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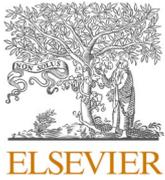
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# Sauna culture improves physical and mental wellbeing in the UK through social connection and ritual

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## ABSTRACT

Sauna culture is experiencing rapid global growth, yet beyond physical health benefits, remains largely understudied within academic research. We investigate both its physical and mental health benefits in the UK using the Social Cure model in conjunction with a ritual lens to understand how feelings of connection grow via sauna. Across three studies ( $N = 1,907$ ), we explored the role of social identities in shaping wellbeing outcomes among sauna users. Studies 1 and 3 employed longitudinal designs, revealing increases in emotional wellbeing over time, while Study 2 used a cross-sectional approach and showed that stronger sauna identities were associated with self-reported improvements in both physical and emotional wellbeing. Study 3 further demonstrated that perceiving sauna use as a ritual, alongside experiencing emotional synchrony during sauna sessions, was positively linked to stronger sauna identities. Together, these findings suggest that the social and ritual aspects of sauna use may contribute to its wellbeing effects, with potential implications for sauna operators in the UK and beyond.

Like many post-industrial nations, the UK faces rising levels of loneliness alongside a range of associated physical and mental health challenges (Chopra et al., 2024; NHS England, 2025). Among the growing number of popularly cited remedies for these issues is sauna, practiced as hyperthermic stress only, or combined with cold-water immersion for thermal contrast therapy, with both practices currently gaining attention for their purported wellbeing benefits. However, despite widespread claims, there has been little systematic research into British sauna culture, leaving key questions unanswered about its physical and mental health benefits and what may underlie them. While strong international evidence highlights the physical health benefits of sauna bathing—particularly for cardiovascular function, immune support, and chronic pain management (Dudzik et al., 2024; Engström et al., 2022; Laukkanen and Kunutsor, 2024)—much less is known about its mental health impacts, especially in the burgeoning UK context.

We propose that understanding sauna as a ritual is essential, as it positions sauna beyond typical group activities explored in the Social Cure model (Jetten et al., 2017) or offered through mainstream health

initiatives, by highlighting its capacity for deep meaning-making. Rituals are uniquely powerful in fostering social cohesion and have been consistently associated with enhanced wellbeing, particularly through emotionally synchronised, shared experiences (Bouchat et al., 2024; Páez et al., 2015; Włodarczyk et al., 2023). This article addresses these gaps through three studies with sauna users in the UK, applying a combination of the Social Cure model with a ritual lens to examine how feelings of belonging and connection within sauna communities may contribute to both physical and mental health outcomes. First, we contextualise sauna use and its health benefits, before reviewing the Social Cure literature, potential application to sauna, and the intersection with ritual and its evidenced wellbeing effects.

## 1. Benefits and prevalence of sauna

Evidence for the health benefits of sauna bathing has expanded considerably, particularly regarding cardiovascular and metabolic health. Regular sauna use has been linked to lower risks of hypertension,

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stroke, cardiovascular and neurocognitive disease, alongside improved circulatory, immune, and endothelial function (Dudzic et al., 2024; Engström et al., 2022; Laukkanen and Kunutsor, 2024). Beyond physical health, growing evidence also highlights reductions in stress, depression, and anxiety, as well as improved happiness, social functioning, and sleep quality (Dudzic et al., 2024; Engström et al., 2022; Hussain and Cohen, 2018). Clinical and longitudinal studies further suggest that sauna use can reduce depressive symptoms, promote relaxation, and even lower the risk of psychosis with frequent use (Reeder et al., 2023; Laukkanen et al., 2018). Neuroscientific findings additionally describe a distinct state of mental clarity and emotional equilibrium—known in Japan as *tononou*—induced by contrast therapy cycles of heat and cold (Chang et al., 2023). Together, these findings provide strong evidence that sauna bathing offers holistic benefits for both physical and psychological wellbeing (Dudzic et al., 2024).

Considering these benefits, it is perhaps not surprising that we have a global tradition of sauna and collective bathing. Japanese baths, Aztec (*temazcal*) and Native American sweat lodges, the Roman Baths, Moroccan and Turkish Hammam, as well as the sweathouses of Ireland represent just a few examples of collective bathing and purification traditions (Epstein and Arvigo, 2018; Kearns and Ylimaunu, 2021; Poluzzi and Esposito, 2019). The origins of the modern globalised therapeutic spa landscape are suggested to date back to the *Roman-Irish Bath*, which traces back to the Roman era and was revived as well as modernised in Ireland in the mid-19th century, and included both hydrotherapeutic and social aspects (Foley, 2014). However, the most prominent represented and researched, of such traditions in Northern Europe is the Finnish sauna. This is not only an integral part of Finnish culture but has become popularised across the globe (Cernych et al., 2018; Hussain and Cohen, 2018; Laukkanen and Kunutsor, 2024; Liikkanen and Laukkanen, 2021). Similar to Russian Banyas, Finnish sauna represents steam baths used for physical cleansing, relaxation and spiritual well-being (Epstein and Arvigo, 2018). Nearly 60% of Finnish survey respondents used sauna *at least* once a week (Liikkanen and Laukkanen, 2021).

Few, if any, countries could compete with Finland and its estimated 3.3 million steam rooms (including private and public facilities) (British Broadcasting Corporation, 2018). However, the popularity of communal saunas is rising in the UK, annually doubling in numbers (Malvern, 2024), and a continuous market size increase for saunas & solariums in the UK (IBISWorld, 2025). British sauna culture is still young but growing fast, evolving from Finnish and Lithuanian foundations into something distinctly its own; more social, experimental, and openly communal. In the UK, saunas are becoming places to connect with others, with community sessions and ritual-inspired practices that lean into shared experience rather than private retreat. Many bathers on the continent prefer to be silent or introspective in public saunas, but the UK has seen a surge in so-called 'community saunas' where one of the primary objectives is to facilitate connection and communication with new people. Despite the popularity of sauna use in the UK, academic research in this region is currently underrepresented. We seek to unite sauna and wellbeing literatures with the Social Cure and ritual literatures in the underrepresented but burgeoning UK sauna culture scene.

## 2. The Social Cure model

The Social Cure model offers a compelling explanation for how social identities can safeguard both mental and physical health by fostering meaningful connections, building self-esteem through group membership, and providing access to shared social and material resources (Haslam et al., 2018; Jetten et al., 2017). Rooted in social identity theory (Tajfel and Turner, 1979), this framework shows that people who feel strongly connected to groups—whether based on community, culture, or shared experience—experience better health outcomes (Greenaway et al., 2015). Despite over a decade of high-profile research, opportunities to build and sustain such connections are increasingly under

threat. The decline of 'third spaces'—free, accessible places for informal socialising such as libraries, cafes, and community centres—limits everyday chances for people to form and maintain social identities (Klinenberg, 2018; Oldenburg, 1999). In this context, finding new ways to cultivate social connection is more urgent than ever.

A growing body of evidence demonstrates that interventions designed to boost social connections can significantly improve wellbeing across diverse populations. For example, the Groups4Health programme has been effective at reducing loneliness and improving mental health by helping individuals build social group ties, including among stroke survivors through choir participation (Cruwys et al., 2022; Haslam et al., 2016). Other successful examples include festivals for teenagers, community sports clubs, and creative arts programmes, all of which harness social identification to promote belonging and psychological health (Jetten et al., 2017; Williams et al., 2020). Meta-analyses show these interventions are effective across continents, with consistent results in over 60 studies conducted in Europe, North America, Asia, and Australia (Steffens et al., 2021). Recent studies further highlight that community groups can buffer against loneliness and protect cardiovascular and cognitive health over time (Chopra et al., 2024).

Whether the mental health improvements associated with sauna use are related to the well-established physical health improvements in the literature, or to the Social Cure, has not yet been explored. Frequent sauna use has even been associated with reduced overall mortality risk, suggesting potential longevity benefits (Hussain and Cohen, 2018; Laukkanen et al., 2018; Laukkanen and Kunutsor, 2024). This may also relate to findings that social relationships are a comparable mortality risk with well-established risks, such as smoking, alcohol, high BMI, and exercise (Holt-Lunstad et al., 2010). While a strong research focus on associated sauna health benefits can be observed internationally, far fewer researchers have explored the ritualistic and social aspects of sauna use. This study builds on evidence from the Social Cure model by investigating sauna use in the UK as a social practice that combines three mechanisms known to improve wellbeing: frequent participation in a shared activity, ritual, and a deepened sense of social connection.

## 3. Rituals and social connection

Social connection has been conceptualised through multiple theoretical frameworks, with foundational insights stemming from Social Identity Theory (Tajfel and Turner, 1979). This posits that individuals derive part of their self-concept from their group memberships, highlighting how identifying with a social group can influence behaviour, emotions, and wellbeing through mechanisms of in-group favouritism and normative alignment (Ellemers et al., 2002; Haslam et al., 2009; Turner et al., 1987). More recent research has built on these insights by introducing the concept of identity fusion; a visceral, emotional sense of oneness with a group whereby personal and group identities completely overlap (Gómez et al., 2012, 2020). Unlike the more flexible and context-dependent dynamics of group identification, identity fusion is characterised by a profound personal alignment with the group's fate and goals, often motivating extreme pro-group behaviours. Both forms of social connection—social identification and identity fusion—have been shown to significantly impact wellbeing, with the strong social ties of identity fusion linked to wellbeing, life satisfaction, reduced loneliness, and enhanced resilience (Henríquez et al., 2023; Peitz and Newson, 2025; Tunçgenç et al., 2023).

Ritual's effects on wellbeing via social cohesion have been observed in diverse settings, from family rituals (Jie and Liu, 2021) and refugee communities (Rebolledo, 2019) to sports fandom (Reyzen et al., 2017; Wann, 2006; Wann et al., 2017). Across these contexts, shared ritual participation often fosters a deep sense of belonging and mutual understanding. Rooted in Durkheim's concept of collective effervescence (1912), shared participation in collective events like folkloric marches or protest demonstrations can boost identity fusion, self-esteem, and positive emotions (Páez et al., 2015). Through collective rituals, under

the right circumstances, participants experience shifts in self-other boundaries, at least in part by invoking emotional synchrony (Baranowski-Pinto et al., 2022; Xygalatas et al., 2025).

Emotional synchrony—sharing the same emotional state with others—strengthens social connection and improves wellbeing. This effect appears across a range of contexts, from marriages, where even sharing a bad day can deepen connection (Randall et al., 2011), to collective religious rituals, such as those in Sikh communities (Sohi et al., 2018). This emotional synchrony can, in turn, improve compassion for others (Pizarro et al., 2020) and feelings of transcendence (Włodarczyk et al., 2023). Supporting this, a recent meta-analysis finds that both group identification and emotional synchrony independently predict key social and psychological outcomes, including increased positive affect and life satisfaction (Bouchat et al., 2024). Emotional synchrony has also been measured physiologically via synchronised heart rates at sports games; with more synchronisation between fans, feelings of personal transformation and identity fusion are heightened (Baranowski-Pinto et al., 2022). Sauna bathing as a collective ritual, potentially offers ideal conditions for powerful relational dynamics to emerge, as it combines pathways to fusion: emotional synchrony, shared vulnerability, and emotionally salient experiences (Gómez et al., 2024; Whitehouse and Lanman, 2014; Zabala et al., 2024). We focus here specifically on emotional synchrony and its association with ritual as pathways to identity fusion, due to the experience of heat, breath, and sensory elements being synchronised in real time through collective affective alignment and embodied co-presence.

Sauna includes many rituals: it takes place in dedicated, purpose-built spaces removed from ordinary settings; often requires specialised or minimal attire; and often involves structured practices such as pouring water over heated stones, the use of birch branches (*vihta* or *vasta*) for physical stimulation, and intentional shifts between heat and cold exposure. Furthermore, sauna sessions tend to involve dim lighting or candlelight, enhancing their symbolic and sensory distinctiveness. These conditions together foster a liminal space—a place marked by altered awareness, in which everyday roles and identities are suspended (Turner, 1967), evoking the potential for transformation (Land et al., 2016). As such, sauna bathing operates within the domain of ritual, with its unique capacity to elicit strong feelings of social connection and shared vulnerability. This ritual dimension is particularly significant in understanding the heightened social bonding and well-being effects observed among participants.

We propose that sauna represents a liminal space, wherein ritual strengthens the act of being together. From a Social Cure perspective, the liminal ritual space, may help to expediate the process of aligning with a social identity as the boundaries of the self become frayed through the mist of sauna, the removal of clothes, and shedding of external identities. Here, social identities can be more effectively ‘yoked’ to personal identities, leading to a host of wellbeing effects via improved self-esteem, sense of purpose, increased support or resources, and a feeling of belonging (Haslam et al., 2018).

Shared ritual experiences can dissolve individual boundaries, allowing participants’ personal identities to become porous and merge with collective identities, i.e., identity fusion (Newson et al., 2021a,b; Whitehouse and Lanman, 2014). This form of social connection is particularly relevant in communal practices such as sauna bathing, where the ritualised nature of participation may intensify feelings, meaning, unity, and belonging. In sauna cultures, especially in Northern European contexts, the fusion of self and group identity may be further reinforced by the physical and emotional vulnerability inherent to the practice, which requires participants to disrobe, endure heat, and engage in cycles of exertion and relaxation together. Relatedly, rituals involving physical endurance or sensory alteration can deepen group commitment and cooperation (Fischer et al., 2014; Xygalatas et al., 2013).

Poluzzi and Esposito (2019) suggest that modern spas create the ‘special’ experiences consumers are likely to keep seeking when they

borrow ritualistic elements, potentially from multiple cultures, and combine them into a multisensory journey. These ritualistic elements may include Tibetan bells ritual for balancing the mind, a Berber ritual classically performed in Moroccan Hamam, or sauna “Aufguss” (German for “infusion”), incorporating targeted aromatherapy and performative elements. Regarding aufguss, which we examine in two of our three studies, a distinction needs to be made between performative and traditional sauna aufguss. The former encourages sauna masters (meisters) to perform carefully choreographed routines for audiences, aiming to dazzle. The latter may include performative elements like music, but remains closely aligned with the origins of aufguss, where the sauna meister focuses on facilitating the cleansing and purification aspects of the ritual.

The absence of academic longitudinal research on health benefits of sauna aufguss ritual and its aromatherapeutic elements does not stand in the way of its popularity. Identified as ‘Trend #1’ by the Global Wellness Summit in 2017, the number of aufguss events has grown globally in recent years. The popularity and growth of the aufguss global championships are indicative of this trend: initially competing six nations in 2014 grew to eighteen nations ten years later. The largest saunas that host these events have the capacity to host up to 200 bathers simultaneously (Aufguss-WM, 2025). Historically rooted in the need to re-oxygenate air and regulate humidity in the enclosed sauna space (Schlichting and Ucke, 2021), over time aufguss ritual has gained layers of complexity. The basic elements include specific choice and information on the used scents, circulating the heat with either towels, flags or branches, as well as individual entertainment elements of ‘sauna masters’ (Poluzzi and Esposito, 2019). While the entertainment value of such events is clearly acknowledged, their effects may extend beyond personal amusement – particularly in terms of the social aspect. Providing the opportunity to meet other people and connect through an intense, ritualised experience, sauna has the potential to offer much more than physical health benefits following heat exposure.

#### 4. Present research

We conducted three studies to explore trends for sauna use in the UK and associated mental and physical health effects. Study 1 (S1) included a cross-sectional cohort of London-based sauna users to assess self-reported changes to physical and mental wellbeing, in association with feelings of social connection to other sauna users. As much work has already evidenced sauna’s relevance to physical health (Laukkanen et al., 2018; Laukkanen and Kunutsor, 2024), we focussed our longitudinal designs on mental wellbeing, building on findings from S1 to investigate how wellbeing changes after sauna in both ceremonial (Study 2, S2) and performance (Study 3, S3) collective aufguss rituals. S3 further investigated types of rituals engaged with and emotional synchrony. Additionally, we explored demographics, including gender, ethnicity, and disability, which are vital to understand how community ritual reaches and can better support disadvantaged groups.

Our research investigated three hypotheses:

- Sauna use is associated with better wellbeing (H1)
- The positive wellbeing effect of sauna use is partially explained by social connections of the sauna experience (H2)
- Ritualised sauna experiences boost wellbeing, and explain the effect of fusion on wellbeing (H3)

#### 5. Methods

##### 5.1. Participants and procedure

Studies 1 and 3 comprised pre- and post-surveys, which were completed up to 2 h before and 2 h after sauna respectively, resulting in a within-subjects repeated measures design. S2 utilised a cross-sectional design. For S1 and S3, to enable the linking of responses between the

pre- and post-sauna surveys, participants were asked to generate and provide a unique identifier, which they entered into each survey. A summary of incorporated study design as well as assessed measures can be found in Table 1. The research was granted ethical approval by two British universities.

Recruitment for S1 engaged sauna bathers attending a traditional aufguss ritual at a community sauna bath. The aufguss was advertised in email newsletter, was free to attend, and participants were offered a complimentary sauna session as an incentive for their participation. 85 people expressed interest in participating, and 35 individuals were invited to take part in the study on a first-come, first-served basis. 2 participants did not provide valid responses to the main measure and were excluded, and the final sample consisted of  $N = 33$  (54.5% 25-34). S2 analysed the anonymised responses to a community sauna bath's annual sauna survey, which participants received via a mailing list. A total of 1,799 people completed the survey, with one response excluded due to age restrictions. The final sample consisted of  $N = 1,798$ . (56.1% 25-34). For S3, participants were recruited via opportunity sampling at a sauna event and distributing the survey links among attendees ( $N = 140$ ). After excluding those who completed less than a third of both surveys, did not complete both surveys, or whose data could not be matched, the final sample consisted of  $N = 74$  ( $M_{age} = 42.65$ ,  $SD_{age} = 11.13$ ).

## 5.2. Measures

Across the three studies, a range of validated and purpose-designed measures were used to assess wellbeing, social connection, and ritual experience. The full list of measures, items and values is available in the data repository at [https://osf.io/hac8b/overview?view\\_only=845e6de216254da9872e97dae254a05c](https://osf.io/hac8b/overview?view_only=845e6de216254da9872e97dae254a05c). Study 1 comprised two surveys capturing pre- and post-sauna responses, including the *Measure Yourself Concerns and Wellbeing* instrument (Paterson et al., 2007) alongside a single-item measure of belonging ("Do you feel a sense of belonging or community when using the sauna?"). Study 2 used two binary items assessing perceived physical and mental health improvements at a single time point and a frequency-of-use question, with social connection measured as per Study 1. Study 3 comprised two surveys capturing pre- and post-sauna responses, including the pictorial identity fusion scale (Swann et al., 2009), the Positive and Negative Affect Schedule - PANAS (Watson et al., 1988), and items assessing perceived emotional synchrony (Włodarczyk et al., 2020) and engagement in or observation of sauna rituals. Participants reporting ritual experiences also completed selected items from the Mystical Experiences Questionnaire (Strickland et al., 2024). All studies recorded demographic information, with additional items on disability, sexual orientation, and socioeconomic status as appropriate.

## 5.3. Statistical analysis

Mean scores were created for multi-item scales and count variables created for ritual engagement (number of rituals observed/engaged in).

**Table 1**  
Summary of studies.

Design	Sample $N$	Well-being ( $H1$ )	Social connection ( $H2$ )	Ritual experience ( $H3$ )
S1 Longitudinal (pre- & post-sauna use surveys)	33	Measure Yourself Concerns and Wellbeing® instrument	Single-item measure of belonging	
S2 Cross-sectional	1,798	Binary items assessing perceived physical and mental health improvements; frequency of use	Single-item measure of belonging	
S3 Longitudinal (pre- & post-sauna use surveys)	74	Positive and Negative Affect Schedule (Watson et al., 1988)	Pictorial identity fusion scale (Swann et al., 2009)	Perceived emotional synchrony (Włodarczyk et al., 2020) and engagement in or observation of sauna rituals; Mystical Experiences Questionnaire (Strickland et al., 2024)

Positive and negative affect scores were calculated according to PANAS guidelines ranging 10-50, with higher scores indicating stronger positive or negative affect. Analyses were conducted using software SPSS (v.29). Power and sample size calculations were conducted a priori for S3 and post-hoc for S1-S2 using G\*Power (version 3.1.9.4). Power analyses targeted 80% power to detect medium sized effects at  $\alpha = 0.05$ , requiring a sample of  $n = 27$  for paired t-tests, and  $n = 77$  for a linear regression with 3 predictors. Mediation analyses were conducted using Hayes' (2022) PROCESS macro (Model 4).

## 6. Results

Wellbeing (S1) and positive affect (S3) both significantly increased following sauna use. Paired sample t-tests were conducted to examine change in well-being over time. In S1, participants showed a large improvement in wellbeing at T2 ( $M = 1.03$ ,  $SD = 0.81$ ) compared to T1 ( $M = 2.39$ ,  $SD = 1.12$ ),  $t(32) = 6.87$ ,  $p < .001$ ,  $d = 1.20$ , 95% CI [0.74, 1.64] (Fig. 1). S3, replicated this finding whereby participants reported a small, but statistically significant increase in positive affect at Time 2 ( $M = 34.83$ ,  $SD = 8.48$ ) compared to Time 1 ( $M = 32.03$ ,  $SD = 7.38$ ),  $t(71) = -2.91$ ,  $p = .005$ ,  $d = -0.34$ , 95% CI [-0.58, -0.10] (Fig. 2), as well as a large reduction of negative affect at Time 2 ( $M = 11.56$ ,  $SD = 2.74$ ) compared to Time 1 ( $M = 15.83$ ,  $SD = 6.21$ ),  $t(71) = 7.06$ ,  $p < .001$ ,  $d = 0.83$ , 95% CI [0.56, 1.10].

Self-reported improvements of physical and mental health (S2) were examined with binary logistic regression analyses, predicting improvements (1 = Yes, 0 = No) based on attendance frequency, and controlling for demographic characteristics, a general overview of which can be found in Table 2.

Results showed significant positive effects of attendance frequency for both outcomes, but whereas both monthly and weekly sauna visits (compared to rare visits) predicted improved mental health, only weekly visits predicted improved physical health (see Table 3). Participants from an ethnic minority background were more likely to report physical health improvements, whereas disabled participants were more likely to report mental health improvements, and participants indicating a minority sexual orientation were less likely to report mental health improvements. There were no effects of age or gender.

### 6.1. Wellbeing effects of sauna are linked to social belonging (S2) and identity fusion (S3)

To investigate a possible social cure effect, in S2 we tested whether a sense of belonging mediates the relationship between sauna use and self-reported health outcomes. Mediation models for improved physical and mental health were independently estimated using Hayes' (2022) PROCESS macro (Model 4). Frequency of sauna visits was entered as a categorical independent variable (reference group = "rarely"). In both models, weekly sauna visits were significantly associated with a stronger sense of belonging compared to rare visits, while monthly visits showed a smaller, non-significant association. Sense of belonging was, in turn, significantly associated with improved physical health and improved

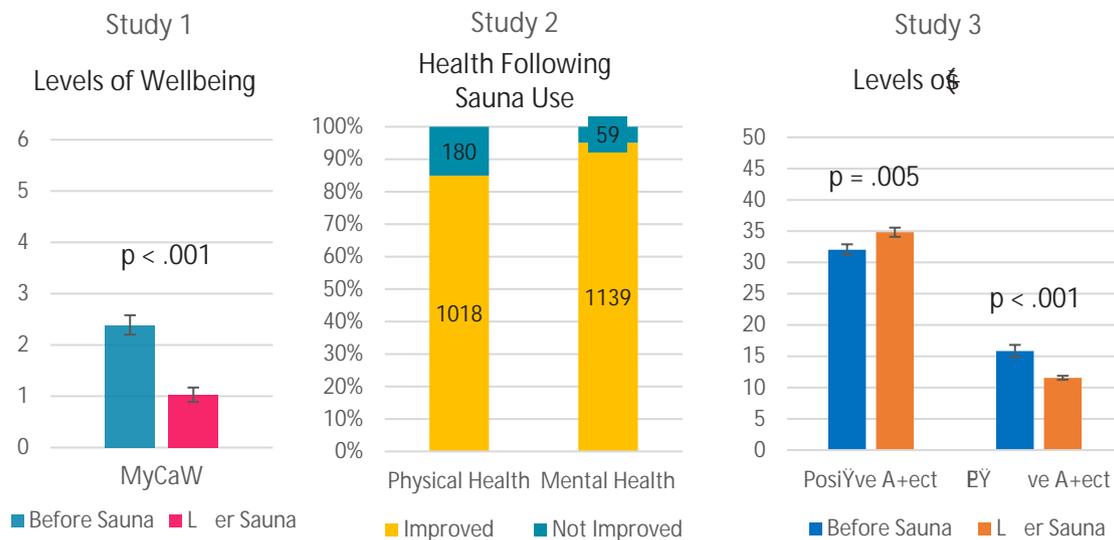


Fig. 1. Means and Distributions of the Wellbeing Outcome Measures Across Studies 1-3

Note. In Study 1, participants completed the Measure Yourself Concerns and Wellbeing questionnaire (MyCaW) before and after sauna use. In Study 2, participants evaluated whether their physical and mental health had improved after using the sauna. In Study 3, participants completed the PANAS before and after sauna use. Error bars represent standard errors. P-values indicate statistical significance of paired sample t-tests.

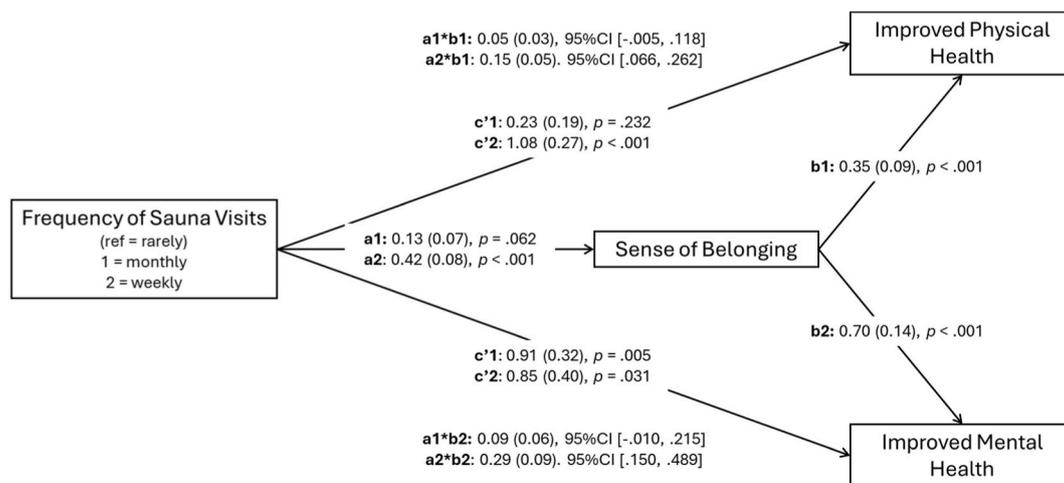


Fig. 2. Indirect effects of visit frequency on health improvements via belonging

Note. Coefficients represent unstandardised effects with standard errors in parentheses. Direct and indirect effects on dependent variables are expressed in log-odds. For direct paths we report p-values, and significance of indirect effects is indicated via 95% confidence intervals. Models control for age, gender (dummy coded as 1 = male), disability, ethnic and sexual minority backgrounds, and were estimated separately for both outcomes using the same analytic sample.

mental health (Fig. 2). Taken together, these results indicate that weekly sauna use is associated with greater health benefits, and that these benefits are partly explained by increased feelings of social belonging. This indirect pathway was particularly robust in the model predicting mental health. While monthly visits were associated with mental health gains, they did not appear to significantly increase belonging or yield indirect effects.

The impact of social connections on wellbeing was further examined in S3, where we employed regression analyses to examine which individual-level factors might explain the observed improved levels of affect after using the sauna. Linear regression models predicted positive and negative affect at T2, respectively, while controlling for their baseline scores at T1. We first entered identity fusion into the model. Results showed that higher levels of identity fusion predicted higher positive affect scores after the sauna ( $B = 2.52, SE = 0.90, 95\%CI [0.73, 4.31], p = .006$ ), in addition to the effect of baseline affect score ( $B = 0.43, SE = 0.13, 95\%CI [0.18, 0.68], p = .001$ ),  $F(2, 69) = 14.43,$

$p < .001, R^2 = .29$ , such that those who were fused experienced the best outcomes (Table 4). The effect remained significant ( $p = .009$ ) when controlling for age, gender, ethnicity and socioeconomic status, only the latter of which showed a significant association with positive affect ( $B = -1.75, SE = 0.75, 95\%CI [-2.90, -0.61], F(6, 65) = 7.51, p < .001, R^2 = .36$ ).

In the models predicting negative affect, identity fusion was not a significant predictor ( $B = 0.21, SE = 0.25, 95\%CI [-0.29, 0.71], p = .401$ ), and only the baseline score ( $B = 0.25, SE = 0.05, 95\%CI [0.16, 0.34], p < .001$ ) and ethnic minority background ( $B = -2.28, SE = 0.88, 95\%CI [-4.03, -0.53], p = .011$ ) were significant predictors,  $F(6, 65) = 7.73, p < .001, R^2 = .36$ .

### 6.2. Ritualised sauna experiences boost wellbeing, and mediate the effect of fusion on wellbeing (S3)

Next, we tested whether observation of, or engagement in, sauna

**Table 2**  
Demographic characteristics of final samples.

Baseline characteristic	S1		S2		S3	
	n	%	n	%	n	%
Gender						
Male	9	27.3	560	31.1	31.1	54.1 %
Female	18	54.5	1165	64.8	64.8	44.6 %
Non-binary/Other	3	9.1	67	3.6	3.6	1.4 %
NA	3	9.1	7	0.4	0.4	0
Ethnicity						
Arab	0	0	8	0.5	0.5	0
Asian	3	9.1	91	5.1	5.1	1.4
Black	1	3	42	2.3	2.3	1.4
Mixed	4	11.4	147	8.2	8.2	2.7
White	22	62.8	1426	79.3	79.3	90.5
Other	0	0	47	2.7	2.7	4.1
NA	5	14.2	37	2.1	2.1	0
Sexual orientation						
Heterosexual	-	-	1037	57.7	57.7	-
Homosexual	-	-	198	11.0	11.0	-
Bisexual/Pansexual	-	-	384	21.4	21.4	-
NA	-	-	179	9.9	9.9	-
Socio-economic status <sup>a</sup>	-	-	-	-	-	1.53
Disability						
Yes	-	-	258	14.3	14.3	-
No	-	-	1486	82.6	82.6	-
NA	-	-	54	3.0	3.0	-
Age <sup>a</sup>	-	-	-	-	-	11.13
18-24	2	6.1	1009	56.1	56.1	-
25-34	18	54.5	492	27.4	27.4	-
35-44	4	12.1	151	8.4	8.4	-
45-54	6	18.2	76	4.2	4.2	-
55-64	0	0	6	0.3	0.3	-
>64	0	0	1	0.1	0.1	-
NA	3	9.1	560	31.1	31.1	-

Note. The category NA includes both missing data and ‘prefer not to say’ responses.

<sup>a</sup> Reflects means and standard deviation.

rituals, social interactions, or ritualised experiences (either mystical experiences or perceived emotional synchrony) could explain the effect of identity fusion on improved affect. We tested for potential mediation effects predicting post-sauna positive affect, based on identity fusion, while controlling for demographics (age, gender, ethnicity, SES) and baseline affect and testing multiple possible mediators separately: number of rituals observed, number of rituals engaged in, number of social interactions, strength of mystical experiences, and perceived

**Table 3**

Logistic regression analyses predicting self-reported improvements in physical and mental health based on demographic characteristics, sauna visit frequency and sense of belonging in study 2.

Variables	Improved Physical Health				Improved Mental Health			
	OR	LL	UL	p	OR	LL	UL	p
Age	1.04	0.86	1.26	.669	0.90	0.68	1.19	.456
Gender (ref = other)				.503				.700
Male	1.14	0.79	1.65	.487	0.77	0.41	1.47	.434
Female	1.85	0.61	5.64	.276	0.64	0.13	3.20	.584
Sex orientation minority	0.93	0.62	1.41	.740	0.53	0.29	0.96	.036
Ethnic minority	2.04	1.15	3.62	.015	1.25	0.53	2.91	.610
Disabled	0.97	0.67	1.41	.888	2.02	1.02	4.00	.044
Visit frequency (ref = rarely)				<.001				<.001
Monthly	1.33	0.91	1.93	.141	2.71	1.46	5.02	.002
weekly	3.40	2.04	5.67	<.001	3.14	1.48	6.66	.003
Model summary	u <sup>2</sup> (8) = 33.81, p < .001, Nagelkerke R <sup>2</sup> = 0.05				u <sup>2</sup> (8) = 26.71, p < .001, Nagelkerke R <sup>2</sup> = 0.07			

Note. Sample N = 1,087.

All analyses used a consistent subsample with complete data on both health outcomes (physical and mental) and excluding ‘don't know’ responses, to ensure internal consistency and allow direct comparison across models. This approach minimised bias from missing data, improved interpretability, and ensured observed differences were not due to sample variation. Multinomial regression analyses showed that none of the variables used here predicted ‘don't know’ responses (in contrast to ‘no improvement’ responses). Gender categories (non-binary, trans identities, self-describe) were collapsed into the reference category ‘other’ due to small group sizes, to reduce model instability, and improve interpretability.

emotional synchrony.

Results showed that social interactions and ritual observation were not significantly associated with either fusion or wellbeing (*p*'s > .313), whereas ritual engagement was correlated with fusion (*B* = −0.70, *SE* = 0.27, 95%*CI* [−1.24, −0.15], *p* = .012), but did not have an effect on positive affect (*B* = 0.49, *SE* = 0.38, 95%*CI* [−0.26, 1.24], *p* = .197). In contrast, perceptions of ritual (mystical experiences and emotional synchrony) correlated significantly with both fusion and affect: instead of a significant direct effect of fusion on affect, there were significant indirect and total effects, indicating full mediation (Fig. 3). This suggests that more fused participants were more susceptible to emotional synchrony and mystical experiences, which contributed to more positive affect after sauna use. The effects were robust when adding control variables. Testing both mystical experiences and emotional synchrony as parallel mediators resulted in non-significant indirect effects, likely due to the high correlation between mystical experiences and perceived emotional synchrony (*r* = .67, *p* < .001).

### 7. Discussion

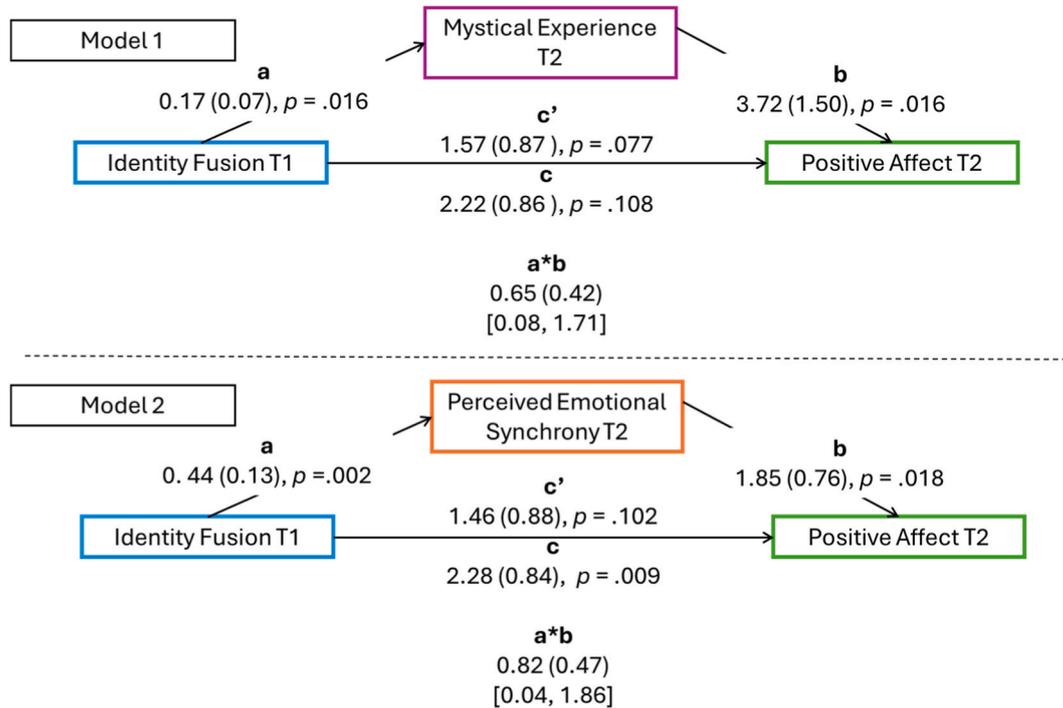
Our findings demonstrate that frequent sauna use, particularly on a weekly basis, is associated with greater health and wellbeing benefits, with these effects partly explained by increased feelings of social belonging. This pathway was especially strong in the prediction of mental health outcomes, suggesting that regular engagement in sauna culture may offer psychological benefits through enhanced social connection, in support of the Social Cure model (Haslam et al., 2019). This study represents the first of its kind to explicitly integrate the Social Cure with a ritual perspective, offering a new insight into how ritualised communal activities—such as sauna bathing—can foster emotional synchrony, deepen group bonds, and consequently elevate positive affect. Participants who were more strongly bonded with their sauna community were more sensitive to the emotional synchrony and mystical or transcendent experiences that occur during sauna rituals, which in turn contributed to greater positive affect after sauna use. These effects remained robust even when accounting for demographic factors, underlining the value of considering both the social and ritual dimensions of communal wellbeing practices.

While participants who attended monthly saunas reported some improvements in mental wellbeing, their visits did not significantly strengthen feelings of belonging nor produce indirect effects through social connection, highlighting the importance of regular participation for maintaining feelings of connection. This relates to earlier work

**Table 4**  
Linear regression analyses predicting post-sauna affect based on pre-sauna affect, identity fusion, and demographic characteristics.

Variables	Positive Affect (T2)					Negative Affect (T2)				
	B	SE	95% CI		p	B	SE	95% CI		p
Positive/Negative Affect T1	0.48	0.12	0.25	0.71	<.001	0.25	0.05	0.16	0.34	<.001
Identity Fusion	2.23	0.83	0.58	3.88	.009	0.21	0.25	-0.29	0.71	.401
Age	.06	.07	-0.08	0.21	.385	-0.01	0.02	-0.06	0.04	.620
Gender	.45	1.64	-2.82	3.72	.785	0.35	0.53	-0.72	1.41	.521
Ethnic minority	2.25	2.73	-3.21	7.70	.413	-2.28	0.88	-4.03	-0.53	.011
Socio economic status	-1.75	0.57	-2.90	-0.61	.003	0.06	0.18	-0.30	0.43	.731
Model summary	$F(6) = 7.51, p < .001, R^2 = 0.36$					$F(6) = 7.73, p < .001, R^2 = 0.36$				

Note. Gender categories (1 = male, 0 = female, other).



**Fig. 3.** Mediation model effects predicting positive affect  
Note. Coefficients represent unstandardised effects with standard errors in parentheses. For direct paths we report *p*-values, and significance of indirect effects is indicated via 95% confidence intervals. Models control for age, gender (dummy coded as 1 = male), ethnic minority background, socio economic status and positive affect at T1.

demonstrating that frequent sauna users (5-15 times per month) had higher mental well-being scores than infrequent sauna users (<5 times per month) (Hussain et al., 2019). Notably, a Finnish cohort study reported a 77% reduction in the annual risk of psychosis among men engaging in sauna bathing 4–7 times per week compared to those using it only once weekly (Laukkanen et al., 2018). We found that although our UK sample bathed at a relatively low frequency by Finnish standards (around once a week or less), they nonetheless already reported mental wellbeing benefits.

From the extreme to the everyday, rituals are established parts of group life. We suggest that it is not the physical behaviours associated with ritual, or even the direct social interactions rituals incur, that constitute the necessary container for improved wellbeing; rather, it is the internal experience of emotional synchrony with others that connects participants to the group and initiates the desired benefits. Research shows that intense rituals and experiences, even those that are *dysphoric*, as opposed to *euphoric*, are particularly powerful. For example, college hazing rituals, the collective grief of losing football matches (Newson et al., 2016, 2021), or even the hardships on the frontline in war (Whitehouse et al., 2014), are associated with the most

extreme form of bonding, identity fusion (Whitehouse et al., 2017), which we examined in Study 3. Crucial to the impact of such experiences is reflection on the event, to make sense of the experience, and subsequent feelings of personal transformation (Newson et al., 2016, 2025). The quiet sauna space may similarly invite reflection. For individuals who are highly bonded, it may open the way to deeper inner reflection and a subsequent merging of self and group (Gómez et al., 2024; Jong et al., 2015). In this way, the extreme heat of sauna, though enjoyed by many, may help to cultivate the reflection and feelings of transformation required to integrate one's group identity into one's sense of self. By enduring the ritual experience *together* participants may have an opportunity to bond at a deeper level than many group activities provide.

Research from Mauritius found that those seeking out the most painful and intense rituals were from the lowest socio-economic status background or had the worst physical health (Xygalatas et al., 2019). These participants also reported improved subjective health, particularly if they engaged in more extreme rituals, and no deleterious effects on health, despite the extremity of the ritual. In the present paper, those from lower socio-economic status backgrounds reported higher positive affect after sauna. We also found that ethnic minorities were more likely

to report physical health improvements and disabled people were more likely to report mental health improvements. This has clear implications for understanding the potential for social prescribing sauna, particularly to those from disadvantaged groups who may benefit from the intense heat sauna offers to cultivate self-esteem and group membership. In this way, sauna ritual may pose as a particularly potent form of social prescribing for those with both physical and mental health challenges. However, sauna is not a panacea for minority groups; for instance, we found that sexual minorities were less likely to see mental health improvements than those who self-identified as heterosexual.

## 8. Implications

In recent years, the UK's National Health Service (NHS) has increasingly adopted social prescribing to connect individuals with community-based resources to improve health and reduce strain on primary care services (NHS England & NHS Improvement, 2020). Social prescribing links patients to non-clinical activities such as gardening groups, walking clubs, or arts programmes to support holistic wellbeing (Evers et al., 2024). However, despite isolated examples of sauna use appearing in social prescribing schemes, it remains largely absent from academic research and policy frameworks (Social Prescribing Network, 2021). This is surprising, given how closely community sauna use aligns with the NHS's preventive care goals, offering both physical health benefits and opportunities for social connection (Davis, 2024; NHS England, 2025). While the evidence base for social prescribing is growing, it is widely recognised that many studies lack the necessary rigour or contextual detail to fully explain what works, for whom, and why (Bickerdike et al., 2017; Husk et al., 2019; Napierala et al., 2022).

The social prescribing literature consistently calls for more targeted, realist-informed studies that address implementation challenges and clarify *when, how, and for whom* social prescribing interventions are effective, as well as their associated costs — before claims about their national health impact can be substantiated (Bickerdike et al., 2017; Napierala et al., 2022). While social prescribing is conceptually promising for improving well-being by linking patients to community resources, existing evaluations lack the methodological rigour and contextual detail needed to determine its actual effectiveness or value for money (Husk et al., 2019). By exploring the social and ritual aspects of sauna use, this research contributes to the social prescribing discussion, positioning community saunas as an overlooked but potentially powerful future tool for social prescribing and public health. Further research is required to explore sauna's potential role in social prescribing, ideally through randomised control trials. Our results suggest that ritual helps support or maintain the social bonds driving wellbeing improvements that participants forge through sauna. As such, we encourage future social prescribing research to consider the role of ritual in its efficacy.

Finally, our finding that social cohesion—specifically identity fusion—improved affect through perceptions of emotional synchrony and ritual offers a novel contribution to the Social Cure model. Traditionally, the Social Cure model emphasises the role of group identification in promoting health and wellbeing via access to social support, shared norms, and increased self-esteem (Haslam et al., 2018; Jetten et al., 2012). However, our results suggest that more intense forms of group bonding, such as identity fusion, may operate through distinct affective pathways involving embodied and emotional alignment. Emotional synchrony, often occurring in ritual contexts, amplifies feelings of unity and positive emotion (Bouchat et al., 2024; Páez et al., 2015), and our findings extend this by showing how ritualised environments like saunas can enhance such synchrony. By integrating concepts from identity fusion theory (Gómez et al., 2020; Swann et al., 2009) into the Social Cure literature, this research highlights how the structure and emotional salience of ritual or communal activities—not just group membership—can drive wellbeing benefits.

## 8.1. Limitations

Several limitations should be considered when interpreting these findings. First, all three studies relied on convenience samples and uncontrolled designs, which limit the generalisability of the results. Participants were likely to be highly engaged with sauna culture, potentially amplifying the observed effects of social connection and ritual engagement and may have had access to a free sauna during the research period, which further biases results from a typical population who will likely need to pay for their experience. Additionally, the primary outcome of wellbeing, although central to this research, presents inherent challenges in measurement. Wellbeing is both profoundly important and notoriously difficult to define; it is a subjective, multi-faceted construct without a universal definition (Jarden and Roache, 2023). In this study, wellbeing was assessed through self-report measures, which inevitably rely on participants' personal interpretations and subjective experiences, thus limiting objectivity. S1 used the MYCaW (Measure Yourself Concerns and Wellbeing) scale, which was selected due to its alignment with the original research aim of evaluating sauna-based social prescriptions. However, this measure may not have been ideally suited for capturing the more nuanced, immediate psychological impacts of the ritualised *aufguss* experience. Furthermore, MYCaW's inverted scoring format—where lower numbers indicate better wellbeing—may have introduced confusion for some participants, potentially affecting the reliability of responses. We addressed this by using general self-reports in S2 and PANAS in S3. The broad and subjective nature of wellbeing means that each participant may have defined it differently, raising questions about the comparability of responses and the interpretation of the statistically significant shifts detected. This underscores the need for more precise, contextually appropriate measures in future research on wellbeing in ritual and communal settings such as sauna.

Our longitudinal designs only captured immediate changes to affect and future research should explore how sustained these improvements are over time. These designs were both limited by relatively small sample sizes, particularly S1. The sampling was also limited to specific communities and points in time, and was biased toward 40% queer in S2, which means results are neither representative nor generalisable. In S1 and S3, we did not have a sufficient sample size to conduct subgroup analyses so, as our aim was to maintain analytic consistency across the three studies, sexual orientation was not specifically analysed and we suggest that more detailed analyses of sexual orientation subgroups would be valuable in future research with larger and more diverse samples. We thus advise caution in applying the findings to settings beyond the communities we worked with and encourage future research to employ longitudinal analyses with extended follow-ups to capture how long improvements to mental wellbeing last, and to recruit beyond local communities.

## 9. Conclusions

Taken together, these results suggest that frequent involvement in communal wellness activities such as sauna bathing can help to promote both physical and psychological wellbeing, at least in part by drawing on social connectedness. These findings provide an important foundation for understanding sauna as both a health-promoting practice and a socially meaningful ritual, with broader implications for public health interventions seeking to harness community-based wellbeing activities. In particular, we would encourage future research to investigate ritualised sauna social prescribing, with opportunities to invite users to reflect on their experiences, not just in terms of physical endurance and transformation, but also personal transformation. This could be explored as a randomised control trial, with some groups having access to the more ritual and reflective practice and others a less ritualised practice.

Reflection is central to the impact of such experiences, allowing individuals to make sense of the event and to develop subsequent feelings

of personal transformation. The quiet setting of many saunas may similarly facilitate reflection. For those who are already strongly bonded, this may promote deeper contemplation and merging of self and group. In this way, the extreme heat of the sauna – while widely enjoyed – may also foster the reflection and transformative feelings necessary for integrating group identity into the self. By enduring this ritual collectively, participants may have the opportunity to bond at a deeper level than is typically afforded by other group activities.

Crucially, and speaking to the wider theoretical implications of this work, our results point to the specific role of ritual and emotional synchrony as key pathways through which social cohesion enhances well-being. Emotional synchrony and perceived ritual meaning were both strongly associated with identity fusion in our study, offering novel insights into how deeply felt social bonds can be drawn on or cultivated in non-traditional health contexts. These findings suggest that designing interventions with ritual-like qualities may offer unique advantages for promoting psychological resilience and social cohesion in community health programmes.

### Ethics statement

The research was granted ethical approval by two British universities; London Interdisciplinary School (S1-2) and the University of Greenwich (S3). All participants provided informed consent for S2-3; participants in S1 voluntarily provided data for a community sauna census, which shared their data anonymously.

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### CRediT authorship contribution statement

**M. Newson:** Conceptualization, Formal analysis, Funding acquisition, Investigation, Methodology, Supervision, Writing – original draft, Writing – review & editing. **R. McGrath:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Visualization, Writing – original draft, Writing – review & editing. **I. Mosina:** Data curation, Investigation, Writing – original draft, Writing – review & editing. **G. Reason:** Investigation, Resources, Writing – original draft, Writing – review & editing. **L. Peitz:** Formal analysis, Visualization, Writing – original draft, Writing – review & editing.

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### Data availability

Data is available on OSF, the link is available in the article.

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