, the results of examining the relationship between reference group type and herd behavior on different levels of self-esteem with and without others’ evaluations are shown in Fig. 2, and the results of examining the relationship between reference group type and herd behavior on different levels of trait anxiety with and without others’ evaluations are
Table 3. Results of the Multilevel Mediated Moderation Model

| Cross-level model                           | Reference group type and herd behavior without others’ evaluations | Reference group type and herd behavior with others’ evaluations |
|--------------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------------------|
|                                            | Buying behavior | Selling behavior | Consistency | Inconsistency | Buying behavior | Selling behavior | Consistency | Inconsistency |
| Multilevel moderation                      |                  |                  |             |              |                  |                  |             |              |
| Self-esteem                               | 0.16***          | 0.09*            | 0.12**      | 0.05         | 0.05            | 0.01            | 0.02        | 0.02         |
| Trait anxiety                             | -0.16***         | -0.14***         | -0.12***    | -0.01        |                  |                  |             |              |
| Multilevel mediated moderation            | Self-esteem→     |                   |             |              |                   |                  |             |              |
|                                            | a                 |                  |             |              |                   |                  |             |              |
|                                            | -0.62***          | -0.62***         | -0.62***    | -0.62***     | -0.62***         |                  |             |              |
|                                            | b                 |                  |             |              |                   |                  |             |              |
|                                            | -0.10**           | -0.16***         | -0.12**     | -0.04        |                   |                  |             |              |
|                                            | a*b               |                  |             |              |                   |                  |             |              |
|                                            | [0.02, 0.11]      | [0.04, 0.16]     | [0.01, 0.14] | [-0.04, 0.07] |                   |                  |             |              |

Note. *p < 0.05, **p < 0.01, ***p < 0.001. The indirect effect a*b corresponds to its 95% confidence interval.
shown in Fig. 3.

Consistency and inconsistency without others’ evaluations. The results in Table 3 reveal that when the subject’s prediction was consistent with the reference group’s prediction and the evaluation effect did not exist, self-esteem positively moderated the relationship between reference group type and herd behavior ($\gamma = 0.12, p < 0.01$), and trait anxiety negatively moderated the relationship between reference group type and herd behavior ($\gamma = -0.12, p < 0.001$). Meanwhile, the 95% confidence interval of the multilevel mediated moderation was [0.01, 0.14], excluding 0. Thus, H4a is supported by the data. When the subject’s prediction and the reference group’s prediction were inconsistent and the evaluation effect did not exist, the multilevel moderation of self-esteem was insignificant (Table 3; $\gamma = 0.05$, n.s.). In such circumstances, there was no multilevel mediated moderation, which supports H4b.

Consistency and inconsistency with others’ evaluations. When the positive evaluation
effect was present, self-esteem (Table 3; $\gamma = 0.02$, n.s.) had an insignificant effect on the random slope of herd behavior. Thus, there was no multilevel mediated moderation of the relationship between reference group type and herd behavior, which supports H5a. When the negative evaluation effect was present, multilevel moderation of self-esteem was insignificant (Table 3; $\gamma = 0.02$, n.s.); in addition, multilevel mediated moderation was insignificant, which supports H5b.

These test results show that the evaluation effect interfered with the multilevel moderation of self-esteem and trait anxiety in the consistency situation. Fig. 4 presents the different trends of herd behavior with different levels of self-esteem in the consistency situation, with and without others’ evaluations. Fig. 5 presents the different trends of herd behavior with different levels of trait anxiety in the consistency situation, with and without others’ evaluations.

DISCUSSION AND CONCLUSION

Although scholars have studied reference groups and herd behavior, they have not addressed how reference group type could affect herd behavior, or the nature of the influence process. Moreover, harm and damage has resulted from herd behavior since the emergence of the Chinese stock market with its specific investment structure in which individual investors are the main participants. Therefore, from the perspective of reference groups, this study investigated the formation mechanism of individual investors’ herd behavior, and expounded the respective and joint effects of individual heterogeneity and decision situations on the formation mechanism.

Buying Behavior and Selling Behavior

As far as individual investors’ behavior is concerned, reference group type predicts herd behavior: herd behavior led by groups of peers, friends, and experts demonstrates a growth trend. In the stock market, following herd behavior based on internalization of the reference group type provides investors with a sense of acceptance, value, and belonging, and also reduces their cognitive costs. Experts have the greatest impact on individual investors, and friends are more influential than peers are.

Individual investor self-esteem has a positive multilevel moderating effect on the relationship between reference group type and herd behavior. According to Gervais and Odean (2001), when transforming their confidence in different types of external reference groups to their confidence in choosing and adopting a reference group type, individual investors with higher levels of self-esteem are more confident in their internalized ideas and strategies, and thus, their investment decisions are more positive and risk-taking. Since H1 posits that reference group type positively predicts herd behavior, the herd behavior of individual investors with higher levels of self-esteem demonstrates a higher growth trend as the reference group type changes.

With regard to trait anxiety, the level of trait anxiety has negative multilevel moderating effects on the relationship between reference group type and herd behavior.
A possible explanation for this result is that when investors’ confidence in reference groups is internalized to confidence in their own ability to make decisions, higher trait anxiety leads to lower inner confidence in making judgments (Hudlicka, 2006). Thus, individual investors follow a conservative and cautious strategy (Gambetti & Giusberti, 2012) because of low confidence in their ability to choose a reference group. According to H1’s test results, we know that the herd behavior growth trend of individuals with higher trait anxiety is slower.

Regarding the joint effect of self-esteem and trait anxiety, individual investor trait anxiety mediates the multilevel moderating effect of self-esteem on the relationship between reference group type and herd behavior. A possible explanation is that the probability estimation bias and risk aversion of individual investors with high levels of trait anxiety arise from the influence of self-esteem (Wray & Stone, 2005), and these investors tend to seek external cues from reference groups to improve their confidence levels (Arndt et al., 2002). Therefore, the difference in decision-making confidence and attitudes of investors with different levels of trait anxiety is influenced by self-esteem.

As far as self-esteem and others’ evaluations are concerned, self-esteem has no effect on the relationship between reference group type and herd behavior. This occurs because individuals with low self-esteem have stronger motivation than those with high self-esteem to seek external evaluation information from reference groups (Rudich & Vallacher, 1999). If the process of making psychological and behavioral connections between individuals and reference groups is improved by others’ evaluations, the stronger motivation of low self-esteem investors strengthens their level of confidence so that their attitude toward investment becomes positive and optimistic.

With regard to trait anxiety and others’ evaluations, the effect of trait anxiety on the random slope of reference group type and herd behavior is not significant. This result is because individuals with high levels of trait anxiety, who have a higher metacognitive threshold, need to start supervising and controlling their metacognition function more frequently, and are more susceptible to external cues (e.g., Hudlicka, 2006). The process of seeking others’ evaluations enables individuals with higher trait anxiety to gain greater confidence, so their investment attitude becomes more positive and optimistic.

As expected, in the situation of others’ evaluations, multilevel mediated moderation is not significant. Because of the above-mentioned process where others’ evaluations disturb the effect of self-esteem and trait anxiety on the mechanism of herd behavior, we know that high trait anxiety individual investors with low self-esteem are more conscious of feedback evaluations from reference groups. In the process of internalizing the identity of social group members into part of the individual’s self-concept to improve decision-making confidence, the investment confidence and positivity of individuals with high trait anxiety and low self-esteem are more obviously increased than that of those with high self-esteem and low trait anxiety are. In such circumstances, there is no significant difference in the growth rate of herd behavior with the change of reference group at different levels of self-esteem and trait anxiety.

These research conclusions elucidate the effects of self-esteem, trait anxiety, and others’ evaluations on the formation of herd behavior in buying. As for selling, when
others’ evaluations do not exist, self-esteem and trait anxiety moderate the relationship between reference group type and herd behavior; moreover, trait anxiety acts as a mediator in the multilevel moderation of self-esteem. When others’ evaluations are present, there is no significant difference in the growth rate of herd behavior with the change of reference group at different levels of self-esteem and trait anxiety, and multilevel mediated moderation is not significant.

It is clear that, whether buying or selling stocks, the effects of self-esteem and trait anxiety on the relationship between reference group type and herd behavior are consistent. These results are consistent with Kyle’s (1985) view that the decision-making mechanism of buying and selling behaviors is the same.

**Consistency and Inconsistency**

When the reference group’s prediction is consistent with the subject’s prediction, and there is no evaluation effect, the multilevel moderation effects of self-esteem and trait anxiety on the relationship between reference group type and herd behavior are significant; moreover, trait anxiety acts as a mediator in the multilevel moderation of self-esteem.

When the reference group’s and subject’s predictions are inconsistent and there is no evaluation effect, the multilevel moderation of self-esteem is insignificant, as is the multilevel mediated moderation. This finding is due to the subjects’ greater confidence in their own prediction when they receive the reference group’s prediction and make a stock price prediction contrary to it. This suggests that given advice from different reference groups, regardless of the subject’s level of self-esteem, their high confidence in their own decision causes them to be less concerned about the identity of the person giving them advice. Therefore, there is no difference between the changing trend of herd behavior of individuals with different self-esteem levels, and multilevel mediated moderation is obviously not significant.

If a positive evaluation effect is present, the multilevel moderating effect of self-esteem on the relationship between reference group type and herd behavior and multilevel mediated moderation are both insignificant. This is because those with lower self-esteem are more affected by positive evaluations and gain higher self-esteem by making behavioral changes consistent with the recommendation of the reference group. This conclusion supports the views of Shrauger (1975) and Anseel and Lievens (2006) that low self-esteem individuals are more responsive to positive evaluations than high self-esteem individuals are.

If a negative evaluation effect is present, self-esteem has no effect on the relationship between reference group type and herd behavior, and there is no multilevel mediated moderation. This is because, when faced with a negative evaluation, individual investors with low self-esteem seek the negative evaluation of reference groups more than those with high self-esteem (e.g., Jussim et al., 1995), and their decision intention and behavior changes are in line with the reference group’s suggested direction to increase their self-esteem.

If individuals view the market from a holistic perspective, blind following of
investment decisions could be reduced or avoided. In other words, because of the complexity of the intrinsic mechanism of herd behavior, investors should comprehensively consider the joint effects of individual investor heterogeneity (self-esteem, trait anxiety) and specific situations (sources of information, others’ evaluations, buying behavior or selling behavior, consistency or inconsistency).

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