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# Effectiveness of Mindfulness Training Program on the Perception of Pain Experience and Self-Compassion in MS Patients

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## Abstract

**Objective:** Multiple sclerosis (MS) is one of the most common neurological diseases. The disease is clinically defined by the involvement of different parts of the central nervous system (CNS) at various times. Its peak incidence is between the ages of 20 and 40. The experience of pain plays an important role in the mental health and quality of life of MS patients. Research also shows that if MS patients have high levels of self-compassion, they can more easily manage negative situations. This research aims to determine the effectiveness of mindfulness training programs on the perception of pain experience and self-compassion in MS patients.

**Method:** The current research is an experiment with available sampling methods. The sample includes 40 MS patients, 20 in the experimental group and 20 in the control group. Mindfulness training programs (Kabat—Zinn), the McGill Pain Experience Scale (MPQ), and the NF Self-Compassion Questionnaire (SCS-LF) were used to collect data. The data were analyzed through the statistical test of multivariate analysis of covariance (MANCOVA).

**Results:** The results showed that the average difference between the groups regarding pain experience (F=49.270) and self-compassion (F=51.249) is significant. Therefore, it can be said that increasing self-compassion leads to higher efficiency in facing stressful situations.

**Conclusion**: Enhancing cognitive processes, particularly self-compassion, through mindfulness training can significantly influence individuals' perception of pain. It is recommended that families receive appropriate training to develop strategies aimed at strengthening mindfulness skills in individuals.

**Keywords:** Mindfulness, Pain experience, Self-compassion, MS.

## Extended Abstract

### Background and Objectives

Multiple sclerosis (MS) is a chronic autoimmune neurological condition that affects myelinated axons in the central nervous system (Zarotti et al., 2022). MS is one of the most common neurological disorders. In addition to the loss of motor, sensory, and cognitive functions depending on the affected area, people with MS also experience related and different symptoms, such as depression, anxiety, stress, fatigue, and pain, which affect people's mental health (Han, 2021). Patients' attitudes, beliefs, and expectations about themselves and their problems, the resources to deal with the disease, as well as the health care system, affect the level of expression of pain, disability, and the patient's response to treatment. The experience of pain in MS patients is one of the variables that are of interest to these patients, and in general, pain causes a set of behaviors that are formed as a result of beliefs related to it (Schutze et al., 2010; Greenberg et al., 2020). According to research, one of the psychological factors that can help people with MS cope with the complications of their disease is self-compassion (Ashoori et al., 2023).

The disadvantages and side effects of drug treatment

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methods have caused efforts to find alternative and complementary treatments in MS patients to increase (Senders et al., 2019). In the meantime, research has shown that mindfulness-based therapy has positive effects on the physical and mental dimensions of people with MS (Carletto et al, 2020; Simpson et al, 2020). Mindfulness-based interventions are considered as one of the cognitive-behavioral treatments of the third wave, which are treated positively by focusing on the present, without ruminating about the past or worrying about the future and life stresses (Solgi & Kamarhankani, 2022). Multiple Sclerosis (MS) generally results in varying levels of disability, significantly impacting the psychological, social, physical, and economic dimensions of those affected. Psychological treatments can help people cope better with their illness by affecting some of these symptoms. (Gedik & Idiman, 2020). Thus, this research aimed to examine the impact of mindfulness on the perception of pain and the development of self-compassion among patients with multiple sclerosis.

## Materials and Methods

This study is semi-experimental with a pre-test, post-test, and follow-up design with two experimental and control groups. In the present study, the statistical population was the group of patients with MS in Urmia City who had medical and neurological records in the hospital. The sampling method was convenience sampling. The statistical sample of the target group included 40 people who were randomly divided into two experimental and control groups (20 people in the experimental group and 20 people in the control group).

**The tools used were:**

*McGill Pain Questionnaire (MPQ):* This questionnaire was created for the first time by Melzack (Melzack, 1975; quoted from Amiri, Isazadegan, Alilou, & Banafsheh, 2015) with 15 items.

*Self-Compassion Scale:* This scale is a 26-item self-report scale developed by Neff (2003). This scale has 6six subscales (Neff, 2003; Shiondi, Naimi, & Farshad, 2015).

*Mindfulness training program:* The MBCT program is a group intervention that lasts eight weeks and two hours each week. After the conclusion of the fifth week, a class is organized for a single day. In this research, the therapy protocol (Segal et al., 2002) is implemented during 8 90-minute group sessions in the experimental group.

SPSS statistical software was used to test the hypotheses and research questions. Initially, the descriptive findings section employed indicators such as the mean, standard deviation, and mode. To further explore the research questions and hypotheses, multivariate analysis of covariance (MANCOVA) and Levene's test were applied.

## Results

According to the results of variance analysis, the average difference between the groups regarding self-compassion and pain experience is significant. This finding shows that there is a significant difference between the experimental group and the control group in self-compassion ($F = 15.63$) and pain experience ($F = 296.85$), and the average of the experimental group is significantly lower than the control group.

## Discussion and Conclusion

This study aimed to investigate the effectiveness of mindfulness on the experience of pain and self-compassion in MS patients. The results indicated that mindfulness training reduces the pain experience and increases self-compassion in people with MS.

The findings of this research regarding the effectiveness of the mindfulness method on the experience of pain are in line with the results of Dunne et al. (2021), Choobforoushzadeh and Mohammadpanah Ardakan (2019), and Senders et al. (2018). In the interpretation and justification of these results, we can state that, undoubtedly, pain is a feeling in the body, but it is always unpleasant and, consequently, is considered an emotional experience (Turk & Monarch, 2002). Mindfulness increases physical self-monitoring and body awareness, which may cause an improvement in bodily mechanisms and self-care. Also, mindfulness is associated with increased parasympathetic activation, leading to deep muscle relaxation, decreased tension and arousal, and ultimately, pain relief.

The results also indicated that mindfulness training is effective in people's self-compassion. These results are also in line with the results of Shahsiah et al. (2021), Sakeni et al. (2019), and Bergen-Cico and Cheon (2014). The constructs of self-compassion and mindfulness have a lot of conceptual overlap, and both emphasize the issue of non-judgment towards experiences. Also,

the mindfulness approach believes that people should not try to change negative thoughts and emotions but accept them, which can lead to increased self-compassion (Shahsiah et al., 2021). Therefore, on this basis, it can be acknowledged that mindfulness helps to reduce negative feelings and finally the self-compassion of people.

Implementing the necessary training for the family about strategies to strengthen mindfulness can increase self-compassion skills and reduce the pain experienced by these patients. The results of this study indicate the recommendation to conduct mindfulness classes and workshops focused on the experience of pain. Furthermore, it is recommended to create a thorough mindfulness training program aimed at enhancing self-care abilities, including self-compassion, within care and clinical facilities.

## Introduction

Multiple sclerosis (MS) is a chronic autoimmune neurological condition that affects myelinated axons in the central nervous system (Zarotti et al., 2022). MS is one of the most common neurological disorders. In this disease, instead of the leukocytes attacking the foreign agent, they attack the myelin sheath of the nerve fibers of the central system, and as a result, the related organs are disturbed (Emadian et al., 2022). Although there is no specific definitive cure for MS, several treatments are helpful. The main goals of treatment are to return function after attacks and prevent disability. Initiation of medications is generally recommended in individuals after the first attack when more than two lesions are seen on MRI (Rae-Grant et al., 2018). Specific symptoms of the disease include diplopia, blindness in one eye, muscle weakness, and difficulty in sensation or coordination (Piryonesi et al., 2021). In addition to the loss of motor, sensory, and cognitive functions depending on the affected area, people with MS also experience related and different symptoms, such as depression, anxiety, stress, fatigue, and pain, which affect people's mental health (Han, 2021). Also, people with MS suffer from many social problems (Marcella, 2021). Patients' attitudes, beliefs, and expectations about themselves and their problems, the resources to deal with the disease, as well as the health care system affect the level of expression of pain, disability, and the patient's response to treatment.

The research conducted in the field of chronic pains has been able to show the key role of perceptual beliefs related to pain in adaptation to pain and response to treatment so that the false perception belief under the name of cognitive bias can increase the severity of chronic musculoskeletal pain (Ehde et al., 2019; Senders et al., 2018; Jensen et al., 2018). Therefore, the experience of pain in MS patients is one of the variables that are of interest to these patients, and in general, pain causes a set of behaviors that are formed as a result of beliefs related to it (Schutze et al., 2010; Greenberg et al., 2020).

According to research, one of the psychological factors that can make people with MS cope with the complications of their disease is self-compassion (Ashoori et al., 2023). Self-compassion is a constructive method that people can use to approach the unpleasant thoughts and feelings they have about themselves and thereby achieve mental and physical well-being (Neff, 2023); also, as a mental health factor, it can be a barrier against stress in critical situations (Pourkhalili et al., 2022). In other words, by self-compassion, one can healthily accept oneself, which means accepting the unpleasant aspects of life and oneself (Mohammadi Sangachin Doost et al., 2022).

Self-compassion causes people to be gentle with themselves, to support themselves, and to be comforting to themselves instead of blaming and criticizing themselves for their defects and shortcomings. In other words, accept oneself unconditionally (Saadatmand et al., 2022). Self-

compassion has three components, each of which has two negative and positive dimensions, such as 1- self-compassion versus self-judgment, 2- mindfulness versus over-identification, and 3-common humanity versus isolation. Also, research shows that self-compassion is considered an essential protective factor (Foroughi et al., 2019). Self-compassion appears to be a chief source of strength in the face of chronic health problems and a significant positive predictor of mental health (Kachooei & Ashori, 2021).

Evidence shows that self-compassionate people have more courage in dealing with negative events. Also, studies showed that self-compassion plays an important role in adapting to chronic diseases such as MS and causes normal physiological and psychological adaptation to the disease. It should be noted that patients with high self-compassion choose a more active coping style and higher mental participation (Ehde et al., 2019; Spitzer and Pakenham, 2018; Simpson et al., 2017). The disadvantages and side effects of drug treatment methods have caused efforts to find alternative and complementary treatments in MS patients to increase (Senders et al., 2019). In the meantime, researches have shown that mindfulness-based therapy has positive effects on the physical and mental dimensions of people with MS (Carletto et al, 2020; Simpson et al, 2020). Mindfulness-based interventions are considered as one of the cognitive-behavioral treatments of the third wave, which are treated positively by focusing on the present, without ruminating about the past or worrying about the future and life stresses (solgi & kamarhkani, 2022).

The mindfulness training protocol mainly involves accepting the present moment with intentional attention and non-judgmental awareness. When clients use a non-judgmental attitude to focus on the present reality, they can reduce internalizing and externalizing behaviors in the face of adversity and stress. Finally, mindfulness-based therapy leads to full growth and increased individual flexibility (Yuan, 2021). In recent years, there has been a strong interest in empirically investigating the application of mindfulness as a possibility to deal with various psychological and physical disorders (Marcella et al., 2021). This program helps MS patients to adapt to the physical and mental changes caused by the disease (Senders et al., 2019).

Multiple Sclerosis (MS) generally results in varying levels of disability, significantly impacting the psychological, social, physical, and economic dimensions of those affected. The negative effects of this disease are aggravated after not controlling the complications of the disease. Psychological treatments can help people cope better with their illness by affecting some of these symptoms. For example, individuals with heightened self-compassion tend to embrace their situations more readily and employ more constructive coping strategies (Gedik & Idiman, 2020). On the other hand, the pain experienced by these patients is also very unpleasant, and a treatment that can reduce this experience will improve the quality of life of these patients and improve their physical and mental dimensions. Thus, this research aimed to examine the impact of mindfulness on the perception of pain and the development of self-compassion among patients with multiple sclerosis.

## Method

This study is semi-experimental with a pre-test, post-test, and follow-up design with two experimental and control groups. In the present study, the statistical population was the group of patients with MS in Urmia City who have medical and neurological records in the hospital. The sampling method was convenience sampling. The statistical sample of the target group included 40 people who were randomly divided into two experimental and control groups

(20 people in the experimental group and 20 people in the control group).

The inclusion criteria included providing informed consent, suffering from MS, being able to participate in group intervention sessions, not participating in other educational and therapeutic classes at the same time, being alert and able to cooperate, having the physical and mental preparation necessary to respond to questions, and not receiving other psychological treatments during research. Exclusion criteria included the presence of another illness, concurrent participation in other treatment sessions, and prior engagement in mindfulness training through previous courses.

## Ethical Statement

In this research, the ethical points of the Declaration of Helsinki, including explaining the objectives to the research sample and obtaining informed written consent from them to participate in the research, giving the research sample the right to choose to enter and leave the research at any time, confidentiality of information, honesty in the selection of research units, and data collection and analysis.

### Measurement

*McGill Pain Questionnaire (MPQ):* This questionnaire was created for the first time by Melzack (Melzack, 1975; quoted from Amiri, Isazadegan, Alilou, & Banafsheh, 2015) with 15 items. After numerous reviews and studies, this questionnaire has been recognized as a reliable tool for studying and investigating pain with different clinical methods. Scoring is done based on a 6-point Likert scale (0 to 5), a higher score indicating more pain the person experiences. Melzack has reported the validity, especially the differential validity (in the ability to diagnose chronic pain), and the validity of this questionnaire at a favorable level. Favorable psychometric properties for this scale have been reported in Iranian society (Ebrahimi, Kohan, & Bahrampour, 2004; quoted by Amiri, Isazadegan, Alilou, & Banafsheh, 2015).

*Self-Compassion Scale:* This scale is a 26-item self-report scale developed by Neff (2003). This scale has 6six subscales (Neff, 2003; Shiondi, Naimi, & Farshad, 2015), and the answers are placed in a Likert scale range from 1 for seldom to 5 for almost always, and a higher score indicates higher self-compassion. Convergent and discriminant validity have shown appropriate internal consistency and retest reliability of this scale (Neff, 2003; quoted by Shiondi, Naimi, & Farshad, 2015). The studies conducted in Iran further validated and confirmed its reliability (Momeni, Shahidi, Mutable Heydari, 2013; Shivani, Naimi, & Farshad, 2015). In this research, Cronbach's alpha was 0.83 (Shivani, Naimi, & Farshad, 2015).

*Mindfulness training program:* The MBCT program is a group intervention that lasts eight weeks and two hours each week. After the conclusion of the fifth week, a class is organized for a single day. In MBCT, the priority is how to pay attention in every moment without judgment. In this process, the client understands through mindfulness that remaining in some feelings is useless and psychologically destructive. In this method, patients learn to stop focusing on negative thoughts and feelings and allow their minds to switch from automatic thinking patterns to conscious emotional processing. In this research, the therapy protocol (Segal et al., 2002) is implemented during 8 90-minute group sessions in the experimental group.

### Statistical Analysis

SPSS statistical software was used to test the hypotheses and research questions. Initially, the descriptive findings section employed indicators such as the mean, standard deviation, and mode. To further explore the research questions and

**Table 1.** Content of cognitive therapy sessions based on mindfulness (Segal et al., 2002).

| session | content | homework |
|---|---|---|
| Session 1 | Pre-test, eating a raisin mindfully; Physical examination. | Physical examination Within 6 days. |
| Session 2 | Practicing thoughts and feelings (visualizing a vague scenario and then examining your reactions to this event and how it affects your mood). | Recording pleasant events (imagining a pleasant event or moment and observing thoughts, feelings,and physical sensations related to it). |
| Session 3 | sitting meditation | Conscious Walking, Breathing space for three minutes three times a day. |
| Session 4 | seeing meditation and hearing meditation; Homework | Sitting meditation (presence of the mind from breathing, body, sounds, thoughts,and awareness without specific direction) 3 minutes of breathing space not only three times a day but at any time to notice tension with unpleasant emotions. |
| Session 5 | Sitting meditation (thoughts are not facts). | Guided sitting meditation |
| Session 6 | Sitting visualization meditation | Shorter guided meditation for at least 40 minutes of Ambiguous scenarios, 3 minutes of breathing three times a day, and any time with stress or difficult emotions |
| Session 7 | Sitting meditation refers to the relationship between mood and activity (self-care) | Discussing the symptoms of relapse, breathing for 3 minutes three times a day and any time with tension or difficult emotions. |
| Session 8 | Physical examination | Experiences and responses to exercises can change over time and in light of new learning. reflection; Feedback (getting feedback from the participants) post-test implementation |

hypotheses, multivariate analysis of covariance (MANCOVA) and Levene's test were applied.

## Results

Descriptive findings - normality test

In Table 2, the descriptive indices of the research variables in the pre-test and post-test are reported by groups, including the mean and standard deviation.

Examining the normality of the data using the Kolmogorov–Smirnov test in Table 3 shows that the research data has a normal distribution.

Table 4 shows the effectiveness of mindfulness training on self-compassion and pain experience among MS patients. Based on the results of Levene's test, the F value was not related to sensitivity, so the use of parametric tests is unimpeded. As a result, the default difference between the covariance is maintained.

According to the results of variance analysis (Table 5), the average difference between the groups regarding self-compassion and pain experience is significant. This finding shows that there is a significant difference between the experimental group and the control group in self-compassion (F = 15.63) and pain experience (F = 296.85) and the average of the experimental group is significantly lower than the control group.

According to the results of variance analysis (Table 5),

**Table 2.** Descriptive indices of research variables by group

| Variable | status | group | Number | mean | standard deviation |
|---|---|---|---|---|---|
| Pain | pre-test | experimental | 20 | 73.00 | 11.85 |
| | | control | 20 | 73.01 | 11.85 |
| | post-test | experimental | 20 | 57.45 | 12.13 |
| | | control | 20 | 74.40 | 11.01 |
| Self-compassion | pre-test | experimental | 20 | 99.15 | 4.94 |
| | | control | 20 | 80.20 | 4.14 |
| | post-test | experimental | 20 | 78.15 | 5.65 |
| | | control | 20 | 78.85 | 4.68 |

**Table 3.** Normality test results

| variable | group | | statistic | df | sig |
|---|---|---|---|---|---|
| self-compassion | Control | Pre-test | 0.974 | 20 | 0.844 |
| | | Post-test | 0.948 | 20 | 0.339 |
| | Test | Pre-test | 0.932 | 20 | 0.166 |
| | | Post-test | 0.952 | 20 | 0.391 |
| pain experience | Control | Pre-test | 0.974 | 20 | 0.843 |
| | | Post-test | 0.984 | 20 | 0.976 |
| | Test | Pre-test | 0.974 | 20 | 0.843 |
| | | Post-test | 0.957 | 20 | 0.485 |

**Table 4.** Summary of Levene's test results

| Variable | F | DF1 | DF2 | P |
|---|---|---|---|---|
| Self-compassion | 1.44 | 1 | 38 | 0.237 |
| pain experience | 0.783 | 1 | 38 | 0.382 |

**Table 5.** Summary of results of multivariate covariance analysis of group differences

| Variable | Source | SS | DF | MS | F | P | Eta |
|---|---|---|---|---|---|---|---|
| Self-compassion | pre-test | 248.74 | 0.213 | 248.74 | 13.39 | 0.01 | 0.266 |
| | group | 290.22 | 1 | 290.22 | 15.63 | 0.01 | 0.297 |
| | error | 344.47 | 37 | 18.56 | | | |
| | total | 883 | 40 | | | | |
| pain experience | pre-test | 4743.65 | 1 | 4743.65 | 490.12 | 0.01 | 0.930 |
| | group | 2873.02 | 1 | 2873.02 | 296.85 | 0.01 | 0.889 |
| | error | 358.10 | 37 | 9.67 | | | |
| | total | 181819 | 40 | | | | |

the average difference between the groups regarding self-compassion and pain experience is significant. This finding shows that there is a significant difference between the experimental group and the control group in self-compassion (F = 15.63) and pain experience (F = 296.85), and the average of the experimental group

is significantly lower than the control group.

## Discussion and Conclusion

This study aimed to investigate the effectiveness of mindfulness on the experience of pain and self-compassion in MS patients. Thus, research hypotheses were proposed and tested, and the results indicated that mindfulness training reduces the pain experience and increases self-compassion in people with MS.

The findings of this research regarding the effectiveness of the mindfulness method on the experience of pain are in line with the results of Dunne et al. (2021), Choobforoushzadeh and Mohammadpanah Ardakan (2019), and Senders et al. (2018). In the interpretation and justification of these results, we can state that the experience of pain consists of two sensory and emotional dimensions. The sensory dimension of pain indicates the intensity of the pain, and its emotional dimension indicates the degree of unpleasantness experienced by the person. Undoubtedly, pain is a feeling in the body, but it is always unpleasant and consequently is considered an emotional experience (Turk & Monarch, 2002).

The method of mindfulness is based on teaching mental concepts. This method attempts to help people have a non-judgmental awareness of all the moments of their experiences (Kabat-Zinn & Hanh, 2009). This is similar to psychological acceptance, which has a non-judgmental approach to unpleasant experiences, feelings, and thoughts that attempts to strengthen this approach in people. Therefore, having a non-judgmental approach to pain, avoiding taking maladaptive actions to control pain, and learning skills to create satisfaction in life despite having pain are among the goals of the mindfulness approach regarding the experience of pain (McCracken & Eccleston, 2005). Mindfulness increases physical self-monitoring and body awareness, which may cause an improvement in bodily mechanisms and self-care. Also, mindfulness is associated with increased parasympathetic activation, leading to deep muscle relaxation, decreased tension and arousal, and ultimately pain relief.

On the other hand, adapting to pain and accepting it through two different mechanisms can affect emotional functioning. The first mechanism is adaptation and satisfaction towards the experience of pain, which protects people from unwanted emotional reactions to pain, and the second mechanism also includes continuing to participate in valuable activities despite the presence of pain, which leads to strengthening positive feelings (Kranz et al., 2010). In fact, in the reasoning of these results, we can state that mindfulness requires the development of three qualities: refraining from judgment, purposeful awareness, and focusing on the present moment in the individual›s attention, which focuses attention on the present moment enables the processing of all aspects of mediated experience, including cognitive, physiological, or behavioral activities. Through practice and techniques based on mindfulness, people become aware of their daily activities. Through moment-to-moment awareness of thoughts, feelings, and physical states, they gain control and are free from the free day and automatic mind focused on the past and future (Senders et al., 2018; Choobforoushzadeh & Mohammadpanah Ardakan, 2019). Therefore, it is clear that these things can reduce the pain experienced by people with MS.

The results also indicated that mindfulness training is effective in people's self-compassion. These results are also in line with the results of Shahsiah et al. (2021), Sakeni et al. (2019), and Bergen-Cico and Cheon (2014).

In interpreting and justifying these results, it should be stated that cultivating self-compassion can be beneficial in facing problematic life events, such as chronic illness, and when feelings of inadequacy

arise, such as disability. Research predicts the relationship between self-compassion and quality of life in people with specific diseases. Self-compassion may increase the ability of people with MS to adopt a mindful attitude toward their condition, thus becoming more accepting of their experience while still engaging in meaningful daily activities. Because people with MS experience extreme fatigue and acute attacks, they may endure more psychological challenges and negative emotions (due to "suffering") than the general population.

Obviously, in this case, promoting self-compassion in them can be useful (Nery-Hurwit et al., 2018). The constructs of self-compassion and mindfulness have a lot of conceptual overlap, and both emphasize the issue of non-judgment towards experiences. On the other hand, self-compassion acts as a shield against stressors (Neff, 2023). Also, if people's minds are not occupied with unpleasant and negative emotions and feelings, they can accept their experiences as they are and not allow them to enter their consciousness. As a result, people will not ruminate on negative thoughts and will not feel hatred towards themselves (Van Dam et al., 2011). Mindfulness teaches people to have a realistic view of their life events and problems and to understand that these experiences are a part of people's lives and they are not alone in this regard. Also, the mindfulness approach believes that people should not try to change negative thoughts and emotions but accept them, which can lead to increased self-compassion (Shahsiah et al., 2021). Therefore, on this basis, it can be acknowledged that mindfulness helps to reduce negative feelings and finally self-compassion of people.

Therefore, the results indicate that the mindfulness method can be effective in reducing the experience of pain and increasing self-compassion in patients with MS. We recommend that future research employ this method to enhance the physical and mental well-being of individuals diagnosed with multiple sclerosis.

Due to the type of research sample, the current research is associated with difficulties, such as the cooperation of the respondents and the influence of those around them. Implementing the necessary training to the family about strategies to strengthen mindfulness can increase self-compassion skills and reduce the pain experienced by these patients. The results of this study indicate the recommendation to conduct mindfulness classes and workshops focused on the experience of pain. Furthermore, it is recommended to create a thorough mindfulness training program aimed at enhancing self-care abilities, including self-compassion, within care and clinical facilities.

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