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# Is Societal Progress Muting the Expressivity of Negative Emotions? Evidence from Two Cross-national Studies

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**Abstract**

Contemporary theories of emotion emphasize the dual role of emotions as both personal experiences and communicative signals during social interactions. However, the impact of macro-level societal structures on emotional expression remains underexplored. This study investigates the expression-experience discrepancy for self-reported emotions across nations, focusing on how societal development relates to this discrepancy, which captures expressivity. Using meta-analysis and multilevel modeling with a multinational sample ($N_{sample}$ = 12,549, $k_{nation}$ = 48; Study 1), we assessed the directions and variabilities in the frequency of expression of both positive and negative emotions, relative to the frequency of experiencing them. Negative emotions were more likely to be under-expressed. Further analyses revealed that societal trust, system quality and fairness, and the human development index significantly predicted the size of these discrepancies. Surprisingly, these effects were not associated with traditional cultural dimensions such as individualism versus collectivism, providing new insights into the social functionality of emotions from a macro perspective. These findings were replicated in an extended multinational sample ($N_{sample}$ = 19,690, $k_{nation}$ = 65; Study 2). Our findings highlight the importance of considering structural and societal factors in emotion research and provide a foundation for future explorations into the relations between cultural contexts and the expression of emotions.

**Keywords**

emotional expression, emotional experience, social norms, societal development, culture

## Introduction

The social-functional approach to emotions considers that the social context guides people to the affective reactions needed to function in their world (Haidt & Keltner, 1999). Emotional expression is integral to human interaction, functioning as a communicative system that conveys information beyond the capacity of words. The emotions-as-social-information model posits that observers can infer the expresser's intentions from the emotions expressed, and subsequently use this information to guide their own behavior in response (Van Kleef, 2010). Emotions, therefore, serve a dual role: they are both experienced by individuals and perceived by others, acting as a social signal that can influence interpersonal interactions and group processes (Haidt & Keltner, 1999; Van Kleef, 2017).

The expression of emotions is often seen as an essential element of communication to facilitate attaining one's social needs (Keltner & Kring, 1998). Specifically, emotional expressions evoke complementary responses, including the observers' feelings and actions (Keltner et al., 2022). For instance, positive emotions such as happiness and gratitude are often used to build and maintain interpersonal relationships, fostering cooperation and a sense of trust (Fredrickson, 2001; Sauter, 2017). Conversely, negative emotions such as anger and sadness can serve to express dissatisfaction or alert others to potential social issues of concern, thereby prompting collective action or eliciting support from others (Tiedens, 2001; Van Kleef & Côté, 2022).

Cultural background significantly influences the social function of emotional expression. Different cultural logics guide varying interpretations, modes of expression, and evaluations of emotions, thereby affecting their role in social interactions (Matsumoto, Yoo & Fontaine, 2008; Mesquita & Frijda, 1992). For example, a smile symbolizes competence in some countries while being perceived as a signal of lower intelligence in others (Krys et al., 2016); expressing negative emotions might be seen as a sign of weakness in some countries (Gross et al., 2006), whereas doing so may be viewed as an expression of sympathy in others (Koopmann-Holm & Tsai, 2014).

Researchers in emotion and cultural psychology are aware that emotional expressions carry distinct social functions across cultural contexts (Greenaway et al., 2018). Prior studies have shown that culture shapes emotional display rules, which in turn relate to emotional expressivity (cf. Matsumoto, Yoo & Fontaine, 2008). Research has also examined how certain macro-level structures, such as historical heterogeneity, are associated with emotional expressivity (Rychlowska et al., 2015). However, to the best of our knowledge, no study has yet examined whether national development level, as a macro-level societal structure, relates to emotional expressivity. This represents a critical gap, as the social-functional approach suggests that emotional expressivity serves communicative and social coordination functions (Keltner & Haidt, 1999), and these functions themselves may vary systematically across societies with different levels of development.

Adopting this macro-level perspective, the present study seeks to examine whether societal development is associated with the discrepancy between emotional experience and emotional expression across nations, providing insight into the social signaling role of emotions in different structural contexts. Accordingly, we address two research questions: Does societal development predict the discrepancy between emotional experience and expression across nations? How does societal development, relative to traditional cultural indicators, relate to the under-expression of especially negative emotions across societies? By investigating these questions across two large multinational samples, we aim to clarify the association between societal structures and variations in emotional expressivity, extending current social-functional frameworks.

## *Emotion Expressivity and Societal Development*

The relation between societal development and emotional expressivity has not been systematically theorized, yet prior research offers indications for two potential perspectives on how macro-level societal structures may be associated with emotional expressivity. Drawing on existing literature, we propose two competing hypotheses to guide the present investigation. The Expressive Alignment Hypothesis suggests that societal development, defined here by levels of trust and institutional effectiveness, may be associated with greater openness, with individuals expressing their emotions more freely in interpersonal contexts. In contrast, the Signaling Reduction Hypothesis suggests that in well-functioning societies, the need to use emotional expressions, particularly negative ones, as social signals may be reduced due to the availability of reliable institutional mechanisms and the adoption of problem-focused coping strategies, resulting in less frequent expressions of these emotions even when they are felt. Clarifying these potential perspectives is important for understanding how societal structures may relate to the social-signaling functions of emotions across cultural contexts. The following sections provide elaborations on how the two competing hypotheses were formed.

*Alignment and Reduced Signaling Perspectives.* As argued by Putnam et al. (1993), "features of social organization, such as trust, norms and networks . . . can improve the efficiency of society by facilitating coordinated actions." (p. 167). According to Knack and Keefer (1997), a developed society is synonymous with a trusting society. In close relationships, trust negatively associates with emotional suppression; to avoid conflict, people with low trust in their partners suppress emotions, whereas those with high trust expect constructive feedback and are more emotionally expressive (Righetti et al., 2015). Although individual-level phenomena often cannot transfer to the macro-level (Lavrakas, 2008), the research on trust may provide insights into the possible mechanisms by which a trusting and efficient society might facilitate the alignment of individuals' emotional expressions with their emotional experiences.

However, an alternative perspective suggests that, in a trusting and efficient society, individuals' expression of experienced emotion might instead be suppressed. Emotional expressions,

especially negative ones, function as a signal for social concerns (Van Kleef & Côté, 2022). For instance, expressions of sadness could be a plea for assistance (Fridlund, 1994), and expressions of anger could denote a determination to counter injustice (Sinaceur & Tiedens, 2006). In societies where the system operates efficiently, injustice is low and individual reliance on institutional support is prevalent, so that the necessity for emotional signaling may be reduced. This reduction can be attributed to individuals in such societies favoring problem-focused coping strategies, as outlined by Lazarus and Folkman's (1987) transaction model on emotion and coping.

These strategies, employed when individuals perceive a higher degree of control over their circumstances, involve tackling problems directly instead of expressing negative emotions. For example, in a society with a responsive system, a person mistreated at a public service facility might opt to report the issue rather than emotionally expressing their discontent. By contrast, in less efficient societies, emotional expressions might be more commonly used to signal unresolved issues. Furthermore, in light of the transaction model on emotion and coping, individuals in more developed societies might not need to rely on emotional coping strategies but instead adopt problem-focused coping (Lazarus & Folkman, 1987). Hence, under-expression of negative emotions results.

This study considers two competing hypotheses regarding the societal impact on emotional expression. The first hypothesis posits that societal development may not be associated with, or could even relate to greater emotional expressivity due to enhanced trust and openness among its members. Conversely, the second hypothesis suggests that more developed societies are characterized by lower need for negative emotional expression by providing systematic support and problem-solving mechanisms. This contrast also raises the question of how positive emotions are handled in such societies, whether similar mechanisms also shape the expression of positive emotions, fostering an environment where these are more freely expressed or differently regulated.

*Differences between Positive and Negative Emotions across Societal Contexts.* In the context of emotional functions and their societal roles, the expression of emotions serves multiple purposes. Research on emotional asymmetry suggests that negative emotions typically carry stronger social signals and are prioritized over positive emotions due to their greater urgency and lasting effects (Baumeister et al., 2001; Gross et al., 2000). Expressing negative emotions can be a way for individuals to signal social concerns, calling for attention to potential problems (Van Kleef, 2010). On the other hand, positive emotions such as happiness or gratitude act as signals of a favorable condition and engagement with the surrounding environment (Shiota et al., 2021). These expressions are not merely responses to immediate stimuli but are deeply embedded within the societal context and co-vary with developmental factors that may constrain or encourage various forms of emotional display. According to the emotion family approach (Sauter, 2017), specific positive emotions also carry distinct prosocial functions; for example, love promotes commitment to intimate relationships (Campos et al., 2013), while gratitude is seen as a mechanism that fosters social bonds (Algoe & Haidt, 2009).

However, it is unclear how societal development is associated with the expression of positive emotions. As discussed by Matsumoto, Yoo & Fontaine, (2008), the cultural factors that are associated with expression of positive emotions are generally weaker compared to expression of negative emotions. Additionally, Manokara et al. (2023) found that cultural norms shape the display rules for the expression of specific positive emotions. These norms vary significantly based on the social context; for instance, the acceptability of expressing certain positive emotions varies with the physical setting or social environment in which they are expressed, as well as the nature of the relationship between the expresser and the perceiver. Thus, the direction of the relation between societal development and the expression of positive emotions may not be straightforward and needs further exploration.

### Discrepancy-Based Emotional Expressivity: Conceptualization and Operationalization

While it is important to understand whether and how societal development relates to the expression of emotions, it is crucial to first differentiate between mere *expression* and *expressivity*. In various cultures, emotions might be expressed to different extents (Krys et al., 2022), but this does not necessarily indicate whether these emotions are felt or being over-expressed or under-expressed (Ekman et al., 1969). In one influential cross-cultural study, Matsumoto, Yoo & Fontaine (2008) examined how cultural values, such as individualism and collectivism, relate to emotional expressivity norms. They asked participants what individuals should do when feeling specific emotions toward different targets in various contexts, with response options ranging from amplifying to suppressing or masking expressions. Critically, these measures reflected participants' perceptions of culturally appropriate emotional displays and may not reflect the actual discrepancies between emotional experience and expression.

While Matsumoto, Yoo & Fontaine (2008) provided an important initial insight into the potential cultural patterns of emotional expression, their focus on belief-based expressivity leaves open the question of how closely emotional expressions correspond to experiences. Cultural ideals (e.g., Tsai, 2007) regarding desirable emotional display can differ substantially from actual emotional behaviors, and examining beliefs may not reflect the degree to which emotions are over-expressed or under-expressed across societies.

To address this gap, we conceptualize emotional expressivity as discrepancy-based expressivity, which we operationalize as the discrepancy between the frequency of emotional experiences and the frequency of emotional expressions within each cultural context. This framing aligns with our study's aim to investigate how macro-level societal structures, particularly societal development, are associated with discrepancies between emotional experiences and expressions across nations.

### The Present Study

The present study addresses the gap in understanding how societal development relates to emotional expressivity across nations, conceptualized as the discrepancy between the frequency of emotional experiences and their expressions. We examine whether societies tend to over-express, under-express, or align emotional expressions with their experiences. Guided by competing perspectives, we test whether societal development is associated with greater alignment between experience and expression (Expressive Alignment Hypothesis) or with reduced signaling through under-expression, particularly of negative emotions (Signaling Reduction Hypothesis). Using two large cross-national samples, we first conduct an exploratory analysis in Study 1 to examine which of the competing hypotheses is supported, and then use Study 2 to test the replicability of these patterns. The studies were not preregistered.

## Study 1

### Method

*Participants.* The current dataset was part of a cross-cultural study on happiness (Krys et al., 2022). The final dataset consisted of 12,549 individuals with valid responses ($M_{age}$ = 24.84; $SD_{age}$ = 4.19; Female% = 60.38%) from 48 nations and regions.[1] For simplicity, the term 'nation' used throughout this document refers to both nations and regions. The data collection was conducted from 2016 to 2018. The average national sample size was $M_n$ = 261, $SD_n$ = 131, varying between 101 (Germany) and 831 (Hungary). The study was performed in accordance

with the ethical standards of the institutional and/or national research committees concerned. Table 1 shows the descriptive statistics of the demographic and focal variables used in the present study.

### Measures

*Frequency of Negative Emotional Experiences and Expressions.* Participants rated their perceived frequency of emotional experiences and expressions of 30 emotions on a nine-point Likert scale with time periods specified (Krys et al., 2022: 1 = *never*; 2 = *a couple of times a year*; 3 = *a couple of times a month*; 4 = *a couple of times a week*; 5 = *once a day*; 6 = *a couple of times a day*; 7 = *almost every single hour*; 8 = *a couple of times an hour*; and 9 = *all the time*). The positive emotions rated were *amused*, *authentic*, *calm*, *elated*, *enthusiastic*, *euphoric*, *excited*, *grateful*, *hopeful*, *in love*, *peaceful*, *proud*, *relaxed*, *respectful*, *self-confident*, and *serene*. The negative emotions rated were *angry*, *ashamed*, *bored*, *depressed*, *disgusted*, *dull*, *embarrassed*, *fearful*, *hateful*, *hostile*, *nervous*, *sad*, *sleepy*, and *sluggish*. The average reliabilities for the emotional expressions and experiences were high, $\alpha s > .81$. In the original study, Krys et al. (2022) found support for metric invariance across cultural clusters (e.g., Anglo, Latin Europe, Confucian Asia, etc.) and weak metric isomorphism (high congruence of the loadings between individual and national levels), following Tay et al.'s (2014) approach.

*Societal Development.* We evaluate societal development using three primary indicators: Societal Trust, Societal System Quality and Fairness, and the Human Development Index. Social trust captures an intangible facet of society. The focus of this assessment is to measure the level of perceived trustworthiness among members of the community. In order to assess this societal feature, data were obtained from two primary sources, namely the World Value Survey (WVS, Haerpfer et al., 2022) and the Human Understanding Measured Across National (HUMAN) Surveys (Klassen, 2018).

The WVS captured general trust as reported by individuals across different countries. The present study primarily employed data from wave 7 (Haerpfer et al., 2022). In instances where data were unavailable for certain nations in the current wave, we resorted to utilizing data from WVS, wave 6. The nation's trust was assessed by the percentage of participants who expressed agreement with the statement that "most people can be trusted," providing a brief representation of the prevalent level of trust throughout these communities. The HUMAN Surveys, conducted by Klassen (2018), provide a metric of social trust that distinguishes between a broad trust in individuals and a tendency towards caution in interpersonal interactions. Trust is measured using a numerical scale ranging from 0, representing the minimum amount of trust, to 100, indicating the maximum level of trust.

Both sources assess people's confidence in others, specifically examining their belief in the trustworthiness of most individuals against their tendency to assume caution while interacting with others. Both measures possess a scale range spanning from 0 to 100. The correlation between the two measures was $r = .82$, $p < .001$, with a confidence interval of [0.69 to 0.90], suggesting a strong overlap between these two variables. In our analysis, the mean of these two variables is utilized as an indicator of societal trust.

Societal system quality and fairness encompass the perceived effectiveness and integrity of governance structures. This measure was derived from the Worldwide Governance Indicators (WGI; Kaufmann & Kraay, 2023) and assesses how the public perceives the efficiency, fairness, and quality of governmental institutions and legal frameworks. By examining factors such as government efficiency, the rule of law, and the accessibility of fair systems, this measure reflects citizens' views on the extent to which their societal systems facilitate fairness, accountability, and effective governance. Such perceptions are crucial in understanding the overall

**Table 1.** Descriptive Statistics of the Demographic and Focal Variables by Nation (Study 1).

| | | | | | Positive Emotion | | | | | Negative Emotion | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nation | *n* | Female % | Student % | $M_{age}$ | Xpr | Xpe | *d* | $V_d$ | *r* | Xpr | Xpe | *d* | $V_d$ | *r* |
| Argentina | 174 | 74.14 | 100 | 32.44 | 5.31 | 5.47 | −0.29 | 0.006 | 0.89 | 3.55 | 3.83 | −0.4 | 0.006 | 0.84 |
| Australia | 336 | 57.74 | 42.56 | 38.04 | 4.65 | 4.73 | −0.16 | 0.003 | 0.95 | 3.83 | 4.01 | −0.34 | 0.003 | 0.93 |
| Austria | 316 | 80.38 | 66.77 | 28.47 | 5.14 | 5.31 | −0.34 | 0.003 | 0.91 | 3.12 | 3.53 | −0.75 | 0.003 | 0.83 |
| Bhutan | 119 | 61.34 | 100 | 22.62 | 4.92 | 4.98 | −0.13 | 0.008 | 0.91 | 4.36 | 4.54 | −0.32 | 0.008 | 0.89 |
| Brazil | 604 | 54.47 | 55.46 | 27.44 | 5.57 | 5.68 | −0.19 | 0.002 | 0.9 | 4.12 | 4.53 | −0.52 | 0.002 | 0.82 |
| Canada | 236 | 72.03 | 100 | 21.89 | 4.89 | 4.94 | −0.09 | 0.004 | 0.92 | 3.7 | 4.02 | −0.55 | 0.004 | 0.85 |
| Chile | 214 | 56.54 | 100 | 21.58 | 5.39 | 5.53 | −0.22 | 0.005 | 0.87 | 3.9 | 4.42 | −0.59 | 0.005 | 0.69 |
| China | 196 | 71.43 | 100 | 20.6 | 5.01 | 5.53 | −0.67 | 0.005 | 0.84 | 3.38 | 3.98 | −0.77 | 0.006 | 0.76 |
| Colombia | 459 | 51.63 | 100 | 32.89 | 5.72 | 5.82 | −0.13 | 0.002 | 0.84 | 3.61 | 3.81 | −0.25 | 0.002 | 0.83 |
| Croatia | 140 | 84.29 | 100 | 30.69 | 4.74 | 4.86 | −0.21 | 0.007 | 0.91 | 3.28 | 3.62 | −0.57 | 0.007 | 0.85 |
| Czech Rep. | 198 | 51.01 | 100 | 22.22 | 5.29 | 5.34 | −0.07 | 0.005 | 0.83 | 3.72 | 4.21 | −0.79 | 0.006 | 0.81 |
| El Salvador | 237 | 58.65 | 100 | 26.9 | 5.9 | 5.97 | −0.1 | 0.004 | 0.81 | 4.23 | 4.46 | −0.25 | 0.004 | 0.77 |
| Estonia | 198 | 71.21 | 100 | 28.8 | 5.18 | 5.36 | −0.31 | 0.005 | 0.83 | 3.37 | 3.9 | −0.76 | 0.006 | 0.72 |
| France | 214 | 83.18 | 100 | 31.73 | 4.59 | 4.94 | −0.44 | 0.005 | 0.76 | 2.97 | 3.5 | −0.83 | 0.005 | 0.78 |
| Georgia | 234 | 53.42 | 100 | 20.05 | 4.57 | 4.73 | −0.23 | 0.004 | 0.79 | 3.33 | 3.88 | −0.72 | 0.005 | 0.7 |
| Germany | 101 | 81.19 | 96.04 | 22.43 | 5.28 | 5.31 | −0.07 | 0.01 | 0.89 | 3.32 | 3.79 | −0.71 | 0.011 | 0.78 |
| Ghana | 258 | 52.33 | 100 | 22.21 | 6.31 | 6.25 | 0.12 | 0.004 | 0.9 | 3.85 | 3.96 | −0.13 | 0.004 | 0.79 |
| Greece | 425 | 59.76 | 53.65 | 24.71 | 5.03 | 5.14 | −0.19 | 0.002 | 0.9 | 3.56 | 4.06 | −0.73 | 0.003 | 0.82 |
| Guatemala | 107 | 71.03 | 100 | 20.51 | 5.7 | 6.04 | −0.36 | 0.01 | 0.73 | 4.24 | 4.94 | −0.69 | 0.011 | 0.66 |
| Hong Kong | 291 | 37.11 | 100 | 21.16 | 4.26 | 4.25 | 0.04 | 0.003 | 0.96 | 3.32 | 3.67 | −0.51 | 0.004 | 0.76 |
| Hungary | 831 | 73.16 | 100 | 20.89 | 5.27 | 5.42 | −0.23 | 0.001 | 0.86 | 3.67 | 4.2 | −0.68 | 0.001 | 0.68 |
| Iceland | 350 | 80.57 | 78.86 | 30.91 | 4.37 | 4.84 | −0.55 | 0.003 | 0.79 | 2.81 | 3.55 | −1.01 | 0.004 | 0.73 |
| Iran | 191 | 48.17 | 100 | 34.42 | 5.01 | 5.17 | −0.21 | 0.005 | 0.8 | 3.58 | 3.91 | −0.4 | 0.005 | 0.75 |
| Ireland | 237 | 59.49 | 100 | 20.96 | 5.17 | 5.35 | −0.26 | 0.004 | 0.8 | 3.77 | 4.28 | −0.69 | 0.005 | 0.75 |
| Italy | 286 | 53.85 | 100 | 25.15 | 5.86 | 5.69 | 0.21 | 0.004 | 0.8 | 4.06 | 4.2 | −0.16 | 0.004 | 0.78 |
| Japan | 198 | 38.89 | 100 | 19.56 | 4.27 | 4.48 | −0.43 | 0.005 | 0.92 | 3.88 | 4.26 | −0.57 | 0.005 | 0.85 |
| South Korea | 208 | 47.6 | 100 | 22.43 | 4.9 | 5.13 | −0.44 | 0.005 | 0.91 | 4.08 | 4.37 | −0.49 | 0.005 | 0.86 |
| Lithuania | 294 | 73.47 | 75.85 | 25.65 | 5.35 | 5.5 | −0.22 | 0.003 | 0.8 | 3.76 | 4.23 | −0.53 | 0.004 | 0.61 |
| Luxembourg | 211 | 69.19 | 80.57 | 25.83 | 5.11 | 5.26 | −0.23 | 0.005 | 0.88 | 3.55 | 4.08 | −0.72 | 0.005 | 0.8 |
| Malaysia | 190 | 67.89 | 100 | 20.82 | 5.7 | 5.89 | −0.32 | 0.005 | 0.89 | 4.2 | 4.63 | −0.61 | 0.006 | 0.82 |
| Mexico | 172 | 56.98 | 100 | 20.79 | 5.26 | 5.49 | −0.35 | 0.006 | 0.88 | 3.63 | 4.15 | −0.67 | 0.007 | 0.73 |
| Netherlands | 194 | 9.79 | 100 | 19.41 | 4.62 | 4.89 | −0.55 | 0.005 | 0.87 | 3.25 | 3.79 | −1.04 | 0.006 | 0.77 |
| Nigeria | 130 | 82.31 | 100 | 19.82 | 5.51 | 5.53 | −0.04 | 0.008 | 0.94 | 4.03 | 4.16 | −0.19 | 0.008 | 0.88 |
| Norway | 249 | 78.71 | 100 | 22.66 | 4.52 | 4.68 | −0.22 | 0.004 | 0.79 | 2.92 | 3.62 | −0.97 | 0.005 | 0.63 |
| Pakistan | 239 | 46.86 | 100 | 21.78 | 5.5 | 5.52 | −0.04 | 0.004 | 0.88 | 4.44 | 4.73 | −0.36 | 0.004 | 0.81 |
| Poland | 470 | 68.94 | 51.7 | 32.55 | 4.39 | 4.4 | −0.02 | 0.002 | 0.93 | 3.34 | 3.62 | −0.46 | 0.002 | 0.86 |
| Portugal | 256 | 66.41 | 59.77 | 28.6 | 5.59 | 5.65 | −0.09 | 0.004 | 0.83 | 3.55 | 3.95 | −0.53 | 0.004 | 0.77 |
| Romania | 289 | 49.83 | 100 | 22.31 | 5.54 | 5.72 | −0.29 | 0.003 | 0.88 | 3.57 | 3.87 | −0.49 | 0.004 | 0.87 |
| Russia | 270 | 62.96 | 100 | 19.76 | 5.02 | 5.12 | −0.16 | 0.004 | 0.83 | 3.88 | 4.19 | −0.36 | 0.004 | 0.76 |
| Saudi Arabia | 177 | 80.79 | 100 | 39.37 | 5.11 | 5.59 | −0.53 | 0.006 | 0.86 | 3.28 | 3.78 | −0.57 | 0.006 | 0.72 |
| Serbia | 210 | 50.48 | 100 | 20.11 | 5.11 | 5.4 | −0.48 | 0.005 | 0.89 | 3.23 | 3.96 | −1.1 | 0.006 | 0.84 |
| Slovakia | 310 | 52.58 | 100 | 21.55 | 5.53 | 5.73 | −0.33 | 0.003 | 0.85 | 3.75 | 4.18 | −0.59 | 0.003 | 0.77 |
| Switzerland | 333 | 20.12 | 95.8 | 25.92 | 4.69 | 4.94 | −0.54 | 0.003 | 0.88 | 2.96 | 3.45 | −1.16 | 0.004 | 0.82 |
| Taiwan | 210 | 64.29 | 100 | 19.99 | 4.71 | 4.8 | −0.2 | 0.005 | 0.92 | 3.31 | 3.74 | −0.68 | 0.005 | 0.81 |
| Turkey | 201 | 53.23 | 100 | 32.02 | 5.62 | 5.69 | −0.17 | 0.005 | 0.93 | 3.64 | 3.94 | −0.47 | 0.005 | 0.87 |
| Ukraine | 204 | 55.39 | 100 | 18.97 | 4.98 | 5.22 | −0.44 | 0.005 | 0.89 | 3.55 | 4.1 | −0.66 | 0.005 | 0.74 |
| UK | 139 | 30.94 | 100 | 20.75 | 4.25 | 4.38 | −0.29 | 0.007 | 0.9 | 3.2 | 3.67 | −0.8 | 0.008 | 0.79 |
| USA | 443 | 70.43 | 100 | 21.37 | 5.24 | 5.28 | −0.07 | 0.002 | 0.89 | 3.77 | 4.16 | −0.55 | 0.002 | 0.83 |
| **Mean** | 261.44 | 60.34 | 92.85 | 24.83 | 5.12 | 5.27 | −0.24 | 0.005 | 0.87 | 3.61 | 4.03 | −0.6 | 0.005 | 0.79 |
| **SD** | 131.06 | 16.13 | 15.63 | 5.3 | 0.48 | 0.45 | 0.18 | 0.002 | 0.05 | 0.39 | 0.34 | 0.24 | 0.002 | 0.07 |
| **Min.** | 101 | 9.79 | 42.56 | 18.97 | 4.25 | 4.25 | −0.67 | 0.001 | 0.73 | 2.81 | 3.45 | −1.16 | 0.001 | 0.61 |
| **Max.** | 831 | 84.29 | 100.00 | 39.37 | 6.31 | 6.25 | 0.21 | 0.01 | 0.96 | 4.44 | 4.94 | −0.13 | 0.011 | 0.93 |

Female% = percentage of female participants; Student% = percentage of student participants; Xpr = Emotional Expression; Xpe = Emotional Experience; *d* = expression–experience discrepancy for positive (posEED) and negative (negEED) emotions (expression – experience); $V_d$ = variance of *d*; *r* = strength of association between emotional expression and experience.

functionality and trustworthiness of a society's institutional framework, directly impacting the degree of trust and cooperation among its members.

We focused on five WGI dimensions, capturing key aspects of societal governance and quality of institutions: Voice and Accountability (VA), highlighting citizens' participatory rights and freedom; Government Effectiveness (GE), reflecting the quality of public services and policy formulation; Regulatory Quality (RQ), assessing the ability of the government to frame and implement sound policies; Rule of Law (RL), signifying the quality of contract enforcement, property rights, and the judiciary; and Control of Corruption (CC), measuring the extent to which public power is used for private gain. A principal component analysis revealed that a dominant single factor accounted for 89.37% of the variance across these dimensions. Loadings of each dimension on this factor were substantial (loadings = .959 − .980), indicating their significant contribution to the primary component of system quality and governance.

The Human Development Index (HDI, United Nations Development Programme, 2018) is a composite statistic of life expectancy, education (measured by mean years of schooling and expected years of schooling), and per capita income indicators, which can be used to rank countries into four tiers of human development. The HDI provides insight into a nation's societal and economic development, reflecting the tangible standard of living. In our study, we chose HDI as a representative measure of societal development because it encompasses not only economic aspects but also educational and health outcomes, offering a broad perspective on societal progress. By including HDI, we aim to capture a multifaceted view of societal development, avoiding redundancy and overlap that might arise from economic development by using GDP as a single indicator.

*Other Cultural Dimensions.* Demographic features of the data included the student sample ratio, female ratio, and mean age of the sample (Krys et al., 2022). These were used to examine whether they were associated with the expression-experience discrepancies. In addition, some cultural dimensions, such as Individualism (Hofstede, 2010) and Self-expression values (vs. Survival values; Inglehart, 2006), have been proposed to relate to emotional expression (Greenaway et al., 2018). For exploratory purposes, the additional cultural dimensions of Cultural Heterogeneity (World Migration Matrix; Putterman & Weil, 2010) and Tightness-Looseness (Gelfand et al., 2011) were also included. These cultural dimensions, while not the central focus of our investigation, serve as potential indicators to ensure a comprehensive understanding of the cultural factors influencing emotional expressivity across diverse contexts.

*Analytical Strategies.* To quantitatively assess the discrepancies between emotional expression and experience within each nation, we conducted within-sample *t*-tests. These tests compare the mean scores of expressed and experienced emotions for each nation. The expression-experience discrepancies (EED) were calculated as the standardized mean difference (Cohen's *d*) of expression minus experience. A positive value of EED indicates that emotions are predominantly over-expressed (i.e., EED $> 0$, expressed more frequently than experienced), whereas a negative value of EED suggests under-expression (i.e., EED $< 0$, expressed less frequently than experienced). This method allows us to evaluate the magnitude of expression-experience discrepancies within each cultural context and to compare these discrepancies across different nations. We compute both EED for positive and negative emotions (hereafter, posEED and negEED, respectively). For example, a negative value of negEED indicates the under-expression of negative emotions.

We conducted a cross-cultural meta-analysis (Smith et al., 2013; see Żelaźniewicz et al., 2025 for a similar practice) with a random-effects model. This method accommodates the heterogeneity across the dataset, enabling us to explore both between- and within-nation effects. Then we employed meta-regression models to explain the cross-national differences in the over-expression, neutral, or under-expression effects for both positive and negative emotions.

All the analyses were conducted under the R statistical environment (R version 4.2.2, R Core Team, 2022) and the 'metafor' package (version 3.8.1, Viechtbauer, 2010) for main effect size estimation and meta-regression analyses.

## Results

*Expression-Experience Discrepancies (EED) Estimates.* Using within-sample paired *t*-tests to compare expression and experience scores within each nation, we first computed the expression-experience discrepancies for positive and negative emotions (posEED and negEED) by using the standardized mean difference (Cohen's *d*; Cohen, 1988) between the mean frequency of emotional expression and that of emotional experience. A random-effect meta-analysis revealed that, overall, both positive and negative emotions were under-expressed (overall posEED and negEED $< 0$); the effect was small in posEED ($d = -0.24$ [$-0.29$, $-0.19$], $p < .001$), while medium to large in negEED ($d = -0.60$ [$-0.66$, $-0.53$], $p < .001$). The complete list of EED is available in Table 1 (sorted alphabetically by nation) and Figure 1 (sorted by effect size).

For positive emotions, most countries demonstrated under-expression of positive emotions. China showed the greatest under-expression with a medium-to-large difference ($d = -0.67$), whereas Italy exhibited significant over-expression with a small effect ($d = 0.21$). In terms of negative emotions, Switzerland showed the greatest under-expression with a large effect ($d = -1.16$), and Ghana displayed the least under-expression with a small effect ($d = -0.13$). These findings highlight substantial variations in the emotional expression-experience discrepancy across countries, which may be associated with distinct societal contexts. The correlation between EED for positive and negative emotions and nation-level variables is in Table 2, and the correlation among all variables used is found in Table S1 of the Supplemental Materials.

To examine whether the between-nation variation is large enough for further moderation analyses, we performed heterogeneity tests. The between-nation variations were large, posEED: $Q$ (47) = 386.08, $p < .001$, $I^2 = 88.27\%$; negEED: $Q$ (47) = 602.24, $p < .001$, $I^2 = 92.42\%$, indicating the need for and suitability of performing moderation analyses to explain the between-nation variations.

*Potential Cultural and Demographic Impacts on EED.* Prior to examining the effects of societal development on emotional expression discrepancies, we assessed the potential impact of sample characteristics, such as student ratio, gender ratio, and mean age, along with various cultural dimensions including Individualism, self-expression values, Cultural Heterogeneity, and Tightness-Looseness on EED. As shown in Table 3, these variables generally were not significantly associated with the EED for either positive or negative emotions, except for a marginally significant effect of self-expression values on the negEED ($p = .07$). The analysis revealed minimal impact from sample characteristics and other cultural dimensions on EED, thus the following sections will focus on the effects of societal development.

*EED and Societal Development.* We found that the more developed a given society was, the stronger the effect of under-expression of negative emotions. Specifically, people under-expressed their negative emotions more in nations with greater societal development, trust: $Q_M$ ($df = 1$) = 14.88, $p < .001$, $R^2 = 24.95\%$; system quality and fairness: $Q_M$ ($df = 1$) = 13.83, $p < .001$, $R^2 = 23.45\%$; HDI: $Q_M$ ($df = 1$) = 15.82, $p < .001$, $R^2 = 26.47\%$. In contrast, when examining posEED, only societal trust showed a significant effect, $Q_M$ ($df = 1$) = 4.85, $p < .05$, $R^2 = 8.97\%$. This suggests that while societal trust correlates with the expression of both positive and negative emotions, the magnitude of its effect is notably more pronounced in negEED. The full meta-regression results for the moderation effects on posEED and negEED can be found in Table 3 and the regressions are illustrated in Figure 2. These effects remained significant after

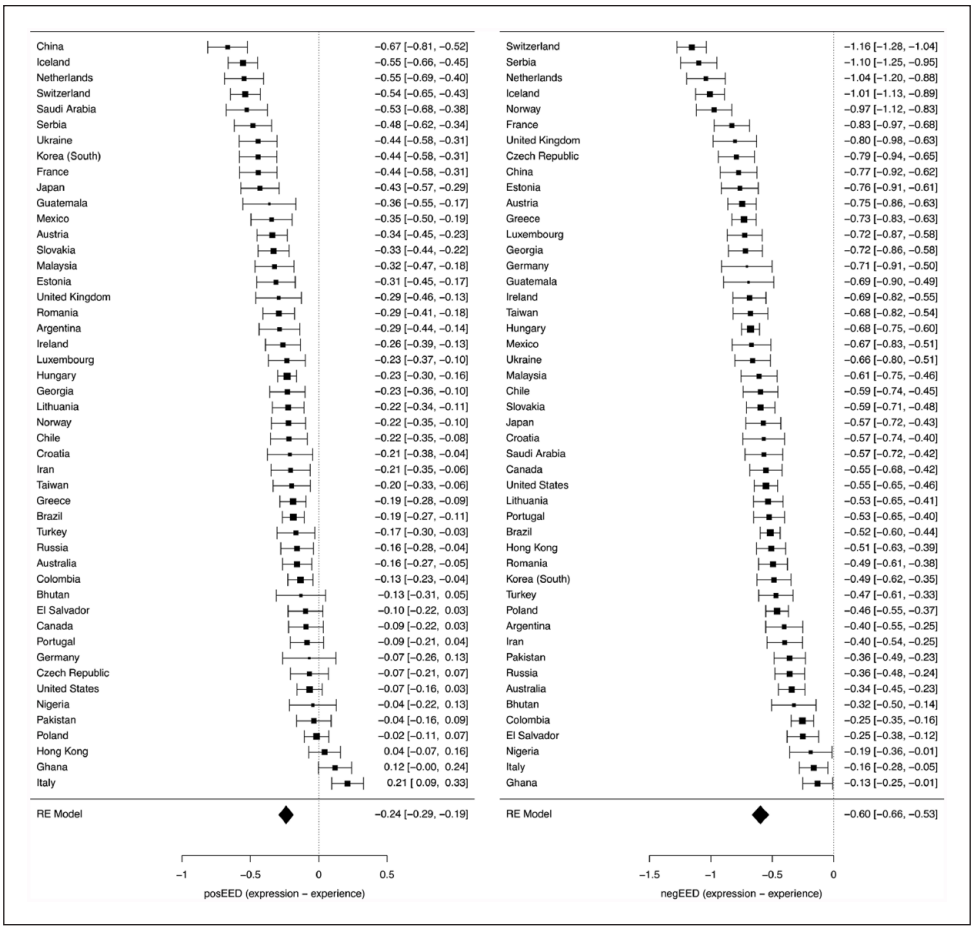


**Figure 1.** Forest plot of the integrated effect sizes of the expression-experience discrepancies for positive and negative emotions (posEED & negEED) across 48 nations (Study 1).

controlling for the effects of study characteristics, that is, the mean age of the sample, the portion of students in the sample, and the portion of females in the sample, for posEED, trust: estimate $= -0.004$, $SE = 0.002$, $p = .02$; for negEED, trust: estimate $= -0.001$, $SE = 0.001$, $p = .002$; system quality and fairness: estimate $= -0.14$, $SE = 0.04$, $p < .001$; HDI: estimate $= -1.25$, $SE = 0.29$, $p < .001$.

### *Sensitivity Checks*

*Response-style robustness check.* Because both experience and expression ratings are retrospective self-reports, cross-national differences in response styles (e.g., acquiescence, extreme responding) could shift scale means and, by subtraction, EED. To address this, we recomputed EED using two transformations, within-country $z$-scoring and person-level ipsatization, and an alternative effect size metric (unstandardized raw mean differences). Across all checks, the pattern of results for negative EED remained consistent: societal development indicators significantly predicted stronger under-expression of negative emotions. Notably, within-country $z$-scored raw mean differences yielded strengthened associations (i.e., smaller $p$-values and larger $R^2$ values): trust: estimate $= -0.002$, $p = <.001$, $R^2 = 19.87\%$; system quality and fairness: estimate $= -0.033$, $p = .007$, $R^2 = 13.33\%$; HDI: estimate $= -0.314$, $p = .001$, $R^2 = 18.76\%$, suggesting

**Table 2.** Correlations Among National Level Indicators in the Main Analyses (Study 1).

| Variable | *M* | *SD* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. posEED | −0.24 | 0.18 | | | | | | | | |
| 2. negEED | −0.6 | 0.24 | .68*** | | | | | | | |
| 3. Positive Emotional Expression | 5.12 | 0.48 | .37* | .51*** | | | | | | |
| 4. Negative Emotional Expression | 3.61 | 0.39 | .42** | .68*** | .58*** | | | | | |
| 5. Positive Emotional Experience | 5.27 | 0.45 | .11 | .35* | .96*** | .49*** | | | | |
| 6. Negative Emotional Experience | 4.03 | 0.34 | .18 | .38** | .52*** | .92*** | .50*** | | | |
| 7. Societal Trust | 33.37 | 16.46 | .30* | .49*** | .56*** | .46** | .51*** | .38** | | |
| 8. System Quality & Fairness | 0.62 | 0.85 | .08 | .48*** | .51*** | .47*** | .54*** | .42** | .71*** | |
| 9. Human Development Index | 0.82 | 0.11 | .22 | .51*** | .55*** | .57*** | .54*** | .50*** | .65*** | .80*** |

*Note*. posEED/negEED = Expression-Experience Discrepency for Positive/Negative Emotions.
*** $p < .001$, ** $p < .01$, * $p < .05$.

**Table 3.** Meta-regression Results for the Moderation Effects of Different Indicators on posEED and negEED (Studies 1 & 2).

| | | Dependent Variables | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | posEED | | | | negEED | | | |
| Moderators | *k* | Data source | $Q_M$ | *B* (*SE*) | *CI* | $R^2$% | $Q_M$ | *B* (*SE*) | *CI* | $R^2$% |
| | | | | | Study 1 | | | | | |
| Sample characteristics | | | | | | | | | | |
| Student sample ratio | 48 | K | 0.69 | −0.14 (0.17) | −0.47, 0.19 | 0 | 0.03 | −0.04 (0.22) | −0.47, 0.39 | 0 |
| Gender ratio | 48 | K | 0.22 | 0.001 (0.002) | −0.003, 0.004 | 0 | 0.55 | 0 (0) | 0, 0.01 | 0 |
| Sample mean age | 48 | K | 0 | 0 (0.01) | −0.01, 0.01 | 0 | 1.68 | 0.01 (0.01) | 0, 0.02 | 1.58 |
| Societal developmental level | | | | | | | | | | |
| Societal Trust | 48 | H&W | 4.85* | −0.003 (0.002) | −0.01, 0 | 8.97 | 14.88*** | −0.01 (0.002) | −0.01, −0.003 | 24.95 |
| Societal System Quality & Fairness | 48 | WGI | 0.35 | −0.019 (0.032) | −0.08, 0.04 | 0 | 13.83*** | −0.13 (0.036) | −0.21, −0.064 | 23.45 |
| Human Development Index | 47 | UNDP | 2.32 | −0.39 (0.26) | −0.89, 0.11 | 3.35 | 15.82*** | −1.15 (0.29) | −1.71, −0.58 | 26.47 |
| Other cultural dimensions | | | | | | | | | | |
| Heterogeneity | 48 | WMM | 0.23 | 0.001 (0.002) | −0.002, 0.004 | 0 | 0.05 | 0 (0.002) | −0.004, 0.005 | 0 |
| Hofstede Individualism | 41 | Hof | 0.31 | 0.001 (0.001) | −0.002, 0.003 | 0 | 2.26 | −0.002 (0.001) | −0.005, 0.001 | 3.27 |
| Self-expression (vs. survival) | 37 | I | 0.34 | −0.03 (0.04) | −0.11, 0.06 | 0 | 3.27† | −0.11(0.06) | −0.22,0.01 | 6.37 |
| Tightness (vs. Looseness) | 25 | G | 0.11 | 0.01 (0.02) | −0.03, 0.04 | 0 | 1.01 | 0.02 (0.02) | −0.01, 0.05 | 0 |
| | | | | | Study 2 (Replication) | | | | | |
| Societal developmental level | | | | | | | | | | |
| Societal Trust | 61 | H&W | 3.726† | 0.004 (0.002) | 0, 0.008 | 6.2 | 11.822*** | −0.009 (0.003) | −0.014, −0.004 | 18.5 |
| Societal System Quality & Fairness | 63 | WGI | 1.61 | 0.049 (0.039) | −0.027, 0.125 | 1.99 | 14.462*** | −0.181 (0.047) | −0.274, −0.088 | 22.24 |
| Human Development Index | 64 | UNDP | 1.067 | 0.263 (0.255) | −0.236, 0.762 | 0.2 | 9.76** | −1.007 (0.322) | −1.639, −0.375 | 14.02 |

*Note.* $k$ = number of nations. $Q_M$ = test of moderator. K = aggregated data from Krys et al. (2022); H = Human Understanding Measured Across National (HUMAN) Surveys; W = World Value Survey wave 7; WGI = World Government Index; UNDP = United Nations Development Programme; G = Gelfand et al. (2011); WMM = World Migration Matrix (Putterman & Weil, 2010); Hof = Hofstede (2010); I = Inglehart (2006).
*** $p < .001$, ** $p < .01$, * $p < .05$, † $p < .10$.

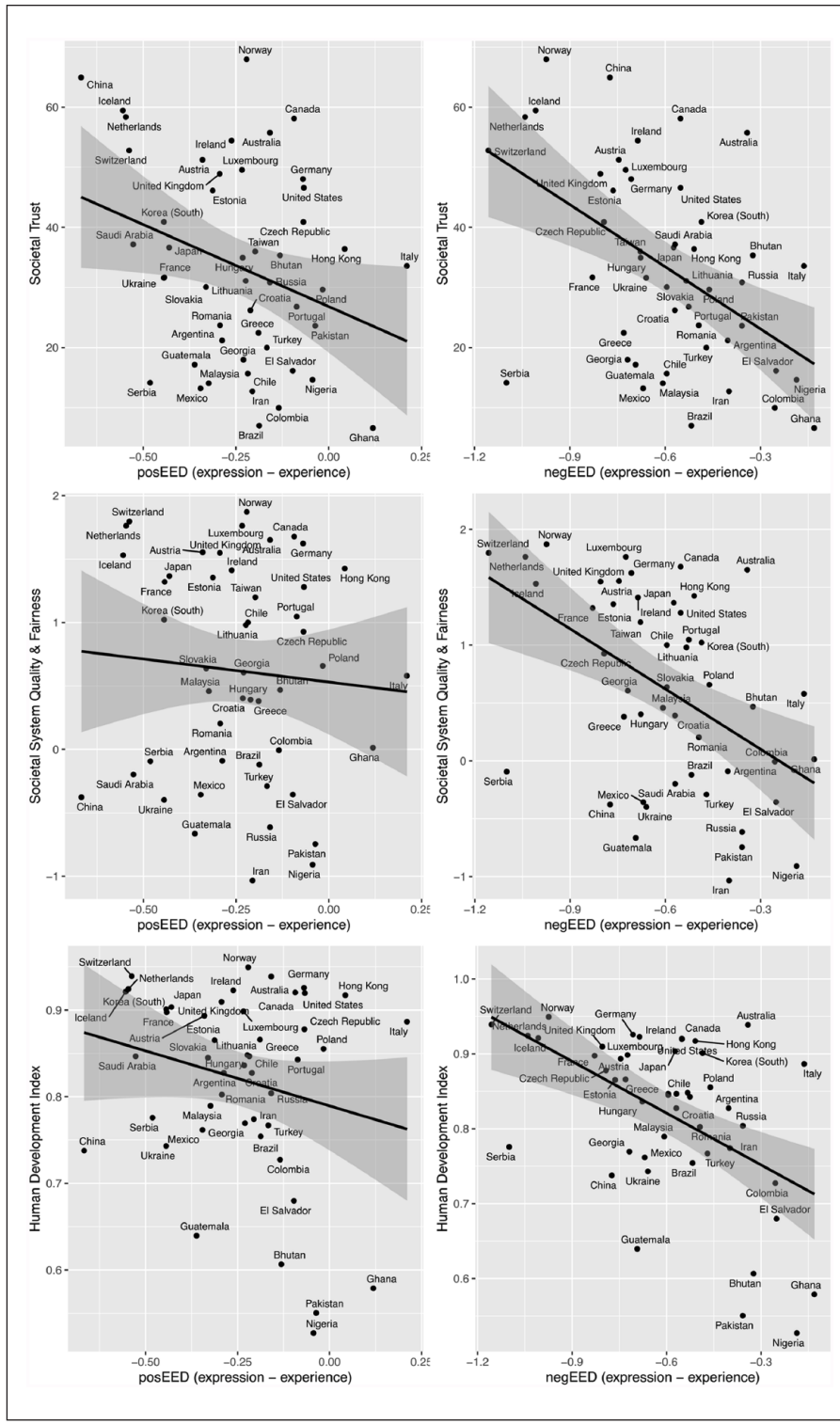


**Figure 2.** The association between emotional expression-experience discrepancy for positive and negative emotions (posEED & negEED) and societal development (Study 1).

that country-level response styles may have attenuated rather than inflated the observed effects. Full results are reported in the Supplemental Materials (p. S2 and Table S4).

*Multilevel Modeling.* As a further sensitivity check, we employed multilevel modeling, which specifies the individual difference scores (i.e., EED) as the outcome variables, and individual demographics and emotional experience as covariates, and evaluated if the effect of societal development remains after introducing these controls. The results based on multilevel analysis with demographics and emotional experiences at the individual level controlled were consistent with those based on the meta-analytic approach. Stronger under-expression of both positive and negative emotions was associated with higher frequency of experiencing those emotions (estimates ranged from −0.25 to −0.09, $p$s $< .001$). For negative emotions, societal trust, societal system quality and fairness, and the HDI were negatively associated with individual EED (estimates range from −.686 to −.004, $p$s $< .01$), whereas for positive emotions, only societal trust was significantly and negatively associated (estimate = −.003, $p < .001$). Details of model specification may be found in Table S5 in the Supplemental Materials.

*Analyses on Specific Emotions.* Not all emotions would show the signaling response related to societal development. To assess this possibility, separate post-hoc meta-regression models for all the specific emotions were conducted. Specifically, we calculated the expression-experience discrepancy for each emotion item and examined whether societal development is associated with the strength of the discrepancy. Given that conducting multiple analyses can elevate the risk of Type I errors, only those results that remained significant after the application of a Bonferroni correction were considered for interpretation. The meta-regression results are in Table 4, and the full list of specific emotion analyses is in the Supplementary Materials.

For positive emotion items, only the expression-experience discrepancy of *grateful* was significantly moderated by societal development. It indicated that the more the society is developed, the greater the under-expression of *grateful*, trust: $Q_M(df = 1) = 13.27$, $p < .001$, $R^2 = 26.16\%$; system quality and fairness: $Q_M\,(df = 1) = 16.52$, $p < .001$, $R^2 = 31.4\%$; HDI: $Q_M\,(df = 1) = 12.54$, $p < .001$, $R^2 = 25.7\%$.

For negative emotion items, the EED of anger was not significantly associated with societal development. However, the complex forms of anger (Shaver et al., 1987), such as hostility, disgust, and hate, as well as emotions related to fear, including fearful and nervous feelings, were associated with societal development indicators. To illustrate, the EED of hostility was moderated by trust ($Q_{\mathrm{M}}\,[df = 1] = 13.68$, $p < .001$), by system quality and fairness ($Q_{\mathrm{M}}\,[df = 1] = 12.98$, $p < .001$), and by HDI ($Q_{\mathrm{M}}\,[df = 1] = 11.23$, $p < .001$), each indicating a considerable percentage of variance explained ($R^2 = 24.82\%$, 23.72%, and 20.78%, respectively). Similarly, the emotion of nervousness showed a significant association with societal development in terms of trust ($Q_{\mathrm{M}}\,[df = 1] = 18.93$, $p < .001$, $R^2 = 32.33\%$), system quality and fairness ($Q_{\mathrm{M}}\,[df = 1] = 14.8$, $p < .001$, $R^2 = 26.53\%$), and HDI ($Q_{\mathrm{M}}\,[df = 1] = 16.76$, $p < .001$, $R^2 = 29.06\%$).

Some negative emotions that cannot be grouped based on emotion families, such as feeling ashamed, depressed, sleepy, and sluggish, were also found to be significantly associated with societal development. For example, the EED of feeling ashamed was notably moderated by societal development, $Q_{\mathrm{M}}\,(df = 1) = 19.99$, $p < .001$, $R^2 = 35.88\%$, for trust, $Q_{\mathrm{M}}\,(df = 1) = 12.21$, $p < .001$, $R^2 = 24.35\%$ for system quality and fairness, and $Q_{\mathrm{M}}\,(df = 1) = 12.69$, $p < .001$, $R^2 = 25.68\%$ for HDI.

**Table 4.** Meta-regression Results for the Moderation Effects of Societal Development on EED of Specific Emotions (Study 1).

| | Moderators | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Societal Trust | | | System Quality & Fairness | | | Human Development Index | | |
| Emotions | $Q_M$ | *B* (*SE*) | $R^2$ % | $Q_M$ | *B* (*SE*) | $R^2$ % | $Q_M$ | *B* (*SE*) | $R^2$ % |
| Positive Emotions | | | | | | | | | |
| amused | 4.61* | 0.00 (0.00) | 13.71 | 0.86 | −0.02 (0.02) | 1.51 | 0.18 | −0.06 (0.15) | 0.00 |
| authentic | 6.76** | 0.00 (0.00) | 15.89 | 1.58 | −0.03 (0.02) | 2.61 | 2.68 | −0.32 (0.19) | 5.96 |
| calm | 0.85 | 0.00 (0.00) | 0.00 | 1.25 | 0.03 (0.03) | 0.17 | 0.29 | 0.12 (0.23) | 0.00 |
| elated | 0.17 | 0.00 (0.00) | 0.00 | 0.03 | 0.00 (0.02) | 0.00 | 0.42 | −0.12 (0.18) | 0.00 |
| enthusiastic | 0.20 | 0.00 (0.00) | 0.00 | 0.56 | 0.01 (0.02) | 0.00 | 0.28 | 0.08 (0.15) | 0.00 |
| euphoric | 1.26 | 0.00 (0.00) | 0.07 | 0.04 | 0.00 (0.02) | 0.00 | 0.10 | 0.05 (0.15) | 0.00 |
| excited | 2.62 | 0.00 (0.00) | 3.93 | 0.35 | −0.01 (0.02) | 0.00 | 1.95 | −0.28 (0.20) | 2.38 |
| **grateful** | **13.27*** ** | **0.00 (0.00)** | **26.16** | **16.52*** ** | **−0.09 (0.02)** | **31.40** | **12.54*** ** | **−0.68 (0.19)** | **25.67** |
| hopeful | 2.00 | 0.00 (0.00) | 2.75 | 0.09 | −0.01 (0.03) | 0.00 | 0.96 | −0.21 (0.22) | 0.00 |
| in love | 3.17† | 0.00 (0.00) | 5.54 | 2.47 | −0.04 (0.02) | 3.48 | 5.69* | −0.46 (0.19) | 10.77 |
| peaceful | 7.17** | 0.00 (0.00) | 14.52 | 0.04 | 0.01 (0.03) | 0.00 | 0.82 | −0.21 (0.23) | 0.00 |
| proud | 3.07† | 0.00 (0.00) | 5.41 | 2.04 | −0.03 (0.02) | 3.14 | 4.17* | −0.39 (0.19) | 8.01 |
| relaxed | 6.31* | 0.00 (0.00) | 14.61 | 0.18 | −0.01 (0.02) | 0.00 | 2.63 | −0.28 (0.17) | 4.92 |
| respectful | 7.46** | 0.00 (0.00) | 16.37 | 4.54* | −0.05 (0.02) | 9.94 | 6.35* | −0.48 (0.19) | 13.56 |
| self-confident | 1.36 | 0.00 (0.00) | 1.81 | 0.25 | 0.01 (0.02) | 0.00 | 0.11 | −0.06 (0.18) | 0.00 |
| serene | 2.49 | 0.00 (0.00) | 3.68 | 0.66 | 0.03 (0.03) | 0.00 | 0.01 | −0.02 (0.25) | 0.00 |

*(continued)*

**Table 4.** (continued)

| | Moderators | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Societal Trust | | | System Quality & Fairness | | | Human Development Index | | |
| Emotions | $Q_M$ | *B* (*SE*) | $R^2$ % | $Q_M$ | *B* (*SE*) | $R^2$ % | $Q_M$ | *B* (*SE*) | $R^2$ % |
| Negative Emotions | | | | | | | | | |
| angry | 5.70* | 0.00 (0.00) | 11.77 | 3.97* | −0.05 (0.02) | 8.12 | 2.60 | −0.32 (0.20) | 4.94 |
| **ashamed** | **19.99*** ** | **−0.01 (0.00)** | **35.88** | **12.21*** ** | **−0.09 (0.02)** | **24.35** | **12.69*** ** | **−0.71 (0.20)** | **25.68** |
| bored | **8.91** ** | **0.00 (0.00)** | **17.82** | 6.95** | −0.06 (0.02) | 13.69 | 7.07** | −0.51 (0.19) | 13.89 |
| **depressed** | **11.42*** ** | **0.00 (0.00)** | **23.83** | **10.00** ** | **−0.07 (0.02)** | **21.22** | **14.77*** ** | **−0.69 (0.18)** | **29.57** |
| **disgusted** | **13.73*** ** | **0.00 (0.00)** | **30.79** | **12.31*** ** | **−0.07 (0.02)** | **28.20** | **8.82** ** | **−0.49 (0.16)** | **22.16** |
| dull | 8.28** | 0.00 (0.00) | 16.76 | 7.26** | −0.07 (0.03) | 14.47 | **11.53*** ** | **−0.71 (0.21)** | **22.33** |
| embarrassed | 7.17** | 0.00 (0.00) | 14.92 | 3.74† | −0.05 (0.03) | 7.45 | 6.20* | −0.52 (0.21) | 12.73 |
| fearful | 7.58** | 0.00 (0.00) | 14.28 | **9.05** ** | **−0.08 (0.03)** | **16.90** | **14.46*** ** | **−0.82 (0.22)** | **26.15** |
| hateful | **10.51** ** | **0.00 (0.00)** | **22.79** | 7.51** | −0.06 (0.02) | 16.87 | **10.57** ** | **−0.54 (0.17)** | **23.27** |
| **hostile** | **13.68*** ** | **−0.01 (0.00)** | **24.82** | **12.98*** ** | **−0.1 (0.03)** | **23.72** | **11.23*** ** | **−0.75 (0.22)** | **20.78** |
| **nervous** | **18.93*** ** | **−0.01 (0.00)** | **32.33** | **14.8*** ** | **−0.1 (0.03)** | **26.53** | **16.76*** ** | **−0.89 (0.22)** | **29.60** |
| sad | 5.27* | 0.00 (0.00) | 10.59 | 6.19* | −0.07 (0.03) | 12.67 | **9.61** ** | **−0.68 (0.22)** | **19.50** |
| **sleepy** | **11.93*** ** | **0.00 (0.00)** | **22.47** | **9.80** ** | **−0.08 (0.03)** | **18.64** | **9.42** ** | **−0.65 (0.21)** | **17.88** |
| **sluggish** | **17.49*** ** | **0.00 (0.00)** | **32.50** | **10.40** ** | **−0.08 (0.02)** | **20.91** | **11.27*** ** | **−0.65 (0.19)** | **22.79** |

*Note.* EED = Expression-Experience Discrepancy. Significant after Bonferroni correction ($p < .05/i$) in bold.
***$p < .001$, **$p < .01$, *$p < .05$, †$p < .10$.

# Study 2

## Method

*Participants.* The current dataset was part of a cross-cultural study on societal development and ideal types of well-being conducted between 2022 and 2024. The final dataset consisted of 19,690 individuals with valid responses ($M_{age}$ = 28.48; $SD_{age}$ = 4.24; $M_{Female\%}$ = 61.06%) from 65 nations and regions.[2] The average national sample size was $M_n$ = 304.16, $SD_n$ = 264.06, varying between 112 (Brazil) and 1800 (Malaysia). Table S2 shows the descriptive statistics of the demographic and focal variables used in the present study.

### Measures

*Frequency of Negative Emotional Experiences and Expressions.* As in Study 1, participants rated their frequency of emotional experiences and expressions on a 9-point Likert scale with the same time periods specified (Krys et al., 2022), but with a shortened list of emotion items (positive: *grateful*, *excited*, *relaxed*, and *in love*; negative: *fearful*, *angry*, *sad*, and *ashamed*). The selection of emotion items was informed by Fischer and Manstead's (2016) framework on the social functions of emotion, which distinguishes affiliative emotions (e.g., gratitude, love) from distancing ones (e.g., anger, fear). While excitement is not explicitly included in this taxonomy, it was retained due to its strong factor loading (.64) in Study 1 and its consistent association with positive valence across cultures.

*Societal Development.* We used the same measures for societal development from Study 1 to maintain consistency, including data from the World Value Survey (Haerpfer et al., 2022). The HUMAN Surveys (Klassen, 2018) were again used to assess societal trust, reflecting the community's perceived trustworthiness. Similarly, the perception of societal system quality and fairness was evaluated using the Worldwide Governance Indicators (Kaufmann & Kraay, 2023), which measure public opinion on government efficiency, fairness, and integrity. Additionally, the Human Development Index (United Nations Development Programme, 2022) was employed to provide a comprehensive measure of life expectancy, education, and income.

## Results

Before proceeding with the main analysis, we conducted tests for measurement invariance of emotional constructs across cultures. We tested a multi-group confirmatory factor analysis for 10 cultural clusters (Gupta et al., 2002; Mensah & Chen, 2013), namely Anglo, Latin Europe, Nordic Europe, Germanic Europe, Eastern Europe, Latin America, Sub-Saharan Africa, Middle East, Southern Asia, and Confucian Asia. These tests demonstrated metric equivalence, indicating that the factor loadings and the relations among items and their corresponding latent structures were consistent across cultures. Scalar invariance was not pursued because our primary analyses focus on relational patterns (i.e., associations between EED and societal development indicators) rather than direct comparisons of latent mean levels across cultural groups, for which metric invariance is sufficient (van de Schoot et al., 2012). Details of these analyses can be found in the Supplemental Materials.

Additionally, because Study 2 used a reduced set of eight emotion items (compared to 30 in Study 1), we assessed cross-study comparability by recomputing EED in Study 1 using only these eight items. The eight-item country-level EED values were highly correlated with the original 30-item values (posEED: $r$ = .85; negEED: $r$ = .97). Meta-regressions using the eight-item negEED replicated the original pattern: trust (estimate = −0.005, $p$ = .002), system quality and fairness (estimate = −0.097, $p$ = .004), and HDI (estimate = −0.846, $p$ < .001) all significantly

predicted stronger under-expression, confirming that the reduced item set does not alter the key findings.

In Study 2, we replicated the main findings from Study 1 regarding under-expression of negative emotions across different societal contexts. Consistent with the initial results, our analysis confirmed that more developed societies show a greater tendency towards under-expression of negative emotions. The statistical significance of this effect remained robust across measures of societal development, mirroring the significant associations found in Study 1: trust: $Q_M$ ($df = 1$) $= 11.82$, $p < .001$, $R^2 = 18.50\%$; system quality and fairness: $Q_M$ ($df = 1$) $= 14.46$, $p < .001$, $R^2 = 22.24\%$; HDI: $Q_M$ ($df = 1$) $= 9.76$, $p = .001$, $R^2 = 14.02\%$.

Regarding positive emotions, societal trust showed a marginally significant effect, $Q_M$ ($df = 1$) $= 3.73$, $p = .053$, $R^2 = 6.20\%$. Consistent with Study 1, other indicators of societal development did not significantly predict expression-experience discrepancy for positive emotions ($p$s $> .20$).

These results reaffirm the findings observed in Study 1, demonstrating the robustness of our findings across a larger and more diverse sample and providing further support for the Signaling Reduction Hypothesis. The full meta-regression results for the moderation effects on posEED and negEED can also be found in Table 3.

## General Discussion

There is often a gap between what people feel and what they express. In the present study, we examined and documented this discrepancy across two studies—one covering 48 nations, another 65—to assess whether emotional expressions tend to underrepresent emotional experiences at the national level, with a particular focus on negative emotions. We further tested competing hypotheses regarding whether societal development would be associated with greater alignment between experience and expression or with reduced signaling through under-expression. Our results consistently supported the Signaling Reduction Hypothesis, showing that higher levels of societal development are associated with stronger under-expression of negative emotions. The consistency of results across two different large-scale cross-cultural studies highlights the robustness of our findings and lends support to the reasoning that societal development may have a pervasive impact on inhibiting negative-emotion expressivity.

### *The Incremental Value of the Current Approach*

The decision to focus on the expression-experience discrepancy using Cohen's $d$ has yielded significant insights that may not have been illuminated through correlation analysis alone. While correlation coefficients indicate the strength and direction of the association between emotional expression and experience, the differences in terms of direction and magnitude between these two measures is not explicitly revealed. This study's approach has allowed for a more directly interpretable analysis of emotional expression norms, revealing that the extent of under-expression of negative emotions can vary dramatically between nations. For example, in Study 1, the substantial difference in negEED values between Switzerland ($d = -1.16$) and Malaysia ($d = -0.61$), despite their identical correlation coefficients ($r = .82$), highlights that Swiss individuals under-express negative emotions to a far greater extent than Malaysians. By quantifying the discrepancies between emotional expression and emotional experience, this research sheds light on the underlying cultural mechanisms that govern emotional behaviour, offering a more precise manifestation of emotional expressivity that extends beyond linear associations.

Our analysis reveals some intriguing patterns showing within-cultural cluster variance. For instance, within the Confucian Asia cluster, China stands out, demonstrating a significant tendency to under-express positive emotions, which contrasts sharply with that of Hong Kong. Despite their geographical proximity and partly shared cultural heritage, Hong Kong displays a

different trend, with data suggesting that its citizens express positive emotions at a level closer to their experience. When examining negEED within the Latin Europe cluster, the data for France and Italy are particularly telling. France demonstrates notable under-expression of negative emotions, suggesting a cultural trend towards restraint in negative emotional displays. Italy shows a milder under-expression, indicating a slighter deviation from the experience baseline in negative emotional expression. These differences within the Latin Europe cluster, especially between France and Italy, suggest that the expressiveness pattern extends beyond cluster categorizations to other macro-level characteristics.

## *Implications of the Current Findings*

*Theoretical Implications on the Social-Functional Approach to Emotions.* Our analysis revealed a substantial correlation between negEED and posEED, with a noteworthy distinction in how these discrepancies relate to societal development. While societal development appeared to be consistently associated with negEED, its association with posEED was less pronounced. These findings at the macro, societal level are consistent with the negative-positive asymmetry (Gross et al., 2000; Jordan et al., 2011) in emotion research that has been mainly based on individual and group levels, which suggest that individuals are naturally inclined to address negative events or signals due to their stronger and lasting effects compared to positive events, consistent with the well-documented phenomenon that "bad is stronger than good" (Baumeister et al., 2001).

Our findings reveal the relatively under-documented topic of how structural context is associated with emotion dynamics from a macro perspective. Trust and efficiency of the societal system moderate the strength of under-expression for negative emotions. In societal systems with efficient institutions and trusting citizens, people under-express negative emotions more (i.e., they express negative emotions less frequently than they feel). This finding suggests that in societies with relatively inefficient institutions, people may rely more on negative emotional expressions to signal and communicate with others about the problems they encounter, in order to provoke ameliorative responses from others.

Surprisingly, in predicting the between-nation variation of negative-emotion expressivity, typical cultural indicators, including tightness (vs. looseness), heterogeneity, individualism (vs. collectivism), and self-expression (vs. survival) values, did not explain the emotional expression-experience discrepancy for negative emotion, while only societal development indicators and their related constructs did so, indicating a unique and crucial role of societal development in negative expressivity. This null finding appears inconsistent with a prior study by Matsumoto, Yoo & Fontaine (2008), which reported a relation between individualism-collectivism and emotional expressivity. However, although both this study and the prior research employed Hofstede's individualism-collectivism dimension, our conceptualizations of expressivity differ. We developed a *discrepancy-based* expressivity approach, focusing on the gap between individuals' emotional experiences and their outward expressions, whereas Matsumoto, Yoo & Fontaine (2008) research examined *belief-based* expressivity, which reflects expectations or norms about how emotions should be displayed. Therefore, belief-based expressivity may be more readily influenced by value-based dimensions like individualism-collectivism, which shape normative emotional display rules, while our discrepancy-based expressivity might be less related to the value-based cultural dimension, but more closely tied to structural factors, which vary in the social effect of emotions in the social environment in which they operate. More broadly, these differences highlight that both emotional and cultural constructs are subject to variation in their conceptualization and measurement. The measurement and dimensionality of national-level individualism–collectivism remain actively debated (e.g., Akaliyski et al., 2026), and recent work on emotional conformity has shown that the predictive role of cultural dimensions varies not only across different cultural constructs, but also across types of emotional measures (e.g.,

experienced vs. valued, positive vs. negative), and even across alternative operationalizations of the same cultural dimension (Smith et al., 2025). Future research may further clarify under what conditions the relation between the individualism–collectivism dimension and emotional expressivity becomes more salient by employing different conceptualizations and operationalizations of both constructs.

In addition, there were some inconclusive patterns regarding the impact of societal development on the expressivity of specific emotions. For instance, among all the expression-experience discrepancies (EED) for positive emotions, only the EED for gratitude was significantly correlated with societal development after Bonferroni correction. The significant moderation of gratitude by societal development indicates that, as societies become more advanced, there may be a greater under-expression of gratitude. Among the prosocial positive emotions such as love and compassion, gratitude is regarded as facilitating reciprocity (Sauter, 2017). In certain cultural contexts, the act of expressing gratitude may also give rise to feelings of indebtedness, creating an obligation to reciprocate the favor received from the benefactor and hence be suppressed (Oishi et al., 2019).

This selective under-expression of gratitude can be contrasted with the non-significant association of societal development with the expression-experience discrepancy for anger. Anger is often regarded as a basic and universal emotion (Ekman, 1999) and rooted in ancestral mechanisms optimized for small-scale societal interactions, rather than the nuanced dynamics of modern, developed societies (Sell et al., 2009). Hence, it may exhibit a relatively stable pattern of expression that transcends variations in societal development levels. In contrast, hostility, disgust, and hate are associated with long-term social issues and biases (Allport, 1954; Rozin et al., 2009). Thus, they might be more subject to societal and cultural influences over time.

*Cultural Implications with Illustrative Examples.* A noteworthy finding in our data concerns the apparent similarity in emotional expression patterns between Italy and Ghana. Both countries demonstrate relatively low under-expression of negative emotions and even slight over-expression of positive emotions, which stands in contrast to their marked differences in societal development levels.

Italy is widely recognized as a highly expressive culture (Morris et al., 2012). Italian social communication is characterized by high affective intensity, where both verbal and non-verbal emotional cues are amplified and socially affirmed (Kendon, 1995). Positive emotions are typically viewed as desirable interpersonal signals, serving affiliative and relational functions. This expressive norm also applies to negative emotions, which tend to be expressed relatively openly in Italian culture, although moderated by contextual factors. Such openness contrasts with cultures where negative emotions are strongly suppressed due to norms prioritizing social order and hierarchy (Matsumoto Yoo, Nakagawa et al., 2008).

Ghana, specifically within the Akan cultural context, exhibits a comparable pattern of mild over-expression of positive emotions and minimal under-expression of negative ones, despite a distinct socio-cultural framework. In Akan society, emotional expression is guided by norms that prioritize social harmony and context-specific appropriateness (Dzokoto et al., 2018). For instance, Akan proverbs suggest that excessive displays of pride may be discouraged to avoid social disruption, while emotions like shame may be expressed to signal social awareness (Dzokoto et al., 2018). This balance of emotional openness and control, according to situational contingencies and social roles, results in a flexible expressive pattern that aligns with the observed quantitative similarity to Italy. A contrasting example of within-cluster divergence is provided by Switzerland. Despite belonging to the Germanic Europe cluster alongside Austria and Germany, Switzerland exhibited the strongest under-expression of negative emotions in the entire sample ($d = -1.16$), considerably exceeding Austria ($d = -0.77$) and Germany ($d = -0.70$). This pronounced under-expression aligns with Switzerland's position at the top of the societal

development indicators (HDI = 0.94), yet the magnitude exceeds what the regression model would predict based on these indicators alone, suggesting that additional cultural factors specific to Swiss society may contribute to this pattern.

Although Italy and Ghana share a similar expressive pattern (low under-expression of negative emotions and mild over-expression of positive emotions), these patterns are embedded in divergent expressive ideologies: one rooted in emotional spontaneity and relational warmth, the other in social role sensitivity and contextual calibration. These examples, together with the case of Switzerland, highlight the importance of interpreting emotional expressivity within each culture's specific relational, contextual, and communicative frameworks.

*Practical Implications.* The current finding may also provide insights for research on emotion regulation regarding the effectiveness of using negative emotional expression as a social strategy in real-life settings. These insights are pivotal for better practices in multi-cultural contexts, such as industrial/organizational or mental health practices involving individuals with mixed cultural backgrounds, where the need for cultural sensitivity in communication is emphasized. For instance, a study focusing on Iranian immigrants in Germany found significant differences in how anger is expressed among Germans, Iranians, and Iranian migrants, depending on their cultural adaptation strategy (Gilan et al., 2022). This indicates that immigrants from certain cultures might seem under-expressive to members of some over-expressive cultures, which might lead to intercultural misunderstanding and even dispute, especially when the consequences of under-expression for some emotions are different across cultures (Butler et al., 2007).

## Limitations & Future Research

*Constraints on Generality.* Regarding constraints on the generality of the current study (Simons et al., 2017), we note several boundary conditions across participants, measures, and geographical coverage. Most of our participants were drawn from convenient, student samples. Although we did not observe that demographic characteristics moderated the effect of our focal variables, the current findings may only describe or be applicable to the younger adult generation across our target nations. Older adults or non-student populations, who may have undergone more prolonged socialization into emotion display norms, could exhibit different expression-experience discrepancy patterns. Additionally, while our samples spanned 48 and 65 nations across two studies, certain world regions (e.g., Central Asia, the Pacific Islands) were underrepresented, and the findings should be generalized to these contexts with caution.

*Measurement and Design Limitations.* The present study relied on emotional self-report using a retrospective time frame (as opposed to momentary experience), which is one type of access to emotion knowledge (Robinson & Clore, 2002). Such emotion self-reports may represent "holistic constructions of key emotional events" (Thomas & Diener, 1990, p. 296) rather than direct recall of emotional experiences. Retrospective self-reports of one's emotions tend to show decreasing accuracy over time (Thomas & Diener, 1990). Implementing a reliable self-reported, retrospective emotional measure with a specific time frame (e.g., "once a week/day") could enhance the consistency and comparability of data across different nations. This approach might mitigate some of the limitations associated with broader retrospective accounts and provide more precise insights into emotional expressivity across diverse cultural settings.

As for the measures used, Study 2 employed a reduced set of eight emotion items compared to the 30 items in Study 1. Although a sensitivity analysis confirmed that the key findings replicate with this subset (see Study 2 Results), the narrower item set may capture a more limited range of emotional experiences and expressions. Additionally, our emotion items were measured

as retrospective frequencies of experiences and expressions in general. Other dimensions of emotional behaviours, such as intensity and event-specificity, however, were not within the scope of the current study. Hence, we cannot know whether under-expression of negative emotion is due to different emotional regulation strategies (Gross, 1998, 2014), such as emotional suppression (i.e., one does not express the corresponding emotion that one feels) and/or antecedent-focused down-regulation (i.e., one reappraises the situation so that expression becomes unnecessary). According to Gross's process model of emotion regulation (2014), these strategies reflect regulation efforts occurring at different stages of the emotion-generative process, from situation selection and cognitive change (e.g., reappraisal) to response modulation (e.g., suppression). Our current data, focusing on national-level expressivity patterns, do not allow us to determine whether such regulation occurs prior to, or at the point of, expressive behaviour. However, the observed under-expression of negative emotions in more developed societies may reflect either reduced need for expressive signaling due to proactive regulation at earlier stages, or socially shaped tendencies to suppress expression at the response stage. Future research is needed to delineate these possibilities by identifying when and how emotion regulation is initiated within specific situational contexts.

In addition, as this study is correlational, some of the interpretations drawn from these findings require confirmation through methods capable of tracking within-person processes across time and contexts. While our results suggest that features of societal structure, such as institutional trust and system quality, may relate to the discrepancy between experienced and expressed emotions, our cross-national design does not permit causal inference. Future studies using experience sampling or experimental manipulations of contextual cues (e.g., varying levels of institutional responsiveness or social accountability) could assess whether particular emotion regulation strategies are more likely in particular environments. This approach would allow researchers to clarify the psychological mechanisms through which societal contexts modulate emotional expressivity.

## Conclusion

This study examined the expression-experience discrepancy (EED) of emotions across 48 (Study 1) and 65 (Study 2) nations, revealing that both positive and negative emotions are generally under-expressed, with negative emotions showing greater under-expression. Societal development indicators, trust, system quality, and HDI, were significantly associated with stronger under-expression of negative emotions, implying that efficient societal systems may reduce the need for emotional signaling. These findings support the Signaling Reduction Hypothesis, advancing the social-functional approach to emotions and informing multicultural communication practices. We encourage future research employing experience sampling and experimental design to clarify causal mechanisms and explore emotion regulation strategies to deepen understanding of how societal contexts relate to emotional expressivity.

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## Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Data Availability Statement

Aggregated country-level data and analysis code for the main analyses in Study 1 are publicly available on the Open Science Framework at https://osf.io/84prv/. Study 2 aggregated data and individual-level data for both studies are available from the corresponding author upon reasonable request.

## Supplemental Material

Supplemental material for this article is available online.

## Notes

1 The term 'nations and regions' is used to acknowledge the inclusion of distinct cultural and administrative entities, such as Hong Kong, which are considered separate for the purpose of this cross-cultural analysis. The current paper excluded one nation (Indonesia) from the data source due to the emotional norms for negative emotions being more than four *SD* from the means of the rest of the nations, as described in Krys et al. (2022).

2 We included only participants who self-reported ages between 18 and 60, excluded responses deemed of low quality (e.g., random or non-compliant with instructions), and considered only data from nations contributing more than 100 valid responses.

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