Conveying Empathy in Social Interactions: The Role of Expressivity.

Christine Spencer
cspencer03@qub.ac.uk
Queen's University Belfast
Belfast, Antrim

Gary McKeown
g.mckeown.ac.uk
Queen's University Belfast
Belfast, Antrim

ABSTRACT

The phenomenon of empathy is often examined in contexts where people demonstrate compassion towards others. However, less is known about the way in which we empathise with others in everyday conversations which are less emotionally-charged. This study sought to explore whether there is a relationship between people's expression levels and the degree to which they are perceived to be empathising. 408 participants were shown thin-slice clips of pairs of people demonstrating varying degrees of empathy towards each other, as rated by groups of naive online observers. The participants then rated the degree to which each interlocutor was behaving in an expressive way. Linear mixed effects modelling was used to test whether there was a significant relationship between the interlocutors' expressivity levels and perceptions of how empathically they were behaving. The results indicated the existence of such a relationship—with an increase of 0.14 units in empathic behaviour intensity ratings observed for every increase of 1 unit in expressivity level. A second model explored whether this effect was influenced by the gender dynamic of the interaction. The results revealed that expressivity conveyed empathic understanding and responsivity in female-female and mixed-sex dyads but did not appear to do so for male-male dyads. The findings offer support to the notion that behaving in a highly expressive way can be a way of conveying empathy in everyday conversations, but this effect may be dependent on an empathiser's gender in relation to their target. Further studies with more examples of naturalistic empathising behaviour will help to establish the generalisability of this finding.

CCS CONCEPTS

• **Applied computing** → **Psychology**.

KEYWORDS

empathy, multimodal expression, nonverbal behaviour, social interactions

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1 INTRODUCTION

More than a century after being introduced into the English language by psychologist Edward Titchener [1], empathy remains an ill-defined phenomenon. Competing definitions abound [2], with a recent review noting multiple inconsistencies in the way that the term had been conceptualised across ninety-six different studies in the year 2017 alone [3]. Empathy is generally thought to be a complex phenomenon involving affective and cognitive processes which work interactively to allow emotional understanding and responsivity towards others [4][5][6]. Although definitional debate prevails, contemporary accounts are progressively defining the phenomenon as extending beyond simply feeling the same emotions as another person [7] or accurately recognising emotions of others [8]. Empathy is increasingly being defined in interpersonal terms, as the capacity of an individual to understand the behaviour of others by inferring their mental states as well as their capacity to also respond with an appropriate emotion [9][10]. Many definitions have only highlighted the intra-psychic aspects of the phenomenon—the experience of the empathiser—paying less heed to its inherently interpersonal nature [11]. Empathy is an interactive process involving a two-way exchange of emotional information between two people—[11] call for greater empirical attention to the ways that this process unfolds across an interaction, how emotional information is communicated from one person to another, as well as the ways in which people flexibly adapt their behaviour to ensure that their partner knows that they have understood and appreciated how they feel. Therefore, although often overlooked, a critical aspect of empathy involves a behavioural response—the demonstration of emotional understanding.

1.1 Beyond compassion

Much is known about the role of empathic behaviour in terms of its role in facilitating compassion—the phenomenon has been frequently examined in clinical and therapeutic contexts. For example, studies have explored its role in improving both patient [12] and client [13] outcomes, how it is related to burn-out in individuals who work in clinical settings [14] and how it can be enhanced in students who are pursuing careers in the health profession [15][16][17]. However, while empathic concern—feelings of warmth and concern for others [18]—is an important component of empathising with others [19], empathy and compassion are distinct phenomena [20][2]. There are many other interactional contexts in which empathy may operate, which may not be emotionally-charged in tone, where the demonstration of compassionate concern may not

be required. For example, empathy may be observed during conversations which are gossip-centred, where both parties share their feelings about another individual or socially significant event. Empathy could equally be found in an everyday discussion between romantic partners about their next vacation plans. Conversational topic is arguably of lesser consequence—what matters more is how people signal that they are interested and trying to understand their partners' emotions.

1.2 The nonverbal signals of empathy

Empathy arguably occurs to some degree whenever individuals communicate—when we send out emotional information about our emotional state, we have an expectation for people to respond appropriately. However, meaningfully capturing how people behaviourally convey emotional understanding is not a trivial task. Several approaches have been used to capture empathy at the behavioural level. For example, specific behaviours have been shown to be associated with empathy, such as increased frequency and duration of eye contact [21], forward lean [22], use of social touch [23] and slower speech rate [24]. However, engaging in extended eye contact or speaking at low pitch may be particularly relevant to therapeutic or counselling contexts, but may not be as relevant in everyday conversational settings. For example, extended eye contact can make a person feel listened and attended to in one context, and uncomfortable in another [25].

The assessment of behavioural mimicry has also been used to capture empathy as it occurs [26][27][28][29][30]. Mimicry is associated with many positive interpersonal outcomes, such as increased rapport and liking [31], for example. Individuals undergoing therapy have been known to find their counsellors more empathic when they place their arms and legs in a manner which matches their own [32]. The assessment of interpersonal synchrony offers another means of gauging the empathic connection between two individuals [33][34]. During social interactions, individuals appear to be highly sensitive to the nonverbal behavioural patterns displayed by others—and can become synchronised with others [35], resulting in greater interpersonal attraction [36] and sense of affiliation [37][38]. Interpersonal coordination appears to increase the degree to which individuals perceive themselves to overlap with others [39].

However, these approaches are associated with certain caveats when it comes to investigating how people convey empathy in everyday conversations. The use of electromyography (EMG) cables and conductive pads to capture mimicked muscular movements may obstruct individuals' natural facial expressions and could prevent them from feeling relaxed. In addition, EMG data can be difficult to record cleanly as many facial muscles are usually involved in complex expressions—it can be difficult to correctly position the electrodes to obtain strong, isolated signals which are not affected by the activity of adjacent muscles [40]. In the case of synchrony, there are operationalisation issues to consider. It is not so clear what is exactly meant by the term—how long is a unit of synchrony? For two individuals to be “synchronised”, does their behaviour need to be coordinated for a few seconds, a few minutes, or for the duration of a conversation? What is the specified time-lag allowed between the behaviour of one person, and that of their partner, to constitute

as synchrony? Does a person's behaviour have to strictly follow a partner's? Or can synchrony be viewed as a complex state with many aspects, with individuals slipping in and out-of-phase across an interaction?

Social interactions are complex—certain behaviours can follow different social patterns, depending on context. The occurrence of behavioural mimicry is context-dependent and strongly driven by motivational and contextual factors [41]. It is not always appropriate to mimic others [42]—for example, in the context of imbalanced hierarchical social dynamics, people have been shown to feel more comfortable when they adopt complementary, as opposed to imitative, behavioural styles [43]. Additionally, not all instances of motor imitation reflect that a person has really understood another person's emotional state [44]—mimicry is only meaningful when it occurs for behaviours which have emotional relevance in the current context [45]. In the case of synchrony, it may be appropriate for two individuals to coordinate some behaviours and not others. For example, although people seem to be perceived to be more coordinated when smiling at the same time, this is not the case for gaze and gesturing activity [36] or dominance behaviours [46][47]. Individuals continuously make adaptations to their behaviour and assume complementary leader-follower stances during interactions [48]. The appropriateness of certain nonverbal behaviours can vary within the course of interaction—for example, sometimes it may be empathically appropriate to closely mirror a partner's behaviour, but at other times behavioural synchrony may occur in a more subtle way, with a longer lag time, or may not be empathically appropriate at all. People strategically alter their behaviour—in order to display a desire for affiliation [49], for example. We do not simply copy, or follow, the behaviour of our partner, but dynamically adjust our own in a way which is dependent on contextual constraints. Therefore, the interpretation of mimicking behaviour and interpersonal synchrony is not straightforward.

1.3 Empathy and expressivity

Multiple nonverbal cues usually work in combination with verbal messages to send an over-arching, gestalt message about how a person is feeling [50][51], and nonverbal signals and behavioural patterns have different meanings in different contexts [52]. It is therefore unlikely that any one particular nonverbal behaviour can hold the sole burden of conveying emotional understanding in all types of social interactions. However, while empathy may not be conveyed through specific, isolated signals, it is possible that one of the general ways that individuals can let their targets know that they understand and appreciate their emotional state is by engaging in high levels of *overall* expression—or “expressivity”.

The link between expressive behaviour and perceptions of rapport, highlighted by [53], supports this notion. Rapport—a positive quality that emerges during a social interaction when two individuals demonstrate mutual attentiveness, emotional coordination and care towards each other [54]—is a construct which is highly aligned with empathy. [53] found that people seem to be able to judge the levels of rapport between two people more accurately when they are more expressive. Similarly, [55] and [56] observed that people are able to make more accurate inferences about how people are feeling when they act more expressively—people signal emotional

information through many channels, and our ability to decode or respond to others' emotion deteriorates to some degree when we are deprived of any of these channels [57].

As highlighted, empathy is an interpersonal phenomenon which involves a behavioural response—it is not simply enough to correctly recognise how someone is feeling. For a social interaction to continue to flow seamlessly, this emotional understanding must be conveyed back in some way. Just as we let others know how we are feeling through multiple channels, it is possible that we let others know that we *understand* their emotions in the same way—by using as many communicative modes as possible. The present study sought to test this assertion, by exploring whether there is a relationship between people's expressivity levels during everyday conversations and the degree to which they are perceived to be conveying empathy. Participants were shown examples of people demonstrating varying degrees of empathy, as rated by independent observers, and were asked to rate the degree to which they were being expressive. It was predicted that there would be a significant, positive relationship between the interlocutors' perceived expressivity levels and their empathic behaviour—the more expressively an interlocutor behaved, the more empathically he or she would be perceived to be behaving.

2 METHOD

2.1 Design

Linear mixed effects modelling was used to explore the relationship between empathic behaviour and expressivity. The independent observers' perceptions of how empathically the interlocutors were behaving was treated as the response variable, the participants' expressivity ratings were entered as a fixed effect, and the natural variation between participants was treated as a random effect. A second model then assessed whether this effect was influenced by the gender interactional dynamic of the dyads.

2.2 Materials

2.2.1 Videotaped material. The study employed the thin-slicing approach [58], which holds that people can make accurate inferences about others based on brief observations of their behaviour. 69 thirty-second clips were created from videotaped recordings of people having conversations, sourced from the ILHAIRE database [59]. The dyads were pre-acquainted, English-speaking people from Northern Ireland. There were three male-male, two female-female and three mixed-sex pairs. The dyads spoke for an hour, during which time they were free to ask the experimenter for conversation topics, although most did not choose this option. The pairs were filmed directly facing each other in a private booth, with unobtrusive cameras recording each person's face and upper body movements. At least eight thin-slice clips were created for each dyad, showing the interlocutors side-by-side, in split-screen format, as shown in Figure 1.

2.2.2 Empathic behaviour intensity ratings. 344 people were recruited via the crowdsourcing platform Prolific Academic to rate the interlocutors' empathic behaviour. Prolific Academic's screening measures ensured that the raters were at least 18 years

Figure 1: Split-screen image video layout

old and spoke English as a first-language. Measures were employed to ensure that high quality empathy ratings were obtained. These included a screening tool which prevented raters from taking part in multiple rating sessions and two questions which assessed whether they had correctly understood the instructions. The sessions also included attention checks, where the raters were instructed to place the slider handle at 100 at a random point during their session—those who did not do this were presumed to not have been paying attention, and their ratings were not used. The video-viewing timing statistics were also checked to make sure that the raters had actually watched the clips and had not simply clicked through the exercises to receive payment. The raters also completed the Toronto Alexithymia Scale [60]. Any ratings provided by individuals who scored higher than 61 were not used, as this score [60] suggested that they may have had difficulty in understanding the emotions of others.

The final sample of 293 raters (143 females and 150 males) had a mean age of 34.8 years. 70.1% of the raters were European nationals, 26.46% were North American, and 3.4% were nationals of Asian, South American and African countries. The rating task was hosted on the Limesurvey opensource survey platform. Raters took part in 9 groups of at least 24 people and were compensated at a rate of £5.50 an hour. Each group rated how empathically each interlocutor was behaving in ten clips, which were presented in randomised order. They were instructed to view each clip as many times as they would like to, before indicating how empathically each interlocutor had been behaving towards their partner on a visual analogue scale which ranged from 0 (“*not at all empathically*”) to 100 (“*highly empathically*”).

As there is currently a lack of academic consensus as to how empathy should be defined, the raters drew on their own understanding of the phenomenon and were not provided with a definition before the task. Their understanding of empathy was assessed afterwards, whereby the raters indicated their level of agreement with a series of statements about empathy, out of 100. The statement “*empathising with a person involves understanding how that person is thinking and feeling and responding in an appropriate way*” received the highest mean agreement score (83.91 out of 100). This definition was presumed to indicate how the participants had understood the term during the task.

Following guidelines by [61], a one-way, random-effects intra-class correlation model was then used to check that the raters

Table 1: Intra-class correlation values for each rating group's empathic behaviour intensity scores

Rating Group	Number of Raters	ICC
Group 1	35	0.91
Group 2	34	0.95
Group 3	34	0.90
Group 4	41	0.95
Group 5	35	0.83
Group 6	30	0.92
Group 7	27	0.84
Group 8	33	0.96
Group 9	24	0.92

had judged the interlocutors' empathic behaviour intensity in a consistent way. The ICC values for each rating group, summarised in Table 1, were all greater than 0.75, a cut-off value generally considered to indicate strong agreement between raters [62]. In total, 5680 empathic behaviour intensity ratings were produced.

2.3 Participants

408 participants were recruited via Prolific Academic for the expressivity rating task. A screening tool prevented any individuals who had taken part in the online empathic behaviour rating sessions from participating. Individuals were also prevented from taking part if they were younger than 18 and did not speak English as a first-language. Participants took part in eighteen groups of at least 20 people, with a mean number of 22 participants in each group. They were compensated at a rate of £5.50 per hour. As with the empathy rating sessions, steps were taken to ensure valid data was captured during the study. To ensure that each group of clips was rated by a different set of people, screening measures prevented participants from taking part twice. Participants' understanding of the task instructions was checked before starting, and further checks were included at random points in the study to identify any instances where people were not paying attention. There were 32 instances where participants either did not pass these checks or did not complete the study. These responses were excluded, resulting in a final sample of 376 participants (209 females, 167 males), with a mean age of 36.90 years. 77.1% of the sample were European, 21.3% were North American, and the remaining 1.1% were nationals of Asian or Oceanic countries.

2.4 Procedure

2.4.1 Expressivity rating task. After ethical approval was obtained from the University's Faculty Research Ethics Committee, Qualtrics survey platform was used to host the expressivity-rating study. Groups of participants were asked to view and rate a set of four videos, which were presented in randomised order. The rating task instructions took the following form: "People can be non-verbally and emotionally expressive to varying degrees during a conversation. How expressive is Person A here?". Participants provided their ratings on a slider scale marked from 0 ("not at all expressive") to 100 ("highly expressive"). Participants saw a varied mix of gender interaction dynamics and never saw the same pair interacting more than once. They could view each clip as many

times as they wished to, before indicating how expressive each interlocutor in each clip had been during the interaction. In total, 3264 expressivity ratings were obtained.

2.4.2 Validation of participants' expressivity ratings. A validity step was included to check that the participants' judgments of expressivity were valid estimates of their interlocutors' actual expression levels. Two research assistants annotated 20% of the clip set for a comprehensive set of nonverbal behaviours and verbalisations. Using ELAN Version 4.9.3, the coders annotated any event where an interlocutor displayed any eyebrow, head or hand movement, as well as any time that he or she smiled, spoke or laughed. Instructions for annotating smiling, laughter, scowling and eyebrow movements were taken from [63], while hand movements were annotated following [53]. Annotation of head movements was performed following [64] and speech annotation was conducted following [65]. Eye contact was not coded as this was difficult for the coders to accurately gauge. Posture and orientation were also not coded as the interlocutors were seated comfortably and rarely adjusted their posture or leaned forward. After receiving training, the assistants coded three practice clips. Their performance was reviewed and they received a second round of training before completing the rest of the clips independently. The annotators' mean duration values for each interlocutors' eyebrow, head, hand and mouth movements, as well as their speech and vocalisations, were totalled to derive an objective value of overall annotated expressivity for each interlocutor in each clip. Krippendorff's alpha [66] was used to assess inter-coder reliability. The mean alpha value across all the behaviours was 0.59, falling below Krippendorff's acceptability cut-off of 0.67 [66]—however, the value was considered acceptable as the coders agreed on the incidence of each behaviour in nearly all instances, and their onset and offset times only differed by a few milliseconds in most cases.

3 RESULTS

Following guidelines from [67], linear mixed effects models (LMMs) were performed in R [68] using the lme4 package [69], and visualisations of each model were created using ggplot2 [70]. The validity of the participants' expressivity judgments was firstly checked—a LMM was created to explore the degree to which participants' expressivity judgments were predicted by the research assistants' annotated estimates of the interlocutors' expressivity levels. The variation in participants' expressivity ratings was treated as a random effect in the model. The results, summarised in Table 2, showed that the participants' expressivity ratings were significantly ($p < .001$) predicted by the annotators' estimates ($\beta = 1.14$)—indicating that they were valid judgments of their expression levels.

Table 2: Annotators' vs participants' judgments of interlocutor expressivity

Fixed effects	Est	SE	<i>t</i>	95% CI
Intercept	30.69	3.02	10.17***	24.78-36.61
Annotated expressivity	1.14	0.11	10.08***	0.92-1.37
Random effects				
Within-study variance	154.06			
Number of raters	180			
Observations				
635	18	0.128	0.337	

* $p < 0.05$, *** $p < 0.01$

A LMM was then created to assess the degree to which the participants' expressivity ratings predicted how empathically the interlocutors behaved. The model, summarised in Table 3, indicated a positive, significant relationship—there was an increase of 0.14 units of empathic behaviour intensity for every increase of 1 in participants' expressivity ratings ($p < .001$). Marginal $R^2 = 0.045$ and conditional $R^2 = 0.091$.

Table 3: Interlocutor Empathic Behaviour Intensity vs Expressivity Level

Fixed effects	Est	SE	<i>t</i>	95% CI
Intercept	48.49	0.77	62.81***	46.98-50.00
Interlocutor expressivity	0.14	0.01	12.23***	0.12-0.16
Random effects				
Within-study variance	13.31			
Number of raters	408			
Observations				
3263	18	0.045	0.091	

* $p < 0.05$, *** $p < 0.01$

This relationship is shown in Figure 2.

The confidence intervals are shown in the grey shaded band.

Figure 2: Interlocutor Empathic Behaviour Intensity vs Expressivity Level

A second model then assessed whether this effect was influenced by the dyads' gender interactional dynamic. The results, summarised in Table 4, indicated that, for every increase of 1 unit in participants' expressivity ratings, there was an increase of 0.18 units in empathic behaviour intensity.

Table 4: Interlocutor expressivity vs empathic behaviour intensity according to dyadic gender composition

Fixed effects	Est	SE	<i>t</i>	95% CI
Intercept	53.82	1.50	35.92***	46.98-50.00
Int. expressivity	0.18	0.02	8.09***	0.13-0.22
Male-male	11.73	2.21	5.30***	7.39-16.07
Mixed-sex	-9.98	1.71	-5.83***	-13.33-6.62
Int.express*male-male	-0.24	0.03	-7.39***	-0.30-0.17
Int.express*mixed-sex	-0.05	0.03	0.036*	-0.10-0.00
Random effects				
Within-study variance	17.49			
Number of raters	408			
Observations				
3263	18	0.180	0.241	

* $p < 0.05$, *** $p < 0.01$

This model was also significant, with significant interaction effects—expressivity positively predicted empathy in the case of the female-female and mixed-sex dyads, but did not appear to be so for the male-male pairs. In this case, when speaking to other men, as men behaved more expressively, this negatively predicted the degree to which they were perceived to be empathising. This model, depicted in Figure 3, was better fitting than the first.

The confidence intervals are shown in the lighter shaded bands.

Figure 3: Interlocutor expressivity vs empathic behaviour intensity according to dyadic gender composition

Marginal $R^2 = 0.18$ and conditional $R^2 = 0.241$ were higher, and the Akaike information criterion (AIC = 27032) was lower than that of the first model (AIC = 27562), indicating better fit [71].

4 DISCUSSION

The present study explored the idea that people convey empathic understanding in everyday conversations by demonstrating high levels of verbal and nonverbal expressivity. The result provided some support to this notion. Separate groups of people viewed the same set of thin-slice clips of social interactions, and the degree to which the interlocutors were perceived to be empathising by observers was positively predicted by their expressivity levels. When people behave more expressively, they willingly provide more information about their emotional state—and this information is used to make more accurate social judgments [55][53][56]. These results suggest that we can let others know that we are empathising with them in a similar way. Although our internal states can never be fully knowable by others [72], simply demonstrating an observable effort to understand a partner's emotions can be more important than knowing exactly how they are feeling [73][74]. Our facial expressions are tools that we use to signal information about our emotional state to others [75][76], and when we act expressively, using multiple communicative modes, this acts as a social signal, showing our partner that we are making an effort to understand their emotional state.

These findings also highlight the role that contextual factors seem to play in the interpretation of expressive behaviour. The first model indicated a general positive relationship between expressivity and empathy, but the second model revealed that this pattern did not apply for male-male dyads. This is in line with previous findings that men are sometimes less likely to express their emotions compared to women [77], particularly when displaying less intense [78] or positive [79] emotions. Although a contentious notion [78], if men are less expressive than women in some situations, this may be due to societal expectations—people are known to hold stereotypical beliefs about men being less expressive than women [80], for example. Men and women also seem to experience different pressures to either suppress or demonstrate high levels of nonverbal expression—[81] observed that men who have greater skill in controlling their emotional expression levels tend to receive more positive interpersonal ratings, while females who are spontaneously expressive and extroverted seem to receive more positive evaluations. It is not necessarily the case that women possess a biological advantage in empathic sensitivity—but rather may have evolved to be more strongly attuned to nonverbal information in their care-provision roles within social groups [82].

It is noteworthy that, in the present study, male expressive behaviour conveyed empathy in situations where men were interacting with women, but not with men. A male-male interaction may present a more competitive interactional context where hierarchical concerns may be more salient—in which case, it may be less appropriate for men to display high levels of expressivity which might be perceived to signal weakness or a lack of power [78]. Conversely, in the absence of intra-sexual competition and hierarchical concerns, men may feel more comfortable to align their expressivity levels more explicitly when interacting with women. It is also possible that women value empathic sensitivity in males, and evaluate this kind of male behaviour more favourably in everyday situations. However, all of these suggestions are speculative and

require further investigation. It should also be noted that videotaped footage for only three male-male dyads was used in the study. Further replication studies with a greater number of interacting pairs are required to determine the generalisability of these findings.

In an additional point for consideration—the interlocutors' empathy was rated here by non-expert laypeople who were not provided with a definition of the phenomenon. It was presumed that most people were likely to have experienced empathic encounters during their lifetimes, and therefore would have an inherent sense of what the phenomenon entailed and would be able to naturally recognise it in action. The reason for this approach was primarily that empathy is not well-defined in academia [2][3]—as the study aimed to explore empathy's behavioural aspects, we did not want to impose any specific definition or guidelines that might steer which behaviours the raters looked for when judging the interlocutors' empathy levels. There is evidence that suggests that non-expert raters are capable of providing ratings of quality which is comparable to that of expert raters [83][84][85]. Although the judgment of empathy is an inherently abstract task, the raters' judgments were shown to be reliable and consistent. An effort was also made to remove submissions from participants who had alexithymia—so it can be reasonably assumed that the raters possessed an acceptable understanding of emotions and emotion-related concepts.

A strength of the present study lies in the fact that empathy was examined in a context outside of its links with compassion—in everyday conversations, recorded in real interactive contexts. However, only a relatively small number of dyads from a specific cultural background were examined. Wide generalisability of these findings can therefore not be assumed. Additionally, it may not always be empathically appropriate to be expressive. For example, a person could act in a highly expressive way during a social interaction yet remain self-absorbed and disinterested in their partner's emotions. People also may alter the degree to which they outwardly express how they are feeling in different contexts—when assigned to a subordinate versus high power role [56], for example. It therefore may be problematic to operationalise empathy in terms of expressivity alone—a behaviour is only empathic in context. The perceptions analysed here were for dyadic conversations that were generally positive and casual in tone. Further studies are needed to determine whether expressive behaviour conveys empathic understanding in situations which are negatively-valenced and more serious, as well as to establish the roles played by gender norms and intra-sexual competition in such situations.

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