Psychological Mechanisms in Social Cognition Research: Taking Social Power Area as an Example

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Abstract: This article discusses the methods and approaches used to examine psychological processes in the field of social cognition research, with a specific focus on the area of social power. Social cognition refers to the mental processes involved in perceiving, interpreting, and understanding social information. Understanding how individuals perceive and respond to power dynamics within social interactions is crucial for comprehending various social phenomena. The article highlights the importance of examining psychological processes in social cognition research and provides insights into the specific example of social power. We introduced three types of methods to examine psychological processes at the level of experiment design proposed by Spencer, Zanna and Fong, and summarized situations of using these three designs in past. It discusses different experimental designs, measures, and paradigms commonly employed to investigate social power and its influence on cognitive processes. Additionally, it emphasizes the need for interdisciplinary collaboration and the integration of various research methods to gain a comprehensive understanding of social cognition and its underlying psychological mechanisms. Overall, this article serves as a guide for researchers interested in studying psychological processes within the context of social cognition, particularly in relation to social power dynamics.

1. Introduction

Baron and Kenny proposed the clear concept of mediation, and explained how to do statistics analysis in details[1]. After that, many psychology studies used this method to test psychology processes[2,3]. However, later researchers pointed out that there exists overuse, even misuse of Baron and Kenny's statistics analysis of mediation for testing psychological processes.

Spencer, Zanna and Fong summarized three types of experimental design to prove a theoretical assumption about psychological process, including measurement-of-mediation design, moderation-of-process design and experimental causal-chain design[4]. They divided different experiment designs by the difficulty level to manipulate and measure a proposed process. Meanwhile, they argued that Baron and Kenny's regression analysis[1] is just one type of statistics analysis when experimenters use measurement of mediation design in their studies to test theoretical assumption. Moreover, this experimental design is just suitable for the situation when processes are hard to manipulate and easy

to measure, but not others. Using this method in improper situation cannot provide strong enough evidence.

Social cognition research has its own features, different from other study types (e.g. questionnaire study, cognitive study). Just as we mentioned above, Baron and Kenny's analysis is usually suitable for the mediating variable easy to be measure[1]. However, due to complex influencing factors, inner psychological processes are not always easy to measure in many cases. Thus, researchers need to choose proper designs according to proposed psychological processes' feature.

In the early period of social cognition research, many research only made arguments about possible psychological processes, but not real designed experiment to prove them, or we can call this type of theory as stimulus-reaction (S-R) model[5]. Classical measurement of mediator method is still the most popular and familiar method for social cognition psychologists, while some social cognition research have begun to use moderation of process design to examine theoretical inner process (although sometimes they do not really make the direct conclusion about mediator). Causal chain design is less paid attention, which is actually a very reasonable method to examine psychological processes by experimental design, especially when proposed processes are both easy to measure and manipulate. It will help researchers to get more reliable results than statistics method.

We aim to show the current situation about examining psychological processes in social cognition research. In order to compare different methods and explain their suitable situations clearly, we take a small area in social cognition, social power study, as an example. We will explain how to use three types of methods to examine psychological process and when they are suitable to be used.

2. Measurement of Mediation

The concept of mediator can date back to Woodworth's S-O-R model[5], which is treated as an active organism intervening between stimulus and response. In long history of psychology, there are a period of time that people only focus on how people behavior, but treat the inner mechanism as a black box, which means we cannot really know what happens inside. However, with the development of cognitive psychology, psychologists gradually noticed the importance of understanding what happened inside the black box[6]. Then, unavoidably, many research started to focus on inner psychological processes and construct various assumption about possible mediation model to understand the inner mechanism or the causes of why independent variables affect dependent variables.

At that time, although many people have been aware of the importance of inner psychological processes, researchers lack effective methods to measure, analyze and examine them. In fact, there was even no the concept of "mediation". At that time, psychologists only made plausible argument about why one specific psychological effect happens, but not really examined their theories by empirical experiment design[4].The earliest social power study can be an example.

For instance, Kipnis firstly tried to explore whether power corrupts and why[7]. He summarized four possible reasons or psychological processes which might lead to connection of power and corruption. He assumed that self-perception and the perceptions of others induced by power are causes of powerful people's corruption. Participants are distributed to power condition and control condition by different levels of award and punishment ability on the role of manager. They received instructions stating that their responsibility was to ensure the company operates profitably by upholding worker efficiency. Finally, participants rated several questionnaires related to self-esteem, evaluation of subordinates, psychological distance, and locus of control. They found that power increases their attempts to influence the powerless, devalues the worth of powerless people, attributes workers' efforts to control but not their own motivation, objects the powerless and keep distance from workers. Of course, they proved that power leads to corruption, but didn't really test the direct

relationship between power, the perceptions of others and corruption. They just made the plausible argument.

In the earlier time of social power research, most researchers just focus on whether power affects one kind of cognition or behavior, and proposed their explanation or theory about why these phenomena happen, but not really use empirical evidence to prove. Later, these phenomena proved by experiments were summarized to form several power theories, such as Approach and inhibition theory of power[8].

Until 1980, Researchers firstly summarized and mentioned the third variable besides independent variable and dependent variable, moderator, and mediator, to describe the influence of identifiability on social loafing[9]. However, they didn't distinguish these two close definitions. Later, Baron and Kenny wrote a paper to summarize and clarify these two definitions, and introduced basic statistics regression analysis method of how to confirm a mediator, which is the earliest and also the most acceptable method to construct mediation model[1].

In research by Baron and Kenny[1], the concept of mediation is defined as the process through which external physical events acquire internal psychological significance. Specifically, the independent variable (A) exerts an influence on the dependent variable (B) by means of a mediator (C). This implies that the mediator (C) can fully or partially account for the direct impact of A on B. To establish mediation, a set of criteria must be satisfied within the analytical framework. Firstly, variations in the independent variable should significantly explain the variations observed in the presumed mediator (Path a). Secondly, variations in the mediator should significantly account for the variations observed in the dependent variable (Path b). Thirdly, when controlling for Paths a and b, any previously significant relationship between the independent and dependent variables (Path c) should no longer remain statistically significant. This represents the most compelling evidence of mediation. It is important to note that within the realm of social cognition, phenomena are often influenced by multiple factors, and as such, Path c may not reduce to zero. However, from a theoretical standpoint, a significant reduction in the relationship can substantiate the specific mediator as a plausible causal factor for the observed effect.

Many social power research used this regression to test psychological processes[10-12]. For example, one paper further discussed the topic whether power corrupts[13]. In study 1, they manipulated participants' power feeling by recalling past events and then test their self-interest behaviors in a dictator game and organizational deviance behaviors. In study 2, researchers measured participants' moral awareness, and then they used statistics regression to prove that moral awareness mediates the direct effect of power on self-awareness.

In one study of Lammers and Stapel about power and moral thinking, they found that powerful people prefer rule-based moral judgment, while low power people are more likely to use outcome-based moral judgment[14]. They assumed that this difference is due to different types of thinking style of the powerful and the powerless, so they used corresponding scale to measure participants' thinking style, and found that the influence of power on moral judgment is mediated by rule-based moral thinking style and outcome-based moral thinking style. Here, they also used Baron and Kenny's mediation model[1] (or measure of mediation) to do examination.

Later, a critique has been put forth by Spencer, Zanna, and Fong[4] regarding the prevalent and sometimes improper utilization of Baron and Kenny's recommended approach[1] to constructing mediation in psychological research. According to their viewpoint, researchers should shift their focus from examining mediators solely at the statistical level to considering their inclusion in the experimental design itself. To support the proposed psychological processes, three distinct methods are available: measurement-of-mediation design, moderation-of-process design, and experimental causal-chain designs. It is important to note that Baron and Kenny's statistical analysis of mediation represents just one type of statistical analysis applicable to the measurement of mediation within

experimental designs, and not the exclusive means to provide evidence for investigating psychological processes.

Moreover, the authors contend that moderation designs serve as an effective means of examining underlying processes when it is relatively easy to manipulate a proposed psychological process but challenging to measure it. On the other hand, mediation analyses should be preferred only when the theoretical psychological process is easily measurable but difficult to manipulate. However, researchers employing this design should remain mindful of its limitations and adequately acknowledge them.

3. Moderation-of-Process Design

In fact, some researchers have used moderation experimental design to test their assumed processes. In one study, researchers used a series of study to show that power (A) affects Objectification (different willing to approaching or liking social targets) (C) through goal-orientation (B) (high instrumental target is more consistent with their goal)[15]. They used moderation design to examine the psychological processes, although they don't mention this very clearly. For example, Gruenfeld et al. claimed that the powerful are more likely to approach social targets due to their instrumentality[15].

In this study, all participants are divided into four groups by power and goal manipulations. Firstly, researchers distributed participants to boss (high power) and subordinate role (low power). Participants are primed two kinds of goals (performance goal, and performance & sex goal) by a word-searching task. Then all participants were told to choose a partner for a subsequent complex analytical task, but the instruction was a key to activate participants' performance goals towards the targets. After participants finished all manipulation above, they were presented with one resume accompanied with photo of a woman, who was moderately competent but highly attractive. That means she was consistent with sex goal, but not suitable for the performance goal. Finally, participants were asked to rate the level they like to work with the specific person on photo.

The results showed that powerful individuals showed a higher preference to work with the beautiful but incompetent female than powerless individuals. When considering different goal settings, power holders are more affected by the instrumentality level of the target. There was a correlation between power and goal setting, indicating that individuals with high power were more influenced by the instrumental value of approach targets compared to those with low power. This result proved that instrumentality is the causes of powerful people preference for approaching specific targets. However, researchers didn't really point out that they used this moderation experimental design to prove their proposed psychological process.

Another study is similar, which explored the relationship between perceived target's power and perceiver's causal attribution towards the target person[16]. They believed that powerful people feel less constraint outside, while powerless people suffer from overwhelming constraints. Their assumption is that constraint acts as a mediator between targets' power-related social categories and perceivers' different attributions towards targets. Therefore, the behavior of individuals in positions of power may be perceived as driven by inherent traits, while the actions of those lacking power may be viewed as influenced by external circumstances.

In Study 1, the researchers sought to demonstrate the way observers attribute behaviors to individuals with varying degrees of power. The findings indicated that behaviors exhibited by individuals lacking power were more likely to be attributed to situational factors, particularly when coercion was involved. In contrast, both the control group and the high-power group were more inclined to attribute behaviors to dispositional factors. Study 2 examined whether constraint is the cause of different attribution towards powerful and powerless people. They manipulated fine-grained

information about constraint, and found that constraints are one cause of perceived power and causal attribution.

We can see from above two examples that researchers used moderation experimental design to examine their assumed psychological processes, but they didn't clear claim this. Spencer et al.[4] believed that when researchers used this method to prove proposed processes, they need to meet two key conditions: a) evidences can prove that moderator indeed influences the assumed psychological process; b) except its effect on assumed psychological process, there is no explanation for the moderating variable's effect on the relationship of independent variable and the dependent variable[17]. This is also the reason that many studies cannot do clear conclusion by using this design to prove inner processes.

Also, this method has its own shortcomings. Firstly, this design necessitates the demonstration of the intended impact of the moderating variable on the proposed psychological process. However, researchers face challenges in providing sufficient robust evidence to substantiate this claim. For instance, in the study conducted by Overbeck et al.[16], it was essential to establish a causal relationship between the manipulation of fine-grained information and participants' perception of targets' constraints. Secondly, such designs must present compelling evidence that the moderator exclusively influences the proposed psychological process, without exerting an effect on other psychological processes. Using the study by Overbeck et al.[16] as an illustration, it was imperative to demonstrate that their moderating variable influenced the perception of constraints specifically, rather than other factors.

4. Causal Chain Design

From Spencer's perspective[1], the best method to test inner psychological processes should be causal-chain experimental design. They proposed that causal-chain design can provide stronger evidence than measurement of mediation, because researchers need to manipulate both independent variable and the mediating variable to see if they can construct a completed system. In this type of experiments, experimenters aim to test whether independent variable (A) influences dependent variable (B) via mediator(C). They firstly test the effect of A on B in the first study, and then they examine whether the causal relationship between B and C is right.

Until now, there is no study in social power area using this design to test proposed psychological processes, so we used a typical example which is mentioned by Spencer et al.[1]. In their study conducted in 1974, Word, Zanna, and Cooper sought to examine the causal relationship between nonverbal behavior, stereotypes, and the self-fulfilling prophecy[19]. Their objective was to investigate the hypothesis that stereotypes (A) lead to behaviors consistent with the stereotype (C) through the influence of nonverbal behavior exhibited by individuals holding the stereotype (B). The initial phase of the study involved White participants conducting interviews with either Black or White interviewees. The results indicated that participants displayed more distant nonverbal behaviors towards Black interviewees compared to White interviewees, thus providing empirical evidence for the relationship between factors A and B. In study 2 White confederates interviewed White participants, but they displayed attitudes towards them as the Blacks or the Whites in study 1 respectively. The result showed that participants who were treated as the Blacks in study 1 performed worse in the interview than those treated as the Whites (i.e., a link between B and C is formed).

Causal chain design also has its own feature. The first difficulty is same as the mediation design. In the design, researcher must be able to measure the proposed process, but many processes are not easy to measure. Secondly, both independent variable and inner psychological process are needed to be manipulated. The most difficult one is that researcher have to prove that the variable they measure in the first step about the relationship of A(independent variable) and C(psychological process) is the

same one that they manipulate in the second step about C and B (dependent variable). For instance, in the research mentioned above by Word et al.[18], they highlighted that the nonverbal behavior they manipulated in the second study is from study 1.

In fact, some existing social power studies can use causal chain design to prove their assumption instead of Baron and Kenny's statistics regression analysis[1]. For example, one study showed that primed power (A) increases participants' self-esteem (B) via their positive affect(C)[12]. They used classical design to test this hypothesis. Affect is a variable easy to be manipulated and measure[19,20]. Thus, they can choose causal chain design to test whether positive affect is the cause of powerful people's higher self-esteem. They can test whether priming power increases participants' positive affect in study 1, and then induce participants' positive affect to test if positive affect could really increase self-esteem.

5. Discussion

Social cognition research has its own feature different from questionnaire study. Due to every variable's different feature, not all psychological processes are suitable to be tested by the most popular and classical statistics analysis by Baron and Kenny[1]. However, most social cognition studies aiming to explore the psychological process still used Baron and Kenny's statistics regression analysis to test, which is overused and sometimes even reduces experiment power. In order to test different psychological processes, researchers need to choose different types of experimental design according to the difficulty level of manipulation and measurement[4]. Till now, there are three types of experimental designs which can be used to prove proposed processes, including measurement-of-mediation design, moderation-of-process design and experimental causal-chain design.

In this paper, we choose social power research as an example of social cognition research, and we found that as other area, most of social power studies still only use Baron and Kenny's analysis[1] to prove their assumed processes[10-12]. For example, one paper further discussed the topic whether power corrupts[13]. Even if some of them changed different statistics analyses, their experiment design still stopped at the measurement of mediation experimental design. Only small part of studies tried to use moderation designs to provide evidences for their theoretical argument[15,16], but they did not have confidence to do conclusions that they examined the proposed processes by moderation design, because only when researcher have enough strong theory to support that the moderating variable really represents the process and only causes proposed process, then they can get the conclusion. Regarding the causal-chain design, there is still very less researcher adopting it.

These three types of methods have their own suitable situations. According to Spencer et al.[4], causal chain experimental design is the strongest design to provide proof for an assumed psychological process. It utilizes several studies to test one psychological process, so both the causal effect of independent variable on mediator and the causal effect of mediator on dependent variable are examined in experimental way. Although causal-chain design has the highest power, it is only suitable when the proposed psychological process is easy to measure and manipulate. In reality, not all proposed psychological processes have this feature. Thus, researcher could consider using moderation of process design to achieve their aims, when the variable is easy to manipulate but not easy to measure. Such designs can provide evidence of a proposed psychological process when there is compelling evidence that the manipulating design of the process is indeed the specific assumed effect, and there is no other explanation for the effect of moderator. Regarding measurement of mediation design, it can be considered when proposed processes are easy to measure and hard to manipulate[4], but researchers still need to consider and avoid its limitation of examining processes.

It is important to find valuable psychological process in theory, but not just significant in statistics. Baron and Kenny's statistics analysis for mediation[1] is of course important, but there is risk that

6

researchers construct psychology model significant in statistics but useless in theory. This paper introduced three types of methods to examine psychological processes at the level of experiment design besides Baron and Kenny's method at the level of statistics, and also summarized situations of using these three designs in past. We believed that in future more studies should choose the suitable designs to prove their theoretical assumptions more powerfully.

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