# Media advocacy promotes in-person and online audiences’ engagement with social justice cause through empathy

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# Author Note

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# Abstract

TODO

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# Media advocacy promotes in-person and online audiences’ engagement with social justice cause through empathy

Despite our shared struggle for a better world, societies remain unjust. For example, criminal justice systems were implemented to enforce justice, but across societies, systemic issues lead to the wrongful imprisonment of innocent individuals. How do we mobilize support to fight social injustice such as wrongful imprisonment? Arts and media are a way of reaching and engaging broad audiences. Film, TV, and theatre, using the power of storytelling, can shape attitudes and behaviours with regards to social injustice. Music is also commonly used to advocate for social justice issues, for instance in the forms of charity concerts and protest songs. Given that music typically has less narration than the previously studied media, it remains unclear how socially responsible music promotes audiences’ engagement with social justice issues. While previous research has uncovered how music shapes our evaluation of the people making the music or listening to it, few studies have investigated how music influences our views of people and issues that are the subject of music. In addition, theories of prosocial behaviour and social engagement put forward various predictors that could explain how arts and media can advocate for social justice issues. This plurality makes it difficult for researchers to integrate previous works, and for artists to understand which factors are decisive to effectively engage their audience.

In two studies, we evaluate how an abstract music performance engages audiences with the issue of wrongful imprisonment, compared to a narrative documentary film. We assess changes in three affective and cognitive variables, empathic concern, relationship closeness, and problem awareness, and compare their influence on supportive behaviour of audiences in the concert hall and at home. This study provides empirical support for the mobilizing potential of music as a medium with less narration, and highlights which facet of audiences’ attitudes artists should appeal to in order to gain support for their cause.

## Mobilizing support for social justice causes

The aim of social justice advocacy is to foster engagement with a social justice issue and mobilize supportive behaviour for that cause. Various psychological theories have identified factors which promote behaviour that benefits others, and which could be applicable in the context of social justice advocacy. This plurality hinders theory integration across studies of socially responsible behaviour. It is therefore necessary to empirically compare the relevance of different factors ([Bekkers & Wiepking, 2011](#ref-bekkers2011)). In this study, we compare normative, empathic, and relational factors.

Justice is a moral concept, and fighting injustices or supporting social justice causes can be conceived as morally-driven behaviour. The norm activation model (NAM, [Schwartz, 1977](#ref-schwartz1977)) lays out the process of how personal norms create a moral obligation to act. According to the model, an actor first has to become aware of a problematic situation, e.g., wrongful imprisonment, that creates a need for those affected by the problem, e.g., innocent prisoners. Subsequently, an actor needs to feel responsible for changing the problematic situation and responding to the need of those affected, e.g., by making a donation to an NGO that re-investigates cases of wrongful imprisonment. As a third component, the problem must be relevant to the personal norms of the actor, e.g., justice in the legal system, for these norms to be activated and to guide the actor’s behaviour in that situation. In combination, problem awareness, ascription of responsibility, and personal norms create a moral obligation to help solve the problem or reduce the need of those affected, so that the actor acts in accordance with their norms ([De Groot & Steg, 2009](#ref-degroot2009); [Schwartz, 1977](#ref-schwartz1977)). Importantly, the NAM postulates a causal chain of the three components, which explains why people do not always adhere to all of their norms: If one is not aware of a problem or does not believe that they can change it, their norms are not activated in that situation and therefore can not guide their behaviour (although the empirical evidence regarding this causal chain is mixed, [Klöckner, 2013](#ref-klockner2013)).

Studies on prosocial and pro-environmental behaviour (e.g., [De Groot & Steg, 2009](#ref-degroot2009); [Savari et al., 2023](#ref-savari2023); [Steg & De Groot, 2010](#ref-steg2010)) commonly integrate the NAM with the theory of planned behaviour (TPB, [Ajzen, 1991](#ref-ajzen1991), [2011](#ref-ajzen2011)). While there is some conceptual overlap between responsibility in the NAM and efficacy in the TPB, as well as between norms in the NAM and attitudes in the TPB, the TPB crucially contributes the behavioural intention as the most proximal predictor of behaviour. The idea is that rational (or planned) behaviour is always preceded by a decision to engage in that behaviour. Therefore, all other predictors of behaviour influence this decision, which in turn mediates the actual behaviour ([Ajzen, 1991](#ref-ajzen1991), [2011](#ref-ajzen2011)). Separating intention and behaviour reduces noise in the analysis, because the translation of intention into behaviour can be hindered by external factors beyond the scope of studying what motivates actors to engage in a behaviour (e.g., lack of resources, or unexpected situations, [Sheeran, 2002](#ref-sheeran2002)). In conclusion, social justice advocacy can mobilize supportive behaviour by raising awareness for a problem, appealing to the audience’s responsibility, or strengthening norms regarding social justice, which contribute to the intention to support the social justice cause. However, problem awareness might have to precede the other components, especially when the social justice issue is lesser known.

Beyond the moral motive, altruistic motives can promote the support of social justice causes. According to the empathy-altruism hypothesis, empathically adopting the perspective of a person in need creates an altruistic motivation to reduce their suffering. For example, empathizing with the experience of an innocent prisoner may give rise to a sense of concern about their well-being, which translates into a motivation to help to improve the well-being of the innocent prisoner, regardless of the behavioural consequences for oneself ([Batson, 1987](#ref-batson1987), [2011](#ref-batson2011)). There has been a long debate on whether helping can be purely altruistic, in that the actor is only acting in the interest of the person receiving the help, or whether the actor always has an egoistic interest to reduce their own distress arising from witnessing the other person suffering (e.g., [Cialdini et al., 1997](#ref-cialdini1997); for a review, see [Batson, 2011](#ref-batson2011)). Both empathic concern and personal distress, however, arise from empathic perspective-taking. Hence, social justice advocacy can mobilize supportive behaviour by conveying the experiences and point of view of those affected by the social justice issue, thereby facilitating empathic responses from the audience.

Finally, social relationships play an important role in supporting social justice causes. A body of literature reports that perceived similarity and familiarity with another person strengthen the tendency to help them ([Batson et al., 1981](#ref-batson1981), [1995](#ref-batson1995); [Burger et al., 2004](#ref-burger2004); [Sole et al., 1975](#ref-sole1975)). One possible explanation is that if one feels closer to a person in need, it is easier to empathize with their need, and one cares more for their well-being, thus facilitating the empathically motivated altruism described above ([Batson et al., 1981](#ref-batson1981), [1995](#ref-batson1995); [Stürmer & Snyder, 2009](#ref-sturmer2009)). In another line of argumentation, if one feels closer to a person in need, one values their social approval more and therefore might help them in hopes of getting their approval, or avoiding the risk of social punishment for not helping them ([Bekkers & Wiepking, 2011](#ref-bekkers2011)). Similarly, a close relationship with those who observe the act of helping may also create a social pressure to help, given that the observers approve of the helping ([Bekkers & Wiepking, 2011](#ref-bekkers2011)). Therefore, social justice advocacy can mobilize supportive behaviour by tightening the social bonds between audiences and those affected by the social justice issue, which should increase the tendency to help.

## Advocacy through art

Social injustices often become the subject of art. Beyond a mere inspiration or description of society, art is used to criticize social injustices and advocate for social justice. Empirical evaluations of such advocacy through art have proven effects of media like documentary films, theatre, and songs on the aforementioned normative, empathic, and relational dimensions, and on behaviour in support of social justice causes. For example, Reddan et al. ([2024](#ref-reddan2024)) compared audience responses to a documentary about wrongful imprisonment and two documentaries about injustices in sports, and found that the former enhanced audiences’ empathic responses towards prisoners, attitudes towards prison reform, and intentions to support a petition to restore voting rights for people with felony convictions. Documentaries about personal life stories also increase social bonding with other audience members ([Dunbar et al., 2016](#ref-dunbar2016)). These studies are comparable to the somewhat larger body of literature attesting that documentaries about climate change increase audiences’ concern and pro-environmental intentions ([Howell, 2011](#ref-howell2011); [Nolan, 2010](#ref-nolan2010); [Sakellari, 2015](#ref-sakellari2015)). Turning to theatre, audiences of theatre performances about disadvantaged groups have been shown to be more empathetic with the represented groups and more willing to donate to charity after the performance, compared to before. Effects on theatre audiences’ attitudes remained ambiguous ([Rathje et al., 2021](#ref-rathje2021)). Moreover, songs with prosocial lyrics like “Love Generation” by Bob Sinclair have been shown to prompt prosocial thoughts and empathic responses in listeners, with empathy mediating the effect of the lyrical content on charitable donations ([Greitemeyer, 2009a](#ref-greitemeyer2009), [2009b](#ref-greitemeyer2009a)).

Most of the research cited above theorizes that art, be it film, theatre, or song, achieves its advocacy effect through powerful narratives influencing audiences’ emotions and cognition regarding the advocacy topic. However, not all art makes use of explicit narration. Visual art, for example, often conveys social critique in an implicit, symbolic, or abstract manner (e.g., [Pelowski et al., 2024](#ref-pelowski2024)). Similarly, much music beyond the song form is carried more by sounds and less by lyrics, and therefore has less tools for explicit narration. Still, there are many examples of classical and jazz music intended to advocate for concrete issues: The West-Eastern Divan Orchestra, a classical symphony orchestra with Israeli and Palestinian musicians, promotes a peaceful solution to the Arab-Israeli conflict by playing for concert audiences and politicians alike (<https://west-eastern-divan.org/>). Jazz icons sonified the struggle for racial justice with works such as Duke Ellington’s *Black and Tan Fantasy*, Oscar Peterson’s *Hymn to Freedom*, and John Coltrane’s *Alabama* (<https://naacpsfnm.org/jazz-and-civil-rights/>). And *The Innocents,* a percussion performance about wrongful imprisonment in the United States, tours schools and universities to educate and engage its audience with this often overlooked social injustice (<https://www.the-innocents.com/>). How does such music mobilize support for social justice causes, if not through explicit narrative lyrics?

Music excels at arousing emotions in the listener. Thinking back to the theoretical frameworks of social justice advocacy, it could therefore be expected that music advocates by eliciting empathic responses and strengthening social bonds among listeners, whereas narrative media like documentary films might be more effective in raising problem awareness. Indeed, making music together can promote empathy ([Clarke et al., 2015](#ref-clarke2015); [Rabinowitch et al., 2013](#ref-rabinowitch2013); [Tzanaki et al., 2025](#ref-tzanaki2025)), though it remains unclear to which extent listening to music advocacy, rather than making music, can promote empathy. Moreover, both making and listening to music can strengthen social bonds with other musicians and listeners ([Mogan et al., 2017](#ref-mogan2017); [Savage et al., 2021](#ref-savage2021); [Swarbrick & Vuoskoski, 2023](#ref-swarbrick2023)). However, there is an ongoing debate as to who those social bonds extend to, beyond the musicians and listeners who are part of the music experience ([Cirelli et al., 2016](#ref-cirelli2016); [Cross et al., 2019](#ref-cross2019); [Cross et al., 2020](#ref-cross2020); [Rabinowitch, 2023](#ref-rabinowitch2023); [Reddish et al., 2014](#ref-reddish2014); [Reddish et al., 2016](#ref-reddish2016)). This latter aspect is crucial for advocacy contexts, because the recipients of charitable behaviour are usually absent during the advocacy (e.g., when an activist speaks to a potential donor at a fundraiser for prison reforms, the affected prisoners usually are not present, [Bekkers & Wiepking, 2011](#ref-bekkers2011)). In conclusion, if music advocacy can raise awareness about social injustice, promote empathy with victims of injustice, or strengthen social bonds with them, any of these effects could explain why audiences would support the advocacy cause.

## Collective aspects of audience experience

Historically, audiences of both music and film would typically gather together in a concert venue or cinema to collectively experience a performance or screening. Over the past decades, however, inventions in disc storage devices, and more recently in streaming services, have led to a shift towards individual experiences of music and film in private audiovisual environments at home or via personal screens and headphones. Media and communications research has theorized that being part of an audience gives rise to a different experience than watching or listening alone: In their reciprocal feedback model of musical communication, Hargreaves et al. ([2005](#ref-hargreaves2005)) emphasize that the presence or absence of others influences both the listener’s response to music, as well as the performance of the music itself. In contrast to recorded or broadcast performances, live music performances allows for bidirectional communication between spatio-temporally co-present performers and audience members: The performer can communicate through more channels than just the sound itself, and the audience can shape the performance through their immediate reactions. Wald-Fuhrmann et al. ([2021](#ref-wald-fuhrmann2021)) corroborate the importance of the presence of musicians and audience members in shaping audiences’ aesthetic experience of music. In addition to the communication between musicians and audience members, they also consider the roles of the communication among audience members during, as well as before and after a music performance, and of the synchronization of bodily responses (like moving and cardiorespiratory activity) of co-present audience members. These factors might explain why music that is experienced together with other audience members has been found to elicit more intense emotional reactions ([Liljeström et al., 2013](#ref-liljestrom2013); though see [Egermann et al., 2011](#ref-egermann2011)), immersion/absorption ([Kreuzer et al., 2025](#ref-kreuzer2025); [Swarbrick et al., 2024](#ref-swarbrick2024)), and intellectual stimulation ([Kreuzer et al., 2025](#ref-kreuzer2025)), than experiencing the same music alone or as part of a virtual audience.

TODO elaborate theoretical predictions ([Hanich, 2014](#ref-hanich2014), [2017](#ref-hanich2017)) and empirical film research ([Kaltwasser et al., 2019](#ref-kaltwasser2019))

To our knowledge, very little is known about how the presence or absence of other audience members affects the mobilization potential of advocacy through art.

* ([Onderdijk et al., 2021](#ref-onderdijk2021); [Swarbrick & Vuoskoski, 2023](#ref-swarbrick2023)): audience/musician co-presence influences connectedness, which plays a role in advocacy
* social pressure of other audience members could enhance effects

in-person event: social contagion/collective action with performers (music only) or audience members (film and music) could enhance effects. And adds ecological validity

no study has compared advocacy effects on individual vs. collective audience

## The present studies

In two studies, we compare how the abstract percussion performance *The Innocents*, and the narrative documentary film of the same title, mobilize support for the fight against wrongful imprisonment. Integrating multiple theoretical frameworks of social justice interventions, we assess the effects of performance and film on problem awareness, empathic concern, and social bonding, and evaluate the contribution of these three variables to supportive behaviour. We test the following hypotheses:

1. Documentary films have been shown to influence audiences’ cognitions about a topic by means of their explicit narrative, whereas abstract music has a more ambiguous meaning. Therefore, we expect the film to increase audiences’ awareness of wrongful imprisonment more than the performance (1a). Based on the norm activation model, we expect problem awareness to predict charitable intentions (1b).
2. Based on previous findings of empathic responses to watching films and making music, we expect both the film and the performance to increase audiences’ empathic concern for wrongfully imprisoned individuals. We further expect that the performance will show larger increases for in-person compared to livestream audiences (2a). We make no prediction whether the film or the performance have a stronger effect on empathy; rather, we are interested in showing whether the performance has an effect on empathy at all, and to use the film as a comparison to interpret the size of a potential effect. Based on the empathy-altruism hypothesis, we expect empathic concern to predict charitable intentions (2b).
3. Both watching films and listening to music together has been shown to strengthen social bonds among audience members, although it is unclear to which extent these bonds extend to the subjects of the film or music. Against this backdrop, we expect that the film and the performance will increase audiences’ closeness with wrongfully imprisoned individuals. Again, we expect the effect of the performance to be larger for in-person compared to online audiences (3a). Based on associations between social relationships and helping, we expect closeness to predict charitable intentions (3b).
4. Based on the theory of planned behaviour, we expect charitable intentions to predict behaviour in support of a charity that fights wrongful imprisonment.

In Study 1, audiences in the concert hall and at home experienced an event featuring both a live performance of *The Innocents* and a screening of the documentary. Participants answered surveys before and after each presentation and we observed their charitable behaviour at the end of the event, as an initial test of the hypotheses. In Study 2, participants at home watched either the performance or the film, to replicate the findings of Study 1 in a larger sample and clarify ambiguities in the comparison between the two stimuli.

# Study 1

Study 1 served as the initial test of our hypotheses in a setting that maximizes ecological validity: two public events, organized on April 2nd and 4th, 2024. Both events featured percussionists John Lane and Allen Otte performing *The Innocents,* and a screening of the eponymous documentary film by Wojciech Lorenc, in counterbalanced order. The events could be attended either in-person or in an online livestream. Participation in the research study was optional for audience members, thus the events were attended by research participants and regular ticket holders alike.

## Method

### Participants

Leading up to the event, all ticket holders were invited to sign up for participation in the research study via email. In addition, we asked in-person ticket holders as they arrived at the venue whether they would like to participate, and recruited additional livestream participants through Prolific. Participants had to be 16 years or older, have healthy hearing and vision, and have not seen the performance or the film before. We initially restricted the upper age limit to 60 years to avoid age effects on eye movements, which were collected for a different research question and not analysed here. However, we made an exception for one participant over 60 who expressed interest in participating. By buying a ticket for in-person or livestream attendance at one of the events, participants self-assigned to an attendance mode and an order of stimli. However, participants were blind to the order in which film and performance would be presented on each of the days, since we did not advertise this information. A total of 90 participants completed the study (day 1 in-person: 30; livestream: 15; day 2 in-person: 31; livestream: 14). In addition, one in-person participant and 2 livestream participants left the event at intermission on day 1, and one livestream participant left at intermission on day 2. They are included in all analyses for which their data are available. Livestream participants were watching from Africa, Europe, North America, Asia, and New Zealand, with most participants watching from South Africa (). Upon completion of the study, ticket holders received $10 CAD compensation and Prolific participants were compensated £18 GBP. For a detailed description of the sample, see [Appendix A](#apx-sampledescription).

### Procedure

Study 1 consisted of three surveys: A pre-survey before the event, a survey at intermission evaluating the stimulus presented in the first half of the event, and a survey at the end, evaluating the second half of the event. In addition, person-level covariates were assessed either in the pre-survey or in the survey at the end. After obtaining informed consent, the pre-survey assessed a baseline of the behavioural predictors interpersonal closeness with a wrongfully imprisoned person, state empathy for their story, problem awareness of wrongful imprisonment, and intentions to support organizations fighting wrongful imprisonment. Moreover, the pre-survey included the other NAM-TPB variables and an affect measure. Participants filled out the pre-survey either in the days leading up to the event, or in the hour right before the event. Closeness with the other audience members and affect were always assessed immediately before the event, because they are specific to the time and context of the event. Participants then saw the film or the performance in the first half of the event, and, after a 30-minute intermission, the other stimulus. After both the film and the performance, we assessed participants’ affect, experience of the event, and again measured their closeness, empathy, awareness, and intentions. The end survey additionally included the remaining NAM-TPB variables, and some questions that were used to answer other research questions not analysed here. At the end of the event, we observed actual behaviour in support of *Innocence Canada*, an organization that advocates for innocent prisoners in Canada. Study 1 was approved by the McMaster Research Ethics Board (MREB#1975).

The events took place in McMaster University’s Large Interactive Virtual Environment laboratory (LIVELab, <https://livelab.mcmaster.ca/>), a concert venue equipped for psychological research, and were livestreamed via YouTube. Livestream participants opened a custom website on their personal computers which presented the surveys and the event stream. To create a controlled experience, the website prohibited access to stream controls (like pausing the stream) and only displayed the video stream, not any additional YouTube features like the chat. Livestream participants were instructed to sit in a quiet environment and use headphones for the best experience, but 9 participants self-reported that they still used the built-in speakers of their machine. Nonetheless, the sound quality was rated as very good ( on a 7-point scale), as was the video quality (), the video fluency (), and the camera framing (). In-person participants filled out the surveys on LIVELab’s tablets or on paper. Participants who signed up in advance were given a link to fill out the pre-survey on their own machines. All surveys, and the presentation of the stream for livestream participants, were coded in jsPsych ([Leeuw et al., 2023](#ref-leeuw2023)) and hosted through JATOS ([Lange et al., 2015](#ref-lange2015)) on our lab server. Print versions and codebooks of the survey are available at <https://doi.org/10.5281/zenodo.15282949>. Note that in-person participants were equipped with mobile eye-tracking glasses and smartwatches for physiological measurements that were analysed for other research questions. For the same reason, livestream participants were recorded via their webcam. Both in-person and livestream participants had to undergo brief calibrations before and after the event and at intermission. For the full technical details of the event, see [Appendix B](#apx-implementation).

### Stimuli

*The Innocents* ([Lane & Otte, 2006](#ref-lane2006)) is a 1-hour contemporary percussion performance by musicians John Lane and Allen Otte. The performance explores issues of the US-American criminal justice system, such as mistaken identity, interrogation malpractices, and forced prison labor. Associated objects, like keys and newspapers, are utilized to create a diverse soundscape ranging from conventional song to experimental noise. In some parts, the musicians speak or sing text fragments, while other parts feature field recordings of demonstrations, interrogations, or police radio. With the performance, the musicians intend to motivate their audiences to engage with the topic of wrongful imprisonment, which they aim to achieve by means of an emotional and experiential immersion, all while remaining artistically abstract ([Lane & Otte, 2021](#ref-lane2021)). A full recording of the performance from April 4th, 2024 is available on YouTube (<https://www.youtube.com/watch?v=sQW0a3NlQUo&ab_channel=BEATLab>).

Director Wojciech Lorenc created an eponymous documentary film about *The Innocents* ([Lorenc, 2022](#ref-lorenc2022)). Over 80 minutes, the film features conversations between the musicians Lane and Otte about their creative process and personal rapport with the issue of wrongful imprisonment, and recordings of their rehearsals and interactions with audiences on tour. A third protagonist of the film is Anna Vasquez, who shares her personal story of being convicted for a crime she did not commit, and her thoughts and feelings about the *Innocents* performance. The film’s score includes excerpts from the performance. Compared to the performance, the film has a more explicit narrative and educates through first-person accounts and realistic, unambiguous images. A trailer for the film is available on YouTube (<https://www.youtube.com/watch?v=PyYSohg-FpI&ab_channel=WojciechLorenc>).

### Measures

#### Interpersonal closeness.

We measured interpersonal closeness with the Inclusion of the Other in the Self scale ([Aron et al., 1992](#ref-aron1992)), a 7-point scale with pictorial anchors that show increasingly overlapping Venn diagrams with two circles labelled “self” and “other”. Participants were instructed to rate which of the paired circles best described their relationship with the “other”. Closeness was assessed separately for the musicians Allen Otte and John Lane, the wrongfully imprisoned Anna Vasquez, the in-person and the livestream audience.

#### State empathy.

To measure state empathy, participants read a vignette about the story of Anna Vasquez’s wrongful imprisonment and exoneration. We then administered the Empathic Concern Index ([Batson, 1987](#ref-batson1987)) for which participants rate the intensity of 14 emotional reactions on a 7-point scale ranging from 1 (“not at all”) to 7 (“extremely”). The items are averaged to obtain two indices, empathic concern () and personal distress ().

#### Problem awareness.

We created an instrument to measure the variables of the NAM and TPB with regards to fighting wrongful imprisonment. The item wordings were based on previous studies using the NAM and TPB to explain social justice engagement ([Torres-Harding et al., 2012](#ref-torres-harding2012)), charitable giving ([Smith & McSweeney, 2007](#ref-smith2007)), and pro-environmental behaviour ([De Groot & Steg, 2009](#ref-degroot2009); [Savari et al., 2023](#ref-savari2023); [Steg & De Groot, 2010](#ref-steg2010)). The instrument consists of four items for each of the NAM variables problem awareness (e.g., “Wrongful incarcerations are an urgent problem in our society”; ), ascription of responsibility (e.g., “Everyone must do something against social injustices in the legal system”; ), and personal norm (e.g., “I would feel guilty if I didn’t do something to make the criminal justice system more fair”; ), and the TPB variables attitude (e.g., “I believe that it is essential to make sure that defendants and convicts receive adequate legal support”; ), subjective norm (e.g., “Other people around me support organizations and groups that fight injustices in the legal system”; ), and perceived behavioural control (e.g., “I believe that I have the power to advocate for social justice in the legal system, if I choose to do so”; ). Behavioural intentions to support the fight against wrongful imprisonment was measured with three items relating to *Innocence Canada*, a local charity: “I intend to join the mailing list of an organization like *Innocence Canada*”, “I intend to read up on wrongful incarceration”, and “I intend to donate to an organization like *Innocence Canada*” (). All NAM-TPB items were rated on a 7-point scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”) and were averaged within each construct.

#### Supportive behaviour.

At the end of the event, we observed whether participants took a flyer of *Innocence Canada* (in-person: paper flyer; livestream: digital download), and whether they signed up for their mailing list. We also provided opportunities to donate (in-person: donation box; livestream: donation link). Because we were ethically not allowed to observe donations directly, we followed up with participants one to two weeks after the event to ask whether and how much they had donated. Note that the *Innocents* performance and film were created in the USA, informed by and referring to wrongful imprisonment in the US-American criminal justice system. On the other hand, *Innocence Canada* fights wrongful imprisonment in Canada. Nonetheless, both countries’ legal systems face related issues, and the advocacy of *The Innocents* is equally relevant in Canada. Audiences’ support for *Innocence Canada*, therefore, further illustrates the advocacy’s ability to transfer to a new local context.

#### Affect.

We assessed affect with six items rated on a 4-point scale ranging from 1 (“I do not feel it”) to 4 (“I feel it strongly”). The six items were combined into three bipolar dimensions alert-tired, relaxed-tense, and positive-negative by subtracting the rating of one pole from the rating of the opposite pole ([Schimmack & Grob, 2000](#ref-schimmack2000)).

#### Event experience.

We asked participants to rate their experience of the film and the performance in terms of enjoyment, interest, being moved, gaining insight, being attentive, experiencing chills or shivers, tearing up or crying, and likelihood of reengaging with a similar event (cf. [Fink et al., 2024](#ref-fink2024); [Schindler et al., 2017](#ref-schindler2017); [Swarbrick & Vuoskoski, 2023](#ref-swarbrick2023)). These items were rated on a 7-point scale ranging from 1 (“not at all”) to 7 (“extremely”). Furthermore, we assessed the perceived duration on a 7-point scale from -3 (“much too short”) to 3 (“much too long”). For the performance only, we asked participants to describe the performance in up to ten of their own words. At the end of the event, we also asked participants whether they liked the order of film and performance that they saw.

#### Person-level covariates.

We assessed participants’ age, income, education, and political orientation. Furthermore, based on the Wheel of Power/Privilege ([Bauer, 2021](#ref-bauer2021); [Canadian Council for Refugees, n.d.](#ref-canadiancouncilforrefugees); [Duckworth, 2020](#ref-duckworth2020)), we asked participants whether they feel part of equity-deserving groups (Women, genderdiverse, LGBQ+, Indigenous Peoples, and Persons of colour) and inquired about their lived experiences (of disability, justice-involvement, and unshelteredness). We assessed participants’ musical background with one item from the Ollen Musical Sophistication Index ([Ollen, 2006](#ref-ollen2006); [Zhang & Schubert, 2019](#ref-zhang2019)). Moreover, we asked for participants’ familiarity with and preference for contemporary percussion music, on scales ranging from 1 (“very unfamiliar”/“strongly dislike”) to 7 (“very familiar”/“strongly like”). We also asked for their motivations to attend the event, and whether they had a personal relationship to the researchers or the artists. Finally, we measured relevant personality traits: Openness to experience with the six-item facet of the Big Five Inventory-2-Short ([Soto & John, 2017](#ref-soto2017)), and trait empathy with 14 items making up the empathic concern and personal distress facets of the Interpersonal Reactivity Index ([Davis, 1980](#ref-davis1980)).

### Analysis

All analyses were performed in R 4.5.0 ([R Core Team, 2024](#ref-R-base)). First, we screened for rushing within each survey component, but no participant was faster than our cutoff criterion of the first quartile minus 1.5 times the interquartile range of the completion times. We further screened for insufficient variance in the response patterns of each participant, which can indicate inattentiveness or dishonesty. For each participant and each multi-item instrument, we calculated the number of unique response values. Responses were excluded if they consisted of only a single repeated value (for instruments with up to 10 items) or only two unique values (for instruments with more items), which was the case for 36.00 out of 1,523.00 (0.02%) responses. Finally, multi-item indices were only computed if a participant had replied to at least 80% of the items making up that index. The resulting sample size for each analysis is reported alongside the results.

To test the effects of the event on each of the potential drivers of prosociality (closeness, emphatic concern, and problem awareness), we fitted linear mixed models (LMMs) with *lmerTest* ([Kuznetsova et al., 2017](#ref-R-lmerTest)). Sum-to-Zero contrasts tested whether the outcomes were higher for in-person compared to livestream attendance, after watching the performance compared to after the film, and at the end of the event compared to at intermission. We added the baseline rating of the respective outcome as a covariate, estimating a fixed effect for the entire sample to account for measured variances in the outcome prior to the event. We also added random intercepts for each participant to account for unmeasured variances and capture intra-participant correlations due to the repeated measures design. The outcomes and baseline covariates were z-scored. Missing values for the baseline covariate were imputed with zero (the mean value after z-scoring). Control variables that had a sizable correlation with the outcome variables () were included as additional covariates in the models. All models met the assumptions of normally distributed residuals and random intercepts, homogeneity of variances, and did not have multicollinearity issues, unless reported otherwise. The model fit was evaluated against a covariate model predicting the outcome from only the baseline and the random intercept using a Likelihood Ratio Test of the maximum likelihood (ML)-generated models. Main and interaction effects were evaluated using the t-statistic of the parameter estimates and Satterthwaite approximations for degrees of freedom of the restricted maximum likelihood (REML)-generated models, as recommended by Meteyard and Davies ([2020](#ref-meteyard2020)). Cohen’s as effect size measure for the fixed effects was calculated using the equation by ([Westfall et al., 2014](#ref-westfall2014); see [Brysbaert & Stevens, 2018](#ref-brysbaert2018)), and interpreted according to the norms by Cohen ([1992](#ref-cohen1992)). Significant interactions were decomposed using one-sided paired t-tests.

To test the influence of closeness, empathic concern, and problem awareness on behavioural intention, we fitted a multiple linear regression with the lm function in the *stats* package. Again, covariates that were sizably correlated with intention were included in the model. All predictors and the outcome were z-scored. Predictors were evaluated with t-test of their regression weights against zero.

To test the influence of intention on observed behaviour, we used ordinal logistic regression with the polr function in *MASS* ([Venables & Ripley, 2002](#ref-R-MASS)) to predict the number of behaviours participants performed. No control variables were sizably correlated with the outcome, and hence no further variables were added to the model. All predictors were z-scored. Predictors were interpreted as having a significant effect if the 95% confidence interval of the Odd’s Ratio (calculated as ) did not cross 1.

Figures were created with *ggplot2* ([Wickham, 2016](#ref-R-ggplot2)), *ggpubr* ([Kassambara, 2023](#ref-R-ggpubr)), *ggridges* ([Wilke, 2024](#ref-R-ggridges)), *ggsignif* ([Constantin & Patil, 2021](#ref-R-ggsignif)), *ggnewscale* ([**R-ggnewscale?**](#ref-R-ggnewscale)), and *png* ([Urbanek, 2022](#ref-R-png)). Error bars represent 95% confidence intervals (CI) based on 1000 bootstrap resamples implemented in *Hmisc* ([Harrell Jr, 2024](#ref-R-Hmisc)).

## Results

TODO Opening paragraph: takeaways from the subjective experience paragraph? + details & figures in supplemental

### Effect of Event Conditions

We evaluated the effects of the event conditions on *awareness* of wrongful imprisonment, *empathy* with the wrongfully imprisoned Anna Vasquez, and *closeness* with Anna Vasquez (Hypotheses 1a, 2a, and 3a), using LMMs.

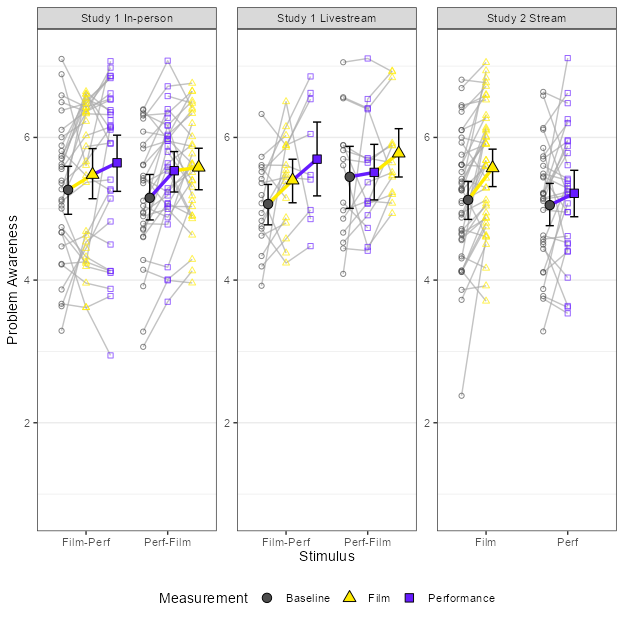
#### Awareness.

Openness to experience was moderately associated with higher awareness, , , and was therefore included as a covariate in the LMM, resulting in the formula . For all three outcomes (awareness, empathy, and closeness), the baseline significantly predicted the outcome, but the data were significantly more likely under the full model including the event conditions, compared to a model with just the covariates and the random intercept (for the full model details and model comparisons see [Appendix C](#apx-modelcomps)).

The main effect and interactions involving the stimulus were not significant, indicating no difference in problem awareness between participants who had seen the performance compared to the film. Thus, the data did not support Hypothesis 1a. The only significant fixed effect was a small main effect of time, , , , , with participants reporting higher problem awareness at the end of the event (, ) compared to intermission (, ), regardless of stimulus and attendance mode. An additional post-hoc test revealed that the increase from baseline (, ) to intermission was also small but significant, , 95% CI , , , (see [Figure 1](#fig-awareness)).

Figure 1

Problem Awareness Throughout the Event



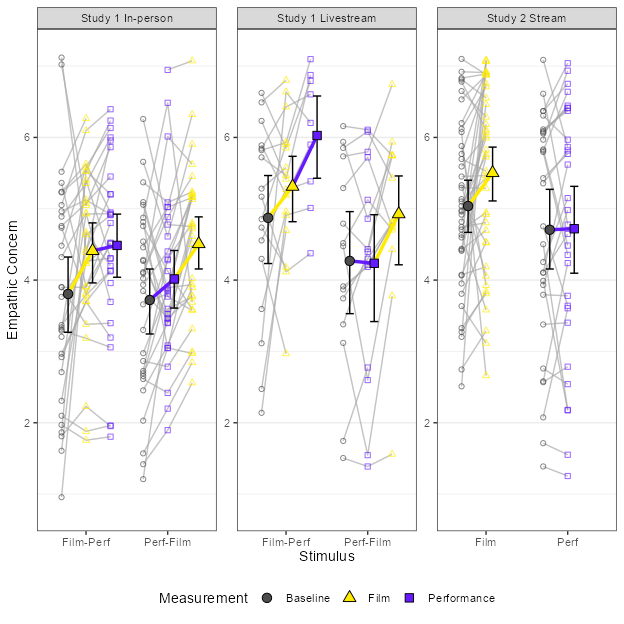
*Note*. Mean and CI of awareness by stimulus (x-axis), split for the in-person (left) and livestream (middle) audience of study 1, and the stream audience of study 2 (right). Awareness was rated on a scale ranging from 1 (strongly disagree) to 7 (strongly agree). Significance levels refer to one-sided pairwise t-tests. , , , n.s. = not significant.

#### Empathy.

Empathic concern for Anna Vasquez did not have any correlations with the control variables that were at least moderately sized. Therefore, no further covariates were included in the LMM . The main effect and interactions involving attendance were not significant, indicating no difference in empathy between in-person and livestream audiences. Thus, the data did not support Hypothesis 2a. Time had a moderate effect on empathy, , , , , with higher empathy ratings at the end of the event (, ) compared to intermission (, ). The main effect of time interacted moderately with medium, , , , . Decomposing the interaction revealed that compared to the empathy ratings at baseline (, ), seeing the film in the first half of the event afforded a small increase in empathy (, , , 95% CI , , , ). In contrast, seeing the performance in the first half did not lead to a significant change in empathy (, , , 95% CI , , , ). In the second half of the event, seeing the performance after the film afforded a small increase in empathy (, , , 95% CI , , , ), compared to a moderate increase when the seeing film after the performance (, , , 95% CI , , , ; see [Figure 2](#fig-empathy)).

Figure 2

Empathic Concern Throughout the Event



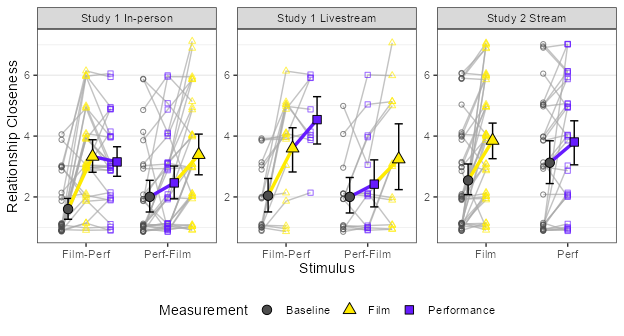
*Note*. Mean and CI of empathy by stimulus (x-axis), split for the in-person (left) and livestream (middle) audience of study 1, and the stream audience of study 2 (right). Empathy was rated on a scale ranging from 1 (not at all) to 7 (extremely). Significance levels refer to one-sided pairwise t-tests. , , , n.s. = not significant.

#### Closeness.

Relationship closeness with Anna Vasquez did not have any sizable correlations with the control variables. Similarly to the empathy model, the closeness LMM with the formula did not feature any significant main or interaction effects involving attendance. The lack of a difference in relationship closeness between in-person and livestream audiences did not support Hypothesis 3a. The stimulus had a small but significant effect on closeness, with participants reporting lower closeness after seeing the performance (, ) than after the film (, , , , , ). Time also had a small effect, with higher closeness at the end of the event (, than at intermission (, , , , , ). Importantly, stimulus and time interacted moderately, , , , . Decomposing the interaction revealed that compared to closeness at baseline (, ), seeing the film in the first half of the event afforded a large increase in closeness (, , , 95% CI , , , ). In contrast, seeing the performance by itself only afforded a small increase (, , , 95% CI , , , ). In the second half, seeing the performance after the film resulted in no significant changes in closeness (, , , 95% CI , , , ), but the film after the performance led to a moderate increase (, , , 95% CI , , , ; see [Figure 3](#fig-closeness)).

Figure 3

Relationship Closeness Throughout the Event



*Note*. Mean and CI of closeness by stimulus (x-axis), split for the in-person (left) and livestream (middle) audience of study 1, and the stream audience of study 2 (right). Closeness was rated on a visual analog scale ranging from 1 (0% overlap) to 7 (90% overlap). Significance levels refer to one-sided pairwise t-tests. , , , n.s. = not significant.

### Charitable Behaviour

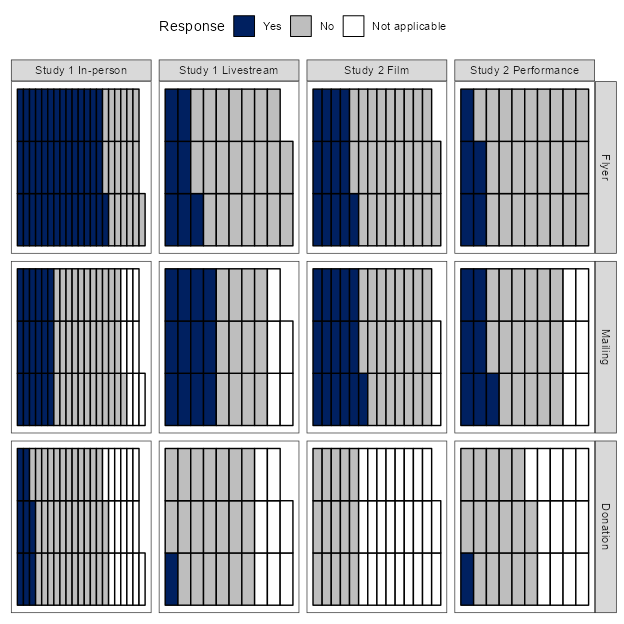
After establishing that the event increased audiences’ awareness, empathy, and closeness, we evaluated the influence of these variables on the intention to support a charity that fights wrongful imprisonment (Hypotheses 1b, 2b, and 3b). Participants with higher trait empathic concern tended to have higher charitable intentions at the end of the event (, , ), as did participants who selected helping the social justice cause among their motivations to get a ticket for the event (, , ). The variables were thus controlled for in the multiple linear regression using just the data from the end of the event. State empathic concern significantly predicted intention with a moderate effect (, , , ) after controlling for differences in the covariates. In other words, participants who felt more empathic concern had a stronger intention to perform charitable behaviour, supporting Hypothesis 2b. In contrast to the predictions of Hypotheses 1b and 3b, problem awareness and relationship closeness did not significantly predict intention (both , ). The total explained variance in intention was .

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Study 1 | | Study 2 (1st Step) | | Study 2 (2nd Step) | |
| Predictors | Estimates | p | Estimates | p | Estimates | p |
| Intercept | 0.17 | 0.095 | -0.06 | 0.543 | -0.44 | 0.493 |
| Trait Empathic Concern | 0.17 | 0.077 |  |  |  |  |
| Social Justice Motivation | 0.20 | 0.061 |  |  |  |  |
| Closeness (Anna) | 0.10 | 0.329 | 0.34 | **0.004** | 0.25 | 0.089 |
| Empathic Concern (Anna) | 0.36 | **0.001** | 0.23 | 0.074 | 0.13 | 0.498 |
| Problem Awareness | 0.05 | 0.616 | 0.34 | **0.003** | 0.35 | **0.003** |
| Closeness (Acquaintance) |  |  |  |  | 0.11 | 0.432 |
| Empathic Concern (Acquaintance) |  |  |  |  | 0.07 | 0.549 |
| Observations | 76 | | 71 | | 71 | |
| R2 / R2 adjusted | 0.381 / 0.336 | | 0.455 / 0.431 | | 0.465 / 0.424 | |

At the end of the event, we assessed three charitable behaviours supporting the charity *Innocence Canada*. Among the participants who completed the event, 66 (73.33%) performed at least one behaviour: 50 participants took an *Innocence Canada* flyer, 30 signed up to their mailing list, and 9 made a donation, raising a total of CAD 192.09 (see [Figure 4](#fig-waffle-behaviour)). To test whether participants’ charitable intentions were implemented in actual behaviour (Hypothesis 4), we calculated a sum score of behaviours for participants with applicable values (yes or no) on all three behaviours (). A logistic regression with the formula revealed that in-person participants demonstrated more behaviours (, ) than participants watching the livestream (, , , 95% CI [1.11, 4.69]). The sum of behaviours did not differ between participants who saw the film first (, ) compared to those who saw the performance first (, , , 95% CI [0.68, 2.02]). Crucially, participants with higher intentions at the end of the event tended to demonstrate more behaviours (, 95% CI [1.68, 5.8]), supporting Hypothesis 4. The model explained a behavioural variance of .

Figure 4

Charitable Behaviour Counts



*Note*. Split for in-person and livestream audiences of study 1, and film and performance audiences of study 2 (from left to right). Note that participants in study 1 who did not complete the event were excluded from this analysis. For mailing, ‘not applicable’ refers to participants who indicated that they were already signed up to the mailing list of the charity. For donation, ‘not applicable’ refers to participants who did not participate in the follow-up survey asking about donation behaviour.

It is important to note that participants’ charitable intentions only increased minimally from baseline (, ) to the end of the event (, , , 95% CI , , ). Did the event matter at all for participants’ charitable behaviour, or was their behaviour already determined by their intentions prior to attending the event? We compared the predictive power of intention before and after the event with two separate logistic regressions. Baseline intention significantly predicted the sum of behaviours, although with a smaller effect than intention at the end of the event (, 95% CI [1.2, 3.39]). Importantly, baseline intention explained much less variance in behaviour () compared to intention at the end of the event ().

## Discussion

2 paragraphs

Unexpectedly, we found that the film led to stronger increases in empathy and closeness with a wrongfully imprisoned person, compared to the performance. However, this difference between the stimuli might be confounded due to the specific wrongfully imprisoned person towards whom empathy and closeness was assessed: The measures of empathy and closeness used here both require a reference person who is presented to the participants in a vignette, with the following items referring to that vignette (e.g., “How compassionate do you feel when thinking of…?”). In this study, a vignette of Anna Vasquez was presented as reference person, because her case as presented in the film lent itself well to using in the survey. What we did not anticipate was that participants are exposed to Anna Vasquez and become familiar with her during the film, in which she is one of the protagonists, but not during the performance, in which her name is only briefly mentioned once. Since familiarity is associated with empathy (CITE) and closeness (CITE), the higher ratings in these measures after seeing the film might be confounded with familiarity.

Given that empathy with Anna Vasquez predicted the intention to support a related charity, *Innocence Canada*, the film’s advantage in increasing empathy raises the question whether the film is more successful at mobilizing supportive behaviour than the performance. However, the crossover design of study 1 does not allow us to compare the behavioural effects of the film and the performance. Study 2 aims to address the potential familiarity confound and to disambiguate the behavioural effects of the two stimuli, while replicating the findings from the live concert setting in a larger-scale online study.

# Study 2

1 introductory paragraph: explain relation to hypotheses, gap of study 1, and how study 2 fills the gap (procedure)

## Method

Study 2 manipulated one factor with two levels: Participants watched either the film or the performance. Therefore, there were only two measurement time points, before and after watching. All participants watched a stream at home, so Study 2 followed many of the same methods used for the livestream audience in Study 1. The methods for Study 2 were preregistered at OSF on June 18th, 2025 (see <https://osf.io/suyef/>), and any deviations from the preregistration are reported here. The OSF repository also contains the survey.

### Participants

For Study 2, we recruited all participants through Prolific between June and July 2025. The study was open Tuesday through Sunday evening roughly between 5:30 and 8:30 pm Eastern Time to imitate the conditions of a livestreamed event as in Study 1. Participants had to be between 18 and 60 years old, be fluent in English, have healthy hearing, watch the event without glasses (healthy vision or correction with contact lenses), have not seen the film or the performance before, and reside in Canada. We added the last requirement to match the area of activity of our partner charity, Innocence Canada. We aimed to recruit 200 participants, 100 per condition. A simulation-based power analysis indicated that this sample size would yield a 75% power to detect the most ambiguous effect from Study 1, the interaction of medium and time on empathic concern (see preregistration for details). A total of xyz participants started the study and xyz (%) completed it, with xyz participants in the film and xyz in the performance condition. Because the film is 15 minutes longer than the performance, we set up two parallel studies on Prolific with identical descriptions, but differing duration and compensation. By signing up to the study, participants therefore blindly self-assigned to a condition (film or performance). Upon completion of the study, participants in the performance condition were compensated with 11.50 GBP, while participants in the film condition received 13 GBP (equivalent to a rate of 6 GBP per hour).

### Procedure

For Study 2, the pre-survey was administered in the same session as the event stream and the post-survey (except for one participant who filled out the pre-survey and asked to finish the remainder of the study the next day). Therefore, the procedure was similar to that used for the impromptu participants of Study 1: After giving informed consent, participants filled out a pre-survey, which assessed a baseline of the behavioural predictors interpersonal closeness, state empathy, problem awareness, and behavioural intnetions. Moreover, the pre-survey included the other NAM-TPB variables and an affect measure. Participants then saw a recording of the event stream from Study 1, containing either the film (first half of the April 2nd, 2024, event) or the performance (first half of the April 4th event). After watching the stream, participants rated their event experience and the same measures already assessed at baseline, and finally the person-level covariates. At the end, we asked participants what they thought the study investigated, and we observed behaviour in support of *Innocence Canada*. Study 2 additionally included some new measures described in the next section, as well as some measures that were used to answer other research questions (see preregistration for details). The implementation of the web surveys and the integrated stream was identical to Study 1. Throughout the study, participants were instructed that they would watch a live event, even though they actually watched a recording, to create an experience comparable to the livestream in Study 1. After the study, participants were debriefed about this deception and reconsented to the use of their data. Study 2 was approved by the McMaster Research Ethics Board (#7202).

### Measures

Study 2 assessed the same measures as Study 1 (interpersonal closeness, state empathy, the variables of the NAM and TPB, supportive behaviour, affect, event experience, and person-level covariates), except for the following changes:

#### Interpersonal closeness.

As in Study 1, we measured interpersonal closeness with the IOS scale ([Aron et al., 1992](#ref-aron1992)), rated for the same target persons/groups. In addition, participants were asked to imagine an acquaintance and prompted to describe them to make sure they were visualizing a person they actually know ([Cialdini et al., 1997](#ref-cialdini1997)). Participants were then asked to imagine that this acquaintance fell victim to wrongful imprisonment (the vignette was modeled after a real case, Verschwele ([2020](#ref-verschwele2020)); for the full vignette see the OSF repository), and rated their closeness with the acquaintance.

#### State empathy.

As in Study 1, participants read a vignette about the wrongful imprisonment of Anna Vasquez and rated their empathic concern and personal distress using the Empathic Concern Index ([Batson, 1987](#ref-batson1987)). In addition, the Empathic Concern Index was also administered after the vignette about the hypothetical wrongful imprisonment of the participant’s acquaintance.

#### Problem awareness.

Problem awareness and the other NAM and TPB variables were assessed using the same self-worded instrument from Study 1. The only change was in the items measuring behavioural intentions: Rather than naming *Innocence Canada,* we asked about participants’ intentions to join the mailing list and donate to “an organization that fights wrongful imprisonment”. Our partner organization *Innocence Canada* was only presented at the end of the study, when assessing actual behaviour, to reduce the risk of participants looking up the organization and engaging in any of the behaviours beforehand.

#### Event experience.

We asked participants in both conditions to describe the stimulus they had seen in up to ten of their own words. Given that participants only saw one of the two stimuli, we abridged the question whether participants liked the order of film and performance.

#### Person-level covariates.

Because all participants were recruited through Prolific, rather than self-initiatively buying a ticket to the event, we did not ask participants for their motivation to attend, nor for their personal relationship with the researchers or the artists. To shorten the post-survey, we abridged the trait empathy measure, which had not shown consistent associations with supportive behaviour or its predictors in Study 1. In the question about participants’ identity, we added an option for religious minorities.

### Analysis

TODO

## Results

TODO row 21, 29, 35, 36, 38, 47, 50, 54 guessed Hypothesis 1, exclude from that analysis.

Run regression of intention twice: once for the film, once for the performance?

## Discussion

# General Discussion

## Displaying Figures

Do you want the tables and figures to be at the end of the document? You can set the floatsintext option to false. The reference labels will work no matter where they are in the text.

A reference label for a figure must have the prefix fig-, and in a code chunk, the caption must be set with fig-cap. Captions are in [title case](https://apastyle.apa.org/style-grammar-guidelines/capitalization/title-case).

Figure 5

The Figure Caption



*Note*. This is the note below the figure.

To refer to any figure or table, use the @ symbol followed by the reference label (e.g., [Figure 5](#fig-myplot)).

See [Figure 6](#fig-appendfig), an example of an imported graphic using markdown syntax.

Figure 6

Appendix Figure



*Note*. A *note* below the figure

## Displaying Tables

We can make a table the same way as a figure. Generating a table that conforms to APA format in all document formats can be tricky. When the table is simple, the kable function from knitr works well. Feel free to experiment with different methods, but I have found that David Gohel’s [flextable](https://davidgohel.github.io/flextable/) to be the best option when I need something more complex.

Table 1

The Table Caption.

| Numbers | Letters |
| --- | --- |
| 1 | A |
| 2 | B |
| 3 | C |
| 4 | D |

*Note*. The note below the table.

To refer to this table in text, use the @ symbol followed by the reference label like so: As seen in [Table 1](#tbl-mytable), the first few numbers and letters of the alphabet are displayed.

## Footnotes

A footnote is usually displayed at the bottom of the page on which the footnote occurs. A short note can be specified with the ^[My note here] syntax.[[1]](#footnote-94) A longer note can be specified with the [^id] syntax with the text specified on a separate line like so [^id]: Text here.[[2]](#footnote-95)

A regular paragraph without any indentation is not part of the footnote and will be part of the main body of the document.

## Tables

[Table 2](#tbl-mymarkdowntable2) is an example of a plain markdown table. Note the that the caption begins with a colon.

Table 2

My Caption.

| Letters | Numbers |
| --- | --- |
| A | 1 |
| B | 2 |
| C | 3 |

*Note*. My note

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# Appendix A

# Detailed sample descriptions

Appendices are created as level 1 headings with an identifier with an #apx- prefix. Appendix titles should be in title case and should describe the content of the appendix.

If there is only one appendix, the label automatically inserted above the the appendix title will be **Appendix**. If there are multiple appendices, the labels **Appendix A**, **Appendix B**, **Appendix C** and so forth will be inserted above the titles.

To cite an appendix as a whole, reference it with the @apx- prefix.

This is an appendix with a table using markdown (see [Table A1](#tbl-letters)).

Table A1

My Caption

| Col 1 | Col 2 | Col 3 |
| --- | --- | --- |
| A | B | C |
| E | F | G |
| A | G | G |

*Note*. These are letters.

# Appendix B

# Technical implementation

## Surveys

All surveys were coded in jsPsych ([Leeuw et al., 2023](#ref-leeuw2023)) and hosted through JATOS ([Lange et al., 2015](#ref-lange2015)) on our lab server located at McMaster University, and managed by McMaster’s Research and High Performance Computing Support. Codebooks and print versions are available at https://doi.org/10.5281/zenodo.15282949. All participants completed the survey via web browser: In-person participants were provided with LIVELab’s Samsung Galaxy Tab A 8.0 SM-T380 tablets, which they could store in a pouch attached to their seat during the event. Livestream participants used their own machines. Since this was a live event, participants had limited time to fill out the surveys before the event and at intermission so as not to delay the performance and the film screening. To ensure that participants progressed through the surveys as planned, we monitored the incoming data using the JATOS logs. If participants did not complete the surveys in the designated time, we skipped the remaining questions so that the surveys would not distract participants from the event. For in-person participants, research assistants went up to their seats and manually skipped the remaining survey questions, whereas for livestream participants, we signaled the JATOS server to move every participant to the livestream once the first and second half of the event began, respectively.

## Physiological measures

Both in-person and online participants consented to eye-tracking and cardiac monitoring. In-person participants were equipped with Bangle.js 2 watches collecting a photoplethysmogram signal ([Flannery & Fink, 2024](#ref-flannery2024)), and with Pupil Labs’ NEON eye-tracking glasses, controlled via a multi-person mobile eye-tracking system ([Saxena et al., 2025](#ref-saxena2025)). Livestream participants were recorded via webcam to extract their eye-movements and cardiac activity post-hoc. The calibration for the eye-tracking glasses is described in Saxena et al. ([2025](#ref-saxena2025)) and the calibration for the webcam is described in Saxena et al. ([2023](#ref-saxena2023)).

## Environment

The LIVELab is equipped with technology that meets the demands of concert halls as well as psychological laboratories. It has a capacity of 106 seats. For this study, in-person participants were seated in the second, third and fourth front rows. Including participants, the event was attended by 55 in-person audience members on April 2nd and 60 audience members on April 4th. The performance took place on the stage, where the sound was recorded by eight microphones for the different instruments and two microphones for the audience (e.g., to capture applause), and presented over a PA system consisting of two Meyer 500HP subwoofers and 5 Meyer UPJ-1P speakers. For the livestream, the performance was filmed from a static PTZOptics pt30x-sdi-g2 camera positioned behind and above the audience seating to capture an unobstructed view of the stage. The livestream audio was the same mix presented in the concert hall. The film was screened for the in-person audience on a 384.5 cm x 216 cm Samsung LH015IER LED video wall, using the same PA sound system. The film video and audio were streamed directly to YouTube. For livestream participants, the stream was presented in the jsPsych environment using the AVOKE plugin [TODO cite].

# Appendix C

# Model Comparisons

TODO expand this appendix to include the full output for each model.

Model comparison results for the three outcomes

| Model/Test | Formula/Statistic |
| --- | --- |
| Closeness | ; |
| Base Model | Closeness Baseline + (1|Participant) |
| Full Model | Closeness Baseline + Attendance \* Stimulus \* Time + (1|Participant) |
| LRT Test | , |

Empathy ;   
Base Model Empathy Baseline + (1|Participant)  
Full Model Empathy Baseline + Attendance \* Stimulus \* Time + (1|Participant)  
LRT Test ,

Awareness ;   
Base Model Awareness Openness + Baseline + (1|Participant)  
Full Model Awareness Openness + Baseline + Attendance \* Stimulus \* Time + (1|Participant) LRT Test ,

*Note*. Base Model - Baseline covariate Model. LRT Test - Likelihood Ratio Test. The model violated the assumption of normally distributed random intercepts, but neither log-transformation nor exclusions could restore normality. Two observations with extreme residuals were excluded to preserve the assumptions of normally distributed residuals and/or random intercepts.

1. Here is my short footnote! [↑](#footnote-ref-94)
2. This is a longer footnote. If it has multiple paragraphs, subsequent paragraphs need to be indented with two tabs.

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