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An Intervention Study of Middle School Students' Self-Regulation Skills Based on Reinforcement Sensitivity Theory

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Abstract

Individuals in adolescence are prone to behavioral problems, which may be attributed to the weak conflict detection and regulation ability of adolescents, therefore, this study, based on the theoretical foundation of reinforcement sensitivity, focuses on exploring whether it is possible to enhance adolescents' behavioral inhibitory ability, so as to improve the level of self-regulation and self-efficacy of individuals. The study used the experimental method, and 75 junior high school students (40 in the experimental group and 35 in the control group) were finally selected as the research subjects, and the intervention training was provided to the students. The results of the experiment found that: On the measure of reinforcement sensitivity, the reward sensitivity of the experimental group was significantly higher than that of the pre-intervention; the punishment sensitivity was significantly lower than that of the pre-intervention; on the measure of general self-efficacy, the general self-efficacy of the students in the experimental group was significantly higher than that of the pre-intervention; there was no significant difference between the pre- and post-intervention levels of conflict regulation and self-regulation, but both of them had an upward trend. Conclusion: The intervention increased students' general self-efficacy and confidence; it increased students' reward sensitivity and decreased students' punishment sensitivity, but it did not increase students' conflict regulation; there was an upward trend in students' self-regulation.

Keywords: intensive sensitivity theory, middle school students, self-regulation skills

1. Introduction

Adolescence is an important period of human growth, and middle school students in this period experience physical and mental changes and changes in interpersonal interactions. The rapid growth has a significant impact on students' learning and life. Middle school students at this stage have poor ability to distinguish between right and wrong, and they are easily exposed to psychological hints, and lack self-regulation ability to some external "temptations" Gray's Reinforcement Sensitivity Theory (RST) was initially proposed with animals as the object of study, although RST

cannot fully explain human behavior, it still makes many psychological researchers to study the behavior of animals, but still makes a lot of psychological research. Although the animal-based theory of reinforcement sensitivity does not fully explain human behavior, it has attracted the interest of many psychological researchers, who have conducted extensive studies on it. From the viewpoint of previous research, many empirical studies on reinforcement sensitivity still have some areas that need to be improved and strengthened: the research on reinforcement sensitivity mainly focuses on the individual's reactive changes in reward and punishment sensitivity and the effects of these two behavioral systems on the individual, while there are very few empirical studies on the level of conflict regulation, which has the greatest change after the revision, not to mention the individual's reactivity to conflict regulation. Behavioral inhibition system is the system with the biggest change in the development process of reinforcement sensitivity theory, and it has also become a more advanced system in the theory of reinforcement sensitivity, and as the newest system developed in the development process of reinforcement sensitivity, it deserves the attention and concern of researchers. From previous research on reinforcement sensitivity, it is easy to find that most of the research on reinforcement sensitivity focuses on adults and college students, and there is a lack of research on lower age groups, such as adolescents and children. Therefore, this study conducted a preliminary exploration of the application of reinforcement sensitivity in middle school students, and used reinforcement sensitivity as the theoretical basis for the intervention training of self-regulation skills for middle school students, so as to improve the self-regulation skills of middle school students, so that middle school students can learn "not to avoid harm" and "not to take advantage", and promote their better development.

2. Literature Review

2.1 Enhanced Sensitivity and Enhanced Sensitivity Theory

Reinforcement sensitivity refers to an individual's responsiveness to reinforcing stimuli, i.e., the tendency and degree of change in behavior, emotion, and motivation produced by an individual in the face of reinforcing stimuli. Reinforcement sensitivity consists of two components: reward and punishment sensitivity (GUO Shaodan, HE Jinlian & ZHANG Liyan, 2009). The introduction of Eysenck's theory of motivation triggered researchers to explore the physiological dimension of personality. Among the studies on the physiological aspects of personality, the most valuable one to explore is Gray's reinforcement sensitivity theory. Reinforcement sensitivity theory suggests that an individual has three nervous systems that are sensitive to reward and punishment signals as well as control and regulate a range of individual behaviors. However, because the reinforcement sensitivity theory takes animals as the research object, so it can't fully apply and explain some human behaviors. Therefore, in 2000, Gray revised the reinforcement sensitivity theory, after the revision of the reinforcement sensitivity theory is still sensitive to reward and punishment signals, but increased the individual's responsiveness to goal conflict and the ability to regulate (Gray J A & Mcnaughton N, 2000). In the process of revision, the research on the theory of reinforcement sensitivity has been deepened, and it has been gradually applied to the field of personality and clinical psychology (Elliot A J & Thrash T M, 2002; Depue R A & Collins P F, 1999), which shows the importance of the theory of reinforcement sensitivity. The revised Reinforcement Sensitivity Theory consists of the Behavioral Approach System (BAS), the Fight-Flight-Freeze System (FFFS), and the Behavioral Inhibition System (BIS). Activation of an individual's BAS and FFFS activates the individual's BIS, and when the BIS is activated, the individual's approach and avoidance behaviors are inhibited, and attention to the desired goal and arousal are produced. According to Gray and McNaughton, when the BIS system is activated, individuals experience emotions such as anxiety and anxiety, and individuals who experience these emotions tend to engage in avoidance behaviors to reduce their negative emotional experiences. In other words, individuals always tend to avoid conflict (Gray J A & Mcnaughton N, 2000). Gray believes that when an individual's behavioral inhibition system is activated, the individual will look for the best way to resolve the conflict in his or her own memories and experiences. For middle school students in adolescence, the best way to find a solution to a conflict is to make the right choice for development. This study concludes that the individual's behavioral inhibition

system consists of two parts: conflict convergence and conflict avoidance.

2.2 Enhancing Sensitivity and Self-Regulation

From the existing studies we did not find any research on the relationship between reinforcement sensitivity and self-regulation. However, we can infer the relationship between reinforcement sensitivity and self-regulation through the concepts of reinforcement sensitivity theory. According to the content of reinforcement sensitivity theory, on the one hand, individuals with activated reward sensitivity are sensitive to conditioned desire stimuli and show convergent behaviors toward desired goals, and individuals with higher reward sensitivity can also be considered to have higher levels of conflict convergence, so individuals with higher reward sensitivity have higher self-regulation. On the other hand, individuals with activated punishment sensitivity are sensitive to conditioned aversive stimuli and exhibit avoidance behavior toward the desired goal, and are negatively correlated with the level of conflict convergence; thus, individuals with higher punishment sensitivity have lower self-regulation (Guo Shaodan, 2010).

2.3 Enhanced Sensitivity and General Self-Efficacy

From the relationship between reinforcement sensitivity and self-regulation ability and the relationship between self-regulation ability and general self-efficacy, it can be inferred that reinforcement sensitivity and general self-efficacy are correlated. Based on the relationship between reinforcement sensitivity and self-regulation ability, we can find that individuals with higher reward sensitivity have higher levels of self-regulation ability, while individuals with higher punishment sensitivity have lower levels of self-regulation ability. Individuals with higher self-regulation abilities are better able to deal with conflicting events in their lives and thus feel confident about the future, so individuals with higher self-regulation abilities tend to have higher levels of general self-efficacy. On the contrary, individuals with lower self-regulation tend to develop withdrawal behavior from situations that cause them conflict and lack confidence in resolving conflicts, so such individuals have lower general self-efficacy. From the above, we can see that individuals with higher reward sensitivity tend to have high levels of general self-efficacy, while individuals with higher punishment sensitivity tend to have lower levels of general self-efficacy.

2.4 Review of Existing Studies

From the perspective of the theoretical development of reinforcement-sensitive habituation, the empirical research on reinforcement-sensitive theory is increasing, but there is very little research on one of the most changed systems after the revision of reinforcement-sensitive theory- BIS system, as a more powerful system after the revision, deserves our attention. According to the revised reinforcement sensitivity theory, we can find that the antagonistic-escape-rigid system and the reward-sensitive system interact with each other, that is to say, the antagonistic-escape-rigid system has a certain inhibitory effect on the reward-sensitive system. However, studies have shown that middle school students in adolescence are at the highest level of reward sensitivity, and the inhibitory effect of the confrontation-escape-rigidity system is obviously insufficient. In order to avoid risky behaviors and negative emotions resulting from high reward sensitivity, we need to inhibit middle school students' behavioral inhibitory systems with more powerful functions (including the conflict-convergence and conflict-avoidance dimensions). So that students can learn not to avoid harm (in the face of difficulties, to be able to rise to the occasion, for the sake of their own goals, courageous perseverance) and not to take advantage of the benefits (in the face of temptation, to learn to refuse, successfully resist the temptation), to make positive choices in favor of (when facing temptations, learn to reject them and successfully resist them), and make positive choices that are favorable to growth. Therefore, based on the above ideas, this paper will explore whether it is possible to improve junior high school students' self-regulation ability through the intervention training of the BIS system? Is it also possible to further enhance middle school students' general self-efficacy?

3. The Research Process

3.1 Subjects of Study

Two classes were selected as the experimental group and control group respectively in the second grade of a middle school in Harbin City. The experimental group had 49 subjects, including 25 boys and 24 girls. The control group consisted of 45 subjects, including 24 boys

and 21 girls. After matching the pre- and post-tests and eliminating invalid questionnaires, 75 valid questionnaires were finally obtained. Among them, 40 were in the experimental group and 35 in the control group.

3.2 Research Tools

3.2.1 Enhanced Sensitivity Questionnaire for Middle School Students

The Reinforcement Sensitivity Questionnaire for Middle School Students (Nannan Cui, 2014) was used, which consists of 24 questions and contains three dimensions: reward sensitivity (r-BAS), punishment sensitivity (r-FFFS), and conflict regulation level (r-BIS), where the conflict regulation level (r BIS) consists of two secondary dimensions: conflict approach (BIS-AP) and conflict avoidance (BIS-AV). The questionnaire is based on a five-point scale ranging from "not at all" to "completely" on a scale of 1-5.

3.2.2 General Self-Efficacy Scale

The General Self-Efficacy Scale (Zhang Xiaolan, 2012) was used, which consists of 10 items and is scored on a four-point Likert scale, and subjects were asked to fill in the scale according to their own reality, with higher scores indicating higher levels of general self-efficacy.

3.2.3 Self-Regulation Questionnaire for Primary and Secondary School Students

The Self-Regulation Questionnaire for Elementary and Middle School Students (Gao Li, 2011) was used, containing three dimensions: motivation, strategies and behavior. A total of 38 questions, divided into positively scored for and negatively scored questions, asked to be rated using a four-point Likert scale.

3.3 Research Design

3.3.1 Pre-Experimental Preparation

Confer with the school's psychology teacher to determine the arrangements for the experimental process, including the selection of the participating classes, the random assignment of the experimental and control groups, and also the details of the content and organization of the intervention sessions. Collect basic information about the students in the class.

3.3.2 Pre-Implementation Testing

Levels of reinforcement sensitivity, general self-efficacy, and self-regulation of junior high school students were measured using the Junior High School Students' Reinforcement Sensitivity Questionnaire, General Self-Efficacy Scale, and Elementary and Middle School Students' Self-Regulation Questionnaire for the experimental and control groups prior to the intervention lecture.

3.3.3 Implementation of Interventions

Weekly use of the experimental group's psychology class time to implement the intervention course, an average of 45 minutes, one lesson per week for 10 weeks, the control group does not conduct any operation; based on the theory of reinforcement sensitivity, the intervention course for junior high school students' self-regulation skills has a total of eight lessons, four parts, namely, understanding the theory of reinforcement sensitivity, applying the theory of reinforcement sensitivity, mastering the strategy of reinforcement sensitivity, and the reinforcement sensitivity theory's application in academic life. See Table 1 for details.

Table 1. Content of self-regulation skills intervention programs for middle school students

Intervention design	Theme of intervention	Content of the intervention
Understanding of the BIS system	Getting to know the BIS system	1) Iowa Gaming Mission 2) Combining the game, explaining the BIS system 3) Group discussion: Have you encountered things in your study and life that make you feel conflicted 4) Summarization
	Getting to know the BIS system on film	1) Review and sort out the content of the previous lesson 2) Watch the movies: "The Three Stooges" and "Braveheart", and identify the reward signals and punishment signals in the movies 3) Discuss in small groups: how you feel about watching the movies and what you gained from the movies 4) Share the results of the small group discussions in class

Learning to utilize the BIS system	Share the BIS Story	1) Combine the results of the pre-test and pick out the students with high scores on the BIS system 2) Ask the students with high scores on the BIS system to share their own short stories about the application of the BIS system in their lives and studies 3) Discussions: Based on the short stories shared by the students, talk about your feelings and gains 4) Teacher's summary: Be brave and persevere towards growth; resist temptation and avoid risks
	In-depth utilization of the BIS system	1) Small group discussion: talk about the gains and feelings of using the BIS system in the last week. 2) Students continue to share their BIS system short stories. 3) Discussion: Tell us whether your short story is about "Courageous perseverance towards growth" or "Resisting temptation and avoiding risk". 4) Teacher's comments and summarization
BIS Strategy Sharing	Strategies for sharing and utilizing BIS systems	1) Group discussion: categorize and summarize the short stories about the BIS system shared in the previous weeks, and talk about their own strategies and feelings when facing the "contradiction" 2) Class sharing: strategy sharing 3) Teacher's comments and summaries, and introduction of appropriate strategies (e.g., imagining the future, attention shifting)
Practical use of the BIS system	BIS systems in interpersonal shyness	1) Knowledge review 2) Experiencing the situation: want to join a "small group" but worry about not being accepted 3) Group discussion: what would you do if you encountered the above situation? 4) Class sharing: the results of the group discussion 5) Teacher's comments and summarization.
	Application of BIS systems to resist peer pressure	1) Review the behavioral assignments from the previous lesson 2) Experience the situations: refusing a classmate's invitation to go to the Internet in order to revise for an exam; being good friends with an unpopular classmate 3) Discuss in small groups: say what you would do if you encountered the above two situations. 4) Summarize
	Application of the BIS system to the rejection of undesirable foods	1) To sort out and review the knowledge learned in the previous lesson 2) To ask students to say their favorite food 3) To watch the video of eating unhealthy food triggering a disease 4) Group discussion: on the video watched, we talk about their own views and how to effectively reject the temptation of bad food to us? 5) Summarize

3.3.4 Post-Implementation Testing

After the intervention session, both the experimental and control groups were measured on the levels of the Enhanced Sensitivity Questionnaire for Junior High School Students, the General Self-Efficacy Scale, and the Elementary and Middle School Students' Self-Regulation Questionnaire.

3.3.5 Data Processing

Excel 2013 and spss 19.0 software were used for data entry and analytical processing.

4. Findings

4.1 Quantitative Findings

4.1.1 Comparison of the Differences Between the Two Groups on Each Measure Before the

Intervention

Table 2. Comparison of the differences between the two groups on the pre-intervention measures

	Experimental group (n=40)	Control group (n=35)	*t*
Reward sensitivity	26.90±4.17	27.34±3.26	-0.52
Punishment sensitivity	24.68±4.60	26.20±4.80	-1.41
Level of conflict regulation	31.48±5.37	35.74±5.07	-3.52***
Closing in on the conflict	19.60±3.79	22.31±3.47	-3.22**
conflict avoidance	11.88±3.18	13.43±2.78	-2.24*
General self-efficacy	23.75±5.20	24.17±3.79	-0.40
self-regulation	93.50±14.11	97.89±12.43	-1.42

Note: * represents p<0.05, ** represents p<0.01, *** represents p<0.001, the same below.

As can be seen from Table 2, there are significant differences between subjects in the experimental and control groups in the level of conflict regulation, conflict convergence dimension, and conflict avoidance dimension at the initial test, and there are no significant differences in reward sensitivity, punishment sensitivity, general self-efficacy, and self-regulation. Since the selection of subject classes in this study was done in a completely randomized manner and there were some differences between classes and classes, we consider it normal that there were significant differences between the two groups on the homogeneity test analysis before the intervention course.

4.1.2 Comparison of the Differences Between the Two Groups on Each Measure After the Intervention

Table 3. Comparison of the differences between the two groups on each measure after the intervention

	Experimental group (n=40)	Control group (n=35)	*t*
Reward sensitivity	28.85±3.02	28.89±3.51	-0.47
Punishment sensitivity	22.48±5.065	23.71±4.91	-1.07
Level of conflict regulation	33.40±5.48	36.09±5.12	-2.18*
Closing in on the conflict	20.75±4.08	22.17±3.42	-1.62
conflict avoidance	12.65±2.43	13.91±2.79	-2.10*
General self-efficacy	26.38±4.48	25.09±3.68	1.35
self-regulation	95.53±14.29	102.31±14.71	-2.03*

As can be seen in Table 3, there are no significant differences in the aspects of conflict convergence and general self-efficacy; there are significant differences in the measures of conflict regulation level, conflict avoidance, and self-regulation.

4.1.3 Comparison of Differences in the Experimental Group on Each Measure Before and After Intervention

Table 4. Comparison of differences between subjects in the experimental group on each measure before and after the intervention (N=40)

	pre-intervention	post-intervention	*t*
Reward sensitivity	26.90±4.17	28.85±3.03	-2.32*
Punishment sensitivity	24.68±4.60	22.48±5.06	2.18*

Level of conflict regulation	31.48±5.37	33.40±5.48	-1.52
Closing in on the conflict	19.60±3.79	20.75±4.08	-1.25
conflict avoidance	11.88±3.18	12.65±2.43	-1.25
General self-efficacy	23.75±5.20	26.38±4.48	-2.28*
self-regulation	93.50±14.11	95.53±14.29	-0.60

As can be seen from Table 4, the experimental group's reward sensitivity, punishment sensitivity, and general self-efficacy are all different compared to the pre-intervention period. Among them, reward sensitivity is significantly higher than before the intervention; punishment sensitivity is significantly lower than before the intervention; general self-efficacy is significantly higher than before the intervention; the level of conflict regulation, conflict convergence, conflict avoidance, level of self-regulation, although there is no significant difference, there is a certain upward trend in terms of the mean value. Further analyzed by t-test, the difference between pre-intervention and post-intervention was significant ($p<0.05$) for reward sensitivity; the difference between pre-intervention and post-intervention was significant ($p<0.05$) for punishment sensitivity; the difference between pre-intervention and post-intervention was not significant ($p>0.05$) for conflict regulation level, the difference between pre-intervention and post-intervention was not significant ($p>0.05$) for conflict convergence, and the difference between pre-intervention and post-intervention was not significant ($p>0.05$) for conflict avoidance. Difference between pre-intervention and post-intervention was not significant ($p>0.05$), significant difference between pre-intervention and post-intervention in general self-efficacy ($p<0.05$); Self-regulation Difference between pre-intervention and post-intervention was not significant ($p>0.05$).

4.1.4 Comparison of Control Group Differences on Each Measure Before and After the Intervention

Table 5. Comparison of differences between control group subjects on each measure before and after the intervention (N=35)

	pre-intervention	post-intervention	*t*
Reward sensitivity	27.34±3.26	28.89±3.51	-1.78
Punishment sensitivity	26.20±4.80	23.71±4.91	2.01
Level of conflict regulation	35.74±5.07	36.09±5.12	-0.26
Closing in on the conflict	22.31±3.47	22.17±3.42	0.16
conflict avoidance	13.43±2.78	13.91±2.79	-0.67
General self-efficacy	24.17±3.79	25.09±3.68	-0.96
self-regulation	97.89±12.43	102.31±14.71	-1.54

As can be seen in Table 5, there was no significant difference between the post-intervention reward sensitivity, punishment sensitivity, conflict regulation level, conflict convergence, conflict avoidance, general self-efficacy, and self-regulation of the control group subjects as compared to the pre-intervention in each of these areas.

4.2 Qualitative Findings

Qualitative information was collected both during and after the intervention sessions and the results are analyzed below:

The qualitative information collected during the intervention focused on students' gains and feelings about behavioral assignments performed after school, for example:

You have to know how to make choices and be able to see yourself clearly and know what you really want.

People will always grow slowly, Tagore said: "On the way to growth, do not have to collect flowers to save, because on the way forward, the flowers, naturally open". Giving up something may be exchanged for something even better.

Learning to avoid harm and not to take advantage.

There are times when giving up something can lead to a bigger and better future.

Be courageous, don't give up on choices and opportunities, and be like the characters in the movie.

It's a good thing to take something for nothing.

Think about the future, try to make friends. It should be nice to have friends.

Taking the behavioral assignments collected during the course in which students talked about how they felt after actually using the BIS system and their feedback on what they learned in each class, we can find that students got to know the BIS system during the course, and also learned the meaning of not avoiding harm and not taking advantage of it, and improved their behavioral regulation skills in life and study.

In the qualitative information collected after the intervention sessions, the students chose the sessions they found impressive and also explained why, and made some suggestions. For example:

I was most impressed with the movie class; it was very interesting and we don't usually have many movie classes. It taught me that you can't avoid harm and you can't take advantage of it; I hope there will be more movie classes in the future.

I was most impressed with the lesson on rejecting bad food; because after watching the video, I felt that what I used to love to eat was neither hygienic nor healthy; and I hope that in the future, I can talk about other delicious things that can replace these junk foods;

The lesson on resisting peer pressure was very impressive; because I learned that I sometimes resist peer pressure by refusing a friend's request; I hope that in future lessons I will know how to politely refuse pressure from others;

I was impressed with the first class; I found the game more interesting and understood that the bigger the gain, the bigger the risk; I hope that we can do more interesting games in future psychology classes;

Impressed with the class that talked about strategies; know what to do when faced with conflict through that class, will deal with that now; introduce some other strategies in future psychology classes.

Through the students' feedback after the intervention program, it can be seen that the students improved their self-regulation skills during the course of the program, but at the same time, some program deficiencies were also revealed. This study will discuss and make some suggestions for improvement based on these deficiencies in the qualitative material.

5. Discussion

The theoretical basis of this intervention program is the Intensive Sensitivity Theory, which aims to improve the self-regulation ability of middle school students through a ten-week intervention program. Currently, intensive sensitivity theory has been studied mainly in adults, and this study seeks to expand the scope of the theory and increase the research on intensive sensitivity theory in adolescents.

5.1 Training Effectiveness of an Intervention Program Based on Reinforcement Sensitivity Theory

5.1.1 Analysis of Significant Effects of Reward Sensitivity, Punishment Sensitivity, and General Self-Efficacy in the Experimental Group

This study is based on the intervention program conducted under the guidance of the reinforcement sensitivity theory, in which the punishment sensitivity was significantly reduced, indicating that the curriculum of this program effectively reduces students' anxiety and fear of some conflicts, and they can better resolve conflicts and make positive choices that are conducive to their growth. There was a significant increase in general self-efficacy in this study, indicating that the students understood the BIS system and learned how to improve their self-regulation abilities through the ten-week program, which effectively improved their self-efficacy and self-confidence to face the future better. The significant rise in reward sensitivity is related to the developmental characteristics of reinforcement sensitivity in adolescence, where reward sensitivity is at a rapid elevation stage.

5.1.2 Reasons for the Lack of Significant Improvement in the Level of conflict Regulation and Self-Regulation in the Experimental Group

The findings of this study showed that the experimental group showed an upward trend in the level of conflict regulation and self-regulation, but there was no significant improvement. The reason for this result may be related to the content of the intervention, the

form of the intervention and the real conduct of the program.

5.2 Reflection and Evaluation of the Intervention Program Based on Intensive Sensitivity Theory

5.2.1 Introduction to the Intervention Program

5.2.1.1 Introduction to Content

Based on the existing research in China and abroad, the present study attempts to explore the intervention program based on the intensive sensitivity theory to enhance the self-regulation ability of secondary school students. The whole program design is based on the enhanced sensitivity theory, and centers on the core concept that students can learn "not to avoid harm and not to take advantage", so as to improve the self-regulation ability of secondary school students, and the intervention program is carried out from various aspects. Specifically, the design of the intervention program is as follows: Understanding of the BIS system (recognizing the BIS system, recognizing the BIS system in the movie) — Learning to use the BIS system (sharing the story of "BIS", in-depth use of the BIS system) — Sharing of BIS strategies (sharing and applying BIS strategies) — Practical application of the BIS system (application of the BIS system in interpersonal shyness, application of the BIS system in resisting peer pressure, application of the BIS system in refusing bad food). (Application of BIS System in resisting peer pressure, application of BIS System in rejecting bad food). The course design adheres to the principle of step-by-step progression, from shallow to deep, which is conducive to students' understanding and grasp. This curriculum design is the first time to use the theory of reinforcement sensitivity as the theoretical basis for intervening in the self-regulation ability of secondary school students, and it is an attempt to practice the study of reinforcement sensitivity in the development of the self-regulation ability of secondary school students.

5.2.1.2 Introduction to Strengths

Based on the theory of reinforcement sensitivity, the ten-week course of the intervention study on middle school students' self-regulation ability, through the courses on the topics of understanding the BIS system, applying the BIS system, mastering the strategies of the BIS system, and the practical application of the BIS system, students learned how to use the BIS system to improve their self-regulation ability, which resulted in the significant increase of reward sensitivity, significant decrease of punishment sensitivity, and significant increase of general self-efficacy of the middle school students, although some measures did not change significantly, the mean of the measures also increase punishment sensitivity significantly decrease, general self-efficacy significantly increase, and although some measures did not change significantly, the mean values of the measures also increased, such as conflict regulation level dimension, conflict convergence dimension, and conflict avoidance dimension. Secondary school students are encouraged to learn how to "avoid harms and avoid benefits" and make positive choices that are conducive to their growth in their studies and lives.

5.2.2 Reflection on the Intervention Program and Evaluation

5.2.2.1 Reflections on the Intervention Program

Research reflection: on the behavioral assignments after the lesson, the collection and feedback of the behavioral assignments were not timely and positive enough, resulting in students not reflecting enough on the lesson after the lesson, which affected their understanding and grasp of the lesson. In the intervention course, there are too many activities for discussion and sharing, which reduces the fun of the course, and there should be more fun guiding activities.

Substitute teachers' reflections: In the first week's lesson, substitute teachers felt that students had some difficulty in understanding the gaming task, and that students had to spend more time on the "Finding the Laws" part of the lesson. The substitute teacher thought that the students could be guided to understand the meaning of the BIS system in a more general way to enhance their understanding of the BIS system. In the second week of the lesson, the substitute teacher thought that the students had a better understanding of resisting temptation through this lesson, but their understanding of courageous perseverance was not as deep as it should be, because no movie clips were selected about courageous perseverance. Of the two movies watched, the movie Braveheart was too old. The substitute teacher thought that the movie Braveheart should be replaced by the movie The Dreaming Giant, a movie about courageous perseverance. In the third and

fourth week of the course, the substitute teacher thought that most of the lessons were discussion sessions, which reduced the interest of the course. The substitute teacher thought that more guided activities on the understanding of the BIS system should be added to enhance the fun of the lesson; in the fifth week's lesson, the substitute teacher thought that the students did not have a deep understanding of the strategies in this lesson, and that specific examples should be given to illustrate the application of each strategy in learning and life; in the seventh week's lesson, the substitute teacher thought that the students did not understand peer pressure very well, and that more time was needed to introduce the topic of what to do with peer pressure; and that more time was needed to introduce the topic of what to do with peer pressure. In the eighth week of the course, the substitute teacher thought that the students' understanding of how to restrain themselves from eating bad food was shallow and not deep enough, and the teacher thought that the methods of how to restrain themselves from eating bad food should be added, and that the form for the behavioral assignment should be improved.

5.2.2.2 Evaluation of the Intervention Program

In terms of the content of the intervention, the design aspect of the course lacked interest, the design of this course had more discussion and sharing sessions and lacked interesting guided activities. Therefore, in future research, we should add interesting guiding activities on the basis of this course, so that students can enhance their understanding and grasp of the course; in the form of intervention, the collection of behavioral assignments was not timely, and students were not given timely and positive feedback after the behavioral assignments, so we should pay attention to the collection of behavioral assignments after the class and timely feedback in future research; in the effect of intervention, the present study did not effectively enhance students' self-regulation ability. In terms of the effect of the intervention, this study did not effectively enhance the students' self-regulation ability, which may be related to the fact that the researcher did not monitor the intervention program well during the implementation of this study, and it is hoped that the monitoring of the intervention program can be enhanced in subsequent studies.

6. Shortcomings and Prospects

First, due to the limited time available to the subjects, this study did not examine the long-term effects of the intervention program and did not conduct a long-term follow-up survey of the students on each indicator. In future studies, follow-up surveys should also be conducted when conditions permit, and the sequential assessment of the intervention program design can more accurately assess the long-term effects of the intervention program; second, the sample was too narrow. This study selected a single sample of second-grade middle school students, making it difficult to generalize the program. Therefore, in future intervention studies, the scope of the study population should be expanded.

7. Conclusion

(1) This intervention increased students' general self-efficacy and confidence.

(2) The present intervention increased students' reward sensitivity and decreased their punishment sensitivity, but did not enhance their conflict regulation.

(3) As a result of this intervention, the students' self-regulation tends to increase.

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