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Original Article

The Effectiveness of Forgiveness Therapy on Metacognition and Self-Restraint among Female Adolescents with Disruptive Mood Dysregulation Disorder

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Abstract

Background and Aim: The aim of this study was to evaluate the effectiveness of forgiveness therapy on state metacognition and self-restraint of female adolescents with disruptive mood dysregulation disorder (DMDD).
Materials and Methods: The research method was semi-experimental with pretest-posttest and a control group. The statistical population of this study were all students with symptoms of disruptive mood dysregulation disorderin the first and second grades of high school in the age range of 14-17 years in schools of Baharestan,Tehran. 35 subjects were selected by convenience sampling method based on the inclusion criteria and randomly assigned to the experimental and control groups. The research instruments included Emotional ResponseScale, Self-Restraint Questionnaire, and State Metacognition Questionnaire. The subjects of the experimental group received 15 sessions of forgiveness therapy while the control group did not receive any intervention. Data were analyzed by multivariate covariance analysis.
Results: The results of data analysis showed that the experimental group compared with the control group in the variables of state metacognition and self-restraint and their components had a significant increase ($P<0.05$).
Conclusion: According to the findings of the study, forgiveness therapy can be used to increase self-restraint and state metacognition in students withdisruptive mood dysregulation disorder.

Keywords: Disruptive mood dysregulation disorder**,** Forgiveness therapy, Self-restraint, State metacognition

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Introduction

Adolescencewith rapid changes in thephysical and neurological development of adolescents can affect the social, emotional, and mental health (1). Among the factors that can overshadow the mental health of adolescents is the issue of anger and aggression. Research has shown that violence among adolescents is one of the mental health concerns, which is associated with many injuries such as mortality, alcohol abuse, low self-esteem and suicide (2).One of the disorders of adolescence in which anger and aggression play an important role is a disruptive mood dysregulation disorder in which frequent and severe outbursts of anger are manifested verbally such as verbal anger or behaviorally (e.g., verbal and physical aggression against people or property) that is very disproportionate to the situation or stimulus in terms of severity or duration (3). One of the risk and prognostic factors for this disorder is that people with disruptive mood dysregulation disorder have deficiencies in information processing and cognitive control.People with disruptive mood dysregulation disorders are distorted while performing tasks that require attention to emotional stimuli (4).The study of information processing and cognitive control and, consequently, metacognitive skills in adolescents with disruptive mood disorders can be investigated. Metacognition is the skill needed to solve a complex task, systematic thinking in adolescents, and information processing (5). Research has shown that children with disruptive mood dysregulation disorders are more likely to be biased and havemalfunction information processing, which is a metacognitive skill, than normal children in a vague social situation, therefore they show more hostility behaviors (6).Metacognition plays an important role in communication, language comprehension, social cognition, attention, self-regulation, memory, writing, problem solving and solving complex tasks and personality development (7). Reduce anxiety, depression, and stress(8), and increase indicators of mental health development(9) in adolescents. Research conducted at Istanbul University has shown that metacognitive skills are directly related to solving complex tasks, which is one of the definitions of metacognition, among high school students (10). Considering the mentioned cases, it is possible to understand the importance of the effect of disruptive mood disorder in adolescents on metacognitive skills that can have a direct role on their academic performance and social relations. Other variables that are important to consider in patients with disruptive mood disorders are self-restraint skills. Self-restraint is defined as the ability to voluntarily control one's inner desires and external behaviors in accordance with social norms, and the ability to delay a desire appropriate to one's social situation without the intervention of a third person or an independent stream (11). Obviously, people with disruptive mood dysregulation disorder are nervous and aggressive people and lose the ability to restrain and control themselves in the face of anger-causing situations (3). Since one of the main diagnostic criteria for disruptive mood dysregulation disorder is the disruption of recurrent outbursts of uncontrolled anger, increasing self-restraint skills and its effect on anger control in patients with this disorder can also be significant and researchable. Studies show that strengthening and training self-control skills can increase mental health, control anger and aggression, and prevent crime among adolescents (12). The results of some studies indicate the effect of third wave therapies on adolescent outpatient problems (13). One of these treatments is forgiveness therapy. Forgiveness is the process of discovering and releasing anger from someone who has caused pain (14). This process can lead to recovery in many situations, as anger is often at the core of clients' problems. Strengthening forgiveness in treatment involves discovering the depth of the client's anger, making a commitment to forgiveness, and striving for the ability to forgive (15). Many people think that forgiveness means giving up or continuing to work. But Bob Enright (15), who pioneered the study of forgiveness three decades ago, says forgiveness is more than that. True forgiveness goes one step further, by offering something positive, including empathy, compassion, and understanding, to the person who hurt you. This element makes forgiveness both a virtue and a powerful structure in positive psychology (7).The results of research (16) also confirm that forgiveness cause social adjustment among students. Self-restraint and self-control to achieve immediate desires have been

considered by various researchers. Research (17) showed that forgiveness plays a mediating rumination effect on the response time of the person; That is, the more forgiving a person is, the less rumination he has and the longer he reacts to unpleasant stimuli.Therefore, it can be inferred that increasing forgiveness with the mediating role of reduction in rumination will cause the individual to refrain from stressful responses. Forgiveness can also lead to forgetting the negative effects of oppression on the individual (18). Forgetting negative memories, forgetting the negative effects of a behavior, is a cognitive strategy for adapting to one's surroundings. Since cognitive strategies are the main component of metacognition, it can be concluded that forgiveness can increase individuals' metacognitive skills. Regarding the component of metacognition, little research has been done with the effect of forgiveness. Researchers have found that if forgiveness therapy is based on metacognition, it can be more effective. For example, forgiveness and metacognition have a significant positive relationship with each other. And this is a two-way relationship (19). Therefore, it can be concluded that forgiveness increases metacognitive empowerment and because of that, it increases the amount of forgiving empowerment in individuals. Forgiveness can also lead to forgetting the negative effects of oppression on the individual. The results of research also show that the atmosphere of forgiveness is directly related to the rate of learning and information processing, which is a component of metacognition. So that the staff of a hotel, when exposed to the atmosphere of forgiveness, were able to learn better and show better and more positive performance and behavior (20). As mentioned earlier, disruptive mood dysregulation disorder is one of the few new disorders listed in the DSM- 5 (3). Studies have shown that not many studies conducted on this disorder. Or if it is done, its number is very small in Iran. Patients with disruptive mood disorders referred to clinics are mostly male. Among the examples of society, there is superiority over boys (3). Therefore, the study of this disorder and its extent in the statistical population of girls is worth paying attention to. During the studies of the researchers of this study, especially during the studies conducted on the effect of the role of forgiveness on increasing self-restraint in angry adolescents with this disorder or increasing metacognitive skills that improve the functional common academic failure among patients with this disorder.

Methods

This study was a semi-experimental with pretest-posttest design andcontrol group.The statistical population of the study includes all female students with disruptive mood dysregulation disorder syndrome in the first and second years of high school (8, 9, 10, and 11 grades), age range of 13-17 years in schools in Baharestan, Tehran province in 2021.This research has been done with this code of ethics. IR.IAU.SHAHROOD.REC.1400.048

The convenience Sampling method was used to select the sample. By referring to the Education Department of Baharestan city and obtaining written permission to conduct research. The Emotional Reactivity Questionnaire (21) was filled out by students of 4 schools. Students who scored above the cutting line were then selected and the parents' emotional responsiveness questionnaire was given. Then, students who scored above in both questionnaires wernothing achieved.Therefore, the vacancy of these studies led the researchers to investigate the effect of therapeutic forgiveness as an effective intervention in self-restraint and increase metacognitive skills in female students with disruptive mood dysregulation disordere.

Materials

interviewed clinically to determine and assess the diagnostic criteria for disruptive mood dysregulation disorder. 38 students were selected, 3 of whom weren't continue for personal reasons. Finally, 17 subjects in the experimental group and 18 subjects in the control group were randomly assigned.After randomly assigning the samples to the experimental and control groups, the state metacognition questionnaire (5) and the self-restraint questionnaire (22) were provided to the samples as a pre-test. The samples of experimental group were then received Perez (23) forgiveness therapy package during 15 sessions of 90 minutes. After the intervention sessions, the above questionnaires were

Table 1: Forgiveness therapy sessions.

sessions	content
Session 1	Identify the main injuries in the lives of the participants in the sessions with the aim of introducing the program and determining the process of conducting the sessions.
Session 2	Focus on defense mechanisms, ask questions about a person's emotions when recalling a traumatic event with the aim of focusing on defense mechanisms and identifying them.
Session 3	Reviewing the defenses of the previous session, imagining the absence of defenses, and placing alternatives to destructive defense mechanisms in order to help deal with anger and failure as a result of weakening defense mechanisms.
Session 4	Challenging the usefulness of anger and aggression behaviors in the face of dangerous events deciding to change in order to identify individuals' coping strategies in the face of pain and suffering.
Session 5	Create an opportunity to replace a constructive response with anger in order to explore forgiveness. Explain to the participant that they have solutions other than anger.
Session 6	Choose an energetic way to retaliate against anger with the goal of forgiving the person who hurt them.
Session 7	Separating the personality of the harmful person from what he or she did with the participant in the sessions with the aim of adopting a new perspective to develop a new understanding of the harmful person.
Session 8	Focus on the emotions that come with hearing the hurtful person's personal life. Provide a platform for empathy with the goal of providing an opportunity to express empathy.
Session 9	Analysis of pain caused by a traumatic event. Analysis of harmful defenses and destructive coping with pain. Releasing negative emotions, expressing positive emotions, aiming to accept and tolerate the discomfort caused by pain.
Session 10	Focus on exploring whether forgiveness can be given to the harmful person. Review forgiveness definition with the aim of examining how to apply forgiveness.
Session 11	Focus and think on your feelings and the meaning of forgiveness when forgiving someone, with the goal of helping the client to find the meaning of forgiveness.
Session 12	Examining a person's need for others to forgive his/her bad behavior with the goal of being forgiven by others in order to help someone who has difficulty forgiving others.
Session 13	Paying attention to one's need to be forgiven by others, by seeking and accepting one's forgiveness by others. Reviewing the story of Prophet Yusuf (AS) with the aim of seeking help from the experience of forgiving others and teaching one's personal faith.
Session 14	Exploring new feelings about the harmful person. Exercising the suggestion of forgiveness to the harmful person. Discussion about forgiveness with the focus on the life story of prophet Yusuf with the aim of proposing forgiveness.
Session15	Review the course of treatment. Discuss self- progress. Review the topics covered with the aim of reminding, creating new insights and awareness, or forgiving, understanding the meaning of forgiveness. Understanding the benefits of forgiveness and being forgiven and not being alone in the forgiveness process.

filled in again by the samples and the data were analyzed statistically. The following instruments were used for data collection purposes.

Emotional Response Index Questionnaire

Emotional responsiveness index was used to measure anger and irritability. This scale was developed by Strringars (21) to assess irritability in children and adolescents. Findings from the reliability of the Emotional Reactivity Index by the internal consistency method show that this questionnaire has considerable reliability. Stringers et al. (21) reported a reliability coefficient of 0.88 and in the British sample 0.90.

Cronbach's alpha was 0.92. They performed this test by two ways, reporting and questioning from parents.

Self-restraint questionnaire

The Self-restraint Questionnaire was developed in 1990 by Weinberger and Schwartz (22) with 30 items and 4 subscales of anger suppression, impulse control, consideration for others, and responsibility. Appropriate content validity reported. The validity of the total retest was reported to be 0.88. The total Cronbach's alpha coefficient was reported to be 0.836. The Iranian standardization was measured by Rostami (24). He mentioned the content and visual validity of this questionnaire as 0.82 and its reliability as a retest method among 35 people as 0.86.

State metacognitionquestionnaire

Was developed by O'Neill and Abedi (5) with the goal of designing a tool to gain information about the skills needed to solve a complex task (the ability of students to think systematically about an exercise).This test has 13 terms and four subscales: awareness, cognitive strategy, planning, and self-assessment, each term is assigned 5 terms and the subject must be on a 4-point Likert scale (from never= 2 to Too much=5) of the agreement or disagreement with each of the statements. In order to standardize this test, the state metacognition questionnaire was administered to 125 students and 230 high school students. The validity and reliability of the questionnaire were measured by Asghari and Sharifi (25). Reliability from 0.73 to 0.78 and checking the validity of the test confirms the validity of the test structure.

In the following, a brief description of the activities in each training session is given. The intervention training package called Forgiveness Therapy will be implemented in groups, based on the training program in 15 consecutive steps. This program was developed based on the Enright process model and the Human Development Study Group and was implemented by Perez (23) at Regent University as a pilot on adolescents with disordered mood disorders, and the results are presented in his doctoral dissertation. In Iran, Asgari, et al. (26) used this protocol, which is based on the Enright process model on adolescent anger. Its visual and content validity have been evaluated and approved by clinical experts. This package It is intended to help people who have experienced deep personal trauma in an unjust environment and who continue to suffer. These sessions will help participants identify the main harms in their lives. Because the first step in identifying the source of anger is to identify the hurtful situations.

The subject of forgiveness will not be introduced until session 5. After that, in the next sessions, the person will be taught to forgive and adopt a new perspective on life instead of anger, empathy with the hurter, accepting grief and meditation, and seeking help to resolve the harm.

Results

Participants in this study included first and second period high school females, aged 14 to 17 years, who were divided into control and experimental groups. There was no significant difference between the two groups in terms of educational level and average age. The mean and standard deviation of age were forgiveness therapy group (14.70 ± 0.58) and control group (15.50 ± 0.78).

This program is designed to include 15 sessions of 60-minutes.

In order to observe ethical considerations in the research process, all students participated with satisfaction and desire. In all stages, priority was given to the treatment of patients until the implementation of the research. In addition, the subjects were assured that the results of the questionnaires would not be interpreted individually and if the results were desired, the subjects would be informed, and all the pamphlets, educational content and necessary tools were provided to them free of charge.

To determine whether the difference between the means of the experimental and control groups in the post-test of the variables is significant or not, analysis of covariance was used. First, the assumptions of normality, homogeneity of variance and regression homogeneity were investigated.To investigate the hypothesis of normal distribution of research variables, Shapiro-Wilk test was used. According to the results of Shapirowilk test ($\rho<0.05$), the distribution of state metacognition components, total score of state metacognition and components of self-restraint and total score of self-restraints are normal. Loon test showed that the variance of the two groups in research

Table 2: Mean and standard deviation of research variables between experimental(n=17) and control groups (n=18).

Sub-scales	test	group			
		Forgiveness therapy		control	
		mean	Standard deviation	mean	Standard deviation
awareness	Pre-test	10.41	2.83	9.00	1.74
	Post-test	15.88	1.88	8.50	2.35
Cognitive strategy	Pre-test	10.29	1.86	8.66	2.22
	Post-test	15.58	2.09	8.11	2.78
planning	Pre-test	10.52	2.00	7.5	1.50
	Post-test	15.64	2.49	8.44	1.98
Self-assessment	pre-test	pre-test	2.15	8.55	1.88
	Post-test	Post-test	2.06	7.61	1.71
State metacognitive	pre-test	41.64	6.99	33.72	5.88
	Post-test	63.52	5.46	32.66	7.30
Anger suppression	pre-test	15.35	3.98	17.16	2.99
	Post-test	27.17	2.03	16.83	3.11
Impulse control	pre-test	18.94	3.54	17.38	2.47
	Post-test	34.64	2.42	18.72	3.54
Observe others	pre-test	15.74	2.90	15.38	2.14
	Post-test	22.76	2.30	14.66	2.67
responsibility	pre-test	2.17	5.02	18.11	2.39
	Post-test	37.05	1.56	16.61	2.11
Self-restraint	pre-test	71.23	10.59	68.05	5.11
	Post-test	121.64	2.39	66.83	7.45

variables is equal. Interaction F test was used to investigate the assumption of homogeneity of pre-test and post-test regression slope of state metacognition and self-restraint variables in the experimental and control groups. The results showed that there is no interaction between the auxiliary variables and the independent variable ($\rho < 0.05$), so the assumption of homogeneity regression slope is established. Comparison of experimental and control groups in terms of state metacognition components: Multivariate analysis of covariance (MANCOVA) test was used for this purpose. Subjects' scores in the state metacognition pre-test were entered into the analysis as an auxiliary variable. Mbox statistics (P = 0.001, F (105163.441):3.083, M ’Box: 35/ 540) were significant. Therefore, the assumption of equality of covariance matrices was not established. For this reason, Wilkes's lambda statistic was used (although different statistics

Table 3: Multivariate analysis of covariance test to compare two groups in state metacognition components.

source	variables	Total squares	df	mean squares	F	Significant level	Effect size
Auxiliary variable	awareness	7.855	1	7.855	2.197	0.001	0.064
	Cognitive strategy	33.106	1	33.106	6.277	0.001	0.164
	planning	6.052	1	6.052	1.239	0.001	0.037
	Self-assessment	22.464	1	22.464	7.493	0.001	0.190
group	awareness	287.217	1	287.217	80.334	0.001	0.715
	Cognitive strategy	243.558	1	243.558	46.175	0.001	0.591
	planning	278.275	1	278.275	56.982	0.001	0.640
	Self-assessment	378.523	1	378.523	126.265	0.001	0.798
error	awareness	114.410	32	3.575			
	Cognitive strategy	168.789	32	5.275			
	planning	156.275	32	4.884			
	Self-assessment	95.931	32	2.998			

do not differ due to being two groups). Lambdawilks multiple statistics (Lambda's Wilks: 0/166, F (4.29):36.347, P<0.001, Partial Eta=0.83) showed that the effect of intervention on the linear composition of state metacognitive components is significant and the effect size of the intervention is very large.

According to Table 3, the effect of therapeutic forgiveness intervention on all four components of state metacognition is significant and according to Table 1, the average of therapeutic forgiveness group in all four components of state metacognition is higher than the average of the control group. The effect size of forgiveness therapy intervention on the components of knowledge (0.715) above average, cognitive strategy (0.591) above average, planning (0.640) above average and self-assessment (0.798) above average. Comparison of experimental and control groups in terms of self-restraint components: Multivariate analysis of covariance (MANCOVA) test was used for this purpose. Subjects' scores in the self-restraint pretest were entered into the analysis as an auxiliary variable.

M-box statistics (P= 0.0441, F (105163.441:1.858, M'Box:21.411) were not significant. Therefore, the assumption of equality of covariance matrices is established. Multiple statistics of Lambda Wilkes (Partial Eta = 0.97, P <0.001, F (4.29): 274.523, Lambda's Wilks: 0.026) showed that the effect of intervention on the linear composition of self-restraint components is significant. And the effect size of intervention is on the components of self-restraint.

According to Table 4, the effect of therapeutic forgiveness intervention on all four components of self-restraint is significant and according to Table 1, the mean of the therapeutic forgiveness group in all four components of self-restraint is higher than the average of the control group. The effect size of therapeutic forgiveness intervention on the components of anger suppression (0.799) is above average, impulse control (0.873) is very high, observe others (0.762) are high and responsibility (0.969) is very high. Comparison of two groups in the total score of state metacognition and total

Table 4: Multivariate analysis of covariance test to compare the two groups in self-restraint components.

source	variables	Total squares	df	mean squares	F	Significant level	Effect size
Auxiliary variable	Anger suppression	1.232	1	1.232	0.172	0.001	0.005
	Impulse control	0.703	1	0.703	0.073	0.001	0.002
	Observe others	21.163	1	21.163	3.643	0.001	0.102
	responsibility	2.013	1	2.013	0.569	0.001	0.017
group	Anger suppression	912.829	1	912.829	127.147	0.001	0.799
	Impulse control	2117.951	1	2117.951	220.915	0.001	0.873
	Observe others	594.480	1	594.480	102.333	0.001	0.762
	responsibility	3483.976	1	3483.976	984.820	0.001	0.969
error	Anger suppression	229.738	32	7.179			
	Impulse control	306.790	32	9.587			
	Observe others	185.896	32	5.809			
	responsibility	113.206	32	3.538			

Table 5: Analysis of covariance to compare the two groups in state metacognition and self-restraint.

variables	source	Total squares	df	mean squares	F	Significant level	Effect size
State metacognitive	Auxiliary variable	248.258	1	248.258	6.981	0.001	0.179
	group	4718.459	1	4718.459	132.683	0.001	0.806
	error	1137.978	32	35.562			
Self-restraint	Auxiliary variable	11.923	1	11.923	0.372	0.001	0.012
	group	25485.393	1	25485.393	796.061	0.001	0.961
	error	1024.460	32	32.014			

score of self-restraint: To compare the two groups of therapeutic forgiveness and control in each of the variables of total score of state metacognition and total score of self-restraint, a covariance analysis was performed, which is summarized in a table:

According to Table 5, the effect of therapeutic

forgiveness intervention on the total score of state metacognition and the total score of inhibition is significant. According to Table 1, in both variables, the mean of the therapeutic forgiveness group is higher than the mean of the control group. The effect size of therapeutic forgiveness intervention on the total score of state metacognition (0.806) and on the total score of self-inhibition (0.961) is very high.

Discussion

The aim of this study was to determine the effectiveness of forgiveness therapy on self-restraint and state metacognition of students with disruptive mood disorders. The results showed that forgiveness therapy was effective in increasing the scores obtained from the post-test of self-restraint and metacognition questionnaires of female students with mood disorders after the intervention. The results of this research were consistent with the results of research (27), (28) and (18). Self-restraint is defined as controlling anger and emotional inhibition (22). This is consistent with the findings of some researchers (27) and they found in their studies that the forgiveness program training reduced externalized problems and aggression of adolescents living in the Tehran Correctional Center. Researchers (28) also found that group forgiveness intervention helps control anger in prisoners. Explaining the effect of forgiveness on self-restraint, it can be said that forgiveness restores the force in the person that causes the person to have self-restraint. And that force is nothing but resilience. Research has shown that forgiveness is a major factor in resilience. (29). Obviously, as the amount of resilience increases in a person, in fact, the person's ability to tolerate increases, and this becomes an obstacle to prevent anger in the person. On the other hand, the forgiveness program creates compatibility (30). In their studies, they found that forgiveness therapy increases compatibility. Obviously, anger and aggression can prevent a person from adjusting to others, so a person who has a personality adjustment component that has been achieved through the intervention of the forgiveness protocol, can better control his anger and excitement, so he has more self-restraint skills.Cognitive strategies are important in explaining the relationship between forgiveness and metacognitive skills. Research has shown that people who forgive emotionally and wholeheartedly over time will forget the mistakes and injuries of the wrongdoer. Forgiveness can reduce cognitive wrong judgments that lead to misconceptions (18). Obviously, by reducing negative thoughts about others, one acquires a greater ability to refrain from aggression and anger. On the other hand, since cognitive strategies are the main component of metacognition, so it can be concluded that forgiveness can increase metacognitive skills in individuals. On the other hand, the results of forgiveness-based interventions in this study showed that the mean scores of state metacognition in female students with this disorder increased significantly. In other words, since metacognition is the skill required to solve a complex task and the ability of students to think systematically about an exercise, the ability to plan, review, and apply different strategies is defined (5). Therefore, based on the results of this study, it can be concluded that forgiveness therapy increases the skill of solving complex tasks in patients with disruptive mood disorder. As stated in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. One of the functional consequences in patients with disruptive mood dysregulation disorders is poor academic performance and difficulty in academic achievement. In explaining the effect of forgiveness on metacognitive skills, it can be said that since metacognition means consciously examining oneself in order to achieve a goal and selecting and applying different strategies, all of these cases require mental health. Research has shown that forgiveness therapy can lead to mental health (28). Obviously, a person with higher mental health can better solve complex tasks. Have better planning to achieve goals, all of which are examples of metacognitive skills. Therefore, it can be concluded that forgiveness can inhibit and modulate metacognitive skills in patients with disruptive mood dysregulation disorders. One of the limitations of the research was the coincidence of the research with the days of Corona disease, which made face-to-face education in schools impossible.

Conclusion

Research and training of forgiveness therapy package for anger management was held online and Shad student network. It is suggested that in addition to the educational forgiveness therapy package, other psychological interventions with different approaches to manage and treat the damages caused by this disorder in students should be performed. It is also suggested that educational and treatment packages, in addition to self-restraint and state metacognition, be studied on other variables that have impaired and affected patients with this disorder.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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