

# The “Double-Edged Sword” Effects of LMX Ambivalence——An Integrated Model of Two Approaches Based on Cognitive Flexibility and Job Anxiety

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**Purpose:** Bootleg Innovation helps enterprises create unconventional innovation achievements, and has gradually become an important approach for radical innovation under the background of open innovation. Through the integration of the cognitive-affective processing system and conservation of resources (COR) theory, the present study takes integrative complexity as a moderator, and explores the mechanism of LMX ambivalence on employees' bootleg innovation.

**Participants and Methods:** A total of 387 employees and 110 supervising managers participated in the two-wave dyadic survey. To test our hypotheses, we performed the hierarchical regression and conducted bootstrapping analyses to test our hypotheses.

**Results:** Findings indicated that LMX ambivalence not only improves employees' cognitive flexibility and promotes bootleg innovation, but also aggravates employees' job anxiety and hinders bootleg innovation. In addition, integrative complexity significantly moderates the above two mediating paths. Specifically, when integrative complexity was higher, the negative mediating effect of job anxiety was attenuated, and the positive mediating effect of cognitive flexibility was enhanced.

**Conclusion:** Contrasting with previous research, this research analyzed the triggering mechanism of bootleg innovation combined with the dynamic interaction of environmental stimulus, emotion and cognition. The findings provide novel insight into how to achieve bootleg innovation.

**Keywords:** LMX ambivalence, bootleg innovation, cognitive flexibility, job anxiety, integrative complexity

## Introduction

Employees often encounter the tension that they are expected to be innovative while there are a set of rules to hinder their innovative behaviors in the organization. Constrained by institutional deficiency, rigid hierarchy structure, and limited organizational resources,<sup>1</sup> most of employees' innovative ideas are ignored by the organization. Some employees, however, continue to carry out their innovative ideas secretly even though rejected by the organization because they solidly believe those innovative ideas can be valuable. Those secret innovative behaviors, defined as bootleg innovation, are not uncommon in practice. If successful, it can bring radical innovation outcomes. Evidence has indicated that 10% of individuals have experienced bootleg innovation in R&D teams.<sup>2</sup> The emergence of Sogou browser, 3M packaging tape, and LED technology highlight the significance of bootleg innovation. With the diversity, boundaryless and openness of firm innovation, bootleg innovation will be an important innovative form for firms. Thus, it is of great significance to explore the antecedent of bootleg innovation, and further help firms break through the dilemma of innovation.

Recently, a growing body of studies has examined the antecedents of bootleg innovation from the perspectives of proactive personality,<sup>3</sup> actual-wanted task identity,<sup>4</sup> risk propensity,<sup>5</sup> leaderships,<sup>6</sup> organizational support<sup>7</sup> and

organizational climate.<sup>8</sup> However, these studies neglected employees' situation-awareness before actions and its resultant emotional state and mental activities.<sup>9</sup> Employee innovative behaviors are closely associated with emotions, and therefore we may gain more new insights by studying innovative behaviors from the emotional perspective. Previous research has suggested that LMX was shaped by a set of pleasant or disturbing events in the interactive process between leaders and their subordinates, and the quality of the LMX, to some extent, reflected the opportunities and supports employees acquired from their leaders. Thus, LMX can be considered as an important emotional event in the workforce,<sup>10</sup> and it can elicit emotional responses from subordinates, and thereafter influence their attitudes and behaviors. For example, high-quality LMX enables employees to feel being respected, promotes employee organizational identity, and thus bootleg innovation. Yet, the latest research indicate that relation can be more than just negative or positive, it also may be in between.<sup>11–13</sup> Prior studies viewed LMX as a monomial continuum, which, to some extent, hold back the examination of the mechanism of LMX on bootleg innovation. When reviewing the emergence of bootleg innovation, we can easily notice that leaders, on one hand, encourage employees to innovate, and on the other hand, stifle their enthusiasms of innovation. Employees have different emotional experiences, like strong negative or positive emotions, and even the switch between the different emotions.<sup>14</sup> According to prior research, leaders frequently have high conflictive requirements for their employees, while providing enough social supports, which incurs employee ambivalence emotional experience. Given that employees are usually exposed to LMX ambivalence, the resultant sense of tension and conflict is a new norm for them. To better understand the complicity of LMX, Lee et al put forward the concept of Leader Member Exchange Ambivalence (LMX Exchange Ambivalence),<sup>15</sup> showing employees' positive and negative experience towards LMX at the same time. Lee's study challenged previous researchers' focus on relationship quality of LMX and opened up a new perspective for understanding of the leader–follower relationship. However, as Ashforth noted,<sup>11</sup> given that ambivalence is a common aspect of organizational life, it is a central shortcoming that the effects of ambivalence on employees' behaviors are still poorly understood. Therefore, our first aim is to study the relationship between LMX ambivalence and Bootleg Innovation amongst employees.

Research has demonstrated that ambivalence experience usually brings about negative effects, and even repugnant consequences.<sup>16</sup> From the emotional perspective, some scholars suggested that ambivalence experience could reduce employees' well-being, and result in avoidance, which inhibits employees' active behaviors.<sup>17,18</sup> While other scholars based on the cognitive view to argue that ambivalence experience can enhance employees' cognition on the confronting questions, and it enables employees to have opening attitudes towards transformation, promotes employee creativity, and finally leads to effective decisions.<sup>19</sup> Extant research tends to focus on either positive or negative influence of ambivalence experience, which might result in opposing conclusions. Unlike prior research, we propose that leader-member ambivalence experience has both positive and negative effects simultaneously, suggesting the “double-edged sword” effects. This study is based on the cognitive-affective processing system framework (CAPS) and the conservation of resources theory (COR) to clarify the dual mechanisms of LMX ambivalence on bootlegging. CAPS stated that individuals often evaluate the influence of situational factors on their own resources, and activate different cognitive and affective components of their mental models (also known as cognition-affection units) in the evaluation process.<sup>20</sup> Even though this theory has realized that resource level has an impact on individuals' behaviors, it fails to uncover how situational factors affect individuals' resources and its ensuing behaviors.<sup>21</sup> COR believed that situational factors have gain or loss effects on resources, and individuals are able to adjust their own behaviors to gain and preserve the valuable resources according to the potential influence.<sup>22</sup> COR, to some extent, effectively makes up for the flaws in the CAPS framework. Previous research has indicated that ambivalence experience, as a critical situational factor, has a directive effect on employees' cognitions and emotions. More specifically, this study has examined the roles of employees' cognition flexibility and job anxiety in the relationship between leader-member ambivalence experience and bootleg innovation. On the one hand, LMX ambivalence is conducive to enhancing employees' information searching and processing capability,<sup>23,24</sup> which improves the agility of employees' actions, thereby promoting the positive influence of resource enrichment on bootlegging. On the other hand, the uncertainty and conflict resulted from LMX ambivalence has become a pressure source of employees, cause the depletion of psychological resource and job anxiety. Therefore, employees are unlikely to practice creative ideas due to the purpose of protecting the existing resources, which inhibits employee bootlegging. Cognitive flexibility and job anxiety not only represent the activated cognition-affection units in

the effect of LMX ambivalence on bootlegging, but also reflect the positive or negative impact of LMX ambivalence on bootlegging via individuals' resource enrichment or depletion. The second aim of this study is to test the mediating role of cognition flexibility and job anxiety in the relationship between LMX ambivalence and bootleg innovation, attempting to clarify the joint effects of the two different mechanisms.

Rothman suggested that most of the current studies discuss ambivalence experience theoretically, while empirical tests on its boundary conditions are lacking.<sup>16</sup> As a matter of fact, individuals' characteristics, cognition and affections interact to function on individuals' behaviors.<sup>20</sup> Individuals' characteristics can lead to different perceptions and behavioral strategies. Integrative complexity, originating from personal construct theory,<sup>25</sup> captures the complexity of cognition in terms of the willingness and capability to understand the environment in a differentiated and integrated manner.<sup>26,27</sup> Thus, this study examines whether integrative complexity which is closely related to individuals' resources has a moderation effect on the relationship between LMX ambivalence and cognitive flexibility and job anxiety.

Echoing the calls of Anderson et al that using integrated frame work to better predict employee innovation behavior,<sup>9</sup> This study proposes a moderated dual-mediation effect model which comprehensively unravels the mechanism of LXM ambivalence on employee bootleg innovation, and the boundary condition of this effect. It not only adds the research results in the field of ambivalence and bootleg innovation that are different from the past, but also is of great benefit to enterprises innovation.

## Research Design

### Hypotheses Development

#### LMX Ambivalence and Bootleg Innovation

Bootleg innovation is defined by Augsdofer as individuals' innovative behaviors that are conducted secretly and voluntarily to be conducive to organizations.<sup>2</sup> Criscuolo et al further summarized four features of bootleg innovation: (1) carried out secretly; (2) no official support from the organization; (3) unknown by senior managers; (4) expected to benefit the organization.<sup>28</sup> Based on literature review, we, in this study, define bootleg innovation as a set of behaviors conducted by employees secretly to implement their rejected innovative plans from the organization in hope of creating more profit for the organization and self-value. Scholars tend to consider that bootleg innovation enables the organization to achieve revolutionary new technologies and innovative gains.<sup>29,30</sup>

Ambivalence refers to an individual's mixed emotional experience (both positive and negative) towards the same object.<sup>11</sup> For example, while we may be excited about a promotion, we may also feel sad that we will no longer be able to work with our current colleagues. In the high frequency of supervisor-subordinate interaction, it is easy for employees to have ambivalence.<sup>31</sup> On the one hand, leaders determine employees' allocation of resources and career development,<sup>32</sup> and thus there is resource dependence between employees and their leaders. On the other hand, the imbalance between employees' dependence and autonomy due to "differential pattern" and "power distance" leads to employees' ambivalence in the assessment of the relationship with their leaders.<sup>31</sup> Ambivalence is related to certain behaviors at work,<sup>33,34</sup> and it also demonstrates the influence of individuals' belief on the ensuing behaviors.<sup>35,36</sup> As a matter of fact, bootleg innovation is an affective event, and the complex cognition process is shaped by emotional experience. Since the novelty of innovation is largely a function of cognition variation, anything increasing variations within our normal cognition may produce bootleg innovation. Considering LMX ambivalence is a source of this variation,<sup>37</sup> it is likely to influence employee bootleg innovation.

Emotional coherence theory suggests that an individual's contradictory experiences are critical in the creative process and can increase the likelihood of integrating these conflicting ideas into a new creation if the individual has opposing thoughts at the same time. Specific emotional states are often associated with specific memories, so individuals experiencing both positive and negative emotions may activate more memories that are unrelated to each other, ultimately increasing creative thinking.<sup>37</sup> This provides theoretical clues that can be drawn on for the generation of transgressive innovative behavior of employees. Some studies have found that individuals' sense of disorientation and conflict when reading short dystopian novels also enhances their desire to learn new patterns.<sup>38</sup> Research by Plambeck and Weber suggests that the CEO's ambivalent experience is associated with extensive searches for possible behaviors, as

well as time and effort invested in the decision-making process.<sup>39</sup> Moreover, individuals in a state of ambivalence also process information more systematically and comprehensively,<sup>24</sup> and this systematic processing promotes individuals to make choices that enhance their motivation and ability to innovate. A study on the relationship between cross-cultural experience and individual innovation behavior suggests that the conflict and ambivalence from exotic culture is a powerful antecedent of individual innovation behavior.<sup>40</sup> Compared with individuals with cooperation experience, individuals experiencing ambivalence are more likely to come up with innovative solutions.<sup>41</sup> Therefore, we hypothesize the following:

H1: LMX ambivalence has a positive effect on employees' bootleg innovation.

### The Mediating Effect of Cognitive Flexibility

Cognitive flexibility is an individual's ability to switch cognition to adapt to the ever-changing environment.<sup>42,43</sup> Evidence has shown that individuals with ambivalence experience go through a cognitive process. For example, they generate many thoughts related the ambivalence experience subjects.<sup>44</sup> Neuroscience scan has indicated that brain regions associated with cognitive control and complex processing can be activated by ambivalence experience.<sup>45</sup> Individuals with ambivalence experience choose the strategy of elaborate processing, for example, collecting various information and carry on deeper and more comprehensive thinking to the problem, and thus making decisions.<sup>46,47</sup>

Research has indicated that the diversity and richness of information can broaden individuals' vision, enable individuals to deal with changes flexibly, and thereby boost cognitive flexibility.<sup>48</sup> We argue that the contradictory behaviors leaders exhibit in the interactions with their subordinates release complex signals, to some extent, objectively create a context to foster cognitive flexibility for subordinates.<sup>49</sup> When individuals are in ambivalence, the motivation of learning is highlighted, which drives them to hone their information searching and processing capability, thereby enforcing flexibility. In the environment of ambivalence, employees are often required to handle more complex information, they actively or passively seek the logics behind the various information leaders deliver, and integrate the contradictory information, which can effectively promote their cognitive capability and cognitive flexibility. Moreover, individuals with high cognitive flexibility are more inclined to perform bootlegging. First, individuals with high cognitive flexibility can adopt corresponding strategies according to changing environment, and constantly change their mode of thinking and behaviors.<sup>50</sup> They are able to adjust their behaviors, and thus show a good environmental adaptation when facing challenges and difficulties.<sup>42</sup> Second, creativity is an important process of cognition. Cognitive flexibility can benefit creativity through changing perspectives and flat associative hierarchies.<sup>48,51</sup> Therefore, they are more likely to come up with innovative plans. Lastly, cognitive flexibility is in favor of individual attitude of risk-taking,<sup>52</sup> reduces individuals' fear of changing, and thus enables individuals to have positive attitudes towards changing.<sup>53</sup> Individuals with high cognitive flexibility have high cognitive needs, and are eager to acquire novel information and ideas.<sup>50</sup> This further drive employees to secretly achieve their goals by using new methods and technologies and breaking through normal mindset at the risk of being punished if being discovered. Taken together, we assume that individuals with high cognitive flexibility will be more willing to transform, to take risks, and will be more creative. Thus, we hypothesize:

H2a: Cognitive flexibility plays a mediating role in the relationship between LMX ambivalence and employee bootleg innovation.

### The Mediating Effect of Job Anxiety

Job anxiety is defined as an unpleasant emotional state, such as fear, distress and restlessness, and it is a response to the perceived physical or psychological risks. Ambivalence identity causes individuals to underestimate their own value and support from leaders, and they are prone to negative evaluation on the relationships with their leaders under LMX ambivalence. LMX ambivalence can reduce individuals' wellbeing,<sup>54</sup> and increase negative emotions,<sup>15</sup> and damage their psychological resources. For example, when facing ambivalence, they are likely to spend more time thinking about action goals or even engage in excessive reflection, causing anxious responses and avoidance tendencies.<sup>55</sup> Furthermore, job anxiety is a requirement for individuals to involve in transformation. On the one hand, job anxiety has an influence on employee learning capability. Individuals under job anxiety will worry various uncertain risks, making them more

conservative, and unwilling to express different opinions, and to conduct challenging and risking behaviors aiming at efficiency improvement.<sup>56</sup> Job anxiety consumes a lot of time and psychological resources, lowers employee job satisfaction, and produce job insecurity, and even depression, thereby damaging employee well-being. Individuals under job anxiety are often afraid of the negative effects on self-image, position, and career development, which urges them to avoid proactive transformation behaviors with certain risks. On the other hand, employees facing job anxiety lack affective commitment to the organization,<sup>57</sup> and tend to consider their relationship with the organization as economic exchange rather than social exchange, and thus will be more reluctant to conduct extra-role behaviors to pay back the organization.<sup>58</sup> Under the constraint of organizational resource and norms, the intrinsic innovation motivation is insufficient, and further reduces the initiative and frequency of bootleg innovation. Therefore, we hypothesize the following:

H2b: Job anxiety plays a mediating role in the relationship between LMX ambivalence and employee bootleg innovation.

### The Moderating Effect of Integrative Complexity

Integrative complexity refers to the ability and willingness that an individual integrates his/her own different opinions on the same question,<sup>26,27</sup> and it requires dialectical thinking and integrative thinking.<sup>59</sup> High integrative complexity enables individuals to look at the environment in multiple perspectives, and thus to promote their effective adaptation in complex situations.<sup>60</sup> Their attitudes towards the environment are more open and multifaceted. The inconsistent and complex LMX ambivalence will be viewed as rich feedbacks by the employees with high integrative complexity. They are more inclined to distinguish ambivalence, to tolerate the inconsistency of other people's motives and behaviors, and thus to be able to better tackle complex information, thereafter increasing cognitive flexibility. In contrast, employees with low integrative complexity are ambiguity aversion, and they seek cognitive closure,<sup>60</sup> which may lead to cognitive dissonance, and thus restrain cognitive flexibility. Taken together, we hypothesize the following:

H3a: Integrative complexity positively moderates the impact of LMX ambivalence on cognitive flexibility.

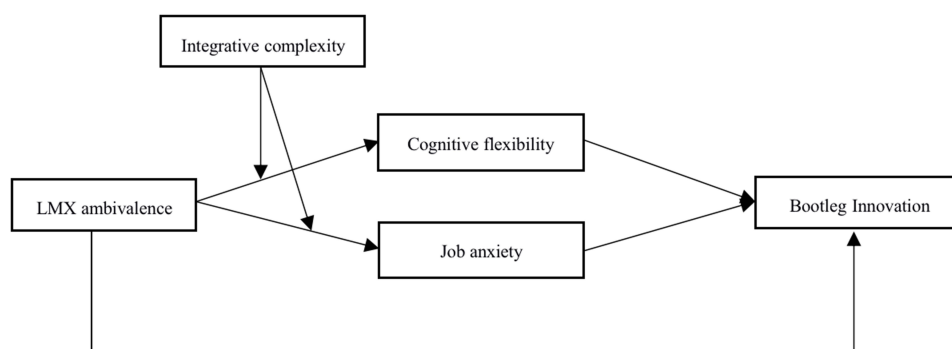
In Chinese context, employees play multiple roles, such as subordinates, colleagues and friends. In order to maintain and develop these relationships, individuals are required to strike a balance between professional norms featuring fair and honest and personal norms favoring openness.<sup>32</sup> The intertwine of professional norms and individuals' emotions aggravates the ambiguity of the relationship between employees and their leaders. The resultant uncertainty and conflict (ambivalence) further become a pressure source of employees.<sup>61</sup> Employees with high integrative complexity have more individual resources to deal with stress and uncertain events. In the face of the uncertain pressure situation of the ambivalence, they can remain confident, optimistic and open, they will absorb and integrate external diversified information more actively, which in turn strengthens employees' concentration and confidence in conquering pressure, forms the "value-added spiral" of positive psychological resources,<sup>62</sup> and reduce their work anxiety. In contrast, low integrative complexity will lead employees to make negative interpretation when facing ambivalence due to lacking of ability and willingness to deal with problems, and further cause negative emotions such as anxiety and depression. In such a situation, employees place more emphasis on losses, for example, the punishment resulted from failure, which further enhances the threat of resource loss. It leads to their psychological exhaustion, and then intensifies the negative impact of the LMX ambivalence on job anxiety. Therefore, we hypothesize:

H3b: Integrative complexity negatively moderates the impact of LMX ambivalence on job anxiety.

Based on the above hypotheses, we further posit that integrative complexity will moderate the mediating roles of cognitive flexibility and job anxiety in the linkage between LMX ambivalence and employee bootleg innovation, and finally a moderated mediation model is built. We thus hypothesize:

H4a: Integrative complexity positively moderates the indirect effect of LMX ambivalence on employee bootleg innovation via cognitive flexibility; the higher integrative complexity, the stronger the indirect effect via cognitive flexibility.





**Figure 1** Conceptual model.

H4b: Integrative complexity negatively moderates the indirect effect of LMX ambivalence on employee bootleg innovation via job anxiety; the higher integrative complexity, the less negative the indirect effect via job anxiety.

The conceptual model is shown in [Figure 1](#).

## Sample and Procedure

The survey samples were collected on-site or online. The on-site versions were distributed to two technology companies in Hefei, which is the Science and Technology Innovation Pilot City in China. Due to the impact of the epidemic, we also collected some data from more than a dozen enterprises in Shanghai, Beijing, and Shenzhen through online questionnaires, mainly covering IT, machinery manufacturing, biomedical and other industries. For the on-site investigation, the sample questionnaires were re-collected immediately. For the online investigation, the completed questionnaires were sent to the author via EMAIL.

For sample selection, we communicated several times with the top management team of the companies, to better identify the employees who participated in the research are engaged in innovation-related activities, such as product development, technical services, quality control and other departments. These employees were selected as the sample because they often generate creative ideas in their work, and as a sample they fit well with the purpose of this study.

To reduce common method biases (CMB), this study used a multi-phase-multi-source approach to collect research samples, pairing the questionnaires in advance, and collecting them at two time points and from two sources: subordinates and supervisors. At time point T1 (February 2022), employees fill out a questionnaire containing basic information, LMX ambivalence, cognitive flexibility, job anxiety, and integrative complexity. A total of 482 questionnaires were distributed and 411 valid questionnaires were recovered (response rate = 85.2%). At time point T2 (April 2022) two months later, 118 supervisors of these 411 employee respondents were invited to complete a questionnaire containing basic information and employee bootleg innovation. The questionnaires that could not be paired, with selections improperly made and those with obvious consistent responses were eliminated. We collected 387 matched questionnaires from 110 supervisors. In the supervisor sample, 25.5% were female; most of them had a bachelor's or higher degree (81.8%), most of them are 31–50 years (60.8%). For the employee sample, 61.8% were male and most of them are 31–50 years (55.9%). The information of respondents as shown in [Table 1](#).

[Table 1](#) Sample Demographics (N = 411).

## Measures

All the scales we used in this study were in English, and we translated them into Chinese according to the back-translation rules.<sup>63</sup> Translations of the scale were made in Chinese by two PhDs of management who have command in both languages English and Chinese. All the questionnaires were adjusted in order to fit Chinese habits of language expression. These translations were retranslated into English by two other PhDs who were unfamiliar with the original English scale. These English translations were compared with the actual scale and judged by experts, how well they

**Table I** Sample Characteristics

Characteristics		Employee		Supervisor	
		N	%	N	%
Gender	Male	239	61.8%	82	74.5%
	Female	148	38.2%	28	25.5%
Age	Below 25 years	60	15.6%	8	7.3%
	26–30 years	98	25.3%	18	16.4%
	31–40 years	149	38.6%	25	22.7%
	41–50 years	67	17.3%	42	38.1%
	Over 51 years	13	3.2%	17	15.5%
Education	Associate degree or below	162	41.9%	20	18.2%
	Bachelor's degree	184	47.6%	56	50.9%
	Master's degree and above	41	10.5%	34	30.9%

**Notes:** For employee sample, sample size = 387; For supervisor sample, sample size = 110.

correspond to the actual English items and whether they carry the idea that is meant in the original scale and are they culturally equivalent to the actual item. Best represented translated items were then merged into one scale. In addition, all the variables were assessed on a 6-point Likert scale, ranging from 1 (strongly disagree) to 6 (strongly agree). The measurements of the various constructs are shown in the [Appendix A](#).

**LMX ambivalence.** We used a 7-item scale from Lee et al.<sup>15</sup> to measure LMX ambivalence. A sample item is “I have conflicting thoughts:”sometimes I think that my working relationship with my manager is very good, while at other times, I don’t.”

**Bootleg Innovation.** Bootleg innovation was checked with a 5-item scale from Criscuolo et al.<sup>28</sup> A sample item is “I have the flexibility to work my way around my official work plan, digging into new potentially valuable business opportunities.”

**Cognitive flexibility.** Cognitive flexibility was measured with a 12-item scale from Martin et al.<sup>64</sup> Sample items are “I can communicate an idea in many different ways.”

**Job anxiety.** Job anxiety was measured with a 5-item scale from Parker et al.<sup>65</sup> Sample items are “I have felt fidgety or nervous as a result of my job.”

**Integrative complexity.** Integrative complexity was measured with a 11-item scale from Zhang et al.<sup>27</sup> A sample item is “I believe in the value of dissent.”

**Control variable.** Referring to previous research, we controlled for employee age, gender and education. Because the age is highly related to the working years ( $\gamma = 0.73$ ,  $P < 0.001$ ), so this study only controls the age of employee.

## Results

### Validity and Reliability

This study assessed reliability and validity of the construct measures following recommendations in the literature<sup>66</sup> and calculated multiple indices to assess the fit of the measurement model with the empirical data. We conducted an exploratory factor analysis (EFA) for the five variables. As shown in [Appendix A](#), inspection of indices indicated that the standardized factor loadings ranged from 0.650 to 0.825, the composite reliability (CR) and Cronbach’s  $\alpha$  of all constructs exceeded the threshold of 0.70, and the average variance extracted (AVE) were higher than the commonly accepted value of 0.5. All these results indicate that the constructs possess convergent validity and reliability.

**Table 2** Model Fit

Model	$\chi^2$	df	CFI	TLI	SRMR	RMSEA
Five-factor model	556.61	242	0.942	0.933	0.043	0.061
Five-factor model, CMV	387.72	219	0.969	0.961	0.231	0.047
Four-factor model	635.72	246	0.898	0.909	0.046	0.069
Three-factor model	832.34	249	0.735	0.758	0.047	0.132
Two-factor model	1346.51	252	0.512	0.556	0.050	0.193
Single-factor model	2857.31	253	0.436	0.412	0.053	0.208

**Notes:** The five-factor model is the measurement model; four-factor model means LMX ambivalence and cognitive flexibility combined; three-factor model means LMX ambivalence, cognitive flexibility, and job anxiety combined; two-factor model means LMX ambivalence, cognitive flexibility, job anxiety, and bootleg innovation combined.

Confirmatory factor analysis (CFA) was used to estimate the discriminant validity.<sup>67</sup> As shown in Table 2, the fit indexes of the model indicated that the overall model fitted the data well ( $\chi^2 = 556.61$ ,  $df = 242$ ;  $p < 0.001$ ; CFI = 0.942; TLI = 0.933; RMSEA = 0.061) and was better than competing models when some variables were combined into one factor. Given these results, the discriminant validity of measures was confirmed.

## Common Method Variance (CMV)

A variety of methods were used to test the CMV effect. First, the results of Harman's single factor method show that the first factor accounts for 23.28% of the population variance.<sup>68</sup> Second, we introduced a common method factor into the model to test the common method variance. As shown in Table 2, the goodness of model fit cannot be significantly improved. Both results indicate that no serious CMV exists.<sup>69</sup>

## Descriptive Statistics and Correlation Analysis

The means, standard deviations, and correlations of all the main variable in this study are displayed in Table 3. The results indicate that: all the correlations of the variables are below 0.7; LMX ambivalence positively relates to cognitive flexibility ( $r = 0.36$ ,  $p < 0.001$ ), job anxiety ( $r = 0.45$ ,  $p < 0.001$ ), bootleg innovation ( $r = 0.19$ ,  $p < 0.01$ ); cognitive flexibility is positively related to bootleg innovation ( $r = 0.39$ ,  $p < 0.001$ ) while job anxiety is negatively associated with bootleg innovation ( $r = -0.19$ ,  $p < 0.05$ ). These results are in accordance with our theoretical predictions and provide preliminary support for the hypotheses in this study.

**Table 3** Mean, Standard Deviation and Correlation Coefficient of Variables

Variables	M	SD	1	2	3	4	5	6	7	8
1 Gender	0.62	0.49								
2 Age	2.78	1.03	0.12							
3 Education	2.34	0.68	-0.05	-0.28**						
4 LMX ambivalence	4.50	0.98	-0.02	-0.22*	0.06	0.79				
5 Cognitive flexibility	4.37	0.56	-0.13	-0.15	0.07	0.36***	0.76			
6 Job anxiety	3.65	0.96	-0.04	-0.05	0.10	0.45***	-0.06	0.91		
7 Integrative complexity	3.72	1.06	-0.15	-0.18	0.07	0.06	0.14	-0.03	0.87	
8 Bootleg innovation	4.92	0.79	-0.07	-0.15	0.16	0.19**	0.39***	-0.19*	-0.11	0.78

**Notes:** \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ . All coefficients are standardized; The diagonal is the square root of AVE.



## Hypotheses Testing

### Testing of the Main Effect and the Dual Mediation Effects

We used hierarchical regression analysis to test the hypotheses in our study. The results are outlined in Table 4. According to Model 6, LMX ambivalence has a positive and significant effect on bootleg innovation ( $\beta=0.18$ ,  $p < 0.01$ ), supporting Hypothesis 1. Based on Model 2, LMX ambivalence has a positive and significant effect on cognitive flexibility ( $\beta=0.31$ ,  $p < 0.001$ ). After LMX ambivalence and cognitive flexibility enter the model simultaneously, the results of Model 7 indicate that cognitive flexibility positively and significantly influences bootleg innovation ( $\beta=0.14$ ,  $p < 0.001$ ), while the positive effect of LMX ambivalence on bootleg innovation is weakened significantly ( $\beta=0.16$ ,  $p < 0.05$ ), which means that challenging appraisal partly mediates the relationship between LMX ambivalence and bootleg innovation. In a similar vein, based on Model 8, job anxiety has a significant and negative effect on bootleg innovation ( $\beta=-0.17$ ,  $p < 0.01$ ), while the positive effect of LMX ambivalence on bootleg innovation is stronger ( $\beta=0.27$ ,  $p < 0.001$ ). These mean that job anxiety partly mediates the relationship between LMX ambivalence and bootleg innovation. Moreover, we draw on process 3.5 to conduct the multiple mediation analysis (sample = 5000, 95% CI) using bootstrapping method. The indirect effect of LMX ambivalence on bootlegging via cognitive flexibility is 0.11 with 95% CI  $\in [0.03, 0.15]$ , excluding zero, which means the mediation effect of cognitive flexibility is significant, supporting hypothesis 2a. LMX ambivalence on bootlegging via job anxiety is  $-0.12$  with 95% CI  $\in [-0.18, -0.05]$ , excluding zero, which means the mediation effect of job anxiety is significant, and thus supports hypothesis 2b.

### The Testing of the Moderating Effect

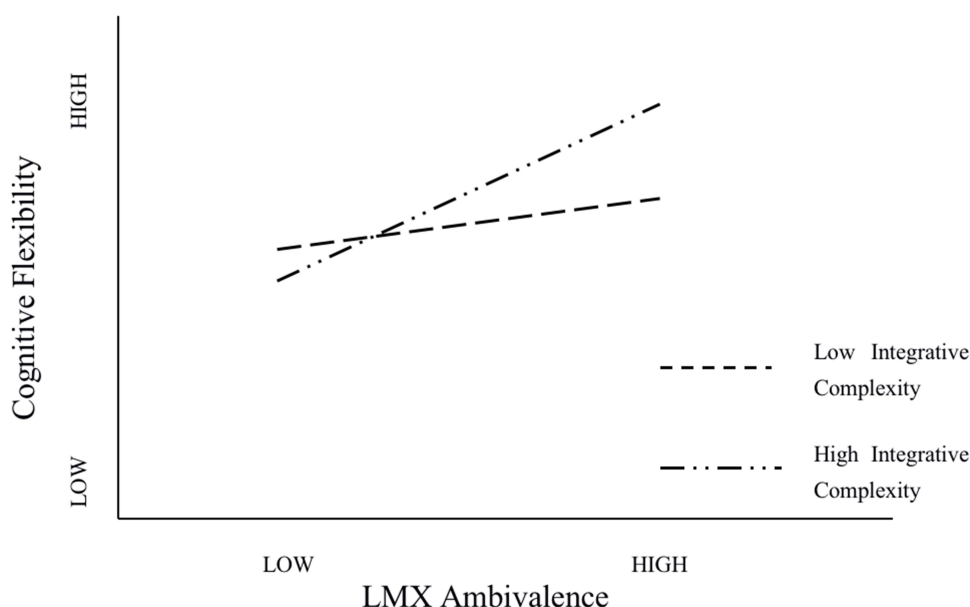
This study followed the suggestions of Aiken and West to centralize the variables and conduct a simple slope analysis before constructing the product term.<sup>70</sup> The products of mean-centered scores were subsequently used as interaction terms (IC \* LMXA). The value of the maximum variance inflation factor in all regression models is less than 1.69, which indicates that multicollinearity is not a concern in this study. As shown in Table 4, H3a proposed a moderating effect of integrative complexity between LMX ambivalence and cognitive flexibility, M10 (Table 2) shows that (IC \* LMXA) meets the significance for cognitive flexibility ( $\beta=0.24$ ,  $p < 0.05$ ). H3b proposed a moderating effect of integrative

**Table 4** Results of Hierarchical Regression Analysis

Variables	Mediation Effect Moderation Effect								Moderation Effect			
	CF		JA		Bootleg Innovation				CF		JA	
	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
Gender	-0.07	-0.10	-0.09	-0.04	-0.06	-0.03	-0.03	-0.09	-0.05	-0.06	-0.07	-0.07
Age	-0.12	-0.09	0.03	0.06	0.02	-0.04	-0.02	-0.05	-0.04	-0.10	-0.05	0.08
Education	0.04	0.03	0.05	0.07	0.11	0.16	0.15	0.08	0.05	0.03	0.04	0.07
LMXA		0.31***		0.46***		0.18**	0.16*	0.27***	0.28***	0.33***	0.38***	0.43***
CF							0.14***					
JA								-0.17**				
IC									-0.11**	-0.12**	-0.21**	-0.10**
LMXA×IC										0.24**		-0.26**
R <sup>2</sup>	0.20	0.23	0.28	0.24	0.25	0.28	0.22	0.18	0.27	0.29	0.28	0.31
ΔR <sup>2</sup>	0.06	0.02	0.04	0.22	0.03	0.02	0.03	0.06	0.01	0.01	0.04	0.08
F	3.97***	6.68***	11.38***	8.47***	8.66***	11.10***	4.35***	3.28***	11.32***	12.89***	11.45***	16.42***

**Notes:** \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ . All coefficients are standardized; Standard errors are in parentheses.

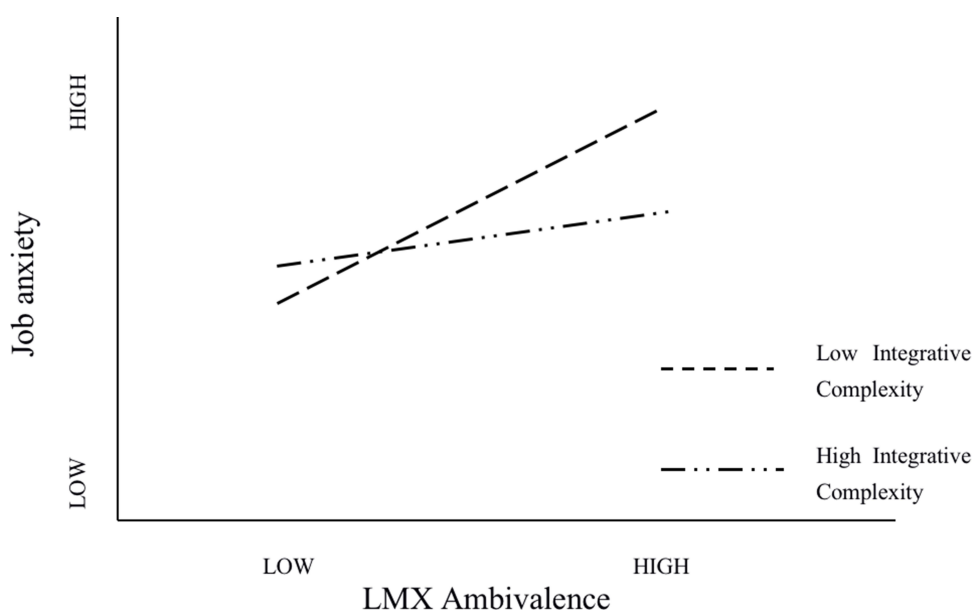
**Abbreviations:** LMXA LMX ambivalence; CF, Cognitive flexibility; JA, Job anxiety; IC, Integrative complexity.



**Figure 2** Moderating effect of integrative complexity on the relationship between cognitive flexibility and LMX ambivalence.

complexity between LMX ambivalence and job anxiety, Model 12 (Table 2) shows that (IC \* LMXA) meets the significance for job anxiety ( $\beta = -0.26$ ,  $p < 0.05$ ). Thus, Hypothesis 3b is also supported.

Furthermore, to show the moderating impact of integrative complexity, the simple slopes analysis was applied to provide graphs of the moderating impact. In doing so, integrative complexity was split into high (one standard deviation or more above the mean) and low (one standard deviation or more below the mean) levels. Figure 2 presents that when the level of integrative complexity is low, the positive effect of LMX ambivalence on the cognitive flexibility becomes weaker. However, Figure 3 presents that when the level of integrative complexity is high, the negative effect of LMX ambivalence on job anxiety becomes stronger.



**Figure 3** Moderating effect of integrative complexity on the relationship between job anxiety and LMX ambivalence.

**Table 5** Bootstrap Test Results of the Moderating Mediation Effect

Paths	Moderators	Coeff	SE	Bootstrap (95% CI)
Cognitive flexibility	High integrative complexity	0.21	0.05	[0.07, 0.28]
	Low integrative complexity	0.04	0.03	[-0.13, 0.27]
Job anxiety	High integrative complexity	-0.04	0.05	[-0.12, 0.04]
	Low integrative complexity	-0.20	0.04	[-0.23, -0.06]

### The Testing of the Moderated Mediation Effect

The method of difference analysis was used to test the moderated mediation effect (Hypothesis 4a and Hypothesis 4b), and we also checked the indirect effect under different level of the moderator through bootstrapping (sampling size = 5000). Specifically, in this part, we aim to check the indirect effects of LMX ambivalence on bootleg innovation via cognitive flexibility and job anxiety under different levels of integrative complexity (Table 5). As shown in Table 5, in high integrative complexity, the indirect effect of LMX ambivalence on bootleg innovation via cognitive flexibility is significant ( $\beta=0.21$ ) with 95% CI of [0.07, 0.28]; while, in low integrative complexity, the indirect effect of LMX ambivalence on bootleg innovation via cognitive flexibility is not significant ( $\beta=0.04$ ) with 95% CI of [-0.13, 0.27]. Therefore, Hypothesis 4a is supported.

Similarly, in high integrative complexity, the indirect effect of LMX ambivalence on bootleg innovation via job anxiety is not significant ( $\beta=-0.04$ ) with 95% CI of [-0.12, 0.04]; while, in low integrative complexity the indirect effect of LMX ambivalence on bootleg innovation via job anxiety is significant ( $\beta=-0.20$ ) with 95% CI of [-0.23, -0.006]. Therefore, Hypothesis 4b is supported.

## Discussion

### Conclusions

People often have a mixed evaluation (both positive and negative) on the same phenomenon. It remains unclear how ambivalence affects employee bootleg innovation. In this study, we proposed and empirically tested a moderated mediation model to clarify the underlying mechanisms of ambivalence on employee bootleg innovation from the perspective of CAPS and COR. The results show that:

First, the results show that LMX ambivalence inhibit employee bootleg innovation by negatively affecting employees' job anxiety. This result was consistent with previous studies that when individuals feel ambivalent about goals, it inhibits behavior toward goals, which in turn leads to psychological stress problems, thus discouraging employees' proactive behavior and even anti-productive behavior. The results also showed that LMX ambivalence can promote employee bootleg innovation by positively influencing cognitive flexibility. This result was consistent with previous studies that ambivalence experience will help employees to have deeper cognitive processing of the problem. More importantly, the present study is a corroboration of the integration framework of Ashforth's contradictory experiential response styles.<sup>11</sup> Ashforth et al divided the individual's experience of contradiction into 4 ways of evading,<sup>11</sup> controlling, compromising, and integrating reactions based on the degree of positive and negative orientation of the individual to the goal in the context. Avoidance is the most instinctive way for actors to react when they feel ambivalent experiences; therefore, most previous studies tend to conclude that ambivalent experiences have negative effects; although avoidance can alleviate the discomfort brought by ambivalent experiences to a certain extent, it cannot solve the underlying problems that cause ambivalent experiences. Therefore, individuals also consciously and actively respond to ambivalent experiences by means of control to produce positive effects, and thus research findings that ambivalent experiences have positive effects have emerged one after another. It is important to note that the control here is achieved by consciously ignoring the negative experiences and focusing only on the positive ones. In contrast, compromise and integration is the simultaneous balancing of both positive and negative subjective experiences, weighing the pros and cons of both orientations to make unbiased decisions. Although the response pattern summarized by Ashforth leaves us with valuable

clues,<sup>11</sup> no proof is given. Through empirical testing, this study confirms the various response models mentioned above, and in particular, it adds to and advances its research in a meaningful way by more clearly portraying the integration process when individuals cope with ambivalent experiences through a dual path.

The results also showed that integrative complexity moderates the relationship between LMX ambivalence and cognitive flexibility, and further has an impact on employee bootleg innovation. Specifically, in high integrative complexity, the positive indirect effect of LMX ambivalence on bootleg innovation via cognitive flexibility is stronger; in low integrative complexity, LMX ambivalence has a negative effect on employee bootleg innovation via job anxiety. Few empirical tests on boundary conditions of LMX ambivalence, considering individual differences, integrative complexity is introduced into the approach-avoidance framework in order to reveal which conditions lead to LMX ambivalence having positive effects and which conditions lead to them having negative effects. Our study makes up for the defect of previous studies ignoring the differences in individual characteristics and helps demonstrate the specific mechanism underlying the double-edged sword effect of LMX ambivalence, thus complementing the findings of previous studies.

## Theoretical Implications

Three main contributions to the literature on ambivalence and bootleg innovation have been achieved in this study. First, from the perspective of individuals' perception on situations, this study is an extension of previous research examining the relationship between multiple leadership styles and bootleg innovation. Existing studies primarily focus on leadership styles (eg, humble leadership and unethical leadership),<sup>71–73</sup> personal characteristics (proactive personality),<sup>3</sup> and organizational climate.<sup>8</sup> Although these studies enhance our understanding about how employee bootleg innovation happen from multiple perspectives, they over-emphasize the effect of objective factors, overlooking the influence of employee (as innovation subjects) perception in this process. Therefore, from the perspective of perception (LMX ambivalence), this study analyzed the triggering mechanism of bootleg innovation combined with the dynamic interaction of environmental stimulus, emotion and cognition. The findings of our study provide a new perspective for the research on bootleg innovation. In addition, this study introduces ambivalence into the field of organizational management, promoting the ambivalence research.

Second, our findings made an extension to the current knowledge on LMX ambivalence experience. Unlike the conclusions from Lee et al's<sup>15</sup> and Han's<sup>54</sup> studies that LMX ambivalence has a negative impact on employee work outcomes, our findings show both positive and negative effects of LMX ambivalence on employee bootleg innovation. To sum up, prior research only focused on single attribute of ambivalence experience, which makes its positive and negative sides oppose with each other, and severs their connection. Actually, ambivalence experience has both positive and negative sides, and employees do not feel that opposites means ambivalence when confronting or thinking the same question. Breaking through the single-dimensional analysis framework, the present study found that ambivalence experience can prompt employees to assess the positive and negative effects of events in the workplace from multiple perspectives and logics by integrating the cognitive and emotional paths. By doing so, this study achieves the conversion from single thinking to dual thinking, and then make employees to better understand and deal with the conflict between the positive and negative emotions resulted from ambivalence experience. In addition, the test of the moderating effect of comprehensive complexity provides strong explanation on the inconsistency of the conclusions between the current studies, thereby offering a new framework for studies on the after effects of ambivalence experience. More importantly, our study aims to employees' bootleg innovation, which is different from existing studies on LMX ambivalence experience that merely focus on employees' behaviors within their duty. Bootleg innovation is an innovative act undertaken privately and spontaneously by employees without formal authorization from the organization. It is a typical conduct beyond duty, and even an "illegal" act due to the violation of organizational norms. The findings of our study indicate that LMX ambivalence experience is also effective to employees' extra-role behaviors, which breaks through the current research situation, and broadly extend the research paradigm and scope between ambivalence experience and employee behavior.

Third, our study provides novel insights into the implication of the COR theory in management research. In this respect, researchers usually emphasize the path of resource conservation, ignoring the acquisition process of individuals.

The COR theory suggests that when facing the threat of resource loss, it is more important for individuals to gain new resources.<sup>74</sup> Hence, it is necessary to study the two processes (resource conservation and resource acquisition) to fully understand the internal motive of individuals' behaviors. To begin with, this study proposes that LMX ambivalence will promote employees' positive affections, and thus will be conducive to their resource acquisition; meanwhile, LMX ambivalence will also exacerbate employees' job anxiety, which leads employees to have conservative tendency. In addition, this study makes up for the deficiency in terms of the explanation of how CAPS framework influences individuals' cognition-affection units and ensuing behaviors by integrating the CAPS framework and the COR theory.

## Practical Implications

This study also provides several implications for managers and management practices.

First, managers should guide employees to treat LMX ambivalence experience well, and employees ought to take ambivalence experience as a common thing in the workplace, not to be trapped in it. Instead, they should see the positive forces of ambivalence experience such as cognition upgrade and creation enhancement. Employees should learn how to deal with their own emotions, and then benefit from the positive influence of ambivalence experience.

Second, LMX ambivalence can bring job anxiety to employees, which is harmful to bootleg innovation. Hence, managers should conduct psychological measurement, pay attention to employees' emotional state, and impart knowledge and experience of stress management to employees through training and other means, and thereby strengthen employees' ability to adjust emotions, and guide employees to effectively relieve anxiety.

Third, our findings suggest that LMX ambivalence plays an important role in managing bootleg innovation. In today's markets is fast-changing and the competition fierce, it is imperative for organizations to harness employee bootleg innovation to enhance the organization's innovation capability. Therefore, managers should deal with bootleg innovation comprehensively according to employees' qualification and ambivalence experience. Ambivalence experience shows an unusual situation, and spurs employees to adopt novel thinking to solve work problems. In the managerial practices, managers should appropriately create a climate that can induce ambivalence experience, and stimulate employees to have more divergent thinking, which is conducive to boosting creativity, and thus promoting firm's sustainable development. At the same time, comprehensive complication can effectively motivate the positive effect of ambivalence experience while assuaging its negative sides. Thus, managers could take a series of measures to enhance employees' comprehensive complication.

## Limitations and Future Directions

Despite these contributions, there are also some limitations. First, although we gathered data from different time point and sources to alleviate the potential common method deviation, we still cannot come to the conclusion about causality from a cross-sectional study. A longitudinal study, therefore, is necessary for future studies to further verify the findings of this study. Second, data were collected from self-report, and this is a weakness of this study. Considering the sensitivity of bootleg innovation, we cannot completely exclude the bias resulted from participants' subjectivity (eg, recall bias). Future research could use multiple methods (eg, experiment) to make more robust conclusions. Third, emphasizing the exploration of the antecedents of ambivalence. While extant ambivalence research primarily focuses on the reaction process and after effect of ambivalence, the antecedents of ambivalence remain underdeveloped. Future studies could dig the trigger factors of ambivalence at the individual and organizational levels, and shed light on the formation mechanism of LMX ambivalence.

## Conclusion

The research may expand extends the bootleg literature with a focus on the specific role of LMX ambivalence. The present study found that ambivalence experience can prompt employees to assess the positive and negative effects of events in the workplace from multiple perspectives and logics by integrating the cognitive and emotional paths. By doing so, this study achieves the conversion from single thinking to dual thinking, and then make employees to better understand and deal with the conflict between the positive and negative emotions resulted form ambivalence experience.

## Ethics Statement

This study was conducted in accordance with the Declaration of Helsinki, and Anhui University of Finance and Economics reviewed and approved the study protocol. All participants read and signed a consent form before they participated in the study.

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## Disclosure

The authors report no conflicts of interest in this work.

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