Construction of the Influence Mechanism of Participation Motivation on Safety Behavior of Mountain Outdoor Sportsmen under Tobacco Control Environment

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Objectives:With the development of mountain sports, there are more and more participants but frequent safety accidents mainlyvictimizing participants. And even caused forest fires because participants smoked. However, as the motivation of participants is the driving force of their actions, theimpact on their safety behavior will inevitably affect the safety of participants in outdoor sports.And if Mountain outdoor Sportsmen are smokers, their safe behavior may be more difficult to control without smoking. Methods: in this study, a qualitative analysis was conducted on 33 interview materials to explore the mechanism of influence of participation motivation of mountain enthusiasts on safety behaviors, and the logical deduction and connotation explanation were carried out based on existing theories.Results: (1)Tobacco control environment does not affect participants' participation motivation, so it does not affect participants' safety behavior through participation motivation; (2) Mountain outdoor Sportsmen' participation motivation has an impact on safety behavior; (3) Safety awareness is an intermediate variable of the influence of mountain outdoor Sportsmen' participation in mountain outdoor sports on safety behavior; (4) Role clarity is the moderating variable of mountain outdoor sports participants' influence on safety behavior. Conclusions: Smoking control environment cannot affect the safety behavior of mountain outdoor athletes through participation motivation, and there may be another mechanism, which needs to be further explored. The participation motivation of mountain outdoor sportsmen affected the safety behavior through the safety perception, but was moderated by Role clarity. And This mechanism needs further quantitative verification.

Key words: mountain sports; participation motivation; safety behavior; smoking control environment
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INTRODUCTION

In recent years, outdoor safety accidents occurred frequently. On November 7, 2019, three people smoking while playing in the wild caused a fire, which caused great damage to themselves and the ecological environment. According to China's National Forestry and Grassland Administration, there were 440 fires in the first quarter of 2021, with outdoor smoking being one of the main factors. People will try smoking when they are tired to keep themselves high[1]. For smokers, if they do not smoke for a long time, it is easy to cause their own emotional loss of control, which is more likely to cause unsafe behavior. The main purpose of many outdoor sports is to get out of the familiar environment and relax in a new place. This helps them forget nicotine in a way. So does the smoking control environment affect participants' safe behavior?

According to the theory of motivation, motivation is the source of impetus, which in psychology refers to an internal state that can guide people's behavior and ultimately help them achieve their goals[2], so it has become an important indicator for evaluating the sense of security[3]. Under the personal motivation of outdoor Sportsmen, they are likely to engage in risk behaviors that violate safety guidelines[4], which may cause them to choose to continue due to their challenging motivation and judgment on their own abilities[5], which may also be the causes of the "522 incident" in Baiyin, Gansu Province. The individual's safety behavior is influenced by his motivation. Psychologist Maslow once said: Demand is the foundation of human activities, demand produces motivation, and motivation determines human behavior. Human individual behavior ability or the causal relationship of individual behavior is affected by the motivation[6], that is, motivation has a causal relationship with human behavior, participation motivation is the internal power of outdoor sportsmen to participate in mountain sports, and safety behavior is their behavior performance to ensure safety in this activity. In mountain sports, participation motivation is an intrinsic stimulus to their safety behavior, which may affect their safety behavior. Therefore, it is feasible to explore the influence mechanism of participation motivation on mountain enthusiasts' safety behavior.

Focusing on the study of outdoor safety from mountain outdoor Sportsmen, and grasping the core point of behavior origin-motivation, in this study, the mountain outdoor Sportsmen are gradually taken as the main research object, focusing on "the influence of participation motivation on safety behavior", to find out how participation motivation affects the safety behavior of mountain outdoor Sportsmen, the mechanism of action, and whether there is an intermediate factor between the two to construct a mechanism model of the influence of mountain outdoor Sportsmen' participation motivation on safety behavior, and to find out the intermediate variable and the regulating variable between the two, with an aim to reveal the mechanism of the influence of mountain outdoor Sportsmen' participation motivation on the safety behavior, and promote the theoretical research on the management of their safety.

LITERATURE REVIEW

After sorting out the existing relevant literature, the research on tobacco control environment is mainly focused on special population studies. For example, studying the effects of secondhand smoke on children[7], almost not from the perspective of individuals. The research on the factors of safety behavior is mainly conducted from two perspectives: internal influencing factors, which are studied from the internal perspective of the individual, and external influencing factors, which are studied from the environmental factors and management factors[8,9,10,11]. Considering that this study is on the individual level of outdoor Sportsmen, it focuses on combing the internal influencing factors.

Internal influence is to influence the safety behavior from the intrinsic reasons of the participants themselves, and the gender, experience, health, own experience and equipment proficiency of outdoor sports participants all influence their awareness of risks, so as to avoid or reduce risks, improve their safety behavior and reduce potential safety hazards[12]. Personal personality and emotion will

affect the safety behavior of outdoor adventure tourists at the scene[13]. Gender has different preferences and requirements for adventure projects that women value safety while men value freedom more[14]. At the same time, outdoor Sportsmen need to be aware of their physical health when they participate in outdoor sports, and even need to provide a medical report when they participate in outdoor sports organized in a standardized way, because self-awareness, pre-trip preparation and their sense of awareness and ability are important factors in ensuring their safety[15]. The effect of tobacco control environment on the safety behavior of Outdoor Sportsmen was not related.

The judgment of risk is a person's sense of concept, which will arouse participants' attention to safety but may prompt them to take more risky behaviors. For example, Buckley et al. (2012) thought that explorers' exploration experience and effective judgment of risks on road trip would prompt them to continue high-risk exploration behavior[4]. Kern et al. (2014) held the same view in their research on skateboarders, and found that even though participants are aware of greater risks, they are willing to take more risks in pursuit of skateboarding fun, but they may eventually hurt themselves[16]. Fang et al. (2017) studied skateboarders and found that personal control of their own sliding speed directly affects the occurrence of safety accidents, and those who abide by the sliding criteria, such as straight-line sliding, rarely have accidents[17]. The level of personal awareness will affect the attention of outdoor Sportsmen to pre-trip preparation, as well as their safety behaviors. Mason et al. (2013) believed that pre-trip preparation and personal experience affect the safety behavior of hikers, and hikers who have long-term activities (not less than 12 hours) must be more fully prepared[18]. Plank (2016) studied the safety behavior of skiers based on the data on the website of outdoor sports platform, and thought that the accuracy of obtaining consultation would affect the safety behavior of participants[19], and the preventive measures before activities were important measures to reduce the risk of outdoor sports. Chippendale et al. (2017) thought that effective preventive measures could reduce the injury risk of the elderly in the study of outdoor activities[20], such as their personal experience, personal technical and physical reserves and pre-trip equipment preparation, etc.However, the lack of personal technical ability will lead to accidents. Zou et al. (2017) analyzed the safety accidents of "tour pals" based on the grounded theory, and concluded that the lack of personal skills is one of the reasons leading to safety accidents, and the lack of self-help and mutual rescue ability in accidents is also a deficiency in accident handling[21].Therefore, it is necessary to prepare for preventive measures before activities, because they depend on the participants' personal awareness of safety, which will affect whether individuals can reasonably apply technology and equipment during outdoor sports, thus avoiding risks[22].Whether an individual is fully prepared for safety before the trip is influenced by tourists'safety concept and safety awareness[23], and safety awareness is mainly reflected in personal safety awareness, so safety awareness is one of the important influencing factors of activists' safety behavior[24].

However, literature review reveals that there is little research on the influence of participation motivation on safety behavior of outdoor Sportsmen. Therefore, in this study, it is attempted to review the related research on motivation and safety behavior in other fields in order to find more literature for literature review. In many studies, safety behaviors have been studied from the internal causes of motivation and behavior, and it is believed that motivation has a close relationship with safety behaviors. Christian et al. (2009) compared human motivation, safety performance behavior and safety result in different contexts based on the theoretical model of worker performance and work environment, and found that safety motivation and safety behavior has a close relationship, believing that safety action opportunity directly affects safety behavior[25]. Ellis et al. (2010) investigated the service personnel in the catering industry, and found that the internal and external motivation of employees will have an impact on their safety behavior, but the internal motivation will have a greater impact[26]. Niu et al. (2015) conducted research on coal enterprise workers, in which safety motivation was divided into controlled safety

motivation and independent safety motivation, and concluded that individual independent safety motivation can influence safety behavior, and independent safety motivation encourages employees to choose safety behavior based on satisfaction and pleasure brought by activities themselves, which can not only achieve expected performance, but also enable employees to explore potential to achieve a higher level of safety performance[27]. Guo et al. (2016) thought that safety motivation is a direct factor affecting workers' safety behavior in their research on construction workers, and emphasized that external environmental factors influence safety behavior on the basis of individual factors[28]. Guo et al. (2020) thought that safety motivation directly affects miners' safety behavior[29].

After combing the related literature of outdoor Sportsmen' safety behavior research, it is found that the research on outdoor Sportsmen' safety behavior focuses on influencing factors, highlighting the influence of safety awareness on their safety behavior. At the same time, most of them focus on specific groups, such as college students, youth groups, or activity groups of a certain project, and so on, with less comprehensive elaboration. However, there is almost no measurement and evaluation on safety behavior of outdoor Sportsmen, and few related researches on safety behavior of outdoor Sportsmen involve participation motivation. In other fields, it is mentioned that the satisfaction of employees' internal needs determines the level of self-determination of safety motivation, and the regulation of employees' safety motivation can essentially correct unsafe behavior[27]. The ultimate expression of internal demand is the motivation of their work. Outdoor Sportsmen' different participation motivations will affect their choices of outdoor sports, and different outdoor sports have different risks and different safety behaviors. Therefore, in this study, focus will be laid on the impact of participation motivation on the safety behavior of outdoor Sportsmen. Especially in the context of tobacco control, does the desire to smoke influence the influence of participation motivation on safe behavior? And the research subjects will focus on the mountain outdoor Sportsmen who have a broad basis of participation in our country.

RESEARCH METHODS and DATA COLLECTION

Research Methods

In this study, the grounded theory, a scientific research method in qualitative research[30], which is generally recognized by the academic circles, is used to explore the mechanism of the influence of mountain outdoor Sportsmen' participation motivation on safety behavior. The grounded theory requires researchers to dig deep into the original data, repeatedly scrutinize, summarize and deduce. The correct research process is a process of summarizing and reasoning, which is to summarize and compress the collected data repeatedly from bottom to top[31]. It also requires researchers to start with the data for inductive analysis instead of relying on the inherent thinking of researchers, and should not perform logical deduction according to the preset research assumptions[32].

According to the characteristics of research with grounded theory, this method is suitable for exploring phenomena, which accords with the research purpose of this study.The grounded theory research method is suitable for the theoretical deduction and construction of the influence mechanism of participation motivation on mountain outdoor Sportsmen. In this study, according to the data collection requirements of grounded theory, semi-structured interviews will be conducted for mountain outdoor Sportsmen to collect data, and the data will be analyzed and deduced according to the analysis process of grounded theory.

Data Collection

Interview

This study clearly covers the participation motivation and safety behavior of outdoor Sportsmen when they participated in mountain outdoor sports last time. In this study, the mountain outdoor Sportsmen were interviewed, including the basic information of the interviewees and interview questions.The interview consisted of three questions: "Do you smoke?", "Do you think the tobacco control environment affects you?", "How do your motivations affect your behavior safety?"Through the interview on this issue, the

original interview data on the influence mechanism of participation motivation on safety behavior are obtained, and on this basis, the author hopes to discover and construct the influence mechanism model of participation motivation on safety behavior of mountain outdoor Sportsmen through the grounded theory method.

Interviewees

A total of 33 people were interviewed in this study, including 23 males and 10 females (Table 1), all of whom were interviewed by researchers in the field. The time span of data collection was long, mainly to ensure the real interaction between researchers and interviewees, so as to make the interview data moresubstantial. Specific interviewees are shown in Table 1.

Table 1
Statistical Data of Interviewees in Formal Survey

Basic information	Items	Number of people	Percentage
Gender	Male	23	69.70
	Female	10	30.30
Age	10-19	1	3.03
	20-29	7	21.21
	30-39	17	51.52
	40-49	7	21.21
	50-59	1	3.03
Smoker	Yes	20	60.61
	NO	13	39.39

Note.
0.01% is missing in the item column for rounding

QUALITATIVE ANALYSIS of INTERVIEW RESULTS

Investigation on the Influence of Tobacco Control Environment on Mountain Outdoor Sportsmen

In the survey, it was found that 60.61% of Outdoor Sportsmen were smokers. Based on the interview with the second question, the results were very consistent. All 20 smokers said that the smoking control environment would not affect them. Before participating in outdoor sports, participants need to know the route. In this process, they have learned which places on the route are not allowed to smoke. They also said they would devote themselves to outdoor sports and ignore smoking. There were also many respondents who said that they wanted to explore nature rather than destroy nature when participating in outdoor sports in mountainous areas. Therefore, they would not let the smoking control environment become their obstacle in the activities.

Therefore, from the analysis of question 2, it is found that the smoking control environment does not affect the motivation of mountain outdoor sports participants.

Theoretical Construction of the Influence Mechanism of Mountain Outdoor Sportsmen' Participation Motivation on Safety Behavior

In the statistics of the previous two questions, it was found that the smoking control environment did not affect participants' motivation to participate. For the third question, we hope that the grounded theory method can be used to discover and construct the mechanism model of the influence of participation motivation on the safety behavior of mountain outdoor Sportsmen. In the coding process, 25 samples were randomly selected for grounded analysis, and 8 samples were reserved for theoretical saturation test.

Open coding

According to the analysis logic of "red-lining→developing concept→discovering category", the original materials were coded in an open way. The specific process is shown in the introduction of the previous research method, which is mainly marked as follows: In the open coding steps of this section: (1) Labeling with ai; (2) Red-lining with aai; (3) Conceptualizing with AAi;(4) Categorizing with Ai.

Labeling and red-lining

In this study, the original data about the influence of mountain outdoor Sportsmen' participation motivation on their safety behavior were collected, that is, the original survey data obtained through the interview of "Question 3: How does your motivation affect your safety behavior" were analyzed one by one strictly following the phenomena truly reflected in the survey data. Through continuous comparison, we abandoned personal prejudice, compared their differences, and repeatedly and deeply analyzed to label and define the phenomena. The phenomenon is red-lined by constantly comparing, discarding personal prejudice, comparing their differences, repeatedly analyzing in depth and then labeling. There was a repetition in the labeling of the 24th qualitative material. In this study, 154 phenomena were obtained from the raw data on the relationship between the participation motivation and safety behavior of mountain outdoor Sportsmen. Examples of the analysis process are shown in Table 2.

Table 2
Excerpts from the Labeling and Definition of the Original Interview Data on the Influence Mechanism of Participation Motivation on Safety Behavior

Case No.	Original data and labeling	Red-lining (ai)
1	Sometimes I fell down because I wanted to catch up or talk with my friends rather than a technical problems (a1), (a2) and (a3), or maybe I was overconfident (a4). Sometimes, if I went too far in pursuing speed, I would have dangerous behavior, because it was easy for me to ignore the danger brought by speed (a5)(a6) and the safety criterion (a7). Sometimes when I slid fast, even if I saw someone in front of me, I wanted to change the direction instead of slowing down (a8). Of course, sometimes when we know that we need to challenge speed, we will make more preparations (a9) (a10), such as warm-up (a11), better equipment (a12), paying attention to the weather (a13), keeping warm (a14), and so on. Generally speaking, if we felt that it would be more dangerous (a15), we would carefully prepare (a16).	a1 catching up with peers a2 speaking with a partner a3 ignoring safety a4 over confidence in oneself a5 over pursuit of speed a6 neglecting risk a7 paying attention to safety standards a8 following standard operation a9 for challenges a10 making more preparation a11 doing more warming up a12 being better equipped a13 paying attention to the weather a14 keeping warm a15 feeling more dangerous a16 careful preparation
……	……	……

Note.
Summarized in this study.

Conceptualization,standardization and categorization

After labeling the phenomena, the 154 defined phenomena were refined and analyzed according to the standard process of open coding: "red-lining→conceptualization→categorization", and 148 initial concepts were formed. Then, 148 preliminary concepts were further standardized in language and concepts, and 58 standardized concepts were finally formed through the process of standardization of the initial concepts. Once again, the standardized concepts were summarized, refined and sublimated, and compared repeatedly. Finally, the generic relationship between concepts was found, and 21 categories were formed. The specific process is shown in Table 3.

Spindle coding

In the process of spindle coding, the deep relationship of each preliminary category is gradually clarified, one preliminary category at a time is analyzed in depth to explore its correlation around the category, and whether there is a potential correlation at the conceptual level for each preliminary category is analyzed to find out its "spindle". Following this analysis step, in this study, the 21 categories obtained in the previous primary coding process were further analyzed, and the relationships among the 21 categories were clarified. By finding the evidence chain supporting the main categories, four main categories, such as participation motivation, safety awareness, safety behavior and role clarity, were finally obtained. The paradigm models of each main category are shown in Table 4.

Table 3
Excerpts from the Open Coding Process of the Original Data of the Interview on the Influence Mechanism of Participation Motivation on Safety Behavior

Red-lining	Conceptualization	Normalization	Categorization
a55 Following the organizer's instructions	aa52 Following the organizer's instructions	AA30 Following the organizer's instructions	A15 Safety compliance behaviors
a78 Valuing matters needing attention	aa74 Matters needing attention	AA39 Matters needing attention	
a149 Strictly abiding by the warning signs	aa143 Strictly abiding by the warning signs	AA57 Observing safety guidelines	
a59 The concern of the family a116 Families	aa56 The concern of the family	AA31 Family concerns	A16 Family role
a95 Having a family	aa91 Having a family		
a65 Being prepared to deal with emergencies	aa61 Doing a good job in response measures	AA34 Cognition of doing a good job of safety protection	A17 Cognition of safety assurance work
a99 Necessary protective measures	aa95 Necessary protective measures		
a132 Making the judgment reasonably	aa127 Making the judgment reasonably		
a139 These safety work should be done more seriously.	aa134 Doing a better job in safety work		
a151 Doing well in the protection work required for outdoor activities	aa145 Doing well in the protection work		

Note.

Summarized in this study

Table 4
List of Main Categories and Category Relations of the Original Interview Data on the Influence Mechanism of Participation Motivation on Safety Behavior

Main categories	Categories
Ca1Participation motivation	A1 Social contact (causal condition); A3 Achievements (causal conditions); A5 Health (causal condition); A8 Seeking knowledge (causal condition); A13 Interest (causal condition)
Ca2Safety awareness	A2 Safety awareness (action strategy); A3 Cognition of self-ability evaluation (causal condition); A4 Cognition of safety behavior knowledge (causal condition); A7 Cognition of preparatory work (causal condition); A10 Safety awareness of mutual assistance with friends (causal conditions); A13 Awareness of activity safety status (action strategy); A17 Cognition of safety and security work (causal conditions); A18 Cognition of self-physical condition (causal condition)
Ca3Safety behaviors	A5 Safety participation behavior (action strategy); A10 Safety compliance behavior (action strategy); A4 Safety intention (result)
Ca4Role clarity	A7 Instructive role (causality); A9 Organizational role (causality); A11 Family roles (causality); A12 Participation role (causality); A14 Social responsibility (causality)

Note.
Summarized in this study

Main categories:

Ca1——Participation motivation: Mountain outdoor Sportsmen do mountain outdoor sports for different motives, either out of their own interests, or out of the need to communicate with others, that is, social communication needs, and also for the purpose of getting healthy through mountain outdoor sports. At the same time, they may also hope to acquire new knowledge or different experiences in the process of mountain outdoor sports, that is, seeking knowledge, and they are more likely to hope to achieve success through participation in mountain outdoor sports. The evidence chain diagram is shown in Fig. 1.

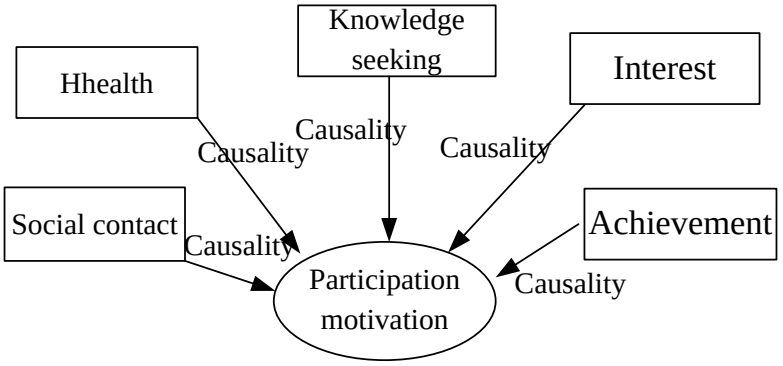

Fig. 1 Evidence chain of participation motivation

For example, the interviewee Liu replied in his answer to the third question: "**Today I teach others to ski, so I will pay more attention to safety behavior (a21 teaching others to ski) (a22 paying more attention to safety). In order to ensure the pleasure of the results (a23 ensuring the pleasure of the results), it is more important to ensure safety (a22 paying more attention to safety).**"From this passage, a23 "to ensure the pleasure of the results" reveals its causal relationship with participation in outdoor sports.As Piaoxue answered, "**To be honest, I mainly go for fitness and social contact (a66 fitness) (a67 social contact). For the purpose of fitness (a66 fitness), I still pay more attention to safety (a22 paying more attention to safety). For example, I must buy knee pads to protect my knees if I am afraid of injury (a68 thinking the joints are in bad condition) (a69 buying pads to protect), and bring enough water and food (a70 bringing enough water and food)and I will choose a reasonable way to go (a71 I will choose a reasonable way to go)** …" Thus it is clear that a66 "fitness" and a67 "social contact"

are the purposes of Piaoxue's participation in outdoor sports.

Ca2——Safety awareness: Mountain outdoor Sportsmen can improve their self-awareness and judgment of safety through their cognition of preparation work, self-awareness of physical condition, knowledge of safety behavior, safety awareness of mutual assistance with friends, safety assurance work and self-evaluation of ability, which is manifested in their cognition and judgment of safety degree and activity safety. See Fig. 2 for the evidence chain.

Interviewee Xiaoxin said: "**The main purpose is to see if I can do it, so I attach great importance to safety (a24 to see if I can do it) (a22 paying more attention to safety). This time I made a lot of preparations in advance (a25 making a lot of preparations in advance), checked a lot of information (a26 looking up a lot of activity-related information), and planned the approximate distance to ride every day (a27 planning the activity distance). At the same time, I set a reasonable time range for myself (a28 leaving myself enough time for activities). I prepared two or three sets of equipment (a29 preparing more equipment) ...**"a27 "planning the activity distance" and a28 "leaving myself enough time for activities" show that mountain outdoor Sportsmen are aware of the safety preparation for activities, and only with this can they have a better attitude to face the situation in the outdoor process.

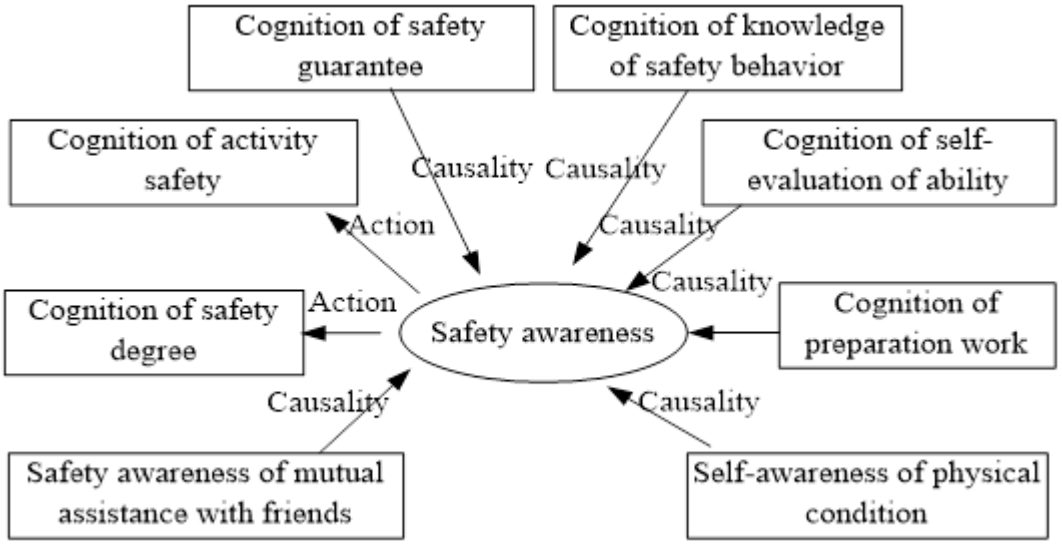

Fig. 2 Evidence chain of safety awareness

Ca3——Safety behavior: Mountain outdoor Sportsmen can ensure their safe work in the process of mountain outdoor sports via their self-safety intentions through two kinds of safety behaviors, namely, safety participation behavior and safety compliance behavior.The former refers to the participants' voluntary participation in their own safety and the team's safety guarantee, while the latter refers to the participants' compliance with safety standards during the activities to ensure the safety of the activities. The evidence chain for safety behavior is shown in Fig. 3.

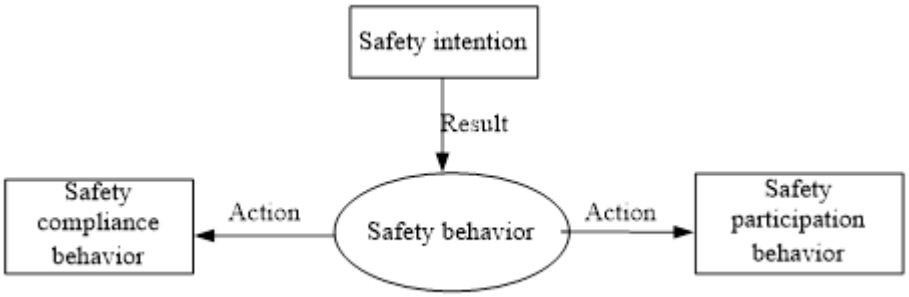

Fig. 3 Evidence chain of safety behavior

Uncle Noodle said in the interview: "**Then I can be safe on my own (a88 being safe on my own).The main tasks are to do a series of preventive work (a89 doing a series of preventive work), better reserve my physical strength (a40 doing more physical strength reserve), guarantee the equipment (a90 equipment guarantee), and carefully evaluate your own condition (a91 carefully evaluating your own condition).**"a89, a40, a90 and a91 in this original data are all safe participation behaviors, that is, personal safety participation is used to ensure safety.Interviewee Xx mentioned in the interview data that "**we should strictly abide by the warning signs (a149 strictly abiding by the warning signs), and do not try to take risks (a150 not trying to take risks)** ..." a149 "Strictly abiding by the warning signs" is a safety behavior and a guarantee to ensure safety.

Ca4——Role clarity: The role clarity of mountain outdoor Sportsmen will be influenced by their role identity, such as instructive role, organizational role, participation role and family role, as well as their own responsibilities. The chain of evidence is shown in Fig. 4.

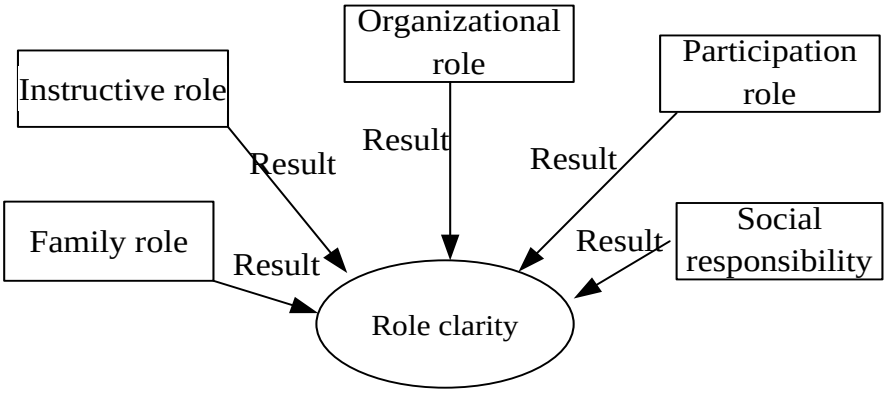

Fig. 4 Evidence chain of role clarity

In the interview, some interviewees said that she would pay more attention to safety because she had a teaching role when guiding others to ski, for example, "**Today I teach others to ski, I would pay more attention to safety behavior (a21 teaching others to ski) (a22 paying more attention to safety)** …". At the same time, some interviewees said that after having a family, they would go to difficult activities less, such as "**I'm less likely to take part in such difficult activities now. After all, I have a family (a95 having a family)** ...". Meanwhile, outdoor participants showed their participation in safety behaviors when participating in activities

organized by others, such as "**Participants should pay attention to some team cautions as (a78 cautions) (a79 as participants) …**".

Selective coding

In this study, the four main categories obtained by pre-coding and repeated examination and analysis were further analyzed by using the four steps of selective coding. Combined with the original data collected in the previous period, the differences and similarities were repeatedly compared and asked, and finally the core category of this study was slowly discovered and determined, which can explain the phenomena in the original data, analyze and connect all other categories, and define the core category as a theoretical structural model of the mechanism of the influence of outdoor Sportsmen' participation motivation on their safety behavior.

According to the collected original qualitative materials, the story line is extracted: the mountain outdoor Sportsmen, driven by their participation motivations such as achievement, interest, knowledge seeking, health, social contact etc., will directly influence their safety behavior, and will also influence their safety behavior through their safety awareness.When mountain outdoor Sportsmen have different degrees of self-role clarity in the process of participating in outdoor sports, the influence of participation motivation on mountain outdoor Sportsmen' safety behavior will be enhanced or weakened.

According to the above research, combined with the description of the story line, the relationship between the four main categories was analyzed, and the mechanism model of the influence of participation motivation on the safety behavior of mountain outdoor Sportsmen was constructed, as shown in Fig. 5.

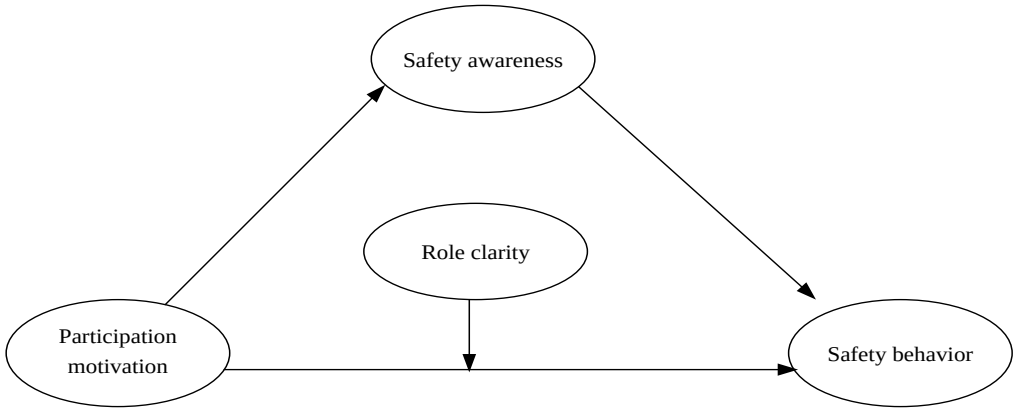

Fig. 5 Preliminary theoretical model of the influence mechanism of participation motivation on safety behavior of mountain outdoor Sportsmen

Theoretical saturation test

Three interview raw materials were randomly selected from the reserved interview materials to test the theoretical saturation of the research content in this section, and the three interview raw materials were open coded using open coding to verify whether new concepts and new categories would appear. The process is as follows:

Interviewee 1: I came to Taibai Mountain-Aoshan Mountain for hiking mainly because I like outdoor sports **(a96 liking outdoor)** and I want to challenge myself **(a44 challengingoneself).**Therefore, I prepared good equipment **(a12 better equipment),** and I also attached great importance to safety **(a22 paying more attention to safety),** knew the activity route in advance **(a75 knowing the route in advance)**, and did more physical exercise at ordinary times **(a40 making more physical reserves)**.I like outdoor sports **(a96 liking outdoor)**, so I have to follow the safety rules **(a7 paying attention to safety rules).** I will hire a professional guide **(a126 inviting a professional team leader)** and participate in professional team

activities **(a127 participating in professional outdoor group activities).**

Interviewee 2: How does participation motivation affect my safety behavior? In fact, I mainly do it for exercise. Therefore, I attached great importance to safety, followed the instructions of the guide **(a55 following the organizer's instructions)**, did more warm-up **(a11 doing more warm-up),** prepared the equipment **(a145 preparing the equipment)**, and wasnot nervous during the activity **(a119 not being nervous)**. Of course, before leaving, I would make a risk assessment myself **(a112 doing a risk assessment)**, so that I can know more about the situation **(a113 making oneself know better)**, which is conducive to making a judgment when an accident happens **(a132 making the judgment reasonably)**.

Interviewee 3:If I go to the mountain outdoor sports to challenge **(a9 to challenge),** maybe I will pay more attention to safety **(a22 paying more attention to safety)**, because if I challenge myself **(a44 challenging oneself)**, the route will be more difficult, so the activities may be risky **(a39 thinking the activities are risky)**, so I will make more preparations **(a10 makingmore preparations)**.If it is for relaxation **(aa116 for relaxation)**, I will choose some simple routes **(a71 I will choose an easier way to go)**, so that I don't have to be too nervous **(a119 not being too nervous)**, but I can't be unprepared **(a84 having no preparation)**, so we should pay attention to safety every time **(a79 paying attention to safety)**.

The coding and analysis of the above three random cases found no new concepts and categories. Therefore, the theoretical model of the impact mechanism of participation motivation on mountain outdoor Sportsmen' safety behavior has reached theoretical saturation and passed the theoretical saturation test.

CONSTRUCTION of the HYPOTHESIS of the MECHANISM of the INFLUENCE of PARTICIPATION MOTIVATION on the SAFETY BEHAVIOR of MOUNTAIN OUTDOORSPORTSMEN

Influence of Participation Motivation on Safety Behavior and Safety Awareness of Mountain Outdoor Sportsmen

In classical behavioral psychology's theory, stimulus can be divided into internal stimulus and external stimulus, both of which will have an impact on human behavior [33,34]. In this study, participation motivation refers to an internal state that guides people to participate in an activity, makes them act, and encourages them to achieve a certain goal. Participating motivation is the inner power of human being and the inner demand of activity participation. The research premise of this study is the influence of outdoor Sportsmen' participation motivation on their safety behavior in a mountain outdoor sport, that is, the scope of the study is the participation motivation of participants in a single mountain outdoor sport, which is the inner belief of mountain outdoor Sportsmen, their psychological motivation to participate in this mountain outdoor sport, and the clear participation motivation of this mountain outdoor sport, which is the prerequisite of activities and the inner stimulus. The safety behavior of mountain outdoor sports refers to the behavior of ensuring their own safety in the mountain outdoor sports, which is the behavior occurring in the activity process. Therefore, participation motivation will affect the safety behavior.

The early "S→R" equation of behaviorism theory was applied to explain the behavior formation of the body, and then developed to the later "S→O→R" equation because it was found that the stimulus reaction was too simple and ignored the role of receptor in the process, so "stimulus-receptor-response" was put forward, which has different applications in different fields. [34] In terms of tourism safety, Lin et al. (2017) believed that external stimuli can change tourists' safety awareness and then change their safety behavior[35]. Wu et al. (2020) held that the participation motivation of mountain outdoor Sportsmen affects their safety awareness, and safety awareness is one of the main manifestations of safety awareness[36]. Participation motivation is the intrinsic stimulation of mountain outdoor Sportsmen' activity behavior, and also a stimulating condition for their safety awareness of this sport.

Participation motivation will affect mountain outdoor Sportsmen' safety awareness.

Influence of Safety Awareness on Safety Behavior of Mountain Outdoor Sportsmen

According to the reinforcement theory of stimulus response theory, behavioral response will be reinforced by personal stimuli in the process, such as personal emotions (pleasure), and personal emotions come from personal evaluation of external stimuli and produce different emotions. In social learning theory, people's subjective initiative is emphasized, and it is believed that people's self-learning and observation can improve cognition and thus affect behavior. According to these two mature theories, it is believed in the present study that behaviors are affected by individual cognition.

The influencing factors of safety behavior can be divided into external influencing factors and internal influencing factors. In this study, the internal influencing factors of safety behavior are considered more, mainly the participants' own factors. Outdoor backpackers who lack experience, emergency rescue, emergency escape and other skills, and do not have a clear understanding of their own safety, are likely to be in distress because they cannot save themselves in time[37]. If the participants do not know enough about the safety events, it will affect their safety awareness, and the participants' safety awareness determines whether they can correctly view the unexpected events, thus affecting the participants' emergency response ability and behavior[38]. Relevant views in other fields have also been confirmed: Yin et al. (2012) studied the safety awareness as one of the factors influencing the safety of coal miners[7]. Ju et al. (2013) thought that individual factors are the main factors of unsafety behaviors, and individual factors mainly include safety awareness[39]. Wang et al. (2013) found that migrant workers' safety awareness has a significant impact on their safety behavior[40]. Wang et al. (2015) found that safety awareness has a negative impact on unsafety behavior in the research of civil aviation crew[41]. Hald(2018) found that workers' safety awareness will be different due to the recognition of the environment, which will affect their safety behavior[42]. The main body of safety awareness and safety behavior is individuals. Similarly, if outdoor Sportsmen have enough knowledge of safety and deep awareness of the importance of safety behavior, their behavior choices tend to be safer, that is, the formation of safety behavior cannot be separated from the influence of the formation process of personal awareness[43].

Moderating Role of Role Clarity

According to the role theory, the process of individual role socialization includes interaction between role and society, formation of role relationship and individual role playing[44].Different roles have different interactions and demands. Role, in essence, is human sociality, which plays an important node role in individual socialization, and it is an important step for individuals to become members of organizations to assume the requirements and expectations of organizations for roles[45].With different roles, the individual's participation motivation will have a different impact on the information systematisms and intuitive information processing.In this study, it is believed think that in the process of mountain outdoor sports, self-positioning will make people more aware of their roles in the whole activity.

Individuals' cognition of role judgment will affect their behavior safety, because if their own role cognition is not accurate enough, it may lead to the deviation of role understanding, which makes them unclear about their own responsibilities and rights, and their own behaviors in the team, which may cause conflicts with others and unnecessary risky behaviors[46].Because there is no clear division of authority among members, there will be contradictions, which will lead to accidents in the process of mountain outdoor sports activities[47].However, when individuals clearly define their roles, the quality of work service will be improved and their clear roles are conducive to further improving themselves and understanding their roles in the team, which in turn affects the quality of work service[48].If individuals can have a clear understanding of their roles, it will help them to fulfill the role requirements, then their participation motivation will likely be amplified in the impact on safety behavior, because they can clearly define their

roles, quickly adapt to the environment, and apply the ability to more in line with the reality, to more effectively ensure the safety of behavior. At present, there have been related researches in other fields. Bliese et al. (2000) found that a clear role of individuals in the work environment can alleviate the relationship between demand and stress in the research on the occupational stress management[49]. Shou et al. (2011) considered in their research on behavior control and trust relationship that an individual's clarification of his/her role will amplify the behavior control and trust relationship[50].

Therefore, in this study, it is considered that the clear judgment of self-role of mountain outdoor Sportsmen will make them respond to accidents more calmly and quickly, and enhance the enforcement of their participation in security work. On the contrary, if outdoor Sportsmen do not clearly understand their roles, such as when they position themselves as veterans when participating in activities as novices, or overestimate their own level and roles too much, this will lead to their neglect of safety, affect their safety behavior, and increase the possibility of risks.

CONCLUSION

Qualitative Theoretical Conclusions

The qualitative research materials collected in the early stage were analyzed according to the grounded theory. The data of three interview questions were comparatively analyzed and repeatedly refined through three-level coding: open coding, spindle coding and selective coding, to get the categories, main categories and core categories of each question. After theoretical saturation test by randomly selecting three reserved materials, the theoretical model of the influence mechanism of participation motivation on the safety behavior of mountain outdoor Sportsmen was constructed. The main conclusions are as follows:

(1)Tobacco control environment does not affect participants' participation motivation, so it does not affect participants' safety behavior through participation motivation;(2)Mountain outdoor Sportsmen' participation motivation has an impact on safety behavior; (3) Safety awareness is an intermediate variable of the influence of mountain outdoor Sportsmen' participation in mountain outdoor sports on safety behavior; (4) Role clarity is the moderating variable of mountain outdoor sports participants' influence on safety behavior.

Specifically, the relationship between participation motivation and safety behavior of mountain outdoor Sportsmen is as follows: participation motivation has a direct impact on mountain outdoor Sportsmen' safety behavior and their safety awareness, while Sportsmen' safety behavior is influenced by their safety awareness, and role clarity may play a moderating role between participation motivation and safety behavior.

Research Prospect

In this study, the mechanism of the influence of participation motivation on safety behavior of mountain outdoor Sportsmen is qualitatively studied by grounded theoretical research method, and the mechanism model of the influence of participation motivation on safety behavior of mountain outdoor Sportsmen is put forward. On this basis, new research directions can be continued in the future, including:

(1) Continue to explore how the tobacco control environment affects the safety behavior mechanism of athletes.

(2)The structure of the model is quantitatively verified by questionnaire survey and mathematical statistics, and the relationship between the dimension of participation motivation and the dimension of safety behavior is further explored, so as to put forward a more accurate model.

(3) A mechanism model of the influence of participation motivation of mountain outdoor sports on safety behavior is constructed, in which safety awareness is a mediating variable, and role clarity is an adjusting variable. In the study, whether role clarity can be adjusted through safety awareness is not explored, that is, the moderating effect of intermediary can be further studied, and whether there are other new mediating variables can be further explored. The new moderating variable needs to be further explored, so as to increase the depth of research

and further improve the mechanism model of participation motivation of mountain outdoor sports personnel on safety behavior.

Author Declaration

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