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Communicating Emotion Through Drawings Across Cultures

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Author contributions: X.F. designed the experiment. X.F., S.W., H.C., R.W., and S.K. implemented the study design and collected data. S.W., H.C., R.W., and X.F. analyzed data. X.F., S.D., and K.K. interpreted results and created figures. X.F., S.W., H.C., and R.W. drafted the manuscript. All authors provided critical revisions and approved the final manuscript for submission.

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Abstract

People use drawings to convey how they feel, yet we know little about how culture shapes such representations and how viewers from different cultures perceive them. We examined whether emotion recognition from drawings was better explained by the emotion-dialect account, which predicts an ingroup recognition advantage, or by the historical-heterogeneity account, which predicts a general recognizability advantage for drawings from historically heterogeneous societies. Across two production studies, Canadian and Chinese expressers produced drawings depicting seven emotion categories, allowing us to establish whether culture shaped the drawings later judged by perceivers. Canadian expressers used a more focal graphic style than Chinese expressers: their drawings contained fewer objects, covered more of the page, and relied more on bodily cues. Across four recognition studies, Canadian, Chinese, and Indian perceivers judged these drawings, with Indian perceivers providing a third-culture test of overall recognizability. Among Canadian and Chinese perceivers, recognition was generally more accurate when expressers and perceivers shared a cultural background than when they did not. Across studies, however, Canadian drawings showed no reliable overall recognition advantage over Chinese drawings. These findings were consistent with the emotion-dialect account but provided little support for the historical-heterogeneity account. Exploratory analyses further showed that some drawing features were associated with overall recognition accuracy, but none was reliably associated with the ingroup advantage. Together, these findings extend previous research on faces and voices by highlighting drawings as a culturally patterned system for communicating emotion.

Keywords: emotion communication, culture, ingroup advantage, emotion dialects, historical heterogeneity

Statement of limitations:

The present research has several limitations that constrain interpretation and generalizability. First, although we document an ingroup advantage in recognizing emotions from drawings, the specific graphic conventions that may underlie this advantage remain underspecified. Our coding scheme sampled only broad dimensions of drawing style and does not constitute a comprehensive taxonomy of graphic cues. Second, our analyses relied on individual-level measures of self-construal and analytic–holistic thinking, and the number of cultural groups was insufficient to test society-level associations. The null associations involving these measures therefore do not rule out society-level cultural explanations of graphic emotion production and recognition. Finally, the generalizability of the findings is limited by sampling from only three countries, relying on student populations, and using a small set of emotions assessed with restricted response alternatives.

Communicating Emotion Through Drawings Across Cultures

From children's sketches and comics to emojis, safety pictograms, digital icons, and museum paintings, people routinely look to lines, shapes, and symbols for clues to how others feel. A few strokes can suggest joy, anger, or sadness, and these graphic cues are an important part of everyday communication. Yet drawn symbols are not interpreted uniformly. Studies of icons and emojis show that the same design can elicit different emotional interpretations across platforms and cultural groups, sometimes leading to substantial miscommunication (Chu, 2003; Miller et al., 2016; Piamonte et al., 2001; Wang et al., 2022). This variability in visual meaning raises a basic question: How does culture shape the way emotions are depicted and understood in drawings?

Drawings are learned representational systems that link visual form to meaning. Like language, they rely on shared conventions that guide how people produce and interpret modality-specific signs (Cohn, 2012, 2014, 2020). Such conventions are not culturally neutral. Prior work suggests that culture can shape the graphic systems people use and the contextual cues they employ when interpreting emotion in images (Cohn, 2012, 2014; Masuda et al., 2008). Drawings can therefore reveal culturally learned ways of depicting emotion and recognizing emotions.

Drawings also offer an advantage over faces and voices for studying cultural variation in emotion communication. Because facial expressions carry cues to race or ethnicity and vocal expressions carry cues to native language or accent, it is difficult to separate emotional information from social identity information. Drawings can convey emotion while reducing many of these identity cues, making them a useful medium for examining how emotions are produced and recognized across cultures.

In the present research, we examined how cultures shape both the recognition and production of emotion through drawings. We tested whether recognition accuracy was higher when expressers and perceivers shared a cultural background, as predicted by the emotion-dialect account, or whether drawings produced in historically heterogeneous cultures were recognized more accurately across perceivers, as predicted by the historical-heterogeneity account. We also assessed cultural differences in the visual features used to depict emotion and explored whether these features were associated with overall recognizability or the ingroup advantage.

Emotion Dialects and Ingroup Advantage

Culture systematically shapes how emotions are expressed and perceived (Keltner et al., 2019; Matsumoto & Hwang, 2012; Mesquita & Boiger, 2014). The dialect account of emotion proposes that emotional communication is grounded in a universally shared system, but that culture-specific learning also shapes how emotions are expressed and decoded. As a result, different cultural groups may develop subtle but reliable differences in both the cues expressers produce and the cues perceivers rely on when interpreting emotions (Elfenbein & Ambady, 2002, 2003; Elfenbein et al., 2007). When expressers and perceivers share a cultural background, these culturally learned conventions should align, yielding higher recognition accuracy of emotions relative to cross-cultural pairings.

In a meta-analysis focusing predominantly on facial stimuli, Elfenbein and Ambady (2002) found that emotions are recognized at better-than-chance levels across cultures, yet accuracy is higher when emotions are expressed and recognized within the same national, ethnic, or regional group. Furthermore, the magnitude of this ingroup advantage was smaller when exposure to other cultures was greater (e.g., shared residence, geographic proximity, telephone

communication). In a complementary production-perception study (Elfenbein et al., 2007), participants from Quebec and Gabon were instructed to pose a set of emotions using facial expressions. An analysis of the activated facial action units revealed substantial cross-cultural consistency, alongside reliable differences that constitute dialects. In subsequent perception tasks with new Canadian and Gabonese samples, within-culture recognition exceeded cross-cultural recognition. Notably, the ingroup advantage was larger for expressions that showed larger cross-cultural "dialect" differences in their activated action units, suggesting that cultural variation in how emotions are produced translates into cultural variation in how they are recognized.

A comparable pattern of results has been found for emotion recognition from voices. A meta-analysis of 37 cross-cultural studies of emotion recognition from speech prosody and nonverbal vocalizations found higher accuracy within than across cultures. Cultural distance, measured as group differences on established cultural dimensions such as individualism-collectivism or power distance, was negatively associated with accuracy and positively associated with the size of the ingroup advantage (Laukka & Elfenbein, 2021). Complementary work used stimuli produced by 100 professional actors from five English-speaking nations, each conveying 11 emotions with semantically controlled sentences (Laukka et al., 2016). Acoustic analyses revealed broad similarities across groups, but also systematic group differences that were consistent with theorizing related to cultural "accents" in expressive styles. In a balanced 5 × 5 (speaker culture × listener culture) design, cross-cultural accuracy exceeded chance, but an ingroup advantage also emerged. This advantage was consistent with a closer match between the acoustic cues used in emotional expression and those used in emotion perception within cultures.

Taken together, this literature suggests that recognition is typically higher when expressers and perceivers share a cultural background. If emotion dialects also operate in the

graphic modality, then drawings should be recognized more accurately when they are produced and judged within the same culture, while still being broadly understandable across cultures.

Historical Heterogeneity and a Clarity Advantage

Rather than predicting a recognition advantage tied to cultural matching between expressers and perceivers, the historical-heterogeneity account proposes that emotional expressions from historically heterogeneous cultures are, on average, easier for observers to recognize than those from historically homogeneous cultures (Niedenthal et al., 2019; Wood et al., 2016). The central idea is that long-term migration patterns shape everyday communication norms. In historically homogeneous societies, where values, beliefs, and interpersonal expectations are more widely shared, communication can rely on common background knowledge and situational cues, consistent with a relatively high-context style of communication (Gudykunst & Ting-Toomey, 1988; Hall, 1976; Mesquita & Frijda, 1992). In historically heterogeneous societies, by contrast, greater diversity in values and beliefs may place stronger pressure on individuals to communicate feelings and intentions more directly and explicitly, consistent with a relatively low-context style (Gudykunst et al., 1996; Niedenthal et al., 2019; Rychlowska et al., 2015). Over time, this process is thought to foster expressive styles that are less dependent on shared context and more readily interpretable by unfamiliar others.

In an analysis of 92 studies yielding 212 cross-cultural recognition scores, Wood and colleagues (2016) found evidence for the predicted pattern of facial emotion communication. Specifically, they found that expressions produced by individuals from historically heterogeneous societies were, on average, recognized more accurately than expressions produced in homogeneous societies, consistent with a general clarity advantage. Converging evidence from display rules (cultural norms around the permissibility of showing one's emotion) showed

that people from heterogeneous countries found more open or even amplified emotional expressions acceptable, whereas people from homogeneous countries endorsed stronger norms to mask expressions (Rychlowska et al., 2015). Direct analyses of facial behavior further supported this view: using a supervised machine learning approach to categorize expressions based on patterns of activated facial action units, both posed and spontaneous expressions were more discriminable when produced by expressers from a heterogeneous (Netherlands) than a homogeneous (China) culture (Fang et al., 2022). Overall, these findings suggest that people in historically heterogeneous cultures may produce emotional expressions with greater expressivity and clarity. If this account extends to the graphic modality, drawings created by members of historically heterogeneous cultures should be identified more accurately overall than drawings created by members of historically homogeneous cultures, regardless of perceiver culture.

Two Accounts of Cultural Variation in Emotion Recognition

Both accounts posit that emotional signals are broadly intelligible across cultures, but they differ in how and why culture is expected to shape recognition. The emotion-dialect account focuses on the relation between expressers and perceivers, proposing that culturally learned conventions shape both expression and interpretation. Applied to the present research, this account predicts an interaction between expresser culture and perceiver culture. By contrast, the historical-heterogeneity account focuses on broader cultural-historical conditions, proposing that long-term migration patterns shape general norms of emotional expression, such that expressions from historically heterogeneous societies may be more broadly recognizable across perceivers. This account therefore predicts a main effect of expresser culture on recognition accuracy. Together, these accounts motivated separate tests of culture-matched recognition and broader recognizability.

Cultural Variation in the Visual Depiction of Emotion

Although the emotion-dialect and historical-heterogeneity accounts make different predictions about recognition, both suggest a connection between how emotion is depicted and how it is recognized. From an emotion-dialect perspective, expressers may use culturally specific graphic conventions that are more readily understood by perceivers from the same culture (Elfenbein & Ambady, 2002, 2003; Elfenbein et al., 2007). From a historical-heterogeneity perspective, expressers from more heterogeneous societies may use clearer or more explicit visual cues that are more readily understood across cultural boundaries (Rychlowska et al., 2015; Wood et al., 2016). Neither account, however, specifies which graphic features should vary across cultures or relate to recognition. We therefore drew on cross-cultural research on visual production to identify broad candidate dimensions along which graphic depictions of emotion might vary.

Analyses of traditional landscape paintings, contemporary landscape drawings, and portrait photographs indicate that East Asian visual products tend to include more contextual information, whereas Western visual products tend to place greater emphasis on focal objects and visually salient foreground elements (Masuda et al., 2008; Nand et al., 2014). Similar patterns emerge in children's artworks. In a study of Canadian and Japanese school-age children, Senzaki and colleagues (2014) found that, beginning in Grade 2, Japanese children placed the horizon higher in landscape drawings and included more pieces of information in landscape collages than Canadian children. Together, these findings suggest that cultural differences in visual production can be reflected in how much information is included in an image and how strongly focal elements are foregrounded relative to surrounding context.

More directly relevant to the present research, studies of emotional drawings suggest that culture can shape how emotions are visually represented. Danner-Weinberger et al. (2019) asked German and Vietnamese art therapy students to draw pictures related to basic emotions and found that the two groups differed in how they represented emotion. Vietnamese participants more often used concrete, scenic expressions, including representations of stories, suggesting that emotions can be embedded in broader situational contexts. German participants, by contrast, relied less on scenic depictions and more often used abstract or implied forms of expression**,** such as colors, lines, or symbolic elements that suggested an emotion without depicting a specific event or story. Although evidence on emotional drawings remains limited, this work suggests that cultural variation in emotional drawings may involve whether emotions are conveyed through focal expressive cues, such as faces, bodies, gestures, and postures, or through broader scenes and situations.

Building on this literature, we examined four broad characteristics of emotional drawings: object count, page coverage, bodily versus situational cues, and abstraction versus concreteness. Object count indexed the amount of visual information included in a drawing. Page coverage indexed visual prominence based on the proportion of available space occupied by the drawing. Bodily versus situational cues distinguished focal expressive cues, such as facial expressions, gestures, and postures, from broader scenes and situations. Finally, abstraction versus concreteness distinguished abstract symbols from concrete objects and situations.

Although these features were selected to capture broad ways in which emotional depictions might vary across cultures, they could also be relevant to the recognition patterns emphasized by the emotion-dialect and historical-heterogeneity accounts. Features reflecting culturally familiar graphic conventions may be more readily understood when expressers and

perceivers share a cultural background, whereas features that make emotional cues clearer may facilitate recognition across perceiver cultures. Accordingly, we also explored whether the coded features were associated with the ingroup advantage or overall recognizability.

The Present Research

The present research examined cross-cultural emotion communication through drawings at both the production and recognition levels across six studies (see Table 1 for an overview).

Table 1

Overview of Present Studies

Set	Study	Participants	Drawings	Additional Measures
Emotion Production	1a	Canadian and Chinese expressers	1,470 drawings	SSCS; self-rated drawing skill/training
	1b (preregistered)	Canadian and Chinese expressers	616 drawings	SCS and AHS; self-rated drawing skill/training
Emotion Recognition	2a	Canadian and Chinese perceivers	From Study 1a	—
	2b (preregistered)	Canadian and Chinese perceivers	From Study 1b	SCS and AHS
	3a	Indian perceivers	From Study 1a	—
	3b (preregistered)	Indian perceivers	From Study 1b	SCS and AHS

Note. SSCS = Sixfold Self-Construal Scale; SCS = Self-Construal Scale; AHS = Analytic–Holistic Thinking Scale.

In Studies 1a and 1b, Canadian and Chinese expressers produced drawings depicting anger, disgust, fear, surprise, sadness, happiness, and a neutral state. Study 1b was a preregistered replication of Study 1a with an independent sample. These studies examined whether Canadian and Chinese expressers differed in the visual features of their emotion drawings, and the resulting drawings provided the stimuli for the subsequent recognition studies.

Expressers from Canada and China were selected because these countries differ markedly in historical heterogeneity, with China typically characterized as historically more homogeneous and Canada as more heterogeneous due to sustained migration (Niedenthal et al., 2019; Rychlowska et al., 2015; Wood et al., 2016).

In Studies 2a and 2b, Canadian and Chinese perceivers judged the emotions conveyed in the drawings from Studies 1a and 1b, respectively. These studies tested whether recognition accuracy would be higher when expressers and perceivers shared a cultural background, as predicted by the emotion-dialect account, or whether drawings from the historically more heterogeneous culture (i.e., Canada) were recognized more accurately overall, as predicted by the historical-heterogeneity account. In Studies 3a and 3b, Indian perceivers judged the same drawings, providing a third-culture test of whether Canadian and Chinese drawings differed in overall recognizability. Finally, exploratory drawing-level analyses examined whether the coded features were associated with the ingroup advantage or overall recognition accuracy.

Transparency and Openness

This manuscript was written in accordance with the Journal Article Reporting Standards (JARS; Appelbaum et al., 2018). We report how sample sizes were determined, all data exclusions, all manipulations, and all measures in each study. All data and analysis code are available at https://osf.io/f92xa/?view_only=8d251a59abae49ab910d5cc6e4a12ade. The designs and analyses of Studies of 1a, 2a, and 3a were not preregistered. Studies 1b, 2b, and 3b were preregistered before data collection (Studies 1b and 2b: https://aspredicted.org/pdfp-fdqn.pdf; Study 3b: https://aspredicted.org/d4x3-d4tp.pdf). Studies received approval from the relevant university ethics committees in China, Canada, and India. Participants provided informed consent and received course credit or monetary compensation. All statistical analyses and

visualizations were conducted using R, Version 4.5.1 (R Core Team, 2024). The main packages were lme4, Version 1.1.37 (Bates et al., 2015), glmmTMB, Version 1.1.14 (Brooks et al., 2017), ordinal, Version 2025.12.29 (Christensen, 2025), simr, Version 1.0.9 (Green & MacLeod, 2016), emmeans, Version 1.11.2 (Lenth, 2025), effectsize, Version 1.0.1 (Ben-Shachar et al., 2020), lavaan, Version 0.6.19 (Rosseel, 2012), bruceR, Version 2024.6 (Bao, 2024), psych, Version 2.5.6 (Revelle, 2025), tidyverse, Version 2.0.0 (Wickham et al., 2019), and ggplot2, Version 3.5.2 (Wickham, 2016).

Studies 1a and 1b: Emotion Production in Canada and China

Studies 1a and 1b first examined cultural differences in how Canadian and Chinese expressers depicted emotion in drawings. Participants in two independent samples generated drawings that were later used in recognition studies. Guided by prior work on cross-cultural visual production and emotional drawings, we focused on four drawing characteristics: object count, page coverage, reliance on bodily versus situational cues, and abstraction versus concreteness. We expected Canadian drawings to show greater visual prominence and stronger reliance on bodily cues than Chinese drawings. In contrast, we expected Chinese drawings to include more visual information and stronger reliance on situational cues than Canadian drawings. We also examined whether the two groups differed in abstraction versus concreteness and whether drawing characteristics were associated with individual differences in self-construal and analytic–holistic thinking.

Method

Participants

In Study 1a, we recruited 226 participants (114 from Canada and 112 from China). Data from 16 participants were excluded because they provided non-original drawings (n = 1), unclear

photographs (n = 8), or drawings that included text (n = 7). The final sample was comprised of 105 Canadian participants (M_{age} = 21.38, SD = 4.46; 22 men, 81 women and 2 others; 90% White) from a university in Canada, and 105 Chinese participants (M_{age} = 20.10, SD = 1.72; 23 men and 82 women; 100% Asian) from several universities in China. Among Canadian participants, 92% (n = 97) reported being born and raised in Canada; the other participants had resided in Canada for an average of 14.13 years (SD = 3.68). All Chinese participants reported being born and raised in China.

In Study 1b, we recruited a different sample of 104 participants (53 from Canada and 51 from China). Data from 16 participants were excluded because they provided unclear photographs (n = 2), drawings containing text (n = 3), completed the task twice (n = 6), provided the same drawing across emotions (n = 4), or failed the attention check[1] (n = 1). The final sample consisted of 43 Canadian participants (M_{age} = 20.58, SD = 4.38; 19 men, 24 women; 98% White) from a university in Canada, and 45 Chinese participants (M_{age} = 20.38, SD = 3.64; 18 men and 27 women; 100% Asian) from a university in China. All participants reported being born and raised in their respective countries.

For the main analyses, we combined the two batches of drawings, yielding a final sample of 298 expressers (148 Canadian and 150 Chinese participants).[2] Because the drawing features differed in scale and distribution and were analyzed with different mixed-model families, we conducted an approximate sensitivity analysis in G*Power 3.1 (Faul et al., 2007) using a two-tailed independent-samples comparison. The combined sample of 298 expressers provided 80% power to detect an overall between-culture difference of d = 0.33 at α = .05. This estimate served as an approximate benchmark for the primary between-culture comparison rather than a model-specific power estimate.

Materials and Procedure

Tasks were administered via the Qualtrics XM online survey platform (https://www.qualtrics.com/). Participants were asked to ensure that they had access to either a camera-equipped mobile phone or a digital camera, as well as a pencil, eraser, and seven sheets of A4-sized white paper. Participants were presented with seven emotion terms (anger, disgust, fear, happiness, sadness, surprise, and neutral) along with definitions and verbal examples of each emotion in a specific context (see Supplementary Table S1). For each emotion, participants were instructed to think about a situation in which they would experience that emotion and then create a drawing depicting it. They could draw anything they believed conveyed the emotion, and there was no time limit. Participants were instructed not to include text in their drawings. Participants were asked to use a pencil and a single A4 white paper for each drawing. They were allowed to use an eraser to modify their image. After completing each drawing, participants were instructed to take and upload a photograph that met the following requirements: (1) The drawing is clearly visible (with good lighting and resolution); (2) The A4 white paper is centered in the photograph; and (3) The A4 white paper largely fills the photograph. Each participant drew and uploaded 7 photographs.

Cultural Orientation Measures

After the expression task, expressers completed a set of self-report measures. In Study 1a, participants responded to the Sixfold Self-Construal Scale (SSCS, see Supplementary Table S2; Harb & Smith, 2008), which assesses personal, relational, and collective self-views. Internal consistencies were acceptable both for Canadian participants (personal $\alpha = .74$, relational $\alpha = .88$, and collective $\alpha = .85$) and for Chinese participants (personal $\alpha = .58$, relational $\alpha = .78$, and collective $\alpha = .85$).

In Study 1b, participants responded to two measures that directly capture cultural cognitive tendencies relevant to visual expression: the Self-Construal Scale (SCS; Singelis, 1994; see Supplementary Table S3) and the Analytic–Holistic Thinking Scale (AHS; Choi et al., 2007; see Supplementary Table S4). For the SCS, internal consistency was $\alpha = .62$ for Canadian participants and $\alpha = .73$ for Chinese participants; for the AHS, internal consistency was $\alpha = .62$ for Canadian participants and $\alpha = .66$ for Chinese participants.

Drawing Experience Measures

Finally, both Canadian and Chinese expressers rated their drawing skills ("Are you good at drawing?") on a 9-point scale (1 = Not at all, 9 = Extremely) and indicated whether they had received formal drawing training (Yes/No). If participants responded "Yes," they were asked to report the number of years of training. Canadian and Chinese expressers completed the study in English and Mandarin, respectively.

Coding of Drawing Features

Two research assistants, naive to the research hypotheses, coded the drawings along the four target features (see codebook in Supplementary Table S5). Specifically, object count indicated the number of discrete items in each drawing. Page coverage was assessed according to the proportion of the page used in the drawing, with scores ranging from 1 to 4: 1 = about 1/5 of the page, 2 = about 2/5, 3 = about 3/5, and 4 = about 4/5 or more. Bodily-versus-situational cues reflected the extent to which the drawing included only situational cues (0), a mix of situational and bodily cues (1), or only bodily cues (2) in the depiction of emotions. Abstraction-versus-concreteness indexed the extent to which the drawing was primarily abstract, such as nonrepresentational lines or shapes (0), mixed abstract and concrete elements (1), or primarily concrete, such as clearly identifiable objects or people (2).

To ensure coding reliability, both coders jointly evaluated an initial set of 20 drawings, resolving discrepancies through discussion. This process was repeated until they reached approximately 90% agreement. Subsequently, each assistant independently coded 60% of the full dataset, with 10% overlap to check reliability. Percent agreement on the overlapped ratings was 89.63%. Discrepancies were resolved by discussion prior to analysis.

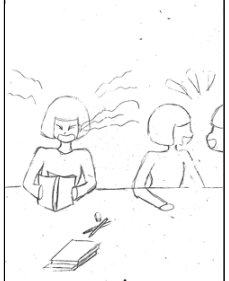
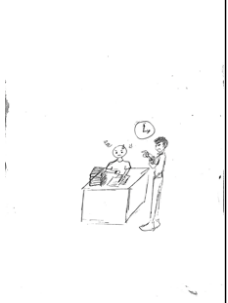
Results and Discussion

Cultural Differences in Drawing Features

Study 1a yielded a total of 1,470 drawings (7 per expresser × 210 expressers), and Study 1b yielded 616 drawings (7 per expresser × 88 expressers). Figure 1 shows example drawings produced by Canadian and Chinese expressers.

Figure 1

Examples of Drawings Depicting the Seven Emotions Produced by Canadian (Top) and Chinese (Bottom) Participants

Expresser	Anger	Disgust	Fear	Happiness	Sadness	Surprise	Neutral
Canadian							
Chinese							

To examine cultural differences in the four drawing features (object count, page coverage, bodily versus situational cues, and abstraction versus concreteness), we analyzed the two batches from Studies 1a and 1b together using outcome-specific mixed-effects models. The models included Expresser Culture, Drawing Batch, and their interaction as fixed effects, along with a random intercept for expresser ID to account for the seven drawings produced by each expresser.[3] The four outcomes differed in scale and distribution; we used a negative binomial mixed model for object count, linear mixed-effects models for page coverage, and cumulative link mixed models for bodily-versus-situational cues and abstraction-versus-concreteness. Table 2 presents the fixed-effect tests from these models.

Table 2

Effects of Expresser Culture, Drawing Batch, and Their Interaction on Drawing Features in Studies 1a and 1b

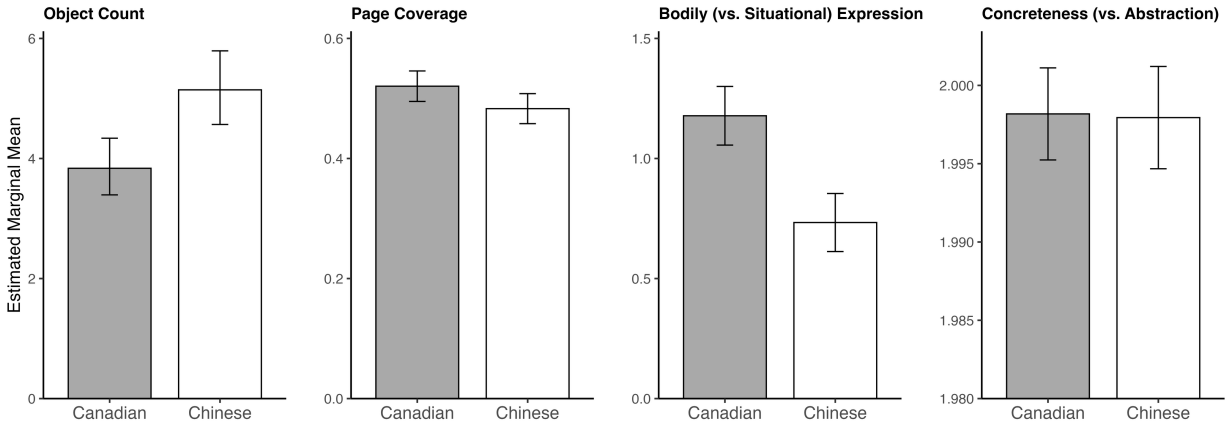
Drawing Feature	Effect	*df*	χ^2	*p*
Object count	Expresser Culture (EC)	1	11.33	.001
	Drawing Batch (DB)	1	14.04	< .001
	EC × DB	1	0.06	.799
Page coverage	Expresser Culture (EC)	1	4.26	.039
	Drawing Batch (DB)	1	6.89	.009
	EC × DB	1	0.13	.714
Bodily-versus-situational cues	Expresser Culture (EC)	1	26.24	< .001
	Drawing Batch (DB)	1	0.42	.519
	EC × DB	1	0.54	.464
Abstraction-versus-concreteness	Expresser Culture (EC)	1	< .01	.965
	Drawing Batch (DB)	1	0.51	.476
	EC × DB	1	0.46	.497

As shown in Table 2, Expresser Culture significantly predicted object count, page coverage, and bodily-versus-situational cues, but not abstraction-versus-concreteness. These

effects were not significantly qualified by Drawing Batch. We therefore focus below on the main effect of Expresser Culture for each feature, with model-estimated means shown in Figure 2.

Figure 2

Cultural Differences in Four Drawing Features Across Studies 1a and 1b



Note. Bars represent model-estimated means across the two drawing batches. Error bars represent 95% confidence intervals. Higher values indicate more objects, greater page coverage, greater reliance on bodily cues, and greater concreteness.

Compared with Chinese drawings, Canadian drawings contained fewer objects (Canadian: $M = 3.84$, $SE = 0.24$; Chinese: $M = 5.14$, $SE = 0.31$), $\chi^2(1) = 11.33$, $p = .001$, estimated ratio = 0.75, 95% CI [0.63, 0.89]. Canadian drawings also used slightly more of the page (Canadian: $M = 0.52$, $SE = 0.01$; Chinese: $M = 0.48$, $SE = 0.01$), $\chi^2(1) = 4.26$, $p = .039$, $b = 0.04$, 95% CI [0.00, 0.07]. In addition, Canadian drawings showed a greater tendency toward bodily rather than situational cues than Chinese drawings (Canadian: $M = 1.18$, $SE = 0.06$;

Chinese: $M = 0.73$, $SE = 0.06$), $\chi^2(1) = 26.24$, $p < .001$, $b = 0.44$, 95% CI [0.27, 0.62]. No reliable cultural difference emerged for abstraction-versus-concreteness, $\chi^2(1) = 0.002$, $p = .965$.

Additional Exploratory Coding of Subject–Background Relations. To further examine whether cultures differed in how focal emotional subjects were visually foregrounded relative to contextual information, we conducted an additional exploratory coding of drawings that contained both bodily and situational cues ($n = 878$). Coders annotated the area occupied by the emotion-relevant subject and the background, from which we calculated subject size, background size, and the subject-to-background ratio. Full procedures and reliability estimates are reported in Supplementary Table S16, and fixed-effect tests are reported in Supplementary Table S17. Canadian drawings had larger emotion-relevant subjects than Chinese drawings (Canadian: $M = 0.13$, $SE = 0.01$; Chinese: $M = 0.10$, $SE = 0.01$), $\chi^2(1) = 4.96$, $p = .026$, $b = 0.03$, 95% CI [0.00, 0.05], whereas background size, $\chi^2(1) = 2.01$, $p = .156$, and the subject-to-background ratio, $\chi^2(1) = 0.23$, $p = .630$, did not differ reliably by expresser culture. Thus, this additional coding provided some evidence that Canadian expressers visually foregrounded the emotion-relevant subject more strongly, but it did not yield reliable cultural differences in the relative balance between subject and background.

Drawing Experience Checks

Analyses of drawing proficiency are reported in Supplementary Table S7. Self-reported drawing skill did not differ reliably by expresser culture in either batch, and prior drawing training did not show a consistent cultural pattern across batches. These results suggest that the observed cultural differences in drawing features were unlikely to be driven by systematic cultural differences in drawing experience.

Associations Between Cultural Orientation and Drawing Features

We next examined whether self-reported cultural orientation measures, including self-construal and analytic–holistic thinking, were associated with the four primary drawing features. Because these measures differed across the two batches, analyses were conducted separately for each batch. In Study 1a, Chinese expressers reported higher collective self-construal than Canadian expressers, but the two groups did not differ reliably in personal or relational self-construal. In Study 1b, Chinese expressers reported greater holistic thinking than Canadian expressers, but the two groups did not differ reliably in interdependence relative to independence (see Supplementary Table S8 for descriptive statistics and group comparisons). Because multigroup confirmatory factor analyses showed poor configural fit for these scales, between-culture comparisons should be interpreted with caution (see Supplementary Table S9). More importantly, correlations between the individual-difference measures and drawing features were not reliable in either batch after false discovery rate correction (Study 1a, rs = [–.22, .19], ps > .307; Study 1b, rs = [–.18, .32], ps > .148; see Supplementary Table S10). Together, these findings suggest that the observed cultural differences in drawing features were not reliably explained by individual differences in self-construal or holistic thinking.

In summary, across two independent batches of emotion drawings from Studies 1a and 1b, Canadian expressers used a more focal style than Chinese expressers. Specifically, they drew fewer objects, used more of the page, included more bodily cues, and, in an exploratory analysis of drawings containing both bodily and situational cues, drew larger emotion-relevant subjects. However, we found no reliable cultural differences in abstraction versus concreteness, background size, or the subject-to-background ratio. Individual differences in self-construal and analytic–holistic thinking were also not reliably associated with the coded drawing features.

Together, these findings establish that the drawings used in the recognition studies differed systematically in how emotion was visually depicted across cultures.

Studies 2a and 2b: Emotion Recognition by Canadian and Chinese Perceivers

In Studies 2a and 2b, we used the drawings produced by Canadian and Chinese expressers in Studies 1a and 1b to examine how perceivers from Canada and China infer emotions from drawings. According to the emotion-dialect account, an interaction between Expresser and Perceiver Culture would be expected, such that same-culture expresser–perceiver pairings should yield higher recognition accuracy than cross-culture pairings. By contrast, the historical-heterogeneity perspective predicts a main effect of Expresser Culture, such that drawings created by members of historically heterogeneous societies (i.e., Canada) should be recognized more accurately than drawings created by members of historically homogeneous societies (i.e., China), overall, regardless of the perceiver's culture. To test these predictions, Canadian and Chinese perceivers made judgments of the Canadian and Chinese drawings from the two independently generated batches. Specifically, in Study 2a, they evaluated the drawings from Study 1a and in Study 2b, new perceivers evaluated the drawings from Study 1b.

Method

Participants

In Study 2a, the 1,470 drawings from Study 1a were divided into seven sets of 210 images. Drawings were approximately balanced for expresser culture and emotion across sets, and participants were randomly assigned to rate one image set. Following prior work demonstrating that approximately 30 raters per culture yields high interrater reliability (Bjornsdottir & Rule, 2017; Rule et al., 2016), we recruited 443 participants (197 Canadian, 246 Chinese). After excluding the data from 18 participants who provided duplicate submissions and

21 participants who failed attention checks, the final sample was comprised of 189 Canadian participants (M_{age} = 20.08, *SD* = 4.10; 65 men, 118 women, and 6 others; 94% White) from a university in Canada, and 215 Chinese participants (M_{age} = 21.44, *SD* = 2.40; 85 men and 130 women; 100% Asian) from several universities in China. This strategy yielded approximately 27 Canadian and 31 Chinese ratings per drawing. Among Canadian participants, 87% (*n* = 164) reported being born and raised in Canada; the remaining participants had resided in Canada for an average of 15.88 years (*SD* = 7.44). All Chinese participants reported being born and raised in China.

In Study 2b, the 616 drawings from Study 1b were divided into four sets of 154 images. As in Study 2a, drawings were approximately balanced by expresser culture and emotion across sets, and participants were randomly assigned to one image set. We recruited 104 participants (57 Canadian, 47 Chinese). After excluding the data from 9 participants who failed the attention check, the final sample was comprised of 49 Canadian participants (M_{age} = 19.49, *SD* = 2.46; 9 men, 39 women, and 1 other; 100% White) from a university in Canada, and 46 Chinese participants (M_{age} = 19.37, *SD* = 1.98; 10 men and 36 women; 100% Asian) from a university in China. This strategy yielded approximately 12 Canadian and 12 Chinese ratings per drawing. All participants reported being born and raised in their respective countries.

For the main analyses, we combined the two recognition studies, yielding a final sample of 499 perceivers, with 238 Canadian perceivers and 261 Chinese perceivers. The primary questions concerned whether recognition accuracy depended on Expresser Culture and whether this effect varied by Perceiver Culture. We therefore conducted simulation-based sensitivity analyses targeting the Expresser Culture main effect and the Expresser Culture × Perceiver Culture interaction in recognition accuracy. The simulation model matched the primary

generalized linear mixed-effects model, including Drawing Batch, Expresser Culture, Perceiver Culture, and their interactions as fixed effects, with random intercepts for perceiver ID, expresser ID, and stimulus. Based on 500 simulations per tested effect size, the combined sample of 499 perceivers provided approximately 80% power to detect an Expresser Culture main effect of b = 0.39 or larger, corresponding to an odds ratio of 1.48, and an Expresser Culture × Perceiver Culture interaction effect of b = 0.14 or larger on the log-odds scale, corresponding to an odds ratio of 1.15, at $\alpha = .05$.

Procedure

The study was administered online using Qualtrics. Participants viewed cropped photographs of the drawings from Studies 1a or 1b. Any background outside the sheet of paper was removed, and background brightness was standardized. For each drawing, participants selected one or more emotions from a list of seven options (anger, disgust, fear, surprise, sadness, happiness, neutral) that best described the drawing. They then rated the intensity of each selected emotion on a 9-point Likert scale ranging from 1 (weak) to 9 (strong). In Study 2b, participants also completed the SCS and AHS after the recognition task. Internal consistency for the SCS was $\alpha = .73$ for Canadian participants and $\alpha = .70$ for Chinese participants. For the AHS, internal consistency was $\alpha = .72$ for Canadian participants and $\alpha = .70$ for Chinese participants. Exploratory analyses relating SCS and AHS scores to recognition accuracy are reported in Supplementary Table S12.

Results and Discussion

In accordance with prior research (Beaupré & Hess, 2005; Hess et al., 1997), we coded a response as correct when the target emotion was among the highest-rated emotion(s), with ties allowed. We fit a binomial generalized linear mixed model to trial-level accuracy data to test two

predictions: whether one culture's drawings were recognized more accurately overall, as indexed by a main effect of Expresser Culture, and whether recognition accuracy depended on cultural matching between expresser and perceiver, as indexed by an Expresser Culture × Perceiver Culture interaction. The model included Expresser Culture, Perceiver Culture, Drawing Batch, and their interactions as fixed effects, with random intercepts for perceiver ID, expresser ID, and stimulus. The full fixed-effect results are shown in Table 3.

Table 3

Effects of Expresser Culture, Perceiver Culture, Drawing Batch, and Their Interactions on Recognition Accuracy Across Studies 2a and 2b

Effect	*df*	χ^2	*p*
Expresser Culture (EC)	1	1.04	.308
Perceiver Culture (PC)	1	6.10	.013
Drawing Batch (DB)	1	12.18	< .001
EC × PC	1	215.31	< .001
EC × DB	1	2.48	.115
PC × DB	1	0.56	.454
EC × PC × DB	1	3.17	.075

To test the general clarity advantage predicted by the historical-heterogeneity account, we examined the main effect of Expresser Culture. This effect was not significant, $\chi^2(1) = 1.04$, $p = .308$, and was not significantly qualified by Drawing Batch, $\chi^2(1) = 2.48$, $p = .115$. Thus, the results did not support the prediction that Canadian drawings would be recognized more accurately overall.

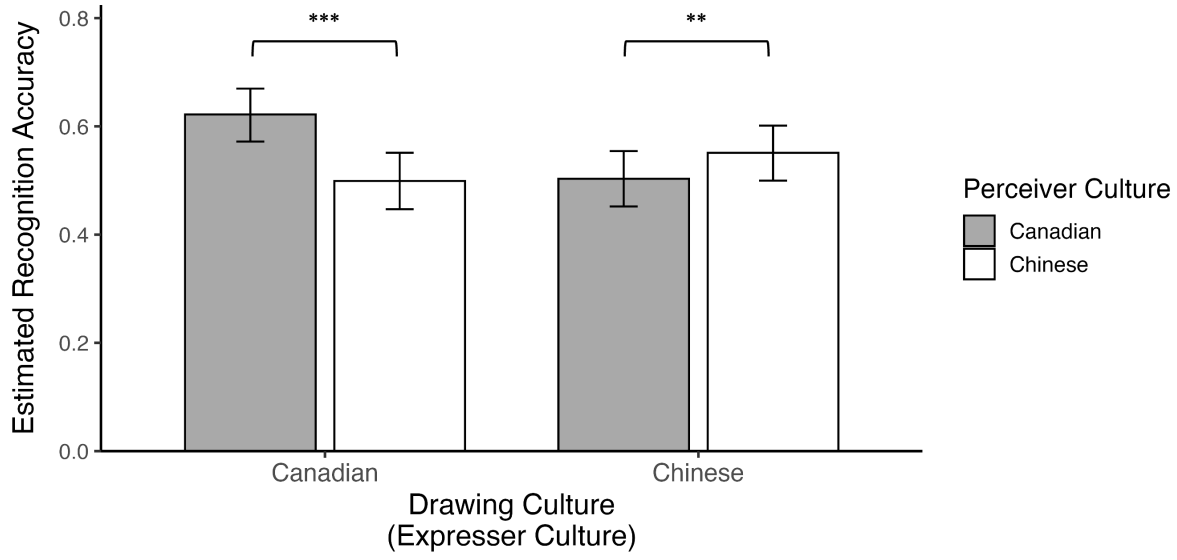
To test the ingroup advantage predicted by the emotion-dialect account, we examined the Expresser Culture × Perceiver Culture interaction. This interaction was significant, $\chi^2(1) = 215.31$, $p < .001$, and was not significantly qualified by Drawing Batch, $\chi^2(1) = 3.17$, $p = .075$.

We decomposed this interaction in two complementary ways. First, we compared perceiver cultures within each drawing culture. Both cultures of drawings showed a same-culture advantage (see Figure 3). Specifically, Canadian drawings were recognized more accurately by Canadian (M = 0.62, SE = 0.02) than by Chinese perceivers (M = 0.50, SE = 0.03), odds ratio = 1.65, 95% CI [1.45, 1.89], z = 7.46, p < .001. In contrast, Chinese drawings were recognized more accurately by Chinese (M = 0.55, SE = 0.03) than by Canadian perceivers (M = 0.50, SE = 0.03), odds ratio = 1.21, 95% CI [1.06, 1.38], z = 2.88, p = .004.

Second, we compared drawing cultures within each perceiver culture. Canadian perceivers recognized Canadian drawings more accurately than Chinese drawings, odds ratio = 1.62, 95% CI [1.24, 2.13], z = 3.52, p < .001. Chinese perceivers showed a weaker, nonsignificant tendency to recognize Chinese drawings more accurately than Canadian drawings, odds ratio = 1.23, 95% CI [0.94, 1.61], z = 1.51, p = .130.

Figure 3

Recognition Accuracy by Drawing Culture and Perceiver Culture Across Studies 2a and 2b



Note. Bars represent model-estimated recognition accuracy across the two batches. Error bars represent 95% confidence intervals. ** indicates $p < .01$, and *** indicates $p < .001$.

Taken together, Studies 2a and 2b failed to provide evidence that drawings from one culture were recognized more accurately overall than drawings from the other culture. Instead, recognition accuracy depended on the cultural match between expressers and perceivers. The pattern of results, therefore, supports an ingroup advantage based on cultural matching, consistent with the emotion-dialect account rather than the historical-heterogeneity account.

Studies 3a and 3b: Emotion Recognition by Indian Perceivers

Studies 2a and 2b provided evidence for a culture-matching pattern among Canadian and Chinese perceivers, but they did not show a reliable overall recognizability advantage for Canadian or Chinese drawings. Because all perceivers belonged to one of the two expresser cultures, recognition accuracy could still reflect perceiver–expresser matching rather than general stimulus legibility. To provide a third-culture benchmark, Studies 3a and 3b tested Indian perceivers, who were cultural outgroup members to both Canadian and Chinese expressers. Because English is widely used in Indian higher education, including in the university context from which our participants were recruited, we were able to use the same English materials and response options used in the Canadian sample, avoiding potential confounds from introducing a third language version. It also moved beyond the typical East–West comparison by testing whether any Canadian–Chinese difference in drawing recognizability would emerge in a South Asian outgroup sample and remain consistent across the two independently generated drawing batches. If one culture's drawings were generally more legible, Indian perceivers should recognize those drawings more accurately across drawing batches. If the recognition advantage

varied across batches, however, it would suggest that differences in recognizability depended more on stimulus-set characteristics than on a stable cultural advantage.

Method

Participants and Procedure

In Study 3a, Indian perceivers evaluated the 1,470 drawings generated in Study 1a. Consistent with Study 2a, we sought to obtain approximately 30 ratings per drawing. We therefore recruited 230 Indian participants from a university in India. After excluding the data from 16 participants who provided duplicate submissions and 43 participants who failed the attention check, the final sample was comprised of 171 Indian perceivers (M_{age} = 26.58, *SD* = 7.55; 50 men and 121 women; 95% South Asian). This strategy yielded approximately 24 Indian ratings per drawing. All participants reported being born and raised in India.

In Study 3b, a different Indian sample evaluated the 616 drawings generated in Study 1b. Consistent with Study 2b, we aimed to obtain approximately 12 ratings per drawing. We therefore recruited 103 Indian participants from a university in India. After excluding the data from 53 participants who failed the attention check, the final sample was comprised of 50 Indian participants (M_{age} = 23.62, *SD* = 4.05; 13 men and 37 women; 78% South Asian). This strategy yielded approximately 13 Indian ratings per drawing. All participants reported being born and raised in India.

For the main analyses, we combined the two recognition batches, yielding a final sample of 221 Indian perceivers. The primary questions concerned whether recognition accuracy depended on Expresser Culture. We therefore conducted simulation-based sensitivity analyses targeting the main effect of Expresser Culture in recognition accuracy. The simulation model matched the primary generalized linear mixed-effects model, including Drawing Batch,

Expresser Culture, and their interaction as fixed effects, with random intercepts for perceiver ID, expresser ID, and stimulus. Based on 500 simulations for each tested effect size, the combined sample provided approximately 80% power to detect an Expresser Culture effect of $b = 0.33$ or larger on the log-odds scale, corresponding to an odds ratio of 1.39, at $\alpha = .05$.

Studies 3a and 3b followed the same procedures as Studies 2a and 2b, respectively, with Indian perceivers completing the English version of the task used with Canadian perceivers. For Indian participants, internal consistency for the SCS was $\alpha = .80$ and $\alpha = .70$ for the AHS.

Results and Discussion

We examined whether Indian perceivers showed differential recognition accuracy for Canadian and Chinese drawings, and whether this difference was consistent across the two drawing batches. Recognition accuracy was analyzed using a binomial generalized linear mixed model with Expresser Culture, Drawing Batch, and their interaction as fixed effects, and random intercepts for perceiver ID, expresser ID, and stimulus.

The main effect of Expresser Culture was not significant, $\chi^2(1) = 3.76$, $p = .052$. Overall recognition accuracy differed across Drawing Batches, $\chi^2(1) = 8.57$, $p = .003$, but the Expresser Culture × Drawing Batch interaction was not significant, $\chi^2(1) = 3.63$, $p = .057$. Thus, Indian perceivers showed no reliable overall advantage for Canadian over Chinese drawings.

Exploratory Associations Between Drawing Features and Recognition

We next conducted exploratory drawing-level analyses to examine whether the coded drawing features were associated with overall recognition accuracy or the ingroup advantage. Full results for the primary and additional subject–background features are reported in Supplementary Tables S14–S15 and S18–S19, respectively.

Across perceiver cultures, greater reliance on bodily cues was consistently associated with higher recognition accuracy, *r*s = [.17, .29], *p*s < .001, and more concrete depictions were also generally associated with higher accuracy, *r*s = [.10, .14], *p*s < .01. Among the additional subject–background features, larger emotion-relevant subjects, *r*s = [.18, .26], *p*s < .001, and higher subject-to-background ratios, were also associated with higher recognition accuracy, *r*s = [.12, .19], *p*s < .019. Object count, page coverage, and background size showed little consistent relation to recognition accuracy, *r*s = [–.07, .05], *p*s > .137.

By contrast, none of the coded features was reliably associated with the size of the ingroup advantage. For each drawing culture, the ingroup advantage was indexed as recognition accuracy by perceivers from the same culture minus recognition accuracy by perceivers from the other culture. Correlations with the ingroup advantage were small and nonsignificant for both the primary features, *r*s = [–.06, .08], *p*s ≥ .058, and the additional subject–background features, *r*s = [–.11, .03], *p*s > .074.

Because measures of perceiver cultural orientation were available only in Studies 2b and 3b, we further explored whether the associations between drawing features and recognition accuracy varied with perceivers' cultural orientations. No Drawing Feature × Perceiver Cultural Orientation interactions were reliable for either the primary coded features or the additional subject–background features in either study (all *p*s > .05; see Supplementary Tables S20 and S21). Taken together, although several broad drawing features were associated with overall recognizability, none was reliably associated with the ingroup advantage, and their associations with recognition accuracy did not reliably vary with perceivers' measured cultural orientations.

General Discussion

Across six studies, we examined how culture shapes the communication of emotion through drawings. Canadian and Chinese expressers used different graphic strategies. Canadian compared to Chinese drawings tended to include fewer objects, occupy more of the page, and rely more on bodily than situational cues. For recognition, emotions were identified more accurately when expressers and perceivers shared a cultural background than when they came from different cultures, consistent with an ingroup advantage in emotion communication. In contrast, drawings from a heterogeneous culture, such as Canada, were not recognized more accurately than drawings from a homogeneous culture, such as China. Together, these findings suggest that graphic emotion communication is culturally shaped in both production and recognition, and that recognition is better explained by cultural matching than by a general clarity advantage.

Cultural Influences on Emotion Recognition from Drawings

The recognition findings allowed us to evaluate two predictions about cross-cultural emotion communication from drawings. The historical-heterogeneity account predicts that people from more historically heterogeneous societies may develop more explicit, low-context expressive styles that are more readily understood across cultural boundaries (Gudykunst & Ting-Toomey, 1988; Hall, 1976; Niedenthal et al., 2019). Applied to the present research, this account would predict that Canadian drawings should be more generally recognizable than Chinese drawings across perceiver groups. In the studies with Canadian and Chinese perceivers, however, Canadian drawings were not recognized more accurately overall than Chinese drawings. The Indian third-culture benchmark provided a further test of this prediction. Because Indian perceivers were cultural outsiders to both expresser groups, a reliable Canadian advantage

in this sample would have suggested that Canadian drawings were generally more legible beyond the Canadian–Chinese perceiver context. Indian perceivers, however, showed no reliable overall advantage for Canadian over Chinese drawings. Thus, the results provided little evidence that drawings from the historically more heterogeneous culture (Canada) were generally more recognizable across perceiver groups.

The emotion-dialect account, by contrast, predicts that recognition should depend on cultural matching between expressers and perceivers. This account holds that emotional expressions can contain culturally patterned cues that are more accurately interpreted by perceivers from the same cultural background (Elfenbein & Ambady, 2002, 2003; Elfenbein et al., 2007). Consistent with this prediction, same-culture expresser–perceiver pairings were recognized more accurately than cross-culture pairings. Specifically, when the interaction was decomposed by drawing culture, both Canadian and Chinese drawings were recognized more accurately by same-culture than other-culture perceivers. When the interaction was decomposed by perceiver culture, the same-culture advantage was stronger among Canadian than Chinese perceivers. Thus, while the findings support an ingroup advantage, they also suggest that the magnitude of this advantage may vary by perceiver culture.

These findings also broaden the scope of emotion-dialect theory. Previous work has documented ingroup advantages primarily in facial and vocal emotion recognition (Elfenbein & Ambady, 2002; Laukka & Elfenbein, 2021). Drawings differ from these channels because they communicate emotion through constructed visual conventions, including bodies, objects, spatial layout, events, and symbolic scenes. Related work on emoticons provides a useful analogue. Japanese emoticons tend to emphasize the eyes, as in (^_^), whereas American emoticons tend to emphasize the mouth, as in :), and perceivers in each culture weight these cues accordingly when

interpreting emotion (Yuki et al., 2007). This eye-focused versus mouth-focused distinction also appears in large-scale social-media analyses of everyday emoticon use across East Asian and Western contexts (Park et al., 2014). The present research extends this logic to free drawings by showing that cultural matching shapes recognition accuracy in graphic emotion communication.

Cultural Differences in Emotional Drawings

The production findings from Studies 1a and 1b show that culture also shapes how expressers graphically encode emotion. Across two independent batches of drawings, Canadian expressers included fewer discrete objects, used a larger proportion of the page, and relied more heavily on bodily relative to situational cues than did Chinese expressers. These findings extend earlier exploratory work on cultural variation in emotional drawings (Danner-Weinberger et al., 2019) by documenting consistent differences in the amount, visual prominence, and focal versus contextual organization of information. The pattern also aligns with broader research showing that Western visual products, relative to East Asian ones, tend to emphasize focal objects, use space more expansively, and rely more on expressive facial and bodily cues (Gernhardt et al., 2013; Masuda et al., 2008; Nand et al., 2014; Nisbett & Masuda, 2003; Senzaki et al., 2014; Thomas et al., 2020). Together, these findings suggest that broader cultural tendencies in visual organization are also evident in emotional drawings, particularly in the relative emphasis placed on focal bodily cues versus broader situational cues.

At the individual level, however, self-construal and analytic–holistic thinking were not reliably associated with the coded drawing features. The absence of corresponding individual-level associations is consistent with evidence that group-level cultural differences are not necessarily mirrored in individual variation within cultures (Na et al., 2010). The cultural differences in drawing features may instead reflect shared representational practices not captured

by the self-report measures used here. Such practices may include culturally familiar graphic conventions acquired through schooling and exposure to visual media.

From Drawing Features to Recognition

The exploratory analyses showed that several broad drawing features were associated with overall recognizability. Across perceiver groups, recognition was higher for drawings that relied more on bodily cues, were more concrete, depicted larger emotion-relevant subjects, or had higher subject-to-background ratios. One possibility is that these features make emotion-relevant information more accessible. Bodily cues provide facial, postural, and gestural information, whereas concrete depictions and visually prominent subjects may reduce ambiguity. Situational depictions, by contrast, often require perceivers to infer emotional meaning from events, social roles, and contextual relationships. This interpretation is consistent with evidence that faces and bodies provide important information for emotion perception (Aviezer et al., 2012; de Gelder, 2006) and that concrete icons are generally easier to understand than abstract symbols (McDougall et al., 1999, 2000).

By contrast, none of the coded features was reliably associated with the ingroup advantage. Nor did the associations between drawing features and recognition accuracy vary reliably with perceivers' measured cultural orientations in Studies 2b and 3b. Thus, the present analyses did not identify which drawing features underlie the ingroup advantage. One possibility is that the current coding did not capture culturally familiar content. It distinguished broad cue types, such as bodily versus situational depictions, but not the particular expressions, events, or symbols represented. The ingroup advantage may therefore depend less on broad cue categories than on perceivers' familiarity with the specific content depicted.

A second possibility is that graphic dialects depend on configurations of cues rather than isolated features. Elfenbein et al. (2007) found that Quebecois and Gabonese participants used different combinations of facial movements when posing the same emotions. An ingroup advantage emerged for these culturally normative expressions, especially those showing stronger regional dialects, but not for standardized prototype expressions designed to minimize dialectal variation. By analogy, graphic emotion dialects may involve culturally familiar combinations of bodily, situational, and symbolic cues. Such configurations may not be captured by examining broad drawing features individually.

Limitations and Future Directions

The present research provides consistent evidence of cultural variation in both the production and recognition of emotion through drawings, but it also has several limitations. First, although our findings identify broad cultural differences in how Chinese and Canadian expressers graphically depicted emotion, they did not identify the specific graphic conventions that might underlie the ingroup advantage in recognition. The coded dimensions captured broad graphic strategies but did not provide a comprehensive taxonomy of graphic cues. Whereas facial expressions can be coded using the Facial Action Coding System (FACS; Ekman et al., 2002), free drawings currently lack a comparable coding framework. Future work would benefit from richer coding schemes that capture finer-grained situational themes, symbolic cues, culturally familiar event scripts, and configurations of multiple cues. Such work should also combine coding with experimental tests of cue use to more directly examine which graphic conventions are produced by expressers and used by perceivers in culture-specific ways.

Second, our analyses relied on individual-level measures of self-construal and analytic–holistic thinking, and the number of cultural groups was insufficient to test society-level

associations. The null associations involving these measures therefore do not rule out the possibility that society-level cultural dimensions are related to variation in graphic emotion production and recognition. Future research should sample a broader range of societies and use multilevel designs to examine variation at the individual and society levels simultaneously.

Finally, generalizability is limited by our inclusion of participants from only three countries (Canada, China, India), the use of university student samples, and the focus on a small number of emotions with a restricted label set. To delineate the scope and boundary conditions of the current effects, future research should broaden sampling across regions and age groups. Including children would be especially informative for examining how graphic emotion dialects emerge and consolidate through cultural learning. Further studies should also adopt response formats beyond forced choice of emotion categories (e.g., free labeling) to assess whether the effects depend on categorical classifications or generalize to graded judgments.

Practical Implications

Compared with text, images can be especially effective for communicating information, particularly when audiences vary in age, literacy, language, or cultural background (Garcia-Retamero & Cokely, 2013; Houts et al., 2006). The present findings offer preliminary guidance for cross-cultural visual communication. In settings where broad legibility is essential, such as safety signage, public-health graphics, and educational materials, designers may benefit from emphasizing bodily cues, such as posture, facial configuration, and gesture, and using more concrete depictions rather than highly abstract symbols. Across perceiver groups, drawings with bodily information and more concrete elements appear to be recognized more accurately, whereas images that rely heavily on abstract or context-dependent cues may require more inference from viewers.

At the same time, our results indicate that drawings, like faces and voices, can carry culture-specific accents. These accents may enhance recognition among ingroup members compared with observers from other cultures. Practitioners should, therefore, expect that the most effective visual strategy may vary somewhat across communities. In applied domains such as counseling materials, localized comics and media, and global product onboarding, it may be useful to tailor images to the intended audience and, where needed, adapt them with culturally attuned variants, rather than assuming that a single graphic style will be optimal for all audiences.

Table 4

Table of Limitations

Scope	Limitation
Graphic dialect specification	The current coding scheme captured broad dimensions of drawing style but may not capture culturally familiar content or configurations of cues that could support culture-matched recognition. Future work should combine finer-grained coding with experimental tests to identify which graphic conventions are produced and interpreted in culturally patterned ways.
Level of cultural analysis	The analyses relied on individual-level measures of self-construal and analytic–holistic thinking, and the number of cultural groups was insufficient to test society-level associations. Future work should sample a broader range of societies and use multilevel designs to examine variation at the individual and society levels in graphic emotion production and recognition.
Sample generalizability	Samples were drawn from only three countries and largely from university populations, limiting claims about other cultural communities, age groups, and nonstudent populations.
Task generalizability	The recognition tasks focused on basic emotions and used restricted response labels, limiting conclusions about whether the findings generalize to free labeling or more graded judgments.

Conclusion

Drawings, like facial and vocal expressions, can effectively convey emotion across cultures, yet this communication is not culturally uniform. The present findings show that culture shapes both how emotions are graphically depicted and how those images are recognized. These results extend emotion-dialect research beyond facial and vocal expression, suggesting that drawings may also carry cultural "accents" that make emotional meaning more accessible to perceivers who share the expresser's cultural background. Future work should identify the finer-grained graphic conventions underlying these accents and examine how they are learned through shared visual, educational, and social experience. Such work could refine theories of emotion communication and inform the design of images for education, health communication, and other cross-cultural settings.

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Notes

[1] In the drawing recognition task (Studies 2a, 2b, 3a, and 3b), the attention checks required participants to select a specified emotion (e.g., happiness) and assign it an intensity rating of 6 on the 1–9 scale. In addition, in Studies 1b, 2b, and 3b, because participants completed two self-report scales with a relatively larger number of items, we added an instructed-response item (e.g., "Select the second option") as an additional check.

[2] These analyses differed from the preregistered plans, which specified that the a and b studies would be analyzed separately. Because the a and b studies used the same task and matched designs, we analyzed each pair together in the main text and included drawing batch as a factor. The same approach was used for Studies 2a and 2b and for Studies 3a and 3b.

[3] The models reported in the main text focused on overall cultural differences across emotions. Supplementary models including emotion as an additional factor are reported in the Supplementary Materials for Studies 1a and 1b, Studies 2a and 2b, and Studies 3a and 3b.