DOI: 10.26387/bpa.2025.00010

Digital MBSR training for TIN* individuals

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ABSTRACT. Questo studio confronta gli effetti della formazione MBSR (Mindfulness Based Stress Reduction) nelle persone TIN* con quelli nelle persone cisgender. 236 soggetti sono stati divisi in un gruppo sperimentale TIN* (n = 34) e un gruppo cisgender (n = 202), entrambi sottoposti a formazione digitale nello studio longitudinale. Tutti i soggetti hanno compilato questionari sulle loro capacità di mindfulness (Mindful Attention and Awareness Scale – MAAS), sulla soddisfazione di vita (Fragebogen zur allgemeinen Lebenszufriedenheit – FLZ) e sullo stress e il recupero (RESTQ) prima e dopo la formazione. Gli individui TIN* hanno anche completato la Utrecht Gender Dysphoria Scale (UGDS) in due momenti. La consapevolezza, la soddisfazione di vita rispetto alla salute e la stanchezza sono migliorate in modo simile durante il training sia negli individui TIN* che in quelli Cis. La formazione MBSR digitale è efficace per le persone TIN*. Non sono stati riscontrati effetti differenziali rispetto alle persone Cis, ma le persone TIN* hanno riportato livelli di stress più elevati e minore soddisfazione di vita, indicando la necessità di interventi personalizzati.

SUMMARY. A mindfulness-based online intervention can be as effective as face-to-face training in Cisgender persons. This study compares MBSR training effects in TIN individuals to Cis persons. 236 subjects were divided into a TIN* experimental group (n = 34) and a Cis group (n = 202), both receiving digital training in the longitudinal study. All subjects completed questionnaires on their mindfulness skills (Mindful Attention and Awareness Scale – MAAS), life satisfaction (Fragebogen zur allgemeinen Lebenszufriedenheit – FLZ), and stress and recovery (RESTQ) before and after training. TIN* individuals also completed the Utrecht Gender Dysphoria Scale (UGDS) at two points. Mindfulness, life satisfaction with health, and fatigue improved similarly over the training in TIN* and Cis individuals. Gender dysphoria remained unchanged. TIN* individuals reported more stress, lower life satisfaction, and mindfulness than Cis individuals, independent of MBSR training. Digital MBSR training is effective for TIN* people. Differential effects compared to Cis persons weren't found, but TIN* persons reported higher stress and lower life satisfaction, indicating a need for tailored interventions.*

Keywords: *TIN* individuals; Life satisfaction; Mindfulness*

INTRODUCTION

TIN* individuals (trans, intersex, and non-binary people) represent a vulnerable and marginalized group (Anderssen, Sivertsen, Lønning & Malterud, 2020; Dolotina & Turban, 2022; Wolf & Bos, 2023). The health care situation for TIN* individuals is of particular importance due to their specific needs. However, current specific health care services are often insufficient and in need of improvement (Przybyl & Stang, 2024; Stang, 2023; Stang, 2024). Mindfulness focuses on the intentional, present-moment awareness and a non-judgmental form of attention (Kabat-Zinn, 2013; Kaluza,

2018; Michalak, Heidenreich, Ströhle & Nachtigall, 2008; Shapiro, Carlson, Astin & Freedman, 2006). Through practice, mindfulness skills can be developed, promoting an attitude characterized by kindness, openness, and acceptance (Johnson et al., 2023; Michalak et al., 2011; Osama, Rabea & Abdelrahman, 2023; Stang et al., submitted). The targeted application of mindfulness can be understood as a beneficial and health-promoting technique, exerting a relaxing effect on psychological and physical processes (Lehrhaupt & Meibert, 2010). Mindfulness-Based Stress Reduction (MBSR) (Kabat-Zinn, 2013; Lehrhaupt & Meibert, 2010) is such a mindfulness training but requires a significant time commitment. Therefore, Demarzo et al. (2017) developed a four-week mindfulness-based intervention that shows similar efficacy to the classic MBSR. There are research gaps regarding the effects of the MBSR course on stress and life satisfaction, specific samples, including TIN* individuals, and the efficacy of an online format.

The current assessment guidelines of the German medical service (Medizinischer Dienst des Spitzenverbandes Bund der Krankenkassen [MDS], 2020) for the assessment of gender reassignment measures for cost coverage by health insurance companies influences psychotherapists, as TIN* people currently still have to demonstrate a certain number of hours of psychotherapy before gender-modifying measures (transition measures) as a last resort (Stang, 2023, 2024). This does not result in a specific indication for psychotherapy. In terms of health-promoting measures, other interventions beyond psychotherapy can also have positive health-related effects. Stang (2023) already pointed out a gap in research on the effectiveness of counselling and health psychology services, such as prevention courses, for TIN* persons.

As a preliminary study, Stang and Rico-Dresel (2023) conducted a synchronous online course on MBSR with a sample of Cis persons. This revealed significant differences between the experimental and control group (without intervention) as well as between the first and second measurement time points on mindfulness and life satisfaction (Stang, 2023).

A systematic literature search found a small number of relevant studies on the effectiveness of an MBSR course for TIN* persons. In general, studies with TIN* persons have small sample sizes, short follow-up periods or outdated data sets (Sun et al., 2023). It should be noted here that the population of TIN* persons is rather small (Kost, 2024). A systematic review (Sun, Nardi, Loucks & Operario, 2021) confirms the research activity on the use of mindfulness-based and mindfulness-informed interventions in people of sexual and gender minorities. A total of 769 studies were reviewed and 13 studies, including 6 randomized controlled trials, were included in the review. Only one study targeted transgender and gender non-conforming people; transgender women living with HIV (Hunter-Jones et al., 2021). Both Cis and transgender women were very satisfied with the mindfulness-based cognitive therapy and showed an improvement in depressive and stress symptoms. It was concluded for future research that more high-quality studies in this context are needed. With reference to the minority stress model, a study (Iacono, 2019) examined the effectiveness of mindfulness-based interventions on the mental health of sexual and gender minority youth. Initial findings from a case study suggest that future research should focus on mindfulness-based interventions for sexual and gender minority youth. The study by Bigelow (2023) examines the acceptance of mindfulness meditation programs among transgender and gender-diverse adolescents and young adults (TGDY). Two focus groups with ten participants each aged 14 to 24 years were conducted in an urban health center for transgender adolescents. Participants experienced a 10-minute guided mindfulness meditation and provided feedback. In addition, participants‘ anxiety was measured before and after the meditation using the State-Trait Anxiety Inventory (STAI). The main results are: TGDY are interested in mindfulness as an additional self-care method. Many participants found silent meditation unsuitable and rejected this exercise. Guided meditation, on the other hand, was perceived as calming and connecting. From future programs, the subjects wanted sensory stimulation, a pressure-free environment and, if possible, transgender instructors. The STAI results showed a significant reduction in anxiety after group meditation. Mindfulness meditation programs may in principle provide valuable support for TGDY. Mindfulness-based programs are a method for promoting mental health in TGDY.

In summary, the current state of research can be interpreted to suggest that mindfulness-based interventions can support TIN* individuals regarding mental health. Our study builds on the aforementioned studies by addressing this apparent research gap regarding an MBSR course for TIN* people by collecting initial results. Stang and Rico-Dresel (2023) conducted a controlled study on an MBSR course in $n = 120$ Cis persons (experimental group: $n = 80$; control group: $n = 40$) and were able to show that a MBSR

course significantly increased both general life satisfaction and, among other things, satisfaction with health, one's own person and sexuality. Since gender dysphoria is characterized by discomfort related to an incongruence between a person's gender identity and their assigned gender, it is hypothesized in the context of existing studies that an MBSR course may be effective for people with gender dysphoria (Bigelow, 2023; Hunter-Jones et al., 2021; Iacono, 2019; Sun et al., 2021).

Aim

The research project presented here aims to evaluate an MBSR course as an online prevention course specifically for TIN*people. In addition, it will be evaluated whether an online MBSR course can have a significant effect on TIN* people in terms of increasing mindfulness and life satisfaction and reducing stress and gender dysphoria. The research question is: 'What is the impact of a digital online MBSR course on TIN* individuals?'. We compare the results of the TIN* sample to the results of a Cis sample, expecting a similar effect on both groups.

Hypotheses

H1: Mindfulness-based training positively affects participants' mindfulness skills in TIN* and Cis persons.

H2: Mindfulness-based training positively affects participants' life satisfaction in TIN* and Cis persons.

H3: Mindfulness-based training positively affects participants' stress and recovery in TIN* and Cis persons.

H4: Mindfulness-based training positively affects gender dysphoria in TIN* persons.

METHOD

Sample

The sample consisted of n = 202 Cis persons and n = 34 TIN* persons undergoing a four-week MBSR training. Mean age was 29.48 (SD = 14.56) years with no significant difference between Cis and TIN* persons ($t(50.66) = 1.22$, $p = .227$). In the Cis sample, 61% were female and 39% male. In the TIN* sample, n = 26 were ascribed female gender identity at birth, and n = 8 male gender identity. Of those TIN* persons who gave information on their present gender status (n = 20), 85% reported a nonbinary gender identity. Of the whole sample, 46% (n = 108 persons) were students or underwent vocational training, and 39% (n = 91 persons) were in employment (n = 9 attending school, n = 8 working in own household, n = 5 retired, n = 7 unemployed, n = 8 missing).

Materials

We used an online questionnaire on demographic data, a personal code, *Mindful Attention and Awareness Scale* (*MAAS*) (Michalak et al., 2011), *General Life Satisfaction Questionnaire* (*FLZ*) (Fahrenberg et al., 2000), the *Recovery-Stress Questionnaire* (*RESTQ*; Kallus & Kellmann, 2016), and the *Utrecht Gender Dysphoria Scale* (*UGDS*) (Cohen-Kettenis & van Goozen, 1997; McGuire et al., 2020; Steensma, McGuire, Kreukels, Beekman & Cohen-Kettenis, 2013).

The *Mindful Attention and Awareness Scale* (*MAAS*; Michalak et al., 2011) measures the frequency of mindful states over time by 15 items (e.g., "I find it difficult to stay focused on what's happening in the present.") on a 6-point Likert scale (1 = almost always to 6 = almost never). The scale shows strong psychometric properties and has been validated with a variety of samples. Reliability (Cronbach's alpha) in our sample was .89.

The questionnaire on life satisfaction (German: *Fragebogen zur Lebenszufriedenheit*, *FLZ*; Fahrenberg, Myrtek & Brähler, 2000) is a multidimensional instrument assessing life satisfaction by 49 items on a 7-point Likert scale (1 = very dissatisfied to 7 = very satisfied). For this study, we investigated life satisfaction concerning seven topics: Satisfaction with Health ($\alpha = .85$), with Finance ($\alpha = .88$), with Housing ($\alpha = .73$), with Leisure activities ($\alpha = .87$), with one's Own person ($\alpha = .86$), Sex ($\alpha = .86$), and with Friends ($\alpha = .73$), and the Overall life satisfaction ($\alpha = .94$). The FLZ is a reliable and valid instrument that is used widely in German speaking countries.

The *Recovery-Stress Questionnaires* (*RESTQ*; Kallus & Kellmann, 2016) is a valid, reliable, and objective instrument for assessing stress symptoms and recovery activities. It consists of 48 items with a 7-point Likert scale (1 = never to 7 = all the time), representing seven stress related scales and five recovery related scales: General stress ($\alpha = .83$, e.g., "... everything became too much for me"), Emotional stress ($\alpha = .77$, "... I was irritable"), Social stress ($\alpha = .64$, "... I got

annoyed with others"), Conflicts/pressure to perform (α = .64, "... I was under pressure to perform"), Fatigue (α = .82, "... I was irritable"), Lack of energy (α = .83, "... I could only do my work slowly"), Somatic stress (α = .75, "... I had physical complaints"), Success (α = .68, "... I was successful"), Social recovery (α = .82, "... I laughed"), Somatic recovery (α = .82, "... I felt physically relaxed"), General well-being (α = .90, "... I was in good spirits"), and Sleep quality (α = .77, "... I fell asleep satisfied and relaxed").

The *Utrecht Gender Dysphoria Scale* (*UGDS*; Cohen-Kettenis & van Goozen, 1997; McGuire et al., 2020; Steensma et al., 2013) consists of twelve items that assess the extent of experienced gender dysphoria using a 5-point Likert scale (1 = strongly agree to 5 = strongly disagree). Persons who were ascribed to male gender at birth fill in different items than persons who were ascribed to female gender at birth (e.g., version GDM "I feel unhappy because I have a male body" for ascribed male gender vs version GDF "I hate menstruating because it makes me feel like a woman" for ascribed female gender). Sum scores range from 12 to 60, with higher values indicating stronger gender dysphoria. The UGDS is an established, validated instrument with good to excellent reliability (in our sample, Cronbach's alpha = .92 for the GDF and .90 for the GDM version).

Procedure

Intervention. The MBSR course comprised weekly, two-hour sessions over a period of four weeks. The content, methods and techniques used as an intervention were based on Demarzo et al. (2017) and Stang and Rico-Dresel (2023). The structure of the course was as follows:

- the first session covered the theory of mindfulness, followed by the practical exercise of the raisin experience;
- the second session focused on emotions and thoughts during mindfulness practice and included a breathing exercise as a practical application;
- in the third session, the first and second suffering were explained theoretically, followed by the practical exercise of the body scan;
- the final fourth session was dedicated to the integration of mindfulness into everyday life and included a walking meditation as a practical exercise.

At the first measurement time point (T1), all participants completed the questionnaires provided before the start of the treatment. The second measurement point (T2) took place after the last session.

Design. The research design was a quantitative longitudinal study with two measurement points (T1 and T2) in the sense of a pre-post measurement. We compared two experimental groups who both received MBSR training: Test subjects for both samples were recruited via social media, public advertisements and email distribution lists. The MBSR trainings of both groups were fully standardized with regard to the training elements according to Stang and Rico-Dresel (2023), with the exception that in the TIN* group care was taken to ensure that the training was conducted in a safe space. Trainers in the TIN* group were Cis female (n = 2) and nonbinary (n = 1).

According to the self-assessment of the Joint Ethics Committee of Bavarian Universities (Gemeinsame Ethikkommission der Hochschulen Bayerns [GEHB], 2022), no risks or harm were to be expected for the participants as a result of taking part in the survey. The study did not include patients but members of the general population. In addition, the basic ethical principles of the professional psychological associations DGPs and BDP were adhered to in the research project and the study was conducted in accordance with the Declaration of Helsinki. The study was preregistered with "as predicted" (www.aspredicted.org, 157614).

RESULTS

For data analysis, we used descriptive statistics, paired t-tests, and mixed ANOVAs via SPSS, Version 29. Normal distribution of the dependent variables in both subgroups and both measurement points was tested and confirmed by Shapiro-Wilks-tests (all tests p>.05).

Mindfulness and life satisfaction

Table 1 and Table 2 summarise the descriptive data and the results of the mixed ANOVA for the comparison of the two training groups. An improvement over time was shown for the MAAS (F(1,226) = 5.71, p = .018, partial η^2 = .024) and life satisfaction with health (F(1,226) = 5.85, p = .016, partial η^2 = .025) scales. Overall, the Cis training group had higher values on all scales, compared to the TIN* group (see Table 1), which was reflected in a significant group effect on

Table 1 – Descriptive data of Cis and TIN* training group on mindfulness (MAAS) and life satisfaction (FLZ)

	***M*(*SD*) Cis (*n* = 198)**	***M*(*SD*) TIN* (*n* = 30)**	***M*(*SD*) Cis (*n* = 198)**	***M*(SD) TIN* (*n* = 30)**
	t1		t2	
MAAS	3.77 (.87)	3.40 (.75)	3.91 (.81)	3.55 (.71)
FLZ health	4.76 (1.22)	4.56 (1.00)	5.02 (1.27)	4.65 (1.08)
FLZ finance	5.07 (1.20)	4.53 (.93)	5.16 (1.16)	4.53 (.96)
FLZ housing	5.53 (.96)	5.27 (.66)	5.46 (1.01)	5.40 (.75)
FLZ leisure activities	4.73 (1.25)	4.46 (.91)	4.76 (1.22)	4.44 (.83)
FLZ own person	5.15 (1.02)	4.69 (1.09)	5.25 (1.07)	4.77(1.07)
FLZ sex	4.92 (1.12)	4.81 (1.12)	5.00 (1.15)	4.86 (1.13)
FLZ friends	5.06 (.86)	4.82 (.74)	5.12 (.94)	4.88(.83)
FLZ overall life satisfaction	5.02 (.75)	4.73 (.61)	5.10 (.83)	4.79 (.68)

Legenda. MAAS = *Mindful Attention and Awareness Scale*; FLZ = *Fragebogen zur allgemeinen Lebenszufriedenheit*.

Table 2 – Mixed ANOVA results (Group: Cis vs TIN* training group) (Time: t1 vs t2) on mindfulness (MAAS) and life satisfaction (FLZ)

	Time		**Group**		**Time*group**	
	F(*df* = 1,226)	*p*	*F*(*df* = 1, 226)	*p*	*F*(*df* = 1, 226)	*p*
MAAS	5.71	.018	5.85	.016	.004	.947
FLZ health	5.85	.016	1.55	.214	1.51	.221
FLZ finance	.50	.482	7.33	.007	.39	.532
FLZ housing	.15	.704	.86	.356	1.72	.191
FLZ leisure activities	.003	.956	1.78	.183	.072	.789
FLZ own person	1.64	.202	6.02	.015	.02	.895
FLZ sex	.81	.370	.34	.561	.07	.797
FLZ friends	.88	.350	2.23	.137	.00	.999
FLZ overall life satisfaction	2.31	.130	4.22	.041	.07	.799

Legenda. df = degree of freedom; MAAS = *Mindful Attention and Awareness Scale*; FLZ = *Fragebogen zur allgemeinen Lebenszufriedenheit*.

the scales MAAS ($F(1,226) = 5.85$, $p = .016$, partial $\eta^2 = .026$), FLZ finance ($F(1,226) = 7.33$, $p = .007$, partial $\eta^2 = .031$), FLZ own person ($F(1,226) = 6.02$, $p = .015$, partial $\eta^2 = .026$), and FLZ overall life satisfaction ($F(1,226) = 4.22$, $p = .041$, partial $\eta^2 = .018$). None of the scales analysed showed a significant interaction effect (see Table 2): therefore, mindfulness and life satisfaction of TIN* and Cis individuals thus changed in a similar way over the course of the training. Figure 1 illustrates the results for the MAAS.

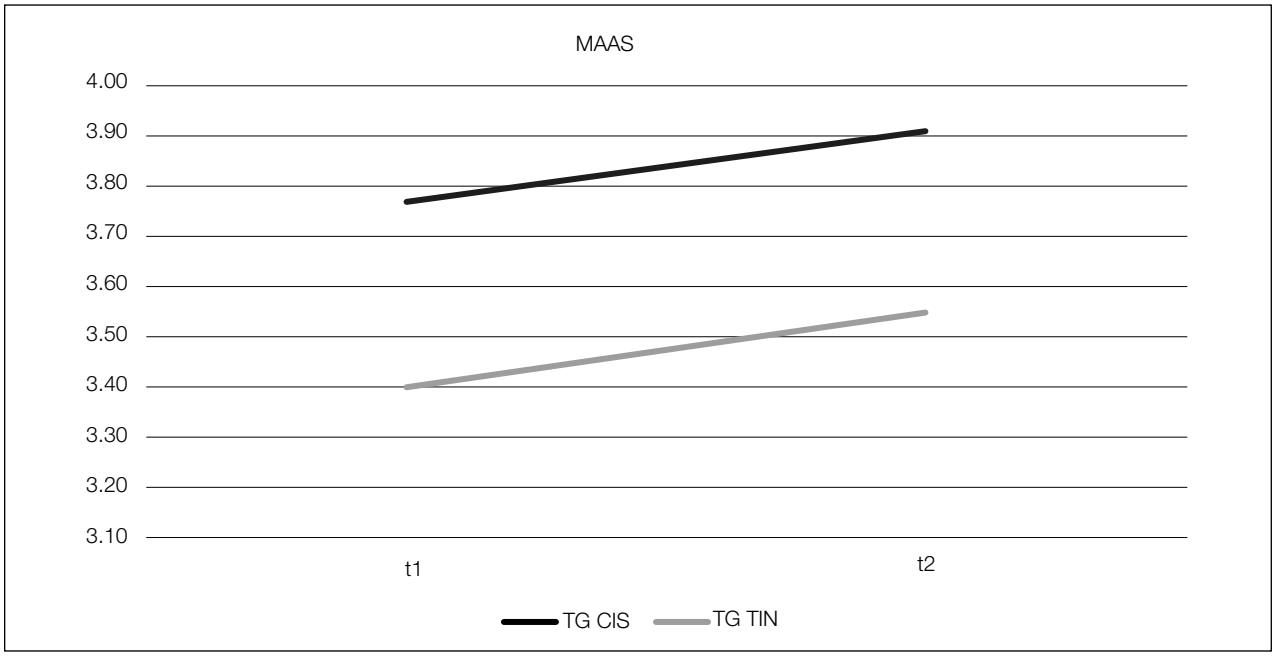
Stress and recovery (RESTQ)

Concerning RESTQ data on stress and recovery, we found group effects on several subscales (general stress, social stress, emotional stress, pressure to perform, lack of energy, social recovery, somatic recovery, general wellbeing, sleep), indicating more stress and less recovery in the TIN* sample. Moreover, descriptive data show an improvement in stress and recovery after MBSR training (see Table 3). However, this change over time only reached statistical significance on the fatigue subscale ($F(1,226) = 4.43$, $p = .036$, partial $\eta^2 = .020$). Mixed ANOVAs did not reveal significant interactions between group and time, indicating that TIN* and Cis persons did not develop differently over time concerning stress and recovery (see Table 4).

Gender dysphoria

UGDS data indicate a higher gender dysphoria in TIN* persons born with a female gender identity ($n = 26$, $M = 43.81$), compared to TIN* persons born with a male gender ($n = 8$, $M = 39.13$) before MBSR training. The UGDS mean values did not change significantly over the training period (see Table 5).

Figure 1 – Changes in mindfulness (MAAS mean values) over time in the Cis and TIN* training group



Legenda. MAAS = *Mindful Attention and Awareness Scale.*

Table 3 – Descriptive data of Cis and TIN* training group stress and recovery (RESTQ)

	***M*(*SD*) Cis (*n* = 198)**	***M*(*SD*) TIN* (*n* = 30)**	***M*(*SD*) Cis (*n* = 198)**	***M*(*SD*) TIN* (*n* = 30)**
	t1		t2	
General stress	2.85 (1.30)	3.46 (1.27)	2.77 (1.33)	3.38 (1.09)
Social stress	2.85 (1.13)	3.48 (.89)	2.84 (1.11)	3.32 (.78)
Emotional stress	2.92 (1.21)	3.38 (.76)	2.87 (1.19)	3.26 (.80)
Pressure to perform	3.29 (1.15)	3.72 (.99)	3.23 (1.10)	3.58 (.92)
Fatigue	3.59 (1.50)	3.88 (.93)	3.41 (1.30)	3.45 (1.22)
Lack of energy	3.20 (1.28)	3.69 (1.06)	3.10 (1.15)	3.55 (1.15)
Somatic stress	3.03 (1.27)	3.38 (.89)	2.96 (1.21)	3.26 (.92)
Success	3.50 (1.08)	3.20 (1.05)	3.61 (1.17)	3.28 (.81)
Social recovery	4.36 (1.27)	3.63 (.78)	4.28 (1.32)	3.53 (1.00)
Somatic recovery	3.89 (1.25)	3.26 (1.01)	3.96 (1.21)	3.54 (1.14)
General wellbeing	4.62 (1.21)	3.63 (.93)	4.65 (1.23)	3.79 (1.12)
Sleep	4.59 (1.33)	4.05 (.95)	4.79 (1.30)	4.22 (1.25)

DISCUSSION

This study examines the effects of a four-week MBSR training on mindfulness, life satisfaction, stress and recovery in a TIN* sample compared to a Cis sample. As the general effectiveness of the training has already been shown in comparison to an untreated control group (Stang & Rico-Dresel, 2023), and as the recruitment of a large TIN* sample is difficult, we did not recruit a TIN* untreated control group but instead focused on the comparison of Cis and TIN* individuals who underwent MBSR training.

Our results show a significant improvement in mindfulness and some aspects of life satisfaction and stress in both subsamples. However, most life satisfaction and stress/recovery scales did not improve significantly over time, even if the descriptive values indicated positive developments. Gender dysphoria as a TIN* specific outcome variable did not improve during the MBSR training. Therefore, results indicate that a short MBSR training improves its core outcome – mindfulness – but does not lead to substantial changes in broader aspects of life such as life satisfaction, stress, and recovery. Our results confirm the prior results by Stang and Rico-Dresel (2023). We did not find any time by group interaction effects which means that MBSR training is equally effective in Cis as in TIN* persons. TIN* people were specifically included in the training to focus on a safe place and awareness of individual needs. The results can also be interpreted to mean that a training exclusively for TIN* persons worked well.

However, we did find that TIN* persons reported less mindfulness, satisfaction with life and recovery and more stress than Cis persons. This observation applies to almost

Table 4 – Mixed ANOVA results (Group: Cis vs TIN* training group) (Time: t1 vs t2) on stress and recovery (RESTQ)

	Time		Group		Time*Group	
	$F(df = 1,226)$	p	$F(df = 1, 226)$	p	$F(df = 1, 226)$	p
General stress	.49	.484	7.10	.008	.01	.979
Social stress	.71	.399	8.94	.003	.56	.455
Emotional stress	.60	.441	4.67	.032	.12	.731
Pressure to perform	.86	.356	4.25	.040	.12	.735
Fatigue	4.43	.036	.52	.470	.70	.403
Lack of energy	1.21	.273	5.11	.025	.03	.859
Somatic stress	.83	.364	2.35	.127	.09	.771
Success	.74	.392	2.78	.097	.02	.895
Social recovery	.41	.523	12.81	<.001	.00	.952
Somatic recovery	2.61	.108	6.12	.014	1.03	.310
General wellbeing	.85	.357	19.75	<.001	.41	.523
Sleep	2.25	.135	6.21	.013	.01	.913

Legenda. df = degree of freedom.

Table 5 – Comparison of gender dysphoria (UGDS) before (T1) and after training (T2)

	M	***SD***	***M***	***SD***	***t* statistic**
	t1		t2		
UGDS MGDF (n = 26)	43.81	10.30	42.81	9.71	$t(25) = 1.25$, $p = .224$
UGDS MGDM (n = 8)	39.13	8.64	43.00	11.03	$t(7) = -1.79$, $p = .117$

Legenda. UGDS = *Utrecht Gender Dysphoria Scale.*

all scales of our questionnaires. Other researchers have pointed out the stressors and challenges in the lives of TIN* persons (Anderssen et al., 2020; Budge, Adelson & Howard, 2013; Dolotina & Turban, 2022; Hatzenbuehler, 2009; Meyer, 1995). A short-term MBSR training may be used as a tailored low-level intervention to prevent psychological distress and promote mental and physical health.

MBSR courses could be increasingly included in general and specialist healthcare. If, due to changes in the healthcare system (e.g. digitalization, changes to the German MDS assessment guidelines for trans* people; Medizinischer Dienst des Spitzenverbandes Bund der Krankenkassen [MDS], 2020; etc.), other healthcare services in addition to traditional psychotherapy are also recognized as a prerequisite for transition measures and these provide empirical evidence of effectiveness, the persons concerned would be more self-determined in their choice of interventions. In the case of health measures, such as MBSR courses, it can already be assumed that they are basically effective, as our study shows. Psychotherapists could also provide information on psychotherapy independently of the assessment guidelines. Politically, there is an urgent need for reform both at a legal level (Transsexuals act *vs* Self-determination act) and in the context of healthcare (Medizinischer Dienst des Spitzenverbandes Bund der Krankenkassen [MDS], 2020; Stang, 2024).

Strengths and limitations

The strength of the work lies in the successful implementation of an evaluation study on a specific group of people, TIN* people, who can be regarded as marginalized and vulnerable. There have only been a few studies on this group of people to date.

The TIN* sample was still quite small compared to the Cis sample, resulting in low statistical power. As TIN* persons are a small demographic group, recruitment of a large TIN* sample will take more time and will have to focus on larger regions than we could manage in our study. The prevalence of trans identity varies internationally and within Germany, with estimates of .8-1% for trans* men and .6-.8% for trans* women (Kost, 2024). Recent studies show an increase in these frequencies, particularly among young people, as in a North American study in which 600 out of 100.000 young people under the age of 21 were identified as transgender (Sun et al., 2023). In line with this limitation, we did not recruit an untreated TIN* control group – therefore, we cannot rule out that improvement over time could be influenced by other factors than the MBSR training, although similar effects were found in a Cis sample compared to a Cis control group (Stang & Rico-Dresel, 2023). As we are conducting an ongoing project on MBSR training in different target groups (Cis persons, TIN* persons, older persons, children and young people, etc.), we will be able to assess the effects of MBSR training in a more specific way in the future.

CONCLUSION, IMPLICATIONS, AND FUTURE DIRECTIONS

We investigated an MBSR course in TIN* people in contrast to cis people in a longitudinal study. In principle, we were able to confirm the effectiveness of MBSR in TIN* people. Our finding that the effectiveness of MBSR is also influenced by certain personal variables, such as gender identity (TIN* *vs* Cis), confirms and extends the previous state of research (Johnson et al., 2023; Osama et al., 2023). It would also make sense to investigate specific areas of application, e.g. in certain medical fields such as orthopaedics versus psychiatry or oncology or in working with specific age groups such as children, adolescents or the elderly. Current findings already indicate that MBSR can have different effects depending on the population. A targeted study of these specific groups could help to further differentiate the applicability and effectiveness of MBSR and develop tailored interventions.

Acknowledgments: We would like to thank Daniela Rico-Dresel, Romina Greßmann, Jasmin Rheiner and Isabel Schuster for their support in literature research, data collection and data processing. We would also like to thank all participating institutions for their support in recruiting the TIN* subsample.
Ethics: (a) Institutional Review Board Statement: the study was conducted in accordance with the Declaration of Helsinki and was approved by an Institutional Review Board/Ethics committee; (b) The study received an exemption from an Institutional Review Board/Ethics committee.
Ethical approval: The study complied with the Declaration of Helsinki. In addition, a pre-registration, the clarification of legal and ethical objections by the self-assessment of the Joint Ethics Committee of the Bavarian Universities (GEHB) and the Bavarian Chamber of Psychotherapists took place. In addition, the basic ethical principles of the professional psychological associations DGPs and BDP were adhered to in the research project. **Informed consent statement:** Informed consent was obtained from all subjects involved in the study. **Data availability statement:** Access to the data is only possible under data protection restrictions. The type and scope of use are determined by the data providers. An individualized contract between data providers and subsequent users is required. The data is classified as particularly sensitive as it contains personal data on gender diversity and well-being. **Conflict of interest statement:** There are no conflicts of interest.

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