A Positive Empathy Intervention to Improve Well-being on Instagram

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In Press at Emotion

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Abstract

With more than half the global population on social media, there is a critical need to understand how to engage it in a way that improves rather than worsens user well-being. Here, we show that positive empathy is a promising tool. Participants who received brief positive empathy instructions before 10 minutes of browsing their own Instagram feed showed greater affective well-being (Studies 1-4) and life satisfaction (Study 4) at post-test relative to participants who were instructed to browse as usual. The positive empathy intervention showed an average effect size on well-being of about a quarter of a standard deviation (mean Cohen's d = 0.25). We included unique active-control groups in each study. We found using positive empathy on social media was about as beneficial to well-being as watching a nature video (Study 1, N = 298) and was better than instructions to focus on positive content (Study 2, N = 302), empathize with all emotions (Study 3, N = 301) or reappraise one's own emotions (Study 4, N = 426). We used structural equation modeling to demonstrate the effect of the intervention on subjective well-being is mediated by changes in positive emotion sharing, appreciative joy, and self-compassion. These experiences form a latent factor we term positive empathy. Our results show that a brief intervention successfully manipulates positive empathy on Instagram, which increases well-being.

Keywords: empathy; social media; Instagram; compassion; appreciative joy; subjective well-being

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The effect of social media on mental health and subjective well-being is a subject of major concern for governments and a matter of intense debate among scientists. While the overall effect of social media use on well-being is an important question, focusing solely on this high-level issue may obscure larger but more specific effects that are of practical importance to society. Given that social media is here to stay, an entrenched part of our society, we need to look beyond whether it is good or bad for users, and instead ask how individuals can engage with social media in a way that is beneficial rather than detrimental to their well-being. Here, we propose that individuals can better engage with Instagram by employing a particular strategy when browsing their feed: positive empathy.

Empathy occurs when individuals understand (perspective taking), share (emotion sharing), and care (compassion) about the emotions of other people. Positive empathy occurs when empathy is applied to positive, rather than negative, emotions. When an empathizer shares and cares about the *positive* emotions of a target and communicates this to the target, this allows the target to 'capitalize' on their positive event by celebrating it with the empathizer (Gable et al., 2012; Reis et al., 2010), and lays the groundwork for a state of synchronized positive emotions known as positivity resonance (Major et al., 2018). In light of these benefits, we test here a wise psychological intervention–i.e., one targeted to a specific psychological process in a particular context (Walton, 2014)–to improve the well-being of social media users by increasing their experiences of positive empathy.

Social Media and Instagram

Over half of the global population and more than 90% of Americans use social media (Kemp, 2023). In the United States, 71% of 18 to 29-year-olds report using Instagram, and 70% of these do so on a daily basis (Auxier & Anderson, 2021). While initially introduced as tools to foster social interaction (Meta, 2023), academic research has pointed to potential detrimental effects of social media including reduced well-being (Allcott et al., 2020), deteriorated mental health (Twenge et al., 2022), and rising

suicide rates (Twenge et al., 2020). However, the practical importance of these effects has been questioned (Orben, 2020; Orben & Przybylski, 2019). Similarly, experimental evidence for the benefits of removing social media is mixed, with a recent meta-analysis suggesting social media has no significant effect on mental health, though results vary widely across experiments (Ferguson, 2024). Studies where social media is removed for a longer time frame have shown benefits on some outcomes (Allcott et al., 2020; Reed et al., 2023). However, removing social media entirely could eliminate a potentially important source of belongingness (Oldemburgo de Mello et al., 2024), self-esteem (Liu & Baumeister, 2016), and social support, capital, and connection (Kim, 2014; Kross et al., 2021; Liu et al., 2016). An alternative to removing social media entirely is intervening in how people use social media such that its effects are less detrimental to users.

Here, we focus on an intervention to positively influence users' subjective well-being (Diener et al., 2018)—defined as their balance of positive and negative emotions (Study 1-4) and overall satisfaction with life (Study 4)—by changing how they psychologically engage with their own Instagram feed. To do so, we must understand how social media platforms can negatively impact well-being.

Social media platforms, including Instagram, tend to contain more positive than negative valenced emotions (Baylis et al., 2018; Dodds et al., 2015; Ferrara & Yang, 2015; Vermeulen et al., 2018). Despite the more evident effects from negative-valenced content exposure (e.g., I get sad when I hear about the war), observing positive emotional expressions on social media may also have negative psychological consequences as it can lead to upward social comparisons (Midgley et al., 2021; Wirtz et al., 2021), where individuals compare themselves unfavorably to others.

Managing impressions on social media might benefit users at the expense of their followers (Kross et al., 2021), as posting boastful content might create opportunities for other users to engage in upward social comparisons. This effect seems to be more prevalent on social media, as these

comparisons are more frequent and extreme on social media than in real life (Midgley et al., 2021), leaving social media users with reduced self-esteem and subjective well-being (Alfasi, 2019; Aubry et al., 2024; Wirtz et al., 2021). Fortunately, social comparisons are not the only possible response to the positive emotions of other people. An alternative is positive empathy.

Positive Empathy

Positive empathy occurs when individuals generate empathy for positive emotions (Light et al., 2019; Morelli et al., 2015)[1]. While the components of empathy—emotion sharing, perspective taking, and compassion—tend to co-occur (Depow et al., 2021), they also have important differences which hold implications for empathizer well-being (Singer & Klimecki, 2014). Empathy can therefore be conceptualized as a multidimensional process[2] (Murphy et al., 2022) that can be strategically regulated (Weisz & Cikara, 2021) depending on key features of the situation (Fabi et al., 2019; Stellar & Duong, 2023). One critical feature is the emotional valence (positivity or negativity) of the target emotion. The effects of emotion sharing on subjective well-being in particular hinge on valence in that sharing positive emotions to a greater extent than one's own average is associated with increased subjective well-being but sharing negative emotions is associated with the opposite (Depow et al., 2021).

Although researchers typically study empathy as a reaction to suffering or distress (Morelli et al., 2015), this misses much of the relevant picture. Positive emotions are more commonly experienced than negative (Zelenski & Larsen, 2000), and this discrepancy is also present on social media (e.g., Vermeulen et al., 2018; Waterloo et al., 2018). As a result, in daily life opportunities to empathize with positive

[1] Positive empathy has been studied under different names, including mudita/sympathetic joy (Eisenberg, 2002), empathic joy (Batson et al., 1991), symhedonia (Royzman & Rozin, 2006), and happy-for-ness (Boecker et al., 2022).

[2] Researchers in mental state attribution and other domains often define empathy alternatively as "the ability to experience others' affective states, while maintaining the distinction from one's own affective states" (Quesque et al., 2024), which maps on to what we call emotion sharing here. The self-other distinction piece of emotion sharing differentiates it from emotion contagion, which can also be observed in infants and other animals, and refers to feeling what others feel without necessarily knowing the source of that emotion (Marx et al., 2024).

emotions are 3 times as common as opportunities to empathize with negative emotions (Depow et al., 2021). Thus, while suffering tends to dominate the psychological and neuroscientific empathy literature, it is also critical to understand how to empathize strategically with positive emotions. Here, we suggest that emotion sharing should play a central role for empathy with positive emotions. In fact, while sharing negative emotions can lead to distress, sharing positive emotions may provide benefits for the empathizer (Depow et al., 2021), target (Andreychik, 2019), and their relationship (Wells et al., 2022).

Evidence for the link between subjective well-being and positive emotion sharing is promising. For example, positive emotion sharing is a stronger negative predictor of depressive symptoms than anhedonia (Light et al., 2019), and it is more important than negative emotion sharing for relationship quality (Andreychik, 2019). When individuals share positive emotions they respond to good news more enthusiastically, which often allows the person experiencing a positive emotion to 'capitalize' on it by celebrating it anew with someone else (Gable et al., 2006). Capitalization—when someone has a positive event and is able to celebrate it with another person—is key for relationships (Reis et al., 2010), which are critical for well-being (Baumeister & Leary, 1995; Leary, 2015). Thus, positive emotion sharing is likely to be beneficial to the subjective well-being of the empathizer.

When positive emotion sharing is combined with compassion, a feeling of warmth, care, or concern for the other person, this is a state known as appreciative joy (Zeng et al., 2017). Appreciative joy, or being happy for others who are happy, is associated with increased subjective well-being (Zeng et al., 2019). Importantly, it may also serve as an alternative to social comparisons, which tend to undermine well-being for social media users (Alfasi, 2019; Midgley et al., 2020; Olivos et al., 2021; Wirtz et al., 2021). When an empathizer shares and has compassion for the positive emotions of another person, this provides necessary (albeit insufficient) conditions for positivity resonance. Positivity resonance occurs when two individuals experience shared positive emotions, feelings of mutual care,

and biological synchrony. This resonance has been linked to increased health and longevity (Wells et al., 2022), prosocial behaviour (Zhou et al., 2022), and meaning in life (Major et al., 2018).

In contrast, sharing negative emotions predicts personal distress (Singer & Klimecki, 2014) and burnout (Bloom, 2017). When engaging with negative emotions, such as a leader helping a suffering follower, it may behoove an empathizer to focus on compassion rather than on sharing the suffering themselves (Depow et al., 2023). This is a key piece of advice in many contexts. For example, physicians consider sharing emotions as central to empathy, but patients do not (Hall et al., 2021). With distress, secondary trauma, and burnout being major issues among this population, physician well-being may improve if they tend to focus on compassion when faced with the suffering of their patients. Even in this challenging context with many negative emotions, positive emotion sharing can be protective (Stosic et al., 2022). Thus, it may be beneficial to regulate empathy according to the situation: while compassion is preferable to emotion sharing for suffering (Klimecki & Singer, 2011), emotion sharing is beneficial on social media where there is a preponderance of positive emotional content (Vermeulen et al., 2018).

Current Studies

We tested a novel wise psychological intervention (Walton, 2014)—i.e., one aimed at a specific psychological process in a specific context—across four studies where participants use empathy to understand, share, and care about the positive emotions of others on Instagram. We instructed individuals to focus on sharing (emotion sharing) and caring (compassion) about the positive emotions of people they care about while passively browsing Instagram for 10 minutes. Given how readily humans make social comparisons, especially on social media (Aubry et al., 2024; Midgley et al., 2021), we included instructions about avoiding social comparisons by remaining focused on the ‘other’ rather than the ‘self’ and maintaining an attitude of self-compassion (Neff, 2003). These instructions make use of an emotion regulation strategy known as reappraisal (Gross, 2002; Wang et al., 2021), telling participants to gently redirect self-focused feelings of envy to other-focused feelings of happiness .

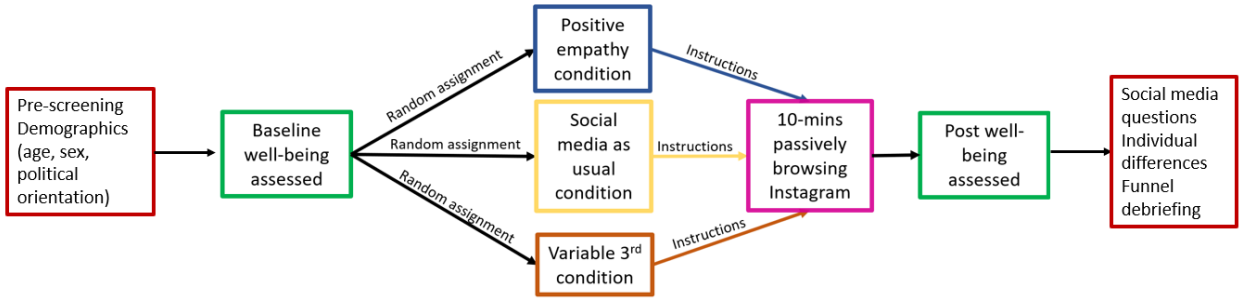
In order to increase the ecological validity of our design, we recruited participants who had an active Instagram account and asked them to browse their own feed. In this way, we target a specific psychological process with an intervention practiced in the same context in which it would theoretically be applied (Walton, 2014). Allowing participants to browse their own feed also ensures that our effects can be generalized beyond specific stimuli presented to participants (Yarkoni, 2022).

In each study, we asked participants to spend 10-minutes on their own Instagram feed[3], randomly assigning them to receive specific instructions about what to focus on while they browse. Subjective well-being was assessed before and after 10-minutes of Instagram use. In all four studies, we compare a condition where participants are instructed to focus on positive empathy while browsing their own Instagram feed to a condition where they are simply instructed to focus on the content of their feed while they browse. The third condition varies in each study to address specific questions (Figure 1). All four studies were pre-registered, and open access to preregistrations, data, code, and materials are provided at osf.io/4m65q.

[3] In one condition in Study 1, participants watched a nature video for 10 minutes rather than browsing Instagram.

Figure 1

Simple overview of procedure for Study 1-4.



Note. Participants were pre-screened, answered baseline well-being questions and were randomized into positive empathy, Instagram as usual, or an active control condition which varied. Participants followed condition-specific instructions while browsing Instagram for 10-minutes. Subjective well-being was re-assessed, and participants answered questions about social emotions on Instagram. Finally, participants answered individual difference measures, questions about the study itself, and were debriefed. For full access to materials used in all four studies, see supplementary materials.

Methods

Transparency and Openness

This article provides full access to the preregistrations, data, code, and materials for all four studies conducted. Here, we describe methods for all studies together. We have detailed and justified our sample sizes. Any deviations from the preregistration are reported and explained. For the sake of length, not all preregistered hypotheses are discussed in the text. However, a full accounting of preregistered hypotheses across all studies can be found in supplementary material (see Table S1).

We preregistered all studies (https://osf.io/e6bq) but the design of Study 1 was changed after pre-registration. Changes included replacing our initial dependent variables with validated measures (Diener et al., 2010; Fredrickson et al., 2003), altering our analytic plan to control for baseline well-being scores (e.g., Aknin et al., 2020), the addition of an active control group (Bullock & Green, 2021) and a smaller desired sample. Thus, Study 1 may be considered non-preregistered. All studies were

preapproved by the University of Toronto Review Ethics Board (Protocol #39641) and conducted adhering to established ethical guidelines for human research.

Participants

Participants were recruited from student participant pools (Studies 1, 3, 4) or from Prolific (Study 2) to an online study. All student participants had an active Instagram account which they used at least 1-2 times per week. Underscoring the popularity of social media, only 7% of our participant population did not have an Instagram account and 75% used Instagram at least 1-2 times a day.

In Study 1 we recruited 397 Instagram users, excluded participants who failed an initial attention check (n = 76) or self-reported not complying with instructions (n = 23), leaving us with a final sample of N = 298 (M_{age} = 19.01, SD = 2.03, 208 females, 84 males, 6 non-binary). Post-hoc sensitivity analysis shows we had power (80%) to detect effects of condition in our ANCOVA of f = .18 or greater.

In Study 2 we preregistered a sample size of N = 300 based on a power analysis showing this provided 80% power for our planned analysis (ANCOVA) to detect an effect size of Cohen's f = .18 or greater. We recruited 323 participants from the online survey platform Prolific Academic. We excluded participants who failed an initial attention check (n = 11), were not assigned to condition properly (n = 2) or reported not complying with instructions (n = 9). Our final sample was N = 302 (M_{age} = 25.34, SD = 7.67, 154 males, 139 females, 8 non-binary). Relative to the student sample in Study 1, our sample was slightly older and more gender-balanced. Using Prolific's pre-screening questions, we included only participants who used Instagram at least once a month. However, on a 1-7 scale ranging from About once a month (1) to Over 20 times a day (7) we found our sample was using Instagram "about 2-5 times a day" on average (M_{use} = 4.33, SD = 1.47).

In Study 3, we initially recruited 397 Instagram users from a student sample. We removed participants that did not answer an attention check correctly (n = 83), and participants that admitted not complying with study instructions (n = 28). This left us with a final sample of N = 301 (215 females, 78

males, 8 non-binary, M_{age} = 19.26, SD = 2.53), meeting our pre-registered sample size of N = 300. Participants in our sample were active users of Instagram, on average using the platform between 1-2 and 3 or more times per day (M_{use} = 4.21, SD = 1.09).

In Study 4, we aimed to recruit 400 participants or as many as possible within a specified timeframe. We initially recruited 508 active Instagram users from a student participant pool. Sixty-three were excluded at the outset for providing an incorrect response on an instructed response question, 14 were excluded for not complying with study instructions, and 5 were excluded because their condition code was missing. This left us with a final sample of N = 426 (333 females, 91 males, 2 other, M_{age} = 19.01, SD = 2.23) active Instagram users that browsed the platform between 2-5 and 6-10 times a day on average (M_{use} = 4.39, SD = 1.32). Sensitivity analysis suggests this sample had 80% power to detect an effect of condition equal to Cohen's f = .15 or larger in our ANCOVA.

Procedure and Materials

We first asked demographic questions which included sex (Male, Female, Other (please specify), age, and political orientation on a scale from extremely liberal (1) to extremely conservative (7). These variables were used for several purposes: a) assessing the robustness of our intervention, b) providing utility for exploratory analyses and future research, and c) distracting from the true purpose of the study. To encourage careful responding and provide value, participants were informed they would have the option to receive feedback about their personality based on their answers after the study.

Participants next reported their baseline subjective well-being and discrete emotions[4]. In Study 4, baseline life satisfaction was assessed using the Satisfaction with Life Scale (SWLS; Diener et al., 1985) rather than discrete emotions. To assess subjective well-being, we administered a modified Scale of Positive and Negative Experience (SPANE; Diener et al., 2010), which asked participants how much they

[4] Discrete emotions were assessed with the modified Differential Emotion Scale (Frederickson et al., 2003), with a triplet added for loneliness, before and after browsing social media in Study 1, Study 2, and Study 3. Due to space constraints, discrete emotion results are discussed in Supplementary Material.

were experiencing a list of feelings at the current moment on a scale from 1 (Not at all) to 5 (Very much). This list included 6 positive (e.g. positive, good, pleasant) and 6 negative (e.g., negative, bad, unpleasant) words which can be summed respectively to make positive and negative affect scores. We used the affective balance score (SPANE B; Diener et al., 2010), which subtracts the negative score from the positive score to create an overall measure of subjective well-being.

Next, participants were assigned to one of three conditions: positive empathy, Instagram as usual, or an active control condition. Participants read condition-specific instructions and were told to passively browse their Instagram feed for 10 minutes while following these instructions (one condition involved watching a nature video rather than browsing Instagram). Participants were told they needed to return to the survey after 10 minutes and warned that taking too long to resume the survey would result in the survey being automatically terminated. A timer counted down on the survey screen with a brief synopsis of the instructions as participants browsed Instagram.

After participants spent 10 minutes in their assigned condition, we asked them the extent to which they experienced social emotions on social media using novel items. To assess positive emotion sharing we asked: “how often did you share positive emotions (i.e., feel what others are feeling)?” while to assess appreciative joy we asked: “how often did you feel grateful, happy, or appreciative about positive emotions of others?” and to measure self-compassion we asked: “how often did you experience feelings of self-compassion or kindness towards yourself?”. Negative emotion sharing was measured by asking “how often did you share negative emotions (i.e., feel what others are feeling)?” and social comparisons were measured with the question “how often did you compare yourself to others?” Participants rated each experience on a scale ranging from very rarely or never (1) to very often or always (5). For all materials see Online SM: https://osf.io/4m65q.

We also asked participants how often they saw specific content on their feed–such as positive posts from friends, negative posts from friends, memes, posts from celebrities, etc.– from very rarely or

never (1) to very often or always (5). We asked how many accounts participants follow in different categories, such as friends, famous people, and digital Influencers, on a scale from none at all (1) to most of the accounts I follow (5). We tested for problematic relationships with social media using the Bergen Social Media Addiction Scale (Andreassen et al., 2016), and asked how often participants experienced feelings of cringe during their time on social media on a scale from very rarely or never (1) to very often or always (5). We assessed feelings of coldness/warmth towards both the Liberal and Conservative Parties of Canada on sliding scales from 0-100. We used these variables to characterize participants' social media feeds and determine whether the intervention will only work for certain types of feeds. For full discussion and analysis of these extra variables see supplementary material.

Next, in all 4 studies subjective well-being was reassessed using the Scale of Positive and Negative Experience (Diener et al., 2010). In Study 1, 2, and 3, discrete emotions were reassessed using the modified Discrete Emotion Scale (Frederickson et al., 2003). In Study 4, life satisfaction was reassessed using the Satisfaction with Life Scale (Diener et al., 1985).

Participants then completed an individual differences block which included a Big Five measure of personality (Soto & John, 2017). Participants could receive their Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism scores after the study if they wished. They also completed the Empathy subscale of the Empathy Index (Jordan et al., 2016) which measures the tendency to share emotions with items like "I sometimes find myself feeling the emotions of the people around me, even if I don't try to feel what they're feeling"; as well as the Interpersonal Reactivity Index (Davis, 1983) which measures four dimensions of empathy: Empathic Concern, Perspective Taking, Personal Distress, and Fantasy. In study 4 participants completed the Empathic Happiness subscale of the Positive Empathy Scale (Light et al., 2019) which measures the tendency to share positive emotions with items such as "It often makes me feel good to see the people around me smiling", rather than the Interpersonal Reactivity Index. In study 1 and 2, participants completed measures of self-esteem (Rosenberg, 1965)

and social desirability (Crowne & Marlowe, 1960). The order of these measures was randomized within the block, as was the order of items within measures. Individual differences were answered after the intervention to ensure participants were not fatigued for the intervention instructions. However, this could effect trait measures. For analysis of individual differences across condition see supplementary material.

Finally, participants were asked about the study itself in a funnel debriefing format. They were reassured that their answers would not affect compensation and were asked how seriously they took the study, whether they complied with instructions, and what percent of the time they focused on the media assigned to them. Participants were then presented with the option to receive their scores for each of the Big 5 dimensions along with information about how they compared to average scores from a large sample (Soto, 2019). Finally, participants were debriefed about the full purpose of the study.

Conditions

In the ***positive empathy*** intervention condition participants were told to browse their feed passively and focus on observing positive emotions of people they care about in their feed. They were told that when they saw positive emotions, they should take a moment to pause and share the positive emotion (emotion sharing), be happy that the other person is happy (appreciative joy) and celebrate this opportunity for shared happiness (see Figure 2). Participants were instructed that if they started to think "I wish I had good news like this", they should be kind to themselves (self-compassion) and remember that the post is about the other person, not the participant themselves. They were instructed to gently redirect their attention to sharing the positive emotion and being happy that the target is happy. Participants observed an example post on which they could practice this strategy. They then answered comprehension questions to ensure that they understood the instructions.

Figure 2

Sample of part of the positive empathy condition instructions

Note. Participants were questioned about the instructions and practiced the approach on an example post. For full instructions of all conditions see supplementary material. Images differ from those shown to participants as permission to publish could not be obtained.

In the ***Instagram as usual*** control condition participants were told to browse their feed passively and focus on the content being posted. They were told not to focus on other sites or apps, but to gently redirect their attention to the content on their feed if they get distracted. Matching instructions where possible, they were also told to feel free to browse a post until they wanted to move on to the next one. Participants were given the same example post as in the positive empathy intervention condition to practice browsing passively until they are ready to move to the next post. Next, participants answered comprehension questions to ensure they understood the instructions (Online SM).

Active Controls

We used a unique active control condition in each study (see Table 1).

Table 1

Overview of conditions used in each study

Study Name	Intervention	Control	Active Control
Study 1	Positive Empathy	Instagram	Watch a nature video (no Instagram)
Study 2	Positive Empathy	Instagram	Focus on positive content on Instagram (no empathy)
Study 3	Positive Empathy	Instagram	Empathy for all emotions on Instagram (no positive focus)
Study 4	Positive Empathy	Instagram	Focus on reappraising own emotions on Instagram

Note. In all conditions, participants were instructed to browse content passively for ten minutes, for example, not to like, comment, share, message, or otherwise engage with their social media. In all conditions aside from the nature video, participants browsed their own Instagram feed.

In Study 1, we used a ***nature video*** condition where participants were instructed to passively watch a video. The video they watched was a 9 minute and 47 second video streamed from YouTube (https://www.youtube.com/watch?v=iyNA62FrKCE) titled Beaver Lodge Construction Squad. It is narrated by David Attenborough and produced by BBC Earth. The video describes how beavers shape the environment, and how their actions help not only themselves but other wildlife such as muskrats. Mirroring instructions of the other conditions as much as possible, participants were instructed to watch the passively, and not to pause, rewind, or fast forward. They were also told not to focus on other sites or apps, but to gently redirect their attention to the video if they get distracted.

The active control condition in Study 2 was a ***positive focus*** condition. In this condition, participants were instructed to passively browse social media for 10 minutes and focus on positive content that they see in their feed. Participants were told that if they got distracted from their feed, they should gently redirect their attention to happy posts on their social media feed. They were told

that they should focus on positive content and happy posts for the duration of their time on social media. Participants were shown the same sample post as positive empathy participants as an example of the sort of happy posts on which they should focus until they are ready to move to the next one. The positive focus condition was therefore matched to the intervention in terms of positivity, but it lacked instructions about empathy.

The active control in Study 3 was an ***empathy for all emotions*** condition. In this condition, participants were instructed to spend 10 minutes focusing on the emotions being expressed by people they care about on their social media feed. They received instructions to the positive empathy intervention, including instructions about sharing emotions, maintaining self-compassion and using reappraisal. They also practiced on the same example post. However, participants in this condition were not instructed to focus on positive emotions specifically, and thus were expected to share both negative and positive emotions while browsing their Instagram feed. This condition was thus matched to the intervention in terms of empathy instructions, but not matched in terms of positive focus.

In Study 4, the active control was a ***reappraisal*** condition. We adapted a brief 'reconstrual' intervention (Wang et al., 2021) previously shown to be successful in helping participants deal with negative emotions related to the Covid-19 pandemic. We instructed participants to focus on the content in their feed and how they feel about it for 10 minutes. Using wording from Wang et al. (2021), participants were told that while browsing their feed they may experience different emotions,

> "which may include feelings of anxiety, anger, and sadness. Sometimes emotions like these are helpful. At other times, however, these emotions can be unhelpful to us. Researchers have found that when people think their emotions are unhelpful, they can take steps to influence their emotions. One strategy that some people find helpful for influencing their emotions is *rethinking.* This strategy involves changing one's thinking in order to change one's emotions. This strategy is based on the insight that different ways of interpreting or thinking about any

situation can lead to different emotions. This means that finding new ways of thinking about a situation can change how you feel about the situation."

Participants were then shown the same practice post used in other conditions and provided with some examples of how they might reappraise negative emotions. See online supplementary material S1-S5 for full materials related to each condition.

Hypotheses

We hypothesized that participants in the positive empathy condition would have higher subjective well-being at post-test, controlling for baseline scores, than participants in the social media or active control conditions. We expected the effect of the intervention to be mediated by increased experiences of positive empathy on Instagram.

Along with affect, one's overall satisfaction with their life, are also important to well-being (Schimmack, 2008). Given the nuanced but significant impact of social media on life satisfaction, especially for females (Orben et al., 2019) we hypothesized that participants in the positive empathy condition would have higher life satisfaction (Diener et al., 1985) than those in the Instagram as usual condition and the reappraisal condition in Study 4. Theoretically, we expected positive empathy would improve life satisfaction by increasing experiences of positive emotion sharing, appreciative joy, and especially self-compassion (Yang et al., 2016).

We also made hypotheses related to specific discrete and social emotions not discussed here. For a full accounting of all hypotheses and their outcomes across Studies 1-4, see Table S1 in the supplementary material.

Analysis

To address our primary research question of whether the positive empathy intervention improves subjective well-being we preregistered an ANCOVA approach, using baseline well-being as a covariate (e.g., Aknin et al., 2020). This design is suitable for our question and data (Bonate, 2000),

particularly due to our low missingness and use of random assignment. In such cases, ANCOVA may be a more powerful (Xi et al., 2018) and efficient (O'Connell et al., 2017) method than other acceptable alternatives such as mixed ANOVA.

We use linear models, again controlling for baseline scores, to compare specific conditions. Given our conceptually comparable studies with small, significant effects, we follow Goh et al., (2016) in performing an internal meta-analysis of the difference between positive empathy and Instagram as usual conditions in our four studies.

To test whether the condition was exerting its effects on well-being through positive empathy on Instagram, we combined data from the positive empathy and Instagram as usual conditions in all four studies, leaving the active control condition participants out of the analysis. We dummy coded the condition variable such that Instagram as usual = 0 and positive empathy = 1. We then used structural equation modeling (SEM) to examine the effect of condition on subjective well-being at post-test through positive empathy (positive emotion sharing, self-compassion, and appreciative joy), controlling for baseline scores. This SEM approach mitigates some of the issues (e.g, Bullock & Green, 2021) associated with a classic measurement of mediation approach (Baron & Kenny, 1986; Gunzler et al., 2013). Further, by controlling for baseline scores of the outcome variable, we account for a potential source of confounding on the mediator (M) and outcome (Y) variables (Rohrer et al., 2022). We used lavaan syntax to specify this model in R, using the SEM function to fit the model (Rosseel, 2012).

Results

Means and standard deviations for pre and post subjective well-being and life satisfaction across studies are shown in Table 2.

Table 2

Means and Standard Deviations for well-being before and after and social emotions during Instagram Across Studies

Measure	Condition	Study 1 Pre	Study 1 Post	Study 2 Pre	Study 2 Post	Study 3 Pre	Study 3 Post	Study 4 Pre	Study 4 Post
		M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
SPANE Balance	Positive Emp.	3.46 (0.72)	**3.76** (0.64)	3.59 (0.73)	**3.84** (0.63)	3.60 (0.61)	**3.87** (0.61)	3.63 (0.66)	**3.78** (0.68)
	Instagram	3.41 (0.71)	3.56 (0.71)	3.55 (0.72)	3.67 (0.74)	3.51 (0.73)	3.68 (0.71)	3.50 (0.65)	3.55 (0.64)
	Active Control	3.55 (0.71)	**3.80** (0.72)	3.65 (0.77)	3.75 (0.70)	3.51 (0.67)	3.75 (0.62)	3.51 (0.70)	3.60 (0.67)
Life Satisfaction	Positive Emp.							4.09 (1.24)	**4.25** (1.39)
	Instagram							4.01 (1.17)	3.96 (1.29)
	Active Control							4.08 (1.34)	4.04 (1.36)

Note. Positive Emp. = the Positive Empathy intervention condition. Instagram = the Instagram as usual control condition. Active Control conditions for each study are as follows: Study 1: Nature Video, a condition with a 10-minute video about beavers. Study 2: Positive Focus, a condition where participants browse Instagram focusing on positive posts. Study 3: Empathy for all Emotions, a condition where participants receive instructions on empathy but are not told to focus on positive emotions. Study 4: Reappraisal, a condition where participants are taught to reappraise their own emotions while browsing social media but not instructed to empathize. Bolded means differ significantly from Instagram as usual in that study.

Subjective Well-being

In Study 1, a one-way ANCOVA predicting subjective well-being (as measured by the SPANE) by condition after 10 minutes on social media, controlling for baseline well-being, revealed a significant effect of condition, $F(2, 294) = 6.63$, $p = .002$, $f = 0.22$. Linear models comparing specific conditions at post-test, controlling for baseline scores, showed subjective well-being was higher in the positive empathy, $b = 0.17$, $SE = 0.07$, $t(294) = 2.33$, $p = .020$, $d = 0.28$, and nature video, $b = 0.15$, $SE = 0.07$, $t(294) = 2.10$, $p = .037$, $d = 0.24$, conditions relative to the Instagram as usual condition. Contrary to our expectations, the nature video condition did not differ significantly from the positive empathy condition, $b = 0.01$, $SE = 0.07$, $t(294) = 0.19$, $p = .853$, $d = 0.02$.

In Study 2, an ANCOVA predicting well-being from condition at post-test controlling for baseline scores again found a significant effect of condition, $F(2, 297) = 3.47$, $p = .032$, $f = 0.31$. Well-being was higher at post-test in the positive empathy condition than both the Instagram as usual, $b = 0.14$, $SE = 0.07$, $t(297) = 2.17$, $p = .031$, $d = 0.24$, and positive focus, $b = 0.13$, $SE = 0.07$, $t(297) = 2.03$, $p = .044$, $d = 0.24$, conditions. These differences were small but significant.

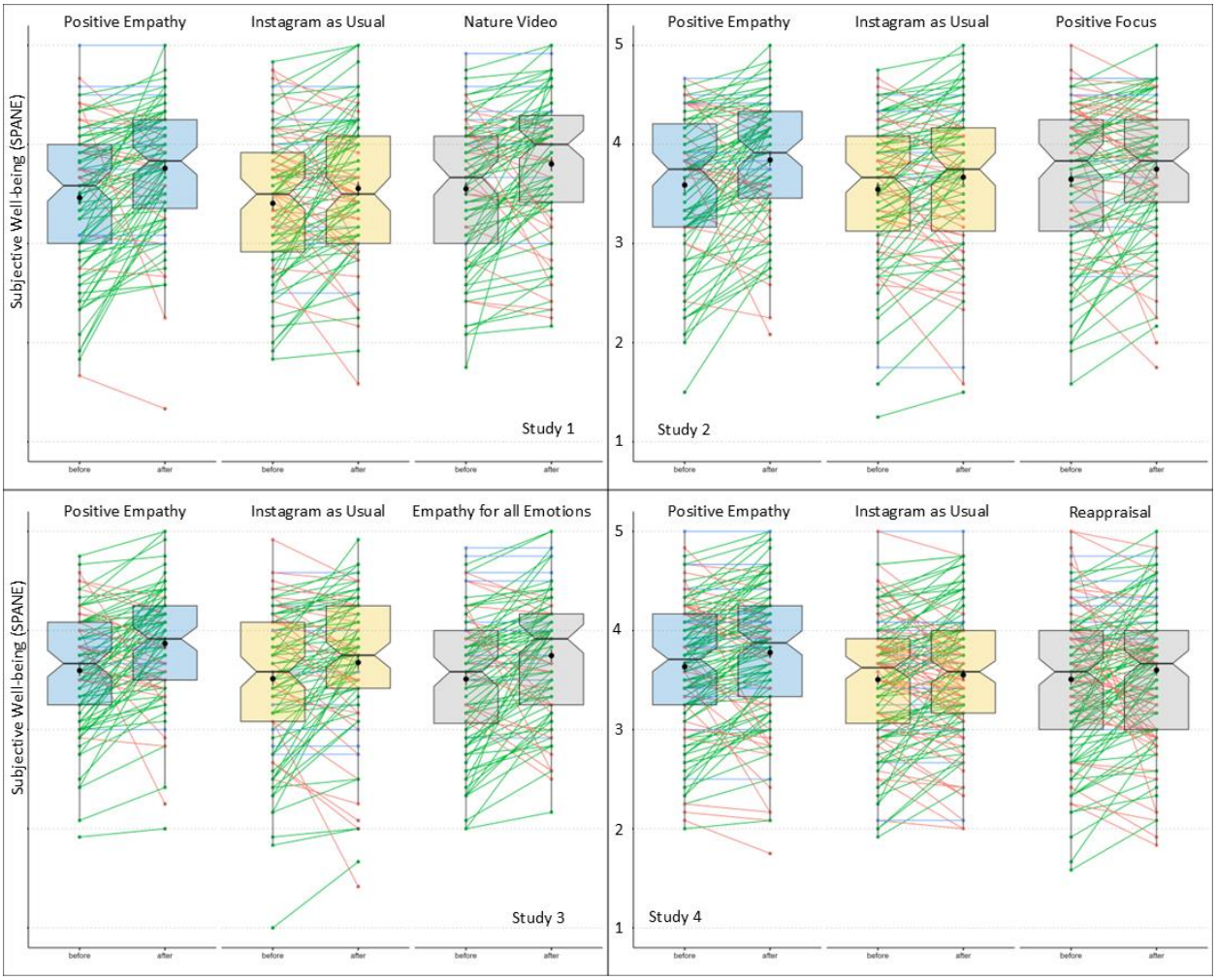
Similarly, in Study 3, we found a significant effect of condition on subjective well-being, $F(2, 296) = 4.24$, $p = .015$, $f = 0.18$, controlling for prior well-being. In particular, well-being was higher for participants in the positive empathy condition compared to those in the Instagram as usual condition, $b = 0.14$, $SE = 0.07$, $t(296) = 2.07$, $p = .039$, $d = 0.24$, replicating Study 1 and 2. This difference was small but significant. Those in the empathy for all emotions condition did not differ significantly from those in the positive empathy condition, $b = -0.07$, $SE = 0.07$, $t(296) = -.99$, $p = .325$, $d = -0.12$; nor from those in the Instagram as usual condition, $b = 0.07$, $SE = 0.07$, $t(296) = 1.09$, $p = .276$, $d = 0.12$.

Finally, in Study 4, an ANCOVA once again showed subjective well-being was significantly impacted by condition, $F(2, 405) = 10.10$, $p < .001$, $f = 0.23$. For the fourth time, we found individuals in the positive empathy condition had higher well-being at post test relative to participants in the

Instagram as usual condition, b = 0.14, SE = 0.05, t(405) = 2.54, p = .011, d = 0.24. The reappraisal condition did not significantly differ in well-being from the positive empathy, b = -0.10, SE = 0.05, t(405) = -1.75, p = .080, d = -0.18, or Instagram as usual conditions, b = 0.04, SE = 0.05, t(405) = 0.78, p = .435, d = 0.08, see Figure 3.

Figure 3

Subjective well-being before and after condition in Studies 1-4



Note. Colored dots and lines are individual participants with colors showing the change in well-being from before to after the 10-minute condition (green = increase, red = decrease, blue = no change). Black dots indicate the mean and standard error. Boxplots show where 50% of the data lies, with lines indicating the median and notches showing the 95% confidence interval. Blue boxes are the intervention (positive empathy) condition, yellow boxes are Instagram as usual, and grey boxes are active controls.

We found positive empathy also had a significant effect on life satisfaction, $F(2, 405) = 6.03$, $p = .003$, $f = 0.17$, in Study 4. Specifically, participants in the positive empathy condition reported higher

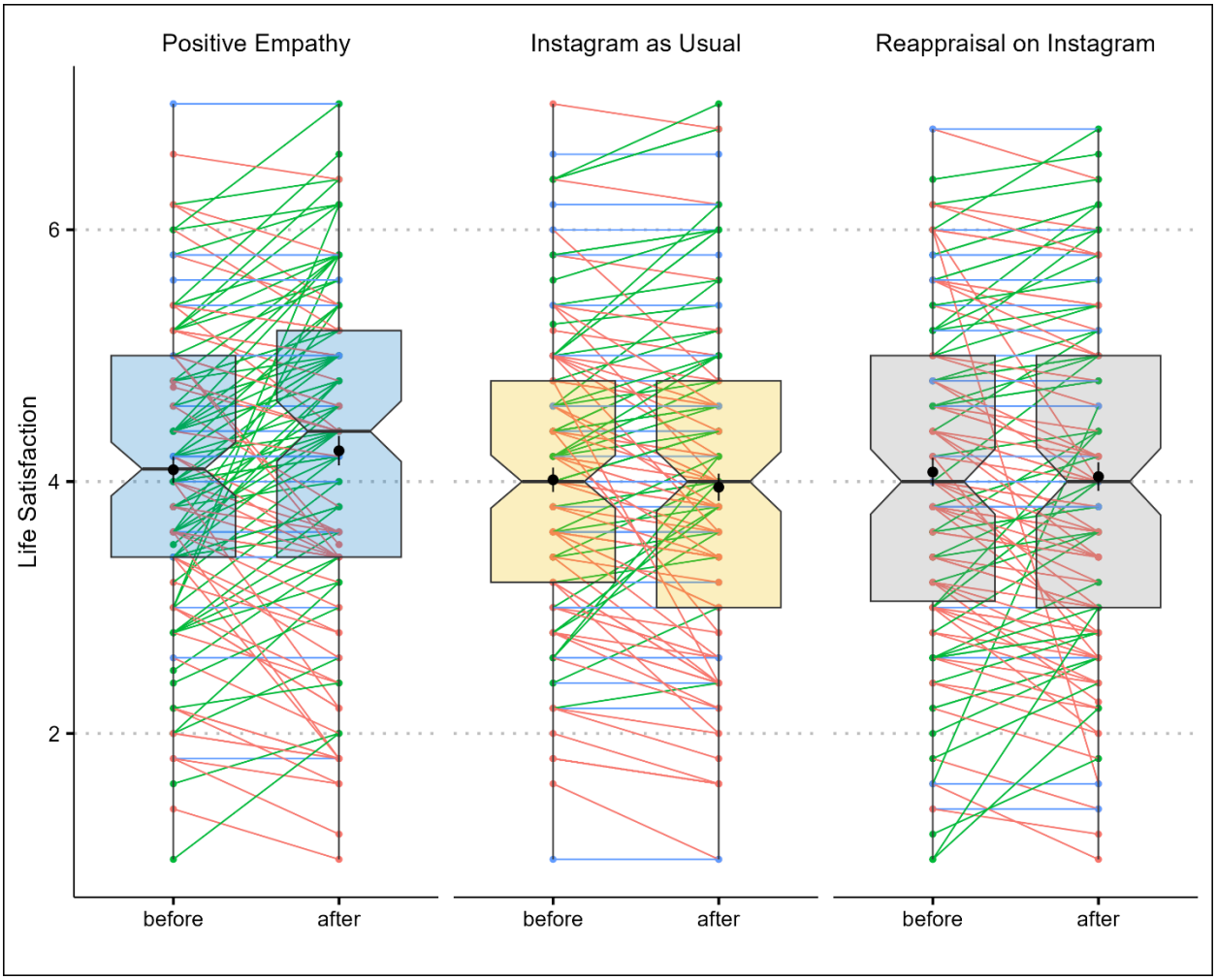
satisfaction with their own life than participants in both the Instagram as usual, $b = 0.23$, $SE = 0.08$, $t(405) = 2.80$, $p = .005$, $d = 0.28$, and reappraisal conditions, $b = 0.22$, $SE = 0.08$, $t(405) = 2.68$, $p = .008$, $d = 0.26$. These results suggest using positive empathy on social media may be beneficial for not only emotional well-being, but also for perceptions of life satisfaction (Figure 4).

In sum, participants who used positive empathy on Instagram had higher emotional well-being relative to those who used Instagram as usual, but not relative to those who reappraised their own emotions on Instagram. However, unlike positive empathy, reappraisal did not show a benefit compared to browsing Instagram as usual.

Taken together, results suggest individuals instructed to empathize with positive emotions on Instagram had higher well-being and life satisfaction than those who browsed without such instruction. They also had higher well-being than participants instructed to browse Instagram while focusing on positive content. Furthermore, participants instructed to empathize with all emotions on Instagram, and participants taught to reappraise their own emotions while browsing, did not show higher well-being compared to those who browsed Instagram as usual.

Figure 4

Life satisfaction before and after social media in each condition in Study 4



Note. Colored dots and lines show individual participant life satisfaction pre and post (green = increase, red = decrease, blue = no change). Boxplots show 50% of the data around the median, notches show 95% confidence intervals. Black dots indicate mean with standard error. Controlling for pre-scores (M_{PosEmp} = 4.09, M_{Reapp} = 4.08, M_{Insta} = 4.01), life satisfaction was higher in positive empathy condition than Instagram, and reappraisal conditions (M_{PosEmp} = 4.24, M_{Reapp} = 4.00, M_{Insta} = 3.98).

Internal Meta-analysis

We found that the positive empathy intervention was associated with a significant mean effect size of Cohen's d = 0.25, SE = 0.06, 95% CI = [0.12, 0.39], Combined Z = 3.68, p < .001. In other words, using positive empathy on Instagram for just 10 minutes instead of browsing normally was associated with an improvement in well-being equal to about a quarter of a standard deviation (Table 3). This is a small but meaningful and consistent effect.

Table 3

Effect size of positive empathy on subjective well-being across studies

Study	Comparison	t	df	p	Cohen's d
Study 1	Positive Empathy vs Instagram as Usual	2.33	199	.020	.28
Study 2	Positive Empathy vs Instagram as Usual	2.17	196	.031	.24
Study 3	Positive Empathy vs Instagram as Usual	2.07	197	.039	.24
Study 4	Positive Empathy vs Instagram as Usual	2.49	270	.013	.24
M d					.25
Combined Z					3.68***

Note. Internal meta-analysis synthesizing all comparisons between Instagram as usual and positive empathy conditions. The dependent variable is the Scale of Positive and Negative Experience at post-test. Effect sizes control for baseline well-being. Across studies, positive empathy was associated with about a quarter of a standard deviation increase in subjective well-being.

While the positive empathy instructions consistently improved subjective well-being, we still wish to understand why this is the case. To do so, we must ask whether participants empathized differently with emotional content on Instagram by probing experiences of social emotions online.

Social Emotions

Means and standard deviations for all social emotions experienced while browsing Instagram across studies are listed in Table 4.

Table 4

Means and Standard Deviations for Social Emotions while browsing Instagram

Measure	Condition	Study 1 M (SD)	Study 2 M (SD)	Study 3 M (SD)	Study 4 M (SD)
Positive Emotion Sharing	Positive Emp.	**3.62** (0.89)	3.51 (0.85)	**3.68** (0.81)	**3.70** (0.84)
	Instagram	3.23 (0.94)	3.27 (0.99)	3.31 (0.96)	3.35 (0.97)
	Active Control	3.36 (1.13)	3.23 (1.08)	**3.71** (0.84)	3.42 (1.00)
Appreciative Joy	Positive Emp.	**3.75** (0.94)	**3.64** (0.91)	**3.69** (0.87)	**3.76** (0.86)
	Instagram	3.17 (0.99)	3.10 (1.11)	3.30 (0.91)	3.24 (1.02)
	Active Control	3.20 (1.23)	3.30 (0.96)	**3.58** (0.90)	3.39 (0.97)
Self-Compassion	Positive Emp.	**3.11** (1.11)	**2.99** (1.05)	**3.11** (1.01)	**3.06** (1.07)
	Instagram	2.72 (1.06)	2.66 (1.02)	2.62 (0.99)	2.72 (1.08)
	Active Control	2.80 (1.26)	2.88 (1.12)	**3.11** (1.03)	2.68 (1.06)
Negative Emotion Sharing	Positive Emp.	1.99 (0.90)	1.77 (0.86)	**1.75** (0.88)	**1.91** (0.95)
	Instagram	1.99 (0.93)	1.92 (0.91)	2.14 (0.97)	2.16 (1.04)
	Active Control	**1.63** (0.86)	1.80 (0.90)	2.13 (0.95)	2.13 (1.00)
Social Comparison	Positive Emp.	2.54 (1.17)	2.42 (1.13)	2.46 (1.18)	2.65 (1.18)
	Instagram	2.75 (1.26)	2.78 (1.21)	2.79 (1.27)	2.70 (1.23)
	Active Control	**1.66** (0.91)	2.68 (1.20)	2.65 (1.15)	2.80 (1.22)

Note. Bolded means differ significantly from the Instagram as usual condition in that study (adjusted $p < .05$). Active controls are as follows: Study 1 – nature video, Study 2 – positive focus, Study 3 – empathy for all emotions, Study 4 – reappraisal of own emotions.

To determine whether the intervention altered aspects of empathy and other social emotions while browsing Instagram, we used linear models to compare positive empathy and Instagram as usual conditions on each variable, correcting p-values together to control the false discovery rate (Benjamini &

Hochberg, 2007). Note that we did not run an initial ANOVA for this analysis as we are interested in specific differences between 2 conditions in particular and we do not expect all social emotions to differ between positive empathy and all active controls.

Comparing positive empathy to social media, we consistently see higher appreciative joy across Study 1, b = 0.58, SE = 0.15, t(295) = 3.88, adj. p < .001, d = 0.45, Study 2, b = 0.55, SE = 0.14, t(298) = 3.86, p < .001, d = 0.45, Study 3, b = 0.39, SE = 0.13, t(298) = 3.11, adj. p = .005, d = 0.37, and Study 4, b = 0.51, SE = 0.11, t(423) = 4.52, adj. p < .001, d = 0.45. Similarly, self-compassion was higher for positive empathy participants in Study 1, b = 0.39, SE = 0.16, t(295) = 2.40, adj. p = .028, d = 0.28, Study 2, b = 0.38, SE = 0.15, t(298) = 2.53, adj. p = .030, d = 0.28, Study 3, b = 0.49, SE = 0.14, t(296) = 3.43, adj. p = .003, d = 0.41, and Study 4, b = 0.33, SE = 0.13, t(423) = 2.63, adj. p = .015, d = 0.26. Positive emotion sharing was higher in the positive empathy condition in Study 1, b = 0.39, SE = 0.14, t(295) = 2.81, adj. p = .013, d = 0.32, Study 3, b = 0.37, SE = 0.12, t(298) = 3.02, adj. p = .005, d = 0.35, and Study 4, b = 0.35, SE = 0.11, t(423) = 3.10, adj. p = .005, d= 0.30, but not Study 2, b = 0.23, SE = 0.14, t(298) = 1.67, adj. p = .120, d = 0.20. Overall, positive empathy participants had higher self-compassion and appreciative joy in all 4 studies, and higher positive emotion sharing in 3 out of 4 studies, than Instagram as usual.

We suggest that negative emotion sharing, and upward social comparisons are often unwise responses to the emotions of others. These variables were less consistently manipulated. Negative emotion sharing was significantly lower for positive empathy participants in Study 3, b = -0.39, SE = 0.13, t(298) = -2.97, adj. p = .006, d = 0.35, and Study 4, b = -0.25, SE = 0.12, t(423) = -2.07, adj. p = .049, d = -0.20, but not Study 1, b = -2e-04, SE = 0.13, t(294) = -0.002, adj. p = .999, or Study 2, b = -0.14, SE = 0.13, t(298) = -1.12, adj. p = .266, d = -0.12. Social comparisons were not significantly less common for positive empathy participants in any of the studies (all adjusted p's > .05).

Examining social emotions during Instagram-based active control conditions can help us assess whether they manipulated intended mediators. We found positive focus (Study 2) participants did not

differ in social emotions from positive empathy participants after adjusting p-values (all adjusted p' > .05). However, they also did not differ from Instagram as usual participants, even prior to adjustment (all p's > .05). Empathy for all emotions (Study 3) participants felt similar self-compassion, appreciative joy, and positive emotion sharing as positive empathy participants (all adjusted p's > .05); but significantly greater negative emotion sharing, b = 0.38, SE = 0.13, t(298) = 2.83, p = .005, r = 0.16. Reappraisal (Study 4) participants indeed used reappraisal more than Instagram as usual participants, b = 0.40, SE = 0.12, t(422) = 3.27, p = .001, r = 0.16, but not positive empathy participants (adjusted p > .05). However, reappraisal participants reported less appreciative joy, b = -0.37, SE = 0.11, t(423) = -3.24, p = .001, r = -0.16, self-compassion, b = -0.37, SE = 0.13, t(423) = -2.93, p = .004, r = -0.14, and positive emotion sharing, b = -0.28, SE = 0.11, t(423) = -2.48, p = .013, r = -0.12, than positive empathy participants, and did not differ from Instagram as usual participants on these variables (all adjusted p's > .05). Overall, aside from Study 2 our active control conditions manipulated mediators largely as expected.

In sum, while participants in the positive empathy condition continued to share negative emotions and compare themselves to others, they engaged more wisely with positive emotions. As intended, active control conditions successfully manipulated some social emotions, but not others, and failed to yield benefits to well-being—underscoring our argument that positive empathy in particular is responsible for improvements to well-being. To test this formally, we examined whether changes in social emotions mediated the effect of the positive empathy intervention on subjective well-being.

Positive Empathy as a Mediator

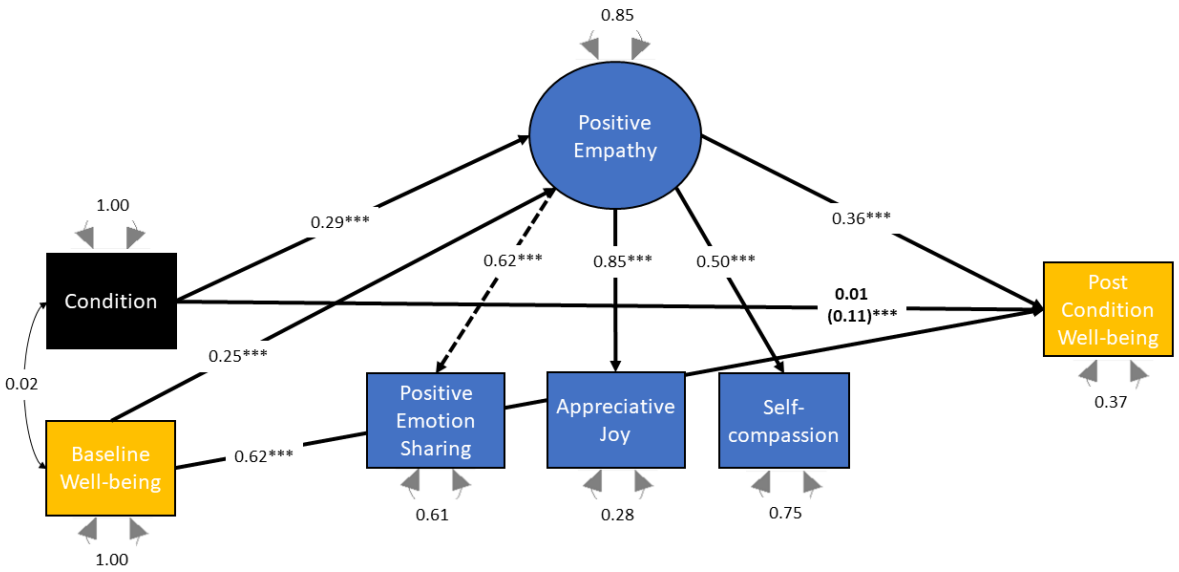
In our mediation Structural Equation Model, assignment to the positive empathy condition impacts subjective well-being through a latent factor called positive empathy, comprised of positive emotion sharing, b = 0.62 (set to 1.0), appreciative joy, b = 0.85, SE = 0.10, z = 14.97, p < .001, and self-compassion, b = 0.50, SE = 0.07, z = 12.18, p < .001. The model controlled for residual covariance between condition and baseline well-being. The model also controlled for the effect of baseline well-

being on well-being at post-test, b = 0.62, SE = 0.02, z = 27.31, p < .001; and on experiences of positive empathy on social media, b = 0.25, SE = 0.03, z = 6.59, p < .001.

We found our model fit the combined data very well, $\chi^2(6) = 5.06$, p = .536, CFI = 1.00, RMSEA = 0.00, 95% CI [0.00, 0.040]. Assignment to the positive empathy condition rather than Instagram as usual condition increased positive empathy, b = 0.29, SE = 0.05, z = 7.44, p < .001, which in turn had a significant effect on subjective well-being b = 0.36, SE = 0.04, z = 11.51, p < .001. The indirect effect of condition through positive empathy was significant, b = 0.11, SE = 0.02, z = 6.75, p < .001, but the effect of condition on well-being after accounting for positive empathy was not, b = 0.01, SE = 0.03, z = 0.12, p = .902, suggesting the effect was fully mediated by positive empathy on Instagram (Figure 5). Removing the direct path from condition to well-being resulted in nearly identical model fit, $\chi2(7) = 5.08$, p = .651, CFI = 1.00, RMSEA = 0.00, 95% CI [0.00, 0.034], indicating the direct path is superfluous.

Figure 5

Mediation SEM showing the effect of condition on well-being through positive empathy



Note. Positive empathy (positive emotion sharing, self-compassion, and appreciative joy) significantly predicted well-being at post-test, controlling for baseline scores. The Indirect path through positive empathy to post well-being was significant, but the remaining effect of condition after accounting for positive empathy was not, suggesting the effect was fully mediated by positive empathy on Instagram. Positive empathy (M) was at an intervening time-point relative to condition (X) and post well-being (Y).

Exploratory Moderator Analysis

We observed significant causal heterogeneity in our intervention (Bolger et al., 2019), with many experiencing an increase in well-being, but others showing no change or even a decrease. We combined data from the positive empathy and Instagram as usual conditions from all four studies and tested for interactions between condition and individual difference variables to probe for moderators.

Demographic variables like gender, b = -1e-04, SE = 0.06, t(880) = -0.002, p = .998, r = 0, age, b = -0.004, SE = 0.007, t(879) = -0.65, p = .514, r = -0.02, and relationship with social media, b = -0.007, SE = 0.03, t(878) = -0.20, p = .845, r = -0.01, did not moderate the effect, nor did baseline well-being, b = 0.09,

SE = 0.05, t(881) = 1.93, p = .054, r = 0.06. Four of our Big 5 dimensions: openness, b = -0.003, SE = 0.004, t(880) = -0.80, p = .426, r = -0.03, conscientiousness, b = 0.002, SE = 0.004, t(880) = 0.45, p = .651, r = 0.01, extraversion, b = 0.002, SE = 0.004, t(880) = 0.63, p = .529, r = 0.02, and agreeableness, b = 0.003, SE = 0.004, t(880) = 0.71, p = .477, r = 0.02, did not moderate the effect. Similarly, trait empathy variables such as empathy (EI), b = 0.003, SE = 0.004, t(880) = 0.71, p = .477, r = 0.02, empathic concern (IRI), b = 0.04, SE = 0.08, t(598) = 0.56, p = .577, r = 0.02, personal distress (IRI), b = 0.09, SE = 0.08, t(598) = 1.17, p = .242, r = 0.05, and perspective taking (IRI), b = 0.02, SE = 0.08, t(598) = 0.29, p = .771, r = 0.01, were not moderators. Finally, features of participant feeds such as valence, b = -0.03, SE = 0.02, t(871) = -1.20, p = .230, r = -0.04, or the number of friend, b = 0.06, SE = 0.06, t(877) = 0.91, p = .361, r = 0.03, or family, b = 0.03, SE = 0.05, t(878) = 0.54, p = .587, r = 0.02, accounts they follow were not significant moderators.

However, we did find condition interacted with one Big-5 dimension: neuroticism. The intervention had a significant effect for individuals high (+1 SD), b = 0.21, SE = 0.04, t = 4.74, p < .001, and average, b = 0.14, SE = 0.03, t = 4.41, p < .001, but not for individuals low (-1 SD) in neuroticism, b = 0.07, SE = 0.04, t = 1.49, p = .140. This finding, and the null findings discussed above, require replication in future studies. Further, these results do not explain why the intervention was unhelpful in so many cases, implying the existence of additional hidden moderators.

Empathy for Negative Emotions

While positive posts are more common on Instagram, negative emotions do come up. Furthermore, negative emotions can be contagious in social networks (Marx et al., 2024). Thus, we also examine empathy for negative emotions in the current work. In Study 3, participants in the empathy for all emotions active control condition were instructed to share and care about the emotions of people they care about on Instagram, regardless of emotional valence. These participants did not differ from positive empathy (or Instagram as usual) participants in terms of subjective well-being. The lack of

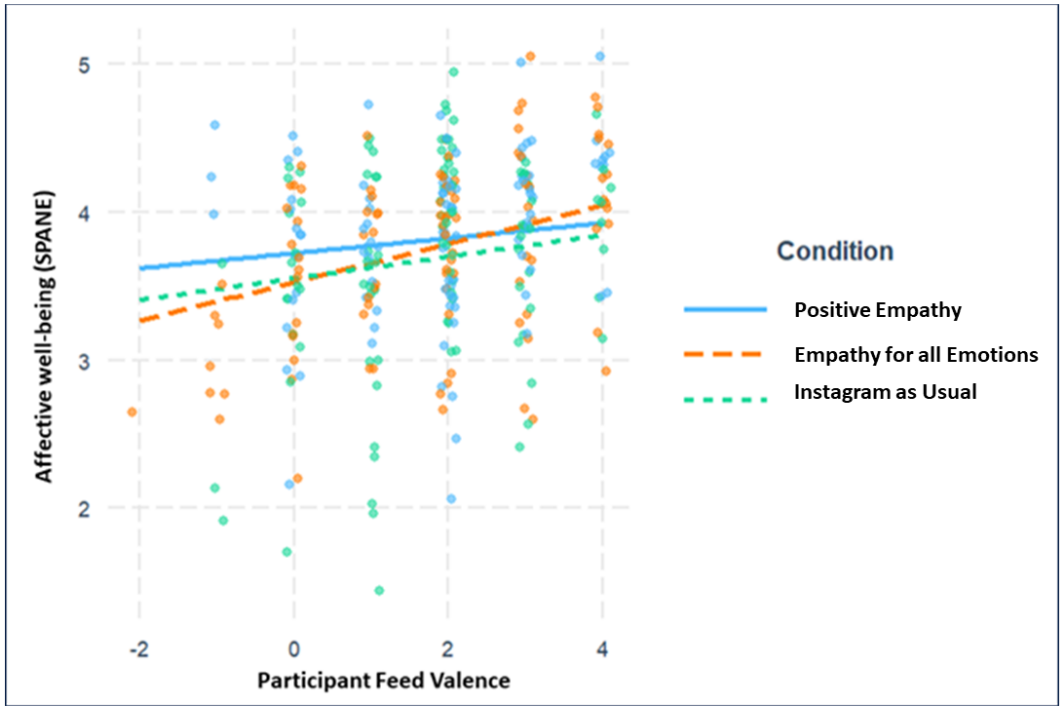
difference between positive empathy and empathy for all emotions is not overly surprising given that social media feeds are often dominated by positive content (Baylis et al., 2018; Dodds et al., 2015; Ferrara & Yang, 2015; Vermeulen et al., 2018), and the feeds of our current participants were no exception, with participants reporting positive posts were more frequent than negative posts.

However, the emotional valence of posts on participants feed should have a stronger effect on well-being in the empathy for all emotions condition as participants should be more likely to share negative emotions that appear on their feed. We ran a preregistered model that tested for an interaction between condition and emotional valence, and found the interaction was not statistically significant, $F(2, 288) = 1.61$, $p = .202$, $f = 0.11$.

Given our pre-existing hypothesis, we nonetheless examined the simple effect of valence at each condition and found it had a significant effect for participants in the empathy for all condition, $b = 0.13$, $SE = 0.03$, $t(288) = 4.33$, $p < .001$, $r = 0.25$, and a smaller effect in the Instagram condition, $b = 0.07$, $SE = 0.04$, $t(288) = 2.04$, $p = .043$, $r = 0.13$. However, it did not have a significant effect in the positive empathy condition, $b = 0.05$, $SE = 0.04$, $t(288) = 1.44$, $p = .150$, $r = 0.09$, (see Figure 6). This suggests that the well-being of individuals in the positive empathy condition were not impacted by the valence of the posts they observed on social media, while individuals instructed to share all emotions they observe were impacted by the valence of their feed as a medium effect.

Figure 6

The slope of feed valence predicting subjective well-being in each condition in Study 3



Note. Shows the effect of valence was strongest when participants were instructed to empathize with all emotions observed in their feed (r = .25, p < .001), smaller and just significant in the Instagram as usual condition (r = .13, p = .043) and was not significant in the positive empathy condition (r = .09, p = .150). This suggests that while empathy for all emotion participants had similar well-being to their positive empathy peers, they were more vulnerable to the affective valence of their feed.

We suspect valence had such an effect because participants in the empathy for all emotions condition were negatively impacted by negative emotion sharing. To test this, we examined the effects of positive and negative emotion sharing, respectively, on subjective well-being in all four studies.

Consistent with our theoretical perspective, positive emotion sharing showed a significant positive effect on subjective well-being in Study 1, b = 0.21, SE = 0.03, t(293) = 7.63, p < .001, r = 0.41, Study 2, b = 0.17, SE = 0.02, t(297) = 7.06, p < .001, r = 0.38, Study 3, b = 0.20, SE = 0.03, t(296) = 7.09, p

< .001, r = 0.38, and Study 4, b = 0.13, SE = 0.02, t(422) = 6.06, p < .001, r = 0.28, controlling for negative emotion sharing and baseline well-being. However, negative emotion sharing showed opposite effects, exhibiting a significant negative effect in Study 1, b = -0.12, SE = 0.03, t(293) = -3.79, p < .001, r = -0.22, Study 2, b = -0.20, SE = 0.03, t(297) = -7.55, p < .001, r = -0.40, Study 3, b = -0.10, SE = 0.03, t(296) = -3.69, p < .001, r = -0.21, and Study 4, b = -0.13, SE = 0.02, t(422) = -6.15, p < .001, r = -0.29. These results strengthen our argument that while negative emotion sharing is often detrimental to well-being, positive emotion sharing is often beneficial. Thus, strategic regulation of empathy looks different for positive and negative emotions, especially with regard to the emotion sharing component.

General Discussion

The impact of social media on subjective well-being is nuanced and depends in part on how social media is used (Kross et al., 2021, Scarpulla et al., 2023). Here, we find a brief intervention to encourage positive empathy on Instagram improves well-being relative to typical use.

Individuals who used positive empathy on Instagram reliably showed higher well-being after 10 minutes than those who browsed without positive empathy (Studies 1-4). This effect was consistently mediated by experiences of positive empathy on Instagram, i.e., how often people experienced self-compassion, positive emotion sharing, and appreciative joy for others' positive emotions on Instagram.

Our SEM approach to demonstrating mediation eliminates some concerns (e.g, Bullock et al., 2010; Bullock & Green, 2021) associated with a classic measurement of mediation approach (see Baron & Kenny, 1986) to establishing causality (Gunzler et al., 2013). However, it still relies on dubious assumptions which must be addressed with design (Rohrer et al., 2022).

To this end, in our design, we randomly assign individuals to condition, manipulate and measure mediating variables (positive emotion sharing, appreciative joy, self-compassion), and use a time-ordered relationship between our variables appropriate to mediation analysis (Tate, 2015). These steps mitigate concerns associated with temporal order and reverse-causality assumptions. We also control

for baseline scores of the outcome variable, accounting for a major potential source of confounding on the mediator (M) and outcome (Y) variables (Rohrer et al., 2022). While statistical mediation is not sufficient to prove causality, for which a case must be gradually built over a body of studies (Rohrer et al., 2022, Bullock & Green, 2021), our mediation approach allows us to better understand the potential mechanism whereby our intervention improves subjective well-being.

Moving beyond approaches which seek to establish causation purely by demonstrating statistical mediation and are reliant on a series of assumptions (e.g., no confounding variables in the causal chain), which are often untenable (Rohrer et al., 2022)–the use of active control groups is important to building a case for a causal relationship (Bullock & Green, 2021). With our use of active control groups, we implicate some mediators but not others, in order to build our argument that positive empathy in particular (as opposed to variables like demand, overall positivity, empathy in general, or self-focused reappraisal) has a causal effect on subjective well-being.

In Study 1 individuals watched a nature video as an active control group. However, the video significantly increased subjective well-being. In hindsight, this should have been expected. Exposure to nature can induce feelings of awe (Shiota et al., 2007) which enhances subjective well-being (Rudd et al., 2012). Thus, rather than serving as a neutral control, the video acted more as an awe-induction, improving participant well-being, and necessitating additional studies with different active control groups. Nonetheless, positive empathy on Instagram appeared to have a similar positive impact on well-being as watching an awe-inspiring nature video.

In Study 2 our active control condition manipulates the focus on happy posts, but not the empathy component of the intervention. Therefore, we show increases in well-being are not caused purely by positivity or demand. However, it is still unclear whether what we are seeing is simply a general empathy effect. We show this is not the case in Study 3 with an empathy for all emotions condition, which manipulates empathy, but not positive focus.

Participants in the empathy for all emotions fell between positive empathy and Instagram as usual participants in terms of well-being but did not differ significantly from either. This is likely because, while they exhibited greater positive empathy than those browsing Instagram, they also shared negative emotions to a greater extent, rendering their mood more susceptible to shifting with the valence of their feed. These results suggested the intervention effect is not due to empathy in general.

However, the positive empathy instructions also contain instructions about reappraising negative emotions (i.e., gently redirecting from jealousy/envy). Even brief reappraisal instructions have been shown to increase positive and decrease negative emotions (Wang et al., 2021). In Study 4 we showed the benefits observed from the intervention were not due to reappraisal.

This work advances theoretical understanding of strategic regulation of empathy (Weisz & Cikara, 2021) by demonstrating how it may be enacted in an understudied yet pressing problem, contending with a deluge of positive emotional content on social media platforms such as Instagram.

Instagram Use

Social media has often been used in the literature to refer to a broad range of activities across different platforms (Kross et al., 2021), obscuring a potential source of heterogeneity. In the current study, we tested our intervention on Instagram. While the most popular platform of study for researchers has traditionally been Facebook (Kross et al., 2021), Instagram is a more common platform for young adults and adolescents who are most at-risk for potential negative effects of social media (Orben et al., 2022).

As such, features of Instagram may influence our results, meaning our findings may not generalize to other social media platforms. However, the effect of positive empathy was robust to many different features of social media, such as which type of accounts participants follow, and what types of posts they saw while browsing (see Online SM). Positive content tends to outnumber negative, not only on Instagram (Vermeulen et al., 2018), but on Twitter (Dodds et al., 2015) and Facebook (Baylis et al.,

2018; Ferrara & Yang, 2015) as well. It is therefore plausible that a positive empathy intervention tailored for these platforms would be effective, though it remains to be empirically demonstrated.

Studying the effects of passive Instagram use with different mindsets theoretically allows us to isolate the effects of internal psychological experiences while on social media from the effects of other factors such as active behaviours (e.g., liking, commenting, chatting) and social feedback (e.g., receiving likes and replies) on the platform. Further, by examining specific psychological experiences people have while on a particular platform—such as positive and negative emotion sharing, self-compassion, social comparisons, and appreciative joy—we can begin to understand what underlying factors might drive effects across platforms; and use this knowledge to facilitate healthier patterns of use. For example, platforms which are able to facilitate positive emotion sharing, self-compassion, and appreciative joy are likely to be associated with better user well-being.

Strategic Empathy for Positive Emotions

Our results support the idea that empathy is trainable (Schumann et al., 2014), multidimensional (Murphy et al., 2022), and can be regulated strategically by focusing on specific dimensions depending on the context (Weisz & Cikara, 2021). Given that empathy can have a negative impact on the empathizer (Klimecki & Singer, 2011; Konrath & Grynberg, 2016), it is important to help train individuals to empathize not only more often (e.g., Weisz & Zaki, 2017), and more widely (Okonofua et al., 2016, 2021), but also more strategically (Weisz & Cikara, 2021). For example, while focusing on compassion for negative emotions is protective (Klimecki & Singer, 2011; Depow et al., 2023), this strategy is less suited to positive emotions. On social media, where emotions are often positive (Baylis et al., 2018, Dodds et al., 2015, Ferrera & Yang, 2015, Vermeulen et al., 2018), focusing on sharing emotions can be beneficial.

Important work has been done understanding how to engage strategically with the negative emotions of others, such as through compassion training (e.g., Jazaieri et al., 2014; Weng et al., 2013)—

but comparably less attention has been paid on how to engage strategically with other's positive emotions. Here, we suggest that strategic empathy for positive emotions, unlike negative emotions, often includes feeling what the target feels.

Empathy may require regulating one's own emotional responses (Lockwood et al., 2014). Indeed, adaptive emotion regulation is positively correlated with perspective taking, emotion sharing, and compassion, but negatively correlated with personal distress (Kämpf et al., 2023). Reappraisal is often a useful regulation strategy (McRae, 2016), but there are boundary cases where another strategy may be more adaptive (Ford & Troy, 2019; McRae, 2016). Thus, flexibility in adapting regulation strategies to the demands of the context is also important (Kobylińska & Kusev, 2019). Our positive empathy intervention uses not only reappraisal (McRae, 2016), but also self-compassion (Neff, 2003), and savouring (Smith & Bryant, 2016) strategies to improve the well-being of Instagram users.

Instagram and Subjective Well-being

Social media has been associated with small but significant decreases in well-being at the between-subject (Twenge et al., 2022) and within-subject (Oldemburgo de Mello et al., 2024) level. However, the effects of social media are complex and may depend on the person using social media as well as on how and why they use (Kross et al., 2021). Whereas passive social media use has been associated with reduced well-being (e.g., Escobar-Viera et al., 2018; but see Valkenburg et al., 2022), we observed increases in well-being following Instagram use in three studies, and no significant effect in another. These results suggest the effects of short bouts of Instagram use—even passive use among a predominantly young female sample—are not always negative. It may be that browsing Instagram was beneficial here because participants did so mindfully (Killingsworth & Gilbert, 2010), they were rewarded for browsing, or for some other reason. While intriguing, interpreting these within-condition results is problematic due to the potential influence of demand effects.

Limitations and Directions for Future Research

Demand is an issue of the current work more generally. This concern is assuaged by the active control groups, as we would expect demand to also be present in the positive focus, empathy for all emotions, and reappraisal conditions, but they did not produce significant benefits like the positive empathy condition. These active controls implicate some mediators, but not others, strengthening the argument that positive empathy plays a causal role in the intervention effect. This argument is further strengthened by our mediation model, which show that the increase in well-being associated with the positive empathy condition is mediated by experiences of positive empathy while browsing Instagram. In future work, alternative methods to assess mediation, such as with an experimental-causal-chain approach, may help to elucidate the process (Spencer et al., 2005; Todd & Burgmer, 2013).

Another limitation of the current work is a lack of control over the Instagram feeds. Participants browsed their own Instagram feed outside the context of the survey. This was a trade-off of control to gain ecological validity in our stimuli and ensure our intervention would generalize to the context in which it would be applied. We mitigated this limitation by asking data quality questions that did not impact compensation (e.g., How seriously did you take the study? What percent of the time did you spend browsing social media?) in a funnel debriefing and by choosing an activity which our sample voluntarily engages in multiple times a day (i.e., browsing their Instagram feed).

In the current set of studies, our intervention is focused on positive emotions. This was a conscious choice to illustrate the potential of empathy, and emotion sharing in particular, in the context of positive emotions. However, participants were told to ‘focus on positive content’ and were not instructed on how to empathize strategically with negative emotions. The failure of the empathy for all emotions condition to improve well-being in Study 3 shows our instructions are tailored for positive emotions. A full empathy intervention would involve the same approach to positive emotions, but also instructions about engaging with negative emotions strategically, which would mean limiting emotion sharing and focusing on compassion. Individuals would be instructed to flexibly switch between these

strategies depending on the valence of the posts observed. Whether such an intervention would further improve well-being is an important direction for future research.

A final limitation worth noting relates to the timeframe of the intervention and dependent variable. While the short-term results observed here are promising, more work needs to be done assessing how long these results hold for, if they hold with shorter or longer browsing sessions, and if people habituate when engaging in the intervention repeatedly or if they continue to see benefits with repeated use. Future work could address this limitation using a longitudinal or ecological momentary intervention approach.

Conclusion

Social media has drifted from its goal of allowing individuals to connect with others and enjoy their experience online. Instead, many leave social media feeling worse than before. On the other hand, social media can provide access to key sources of social capital (Liu et al., 2016), and many are simply unwilling to leave. Understanding how to improve the effects of social media use is therefore an important problem. Here we suggest that positive empathy—an aspect of empathy that is under-represented in research (Morelli et al., 2015), but over-represented in everyday empathy experiences (Depow et al., 2021)—is a promising tool for improving the well-being of social media users. When individuals focus on noticing, sharing, and caring for the positive emotions of people they care about on Instagram, they have greater emotional well-being and life satisfaction themselves.

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