What if I Use Help for This? Exploring Normative Evaluations of Relationship Maintenance Behaviors Augmented by External Agency

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Abstract

Relationship maintenance needs sincere efforts made by both self and relational partners. Yet, technological development provides people with convenient access to help from external sources—other people online, or even tools powered by artificial intelligence (AI)—when performing certain relational activities. By reducing personal effort, receiving external augmentation might compromise the desired effort level in a close relationship. To explore people's normative evaluations of such behaviors, we conducted a survey experiment (N = 114) wherein participants provided their evaluations of 25 common relational activities in friendship maintenance. Most activities were considered as requiring sincere efforts and subjective in nature. We found that the more sincere efforts and the more subjectivity a relational activity required, the more inappropriate people considered it being augmented by another human or AI system. These results together advance our knowledge of how technology-mediated interactions are judged in interpersonal relationships.

Keywords: Relationship maintenance, effort, activity type, external agency, normative evaluation

1. Introduction

Relationship maintenance in the digital age can be easy and challenging at the same time. On the one hand, emerging technologies provide numerous opportunities for people to connect with their relational partners by breaking the space- and time-specific boundaries. On the other hand, relying too much on technologies to carry out important relational activities, that is, leveraging agency external to oneself, might risk backfiring as this act could be considered as one being reluctant to make efforts in the relationship by their relational partners. In the latter case, we consider such reliance on technologies as relationship maintenance being *augmented* by technology. In practice, relational maintenance can be augmented by external agency of various sources, including both technology and other humans using technology. Against the backdrop of the rapid growth of AI-based technology, in the present study, we examine people's perception of relational maintenance augmented by AI or other human, the source of which can come from an advanced technology itself (e.g, AI system that we focus in the current study as AI augmentation) or humans making use of a specific technology (i.e., human augmentation).

Overall, we set out to (1) evaluate common relational activities on dimensions such as importance of sincerity and subjectivity, that are crucial to relationship maintenance and (2) explore the social norms people hold for the use of external agency in mediated interpersonal communication. Specifically we ask, what is the relationship between the importance of sincerity and subjectivity of a relational activity, and the inappropriateness for AI and human augmentation in performing it? Our results will illuminate research designs for future research studying the psychology of interpersonal relationships and communication in technology-mediated contexts by identifying important perceptual attributes of relationship maintenance behaviors and how they affect people's normative evaluations of augmentation, to account for the new challenges brought by emerging technologies on relational maintenance.

2. Relevant work

2.1. Effort in relationship maintenance

Maintaining a close relationship requires a considerable amount of *effort* from both parties to keep the relationship stable, intimate, and satisfactory (Dindia & Canary, 1993; Tong & Walther, 2011). As such, theoretical work including the equity theory (Hatfield et al., 1985) and the actor-partner interdependence model (Shafer et al., 2014) indicates

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that people would evaluate the extent to which their relational partners and themselves invest balanced and equitable effort (Brody & Peña, 2015) as a signal of one's commitment to their relationship (Shafer et al., 2014). It is therefore almost always desirable to consistently carry out adequate relational activities to maintain a close relationship. Empirical research has found that certain types of activities are commonly performed across various relational types to maintain a relationship satisfactory. According to Stafford & Canary (1991) and Oswald et al. (2004), the various types of relational activities include positivity, supportiveness, assurances, openness, and interaction that could include sharing and social networks. For instance, exemplar behaviors exhibiting positivity in friendships include "Express thanks when one friend does something nice for the other," and those exhibiting supportiveness include "Support each other when one of you is going through a difficult time" (Oswald et al., 2004, p. 422). These activities altogether embody the amount of effort that one invests in their relationship maintenance.

Going beyond the quantity, the quality of effort manifested in those relational activities also plays a significant role. Research has found that relational activities that required one's personal and meaningful efforts, such as spending time to write a letter and make a phone call, were evaluated more favorably by their relational partners than activities that could be done with lightweight interactions (King & Forlizzi, 2007; Lindley et al., 2009). More recently, Kelly et al. (2017) summarized several characteristics of efforts valued in close personal relationships, including *discretionary investment* that denotes one's intrinsic motivation to "go out of their way" for relationship maintenance (p. 74), and *personal craft* that shows one's willingness to *make, take and dedicate time* to *respond to* the needs of relational partners.

Unanimously, these findings highlight the importance of sincere efforts made out of one's own heart in relationship maintenance activities, be it strategic or routinized (i.e., with or without intention of maintaining a relationship in the first place, see Dainton & Stafford, 1993), as assurance of cherishing from their relational partners. After all, the felt sincerity signifies one's continuous and extensive commitment to a relationship. However, technological development, while bringing in huge convenience to diversify the kinds of relational activities one could perform, also risks diluting the much needed effortful communication in close relationships. In what follows, we discuss how technology might transform relationship maintenance behaviors along with the normative evaluations of mediated effort in the process.

2.2. When agency transfers: (In)appropriateness of mediated effort

Traditional relationship maintenance behaviors are considerably altered by computer-mediated communication (CMC) in that people can still carry out positive, open, and intimate relational activities without being physically co-located (Tong & Walther, 2011). Digital platforms can send reminders for people to wish their relational partners a happy birthday on time without people themselves making efforts to remember the date; the wide selection of resources online can help people find effective solutions to problems their relational partners might be facing without trying hard to come up with their own; nowadays when people craft personal messages via email for instance, there is even a smart reply function that suggests quick responses without people pondering how to phrase a given sentence. In these cases, the effort desired in relationship maintenance can be divided into two parts: one part that involves the exercise of one's own agency that counts as their discretionary investment in a relationship (Kelly et al., 2017), while the other part is clearly delegated to technologies that exercise machine agency (i.e., the degree to which a machine exercises autonomy and volition) (Jia et al., 2022). As such, technology-mediated interaction "is not simply transmitted by technology, but modified, augmented, or even generated by a computational agent to achieve communication goals" (Hancock et al., 2020, p. 90). From a normative perspective, would such augmentation be considered unacceptable in interpersonal relationships?

One line of research on the phenomenon of *anthropocentrism*, a tendency to treat humans as unique and superior to other entities (Nass et al., 1995), might suggest so. Especially for tasks that are subjective and interpretive (Lee, 2018; Nass et al., 1995), people regard machines as inappropriate and inadequate to undertake such tasks, because machines are believed to lack certain capacities that are unique to humans, such as experience and subjectivity. Empirical research found people preferred human-generated artwork over AI-generated artwork (Ragot et al., 2020), perceived human translation as better than machine translation even when the translations were identical (Asscher & Glikson, 2021; Gao et al., 2014), and believed that AI lacked the abilities to perform subjective tasks that were "open to interpretation and based on personal opinion or intuition" in marketing (Castelo et al., 2019, p. 811).

Another line of research instead, finds *anthropomorphism*, that is, the tendency of treating nonhuman entities (e.g., AI in our case) as if they possess humanlike capacities such as thinking and

feeling (Gray et al., 2007; Waytz et al., 2010; Waytz et al., 2014). With an increasing tendency to anthropomorphize nonhumans by attributing them with humanlike characteristics, the ontological lines between machines and humans will become less distinct (Guzman, 2020). Following this reasoning, people might judge AI as appropriate and competent in augmenting relational activities. There has also been some empirical evidence suggesting people's acceptance of AI in performing interpretive, subjective tasks. For instance, in the context of journalism, Liu and Wei (2019) found that for machine writers, the interpretive news that demanded more cognitive processing was considered as more credible than spot news that usually required fewer cognitive resources (Reinemann et al., 2012). In education, Kim et al. (2021) found students particularly liked a relational (vs. functional) AI instructor in a social science (vs. natural science) lecture.

What adds more complexity to such a debate is the nature of relational activity. In relational contexts, relational activities mostly require an understanding of relational experience. That said, some activities such as providing advice about personal finance management tend to involve more objective and analytical thinking, while others such as selecting birthday gifts might be more subject to one's own tastes (see detailed definitional difference between subjective and objective tasks in the algorithmic context in Castelo et al., 2019). Although it is difficult to claim that a relational activity is solely objective or subjective in close relationships, some activities do exhibit more attributes towards one end or the other on this objective—subjective spectrum. In this respect, will people accept and believe that AI can carry out and even specialize in relational activities varying on the level of subjectivity? Would human-augmented relational maintenance be considered more or less inappropriate than the AI-augmented maintenance?

2.3. Research questions

Thus far, we have raised many questions about whether people would consider augmented interpersonal communication as appropriate. The lack of empirical evidence precludes a definite answer to them. We thereby propose our first research question (RQ) as follows to explore how common relational activities informed by existing research will be evaluated on aforementioned dimensions. Answering this question helps to provide state-of-the-art understanding of how traditional relational activities are perceived in a mediated interpersonal space.

RQ1: How are common relational activities perceived on dimensions of (a) importance of sincerity, (b) subjectivity, (c) inappropriateness for human augmentation, and (d) inappropriateness for AI augmentation?

Since relationship maintenance requires discretionary care and time dedication (Kelly et al., 2017), the evaluation of inappropriateness of mediated effort might be associated with how much sincere effort is demanded in a relational activity. We therefore propose the second RQ as follows to probe this relationship.

RQ2: What is the relationship between the importance of sincerity and (a) inappropriateness for human augmentation and (b) inappropriateness for AI augmentation for a relational activity?

Taken further, judging the inappropriateness of technological augmentation might also depend on the subjectivity of a relational activity as discussed before. Then, how would these two aspects collectively influence one's normative considerations? One possibility is that they produce an additive effect such that an activity will be considered as the most inappropriate when it needs more sincerity and is more subjective at the same time, or most inappropriate when it needs less sincerity and is more objective at the same time. The second possibility is that they produce an interaction effect such that the direction and/or the magnitude of the association between the importance of sincerity and inappropriateness depend on the level of subjectivity. The third possibility is that we would not observe a collective influence at all. To explore these possibilities, we further propose the following two research questions:

RQ3: What is the relationship between subjectivity and (a) inappropriateness for human augmentation and (b) inappropriateness for AI augmentation for a relational activity?

RQ4: How do the importance of sincerity and subjectivity collectively influence (a) inappropriateness for human augmentation and (b) inappropriateness for AI augmentation for a relational activity?

3. Method

3.1. Study design and procedure

To answer our research questions, we conducted a survey experiment with mixed design administered on the Qualtrics.com platform, the protocol of which has been approved by the relevant institutional review board. On average, the study took 8.43 minutes to complete, and it proceeded as follows.

Participants first read a consent form detailing the purpose and procedure of the study. After consenting to participate, they were randomly assigned to evaluate

three out of 25 relational activities (more details in section **3.3**). For each activity, they first read a brief description of it (e.g., "Activity: Giving you advice on how to set financial goals"), followed by providing their evaluations of that activity on dimensions including (1) required effort, (2) importance of sincerity, (3) subjectivity, (4) inappropriateness of human augmentation, and (5) inappropriateness of AI augmentation. Finally, participants answered some questions about their demographics, and were thanked and compensated for their participation.

3.2. Sample

We recruited 150 participants who resided in the United States and had at least 90% approval rate from Amazon Mechanical Turk (mTurk)—a crowdsourcing platform that provides researchers with affordable accesses to eligible study-takers, which has been one of the common ways to recruit participants in digital media and psychology research (e.g., Hammer et al., 2019; Stefanone et al., 2016).

Participants were recruited at three different time points. The first (n = 39) and last group (n = 99) were compensated $1 USD and the second group was compensated $2 USD ($n$ = 12). This difference in compensation was due to our initial difficulty in recruiting participants with the first group.

After removing 36 participants with poor response quality, our final sample consisted of 114 participants. There were 69 males, 44 females, and one missing response on their gender. Participants' age ranged from 21 to 70 years, M = 41.81, SD = 12.83. The ethnicity distribution is as follows: 85 self-identified as White, 13 as Asian/Pacific Islander, nine as Black, three as Hispanic/Latino/a, and two multiracial. Overall, 107 participants reported to be native English speakers, and four reported to be non-native speakers but fluent in English. And 74.1% participants reported to have at least a 4-year degree.

3.3. Selected relational activities

Guided by literature in relational maintenance, we chose 25 activities people do with or for each other to maintain relationships (e.g., Oswald et al., 2004; Stafford & Canary, 1991). While searching relevant literature, we first narrowed down general themes that were commonly reported in those studies (e.g., celebrating birthdays) and then proposed a specific activity for each theme (e.g., writing a birthday card). In devising a specific activity, we also took into account how sensible it would be for a person to ask assistance from an AI system or another person to perform a given activity. We chose friendship as a context to expand prior work on the effects of AI-mediated communication between friends (e.g., Liu et al., 2022).

These activities were classified into five groups: 1) giving advice/providing informational support to a friend (e.g., giving advice on how to set financial goals), 2) choosing content for a friend (e.g., recommending a news story to read), 3) expressing affection and support to a friend (e.g., painting an artwork), 4) making suggestions on shared activities to a friend (e.g., recommending a movie to watch together), and 5) engaging in self-disclosure to a friend (e.g., writing about recent reading experience). Each activity was modified to include 'you' as reference (e.g., giving 'you' advice on how to set financial goals, painting 'you' an artwork').

Table 2 presents the 25 relational activities (**T**) that we selected and tested.

3.4. Measurements

All the variables were measured on seven-point scales. And all except for *inappropriateness of human/AI augmentation* were measured with single-item measurement, which according to Allen et al. (2022), can yield valid inferences for psychological research while facilitating an efficient and simple survey-taking process for participants.

3.4.1. Required effort. We asked participants one question "How much effort do you think this activity requires from a close friend if they decide to perform it?" for the activities they had been assigned to. Responses were calibrated by a semantic differential scale with the "Effortless—Effortful" word pair, M = 5.16, SD = 1.60. This variable was mainly used for the preliminary analysis to anchor the amount of effort desired in common relational activities informed by past research (e.g., Oswald et al., 2004; Stafford & Canary, 1991), which seeks to update our existing knowledge to guide future research.

3.4.2. Importance of sincerity. We asked participants one question "How important is it that your close friend does this activity out of sincere effort?" Similarly, a semantic differential scale with the "Unimportant—Important" word pair was adopted, M = 5.22, SD = 1.86.

3.4.3. Subjectivity. To measure participants' perception of subjectivity for each of their assigned relational activities, we began with defining "objective activity" and "subjective activity" informed by previous research (Castelo et al., 2019; Inbar et al., 2010) as follows:

> *"An objective activity involves logical, rule-based analysis and it also involves facts and quantitative data. A subjective activity involves subjective*

judgment and emotional capability and it is based on personal opinion or intuition."

Then, we asked this question "How objective do you perceive this activity?" on a semantic differential scale with the "Objective—Subjective" word pair, M = 5.44, SD = 1.60.

3.4.4. Inappropriateness of external agency. We measured the inappropriateness of external agency on a likert scale where 1 = strongly disagree and 7 = strongly agree.

For the ***inappropriateness of human augmentation***, we began with the lead-in "There are many online communities (e.g., Reddit) that people can use to get help. Please indicate how you would feel if your close friend uses help from online communities (e.g., Reddit users) to perform this activity, instead of performing the activity on their own." Then participants responded to two questions, respectively "I will be bothered if my close friend uses help from online communities for the activity" and "It is inappropriate for my close friend to use help from online communities for the activity," Cronbach's α = .94, M = 3.78, SD = 2.11.

For the ***inappropriateness of AI augmentation***, the lead-in was "Artificial intelligence (AI) is now capable of performing many things that only humans could do before. Please indicate how you would feel if your close friend uses an AI system to perform this activity, instead of performing the activity on their own." Then participants responded to two questions, respectively "I will be bothered if my close friend uses an AI for the activity" and "It is inappropriate for my close friend to use an AI for the activity," Cronbach's α = .92, M = 4.02, SD = 2.09.

The bivariate correlations of focal variables are presented in Table 1.

Table 1. Bivariate correlations

	1	2	3	4
1	-			
2	.04	-		
3	.27***	.22***	-	
4	.27***	.22***	.81***	-

Note: 1 = Subjectivity, 2 = Importance of sincerity, 3 = Inappropriateness of human augmentation, 4 = Inappropriateness of AI augmentation; *** $p < .001$

3.5. Data analysis strategy

To answer RQ1, we treated individual participants as the unit of analysis and performed descriptive analyses on the importance of sincerity, subjectivity, inappropriateness of human augmentation, and inappropriateness of AI augmentation across 25 selected relational activities. We focused on describing their mean comparisons without claiming statistical significance.

To answer RQ2–4, we re-structured the data and treated each set of evaluations (inclusive of the importance of sincerity, subjectivity, inappropriateness of human augmentation, and inappropriateness of AI augmentation) as the unit of analysis. Given our mixed design, each relational activity was evaluated by 10 to 16 participants, which returned a total number of 338 sets of evaluations for the 25 relational activities.

To account for the hierarchical data structures, we specified two-level random intercepts linear mixed-effects models with sets of evaluations (level 1) nested within relational activities (level 2) using the *lme4* package in R (Bates et al., 2015). The fixed parameters were the importance of sincerity, subjectivity, and their interaction term (which was later dropped due to statistical non-significance); the dependent variable was perceived inappropriateness of human augmentation and inappropriateness of AI augmentation separately.

4. Results

4.1. Preliminary analysis

Figure 1 visualizes the amount of effort required for selected relational activities. The red line indicates the midpoint 4 of the scale.

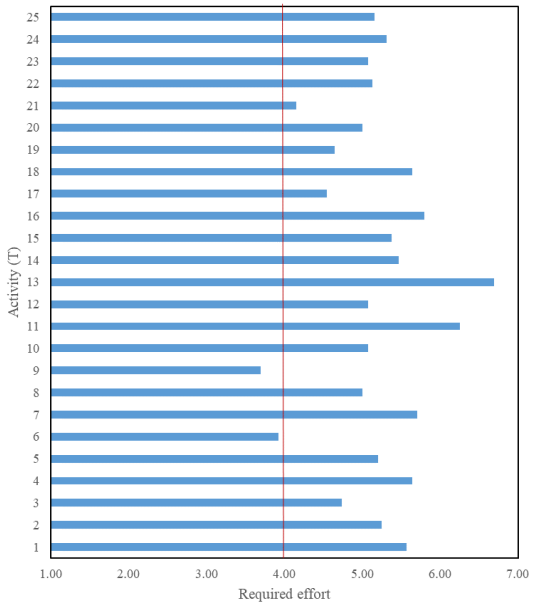

Figure 1. Required effort across 25 relational activities

Table 2. Mean comparisons across 25 relational activities					
C	**T**	**Sin**	**Sub**	**InA-H**	**InA-AI**
1: Giving advice/Providing informational support to a friend	1: Giving you advice on how to set financial goals	5.71(1.59)	**3.93(1.94)**	3.39(2.16)	3.00(1.74)
	2: Recommending you social activities to do with a new colleague	5.25(1.71)	6.00(0.95)	3.38(1.82)	3.50(1.87)
	3: Recommending you food recipes with step-by-step instructions	**4.13(2.29)**	4.73(1.58)	4.07(1.66)	4.23(1.86)
	4: Recommending you job positions based on your existing skills	**6.00(1.55)**	4.45(2.21)	3.36(2.23)	3.45(2.04)
	5: Giving you advice on how to resolve interpersonal conflicts	**6.00(0.93)**	6.07(0.88)	4.43(1.85)	4.93(1.52)
	6: Giving you advice on travel plans	4.85(1.52)	5.31(1.65)	3.12(1.73)	3.88(2.29)
2: Choosing content for a friend	7: Making a personalized music playlist for you	4.60(2.32)	5.90(1.20)	3.75(2.51)	3.95(2.10)
	8: Recommending you home remedies when you are sick	4.67(2.39)	5.00(1.86)	3.96(1.91)	4.04(1.86)
	9: Recommending you a news story to read	4.46(1.66)	5.00(1.96)	**2.62(2.04)**	**2.85(1.92)**
	10: Recommending you a romantic partner	5.29(2.05)	**6.21(1.12)**	**5.82(1.71)**	**5.55(2.13)**
3: Expressing affection and support to a friend	11: Painting you an artwork	5.83(1.75)	5.75(1.13)	3.88(1.94)	4.21(1.89)
	12: Making you funny memes	5.54(2.15)	5.92(1.19)	3.15(2.06)	3.23(2.03)
	13: Writing you a song	5.85(1.82)	5.38(1.56)	3.38(2.28)	3.23(1.98)
	14: Choosing a birthday gift for you	5.53(1.60)	5.33(1.35)	3.27(2.04)	3.80(1.95)
	15: Writing you supportive messages when you are in need	5.88(1.50)	6.00(1.46)	4.53(1.94)	5.34(1.90)
	16: Writing you a gratitude letter	5.73(2.12)	5.07(1.94)	3.37(2.29)	3.90(2.16)
	17: Writing you a birthday card	4.82(1.83)	5.55(1.04)	5.09(2.12)	5.14(1.91)
	18: Writing you a poem	4.86(2.11)	6.14(1.03)	4.61(1.82)	5.14(1.65)
4: Making suggestions on shared activities to a friend	19: Proposing ideas about activities that you can do together	5.64(1.28)	5.00(2.00)	2.64(2.02)	3.04(2.11)
	20: Recommending you a book to read together	5.29(1.38)	4.93(1.59)	3.00(2.25)	3.39(2.25)
	21: Recommending you a movie to watch together	5.85(1.77)	5.62(1.39)	3.00(2.16)	3.00(2.22)
5: Engaging in self-disclosure to a friend	22: Writing you a message expressing their feelings about your friendship	5.56(1.97)	6.00(1.51)	4.78(1.86)	4.84(1.67)
	23: Writing to you about their opinions about politics	4.14(2.14)	5.79(1.76)	3.50(2.32)	3.46(2.32)
	24: Writing to you about their recent reading experience	4.50(1.67)	5.13(2.00)	3.66(1.69)	4.28(2.02)
	25: Writing you messages about their childhood memories	5.31(1.97)	5.77(1.17)	4.46(2.45)	4.46(2.47)

Note:
1. The format of mean comparisons is *mean(standard deviation)*.
2. C = Categories of relational activities, T = Relational activity, Sin = Importance of sincerity, Sub = Subjectivity, InA-H = Inappropriateness of human augmentation, InA-AI = Inappropriateness of AI augmentation.
3. Within each column of evaluations, the highest and lowest means are in boldface.

Overall, 23 out of 25 activities were considered requiring at least a moderate level of effort (i.e., over the midpoint 4 on a 1–7 scale). The two activities that did not meet this standard are "T6: Giving you advice on travel plans" and "T9: Recommending you a news story to read."

As shown in Table 2, all activities were rated as needing a moderate-to-high level of sincere effort (i.e., scored 4–6 on a 1–7 scale). The two activities that were considered as requiring the most sincere effort are "T4: Recommending you job positions based on your existing skills" and "T5: Giving you advice on how to resolve interpersonal conflicts."

For the perceived subjectivity, all but "T1: Giving you advice on how to set financial goals" (M = 3.93, SD = 1.94) were considered as relatively more subjective (i.e., scored above 4 on 1–7 scale). The most subjective activity was "T10: Recommending you a romantic partner" (M = 6.21, SD = 1.12).

For the inappropriateness of external agency, participants' evaluations were rather similar between human augmentation and AI augmentation. Among all, 8 out of 25 activities were considered as inappropriate for having human augmentation, while 11 out of 25 activities were considered as inappropriate for having AI augmentation (i.e., scored above 4 on 1–7 scale). The most appropriate activity for both types of augmentation was "T9: Recommending you a news story to read" (M = 2.62, SD = 2.04 for human augmentation; M = 2.85, SD = 1.92 for AI augmentation). And the most inappropriate activity for both types of augmentation was "T10: Recommending you a romantic partner" (M = 5.82, SD = 1.71 for human augmentation; M = 5.55, SD = 2.13 for AI augmentation).

4.3. Associations among the importance of sincerity, subjectivity, and inappropriateness

As shown in Table 3 and Table 4, in answering RQ2, we found a statistically significant association between perceived importance of sincerity and inappropriateness of external agency such that the more an activity required a close friend's sincere effort, the more inappropriate it was to involve agency by human or AI to perform that activity.

Similarly, in answering RQ3, we found a statistically significant association between perceived subjectivity and inappropriateness of technological augmentation such that participants considered performing more subjective relational activities as more inappropriate for involving machine agency by human or AI.

Table 3. Associations among the importance of sincerity, subjectivity, and inappropriateness of human augmentation

Predictors	Estimates	*95% CI*	*p*-value
(Intercept)	0.71	[−0.25, 1.67]	.15
Sincerity	0.25	[0.14, 0.36]	<.001
Subjectivity	0.32	[0.19, 0.46]	<.001
Random effects			
σ^2	3.72	τ_{00}	$0.25_{Activity}$
ICC	0.06	N	$25_{Activity}$
Observations	338	Marginal R^2 / Conditional R^2	.112 /.168

In answering RQ4, we did not find evidence to support the interaction effect between perceived importance of sincerity and perceived subjectivity on the inappropriateness of technological augmentation. Instead, the two predictors produced an additive effect such that it would be considered as most inappropriate to involve external agency by human or AI for relational activity that requires a close friend's sincere effort and is more subjective at the same time.

Table 4. Associations among the importance of sincerity, subjectivity, and inappropriateness of AI augmentation

Predictors	Estimates	*95% CI*	*p*-value
(Intercept)	1.00	[−0.05, 1.96]	.039
Sincerity	0.25	[0.14, 0.36]	<.001
Subjectivity	0.31	[0.18, 0.44]	<.001
Random effects			
σ^2	3.60	τ_{00}	$0.27_{Activity}$
ICC	0.07	N	$25_{Activity}$
Observations	338	Marginal R^2 / Conditional R^2	.111 /.173

5. Discussion

In the present study, we explored how people perceived *effort* desired in common relational activities being augmented by external agency. We found a majority of the selected activities needed to be carried out with sincere effort, and were more considered as subjective (rather than objective) activities. While some activities were deemed as

appropriate to involve augmentation, overall, people would be more bothered if a subjective activity that required sincere effort was augmented by external agency—regardless of human or AI exercising it. These findings altogether have important implications for research and practice on CMC and relational maintenance.

5.1. Theoretical implications

First, for general research on CMC and interpersonal relationships, our descriptive results anchor relational activities common in friendships on important evaluative dimensions. Their varying degrees on those dimensions will help improve study designs in future research on relationship maintenance, for instance, when selecting certain activities to create experimental stimuli.

Second, in line with prior research (Dindia & Canary, 1993; Tong & Walther, 2011), the positive association between importance of sincerity and inappropriateness of technological augmentation validated the critical role of effort in online relationship maintenance. Even though CMC provides more flexibility and opens up more possibilities for people to manage their interpersonal relationships by transcending the time- and location-specific boundaries (Tong & Walther, 2011), choosing technologies to do so risks receiving negative evaluations from relational partners because the level of discretionary investment needed in keeping a relationship satisfactory (Kelly et al., 2017) would significantly decay.

Hence, our findings expand on the equity theory (Hatfield et al., 1985) and the actor-partner interdependence model (Shafer et al., 2014). While much work taking these two perspectives/approaches has exclusively focused on examining perceived effort of a task (e.g., Shafer et al., 2013) in the context of non-augmentation, we identified and explored other important dimensions of a relational activity (i.e., subjectivity, importance of sincerity) that scholars can consider in the context of augmented communication. Our results will add to understanding the need for maintaining equitable relationships in a technology-mediated world by pointing out what additional evaluative criteria that relational partners would hold when they assess their close relationships.

Third, we found a positive association between a relational activity's subjectiveness and people's perceived inappropriateness of it being augmented by external agency, both human and AI. This finding extends research on anthropomorphism (Gray et al., 2007; Waytz et al., 2010; Waytz et al., 2014) to interpersonal contexts and adds to our understanding of how external agency is not appreciated in relationship maintenance. We found subjectivity and importance of sincerity of a relational task had additive, rather than interaction effect on perceived inappropriateness, which further indicates that people considered the act of involving external agency itself unacceptable, even for activities that require minimum sincere effort.

5.2. Practical implications

Our findings also have important practical implications for technology designers. For digital platforms that afford convenience to augment relational activities, developers and designers could consider creating novel features that allow people to show their sincere effort in the process of performing a relational activity. For example, the technology interface could be designed with features showcasing the effort of their partners (e.g., how they put effort in engaging with the technology), so as to make one more aware of the effort from each other (Kelly et al., 2018).

For people in close relationships, they need to weigh the benefits and costs of using external sources in their relationship maintenance. Based on our results, augmenting more objective relational activities might receive less pushback from relational partners. An interesting idea would be to embed a message that can prompt reflection in a user before they decide to use any augmentation. Research has shown that certain attributes in a message (e.g., a friendly message, the use of informal words) motivate actions in users (Kang & Wei, 2020). Messages with attributes that remind a user of their closeness with a friend then can encourage them to think of their relationship as private and "we-focused," thereby performing an action without any intervention of a third party, be it an AI or another user.

Lastly, developers and designers can think of ways to restore relationships if one finds out their close friends resorted to the use of external agency on subjective activities, whether human or AI. Prior work on restoration of relationship conflicts suggest there are three restoration strategies involved: apologies, demonstration of concern, and penance (Ren & Gray, 2009). Demonstration of concern is especially relevant and is defined as "an offender" showing their benevolent intentions for their original behaviors. Applying this concept, developers and designers can offer "an offender" to attach a message from the start and this message would highlight their benevolent intention when they send a close friend a

given outcome (e.g., book, advice, song, gift) (e.g., "your friend used an AI or an online community to recommend a book because they wanted to spend a good time with you and they did not feel confident about their own recommendations!").

5.3. Limitations and future work

There are several limitations of the current study that can be addressed in future work. First, we only focused on common relational activities in close friendship. Yet, the evaluations of technological augmentation might differ in other relational contexts such as family, marriage, or acquaintances featuring diverse interaction dynamics, combined with individual difference variables (e.g., AI aversion, see Melick, 2020). Researchers are then encouraged to increase the sample size to further explore this topic with more contexts taken into consideration. Relatedly, considering the mean age of our participants was relatively high, we also encourage future work to replicate our study with people of different ages (e.g., young adults, adolescents).

Second, we asked participants to provide their evaluations with a short description of given relational activity. While simplifying the whole study-taking process, this can be further improved to yield richer insights if participants are prompted to contextualize those activities in their real-life close relationships in future work.

Third, people are aware of AI technologies that are around them. It therefore won't be surprising if one reflects on the nature of a close friend's online relationship maintenance behaviors. When that reflection occurs, it will be interesting to explore people's evaluations of their relationship when they are made aware of their relational partners' leverage of technological augmentation with inappropriateness as an underlying mechanism.

Despite these limitations, our study contributed to the existing body of research on mediated conversations in interpersonal relationships. We invite researchers to continue to unpack the nuances of the relationship between external agency and relational maintenance.

6. References

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