CareJournal: A Voice-Based Conversational Agent for Supporting Care Communications

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ABSTRACT

Effective communication between older adult care recipients and unpaid caregivers is essential to both care partners' well-being. To understand communication in care relationships, we conducted a two-part study with older adult care recipients and caregivers. First, we conducted a two-week diary study to gain insight into care-related communication challenges. While caregivers discussed the benefits of emotional attachment, care recipients expressed concerns about emotional fluctuation and losing autonomy. These findings, along with literature on self-disclosure and conversational scaffolding informed our design of CareJournal—a voice-based conversational agent that supports care-related disclosure between care partners. We evaluated CareJournal with 40 care partners to inform future design considerations and learn more about their communication practices. Our findings highlight the impact of distance and tensions between care and independence, providing insight into how care partners imagine computer-mediated care communication impacting their relationships.

CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in HCI**; **Auditory feedback**; **Empirical studies in collaborative and social computing**; **Empirical studies in accessibility**; **Accessibility systems and tools**.

KEYWORDS

caregiving, care receiving, older adults, conversational scaffolding, evaluative disclosure, voice assistants

1 INTRODUCTION

People are likely to confront changing health and mobility conditions as they age. As a result, older adults (65+) may require new care relationships and routines to maintain their quality of life and sense of independence. Although some older adult care recipients receive assistance from people who are paid to provide care, unpaid family members or close friends provide the majority of their care [1]. As the population ages and a growing number of older adults express a desire to age at home—rather than in institutional settings—more people in the United States are expected to assume the roles of unpaid or "informal"[1] caregivers [113]. Such roles, which care scholars define as including "the varied activities of providing for the needs or well-being of another person" [58, 86], affect all aspects of caregivers' lives in positive and negative ways [118]. Similarly, the physical and cognitive changes often accompanying old age impact older adults' daily activities [90, 124], social lives [67, 100], emotions [67, 124], and sense of identity [124, 127].

In light of these dynamics, policymakers, advocates, and researchers often discuss technology's role in the constellation of challenges and opportunities associated with care [e.g., 2, 40, 81]. For example, HCI researchers have engaged in efforts to support care relationships across various dimensions of distance (e.g., physical context, age differences) [65, 89, 116, 147, 148], highlighting the diversity, complexity, and dynamism of intimate relationships [80]. However, most efforts to support care relationships between older adult care recipients and unpaid caregivers involve developing technologies meant to monitor older adults' health and well-being [e.g., 38, 68, 114]. Critics express concern about how these technologies threaten existing care routines and ideals [19, 20, 43, 95] and contribute to the depersonalization of care [132] and further strain care relationships.

We pursued an alternative approach to supporting care partners[2] by shifting focus away from technologies meant to monitor and improve health and well-being to supporting care partners' communication practices. Interdisciplinary research suggests improved

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[1]While researchers have used the term "informal care" to differentiate support and assistance provided by family members and friends from the work of healthcare professionals, critics argue that this choice of language contributes to the cultural devaluation of labor performed by people—often women—who provide care on an unpaid basis [see 7].

[2]Throughout this paper, we refer to pairs of caregivers and older adult care recipients as "care partners" to highlight the collaborative and reciprocal nature of caregiving relationships, recognizing the shared responsibilities, mutual support, and dynamic exchange of care and assistance.

communication is a potential solution to the challenges that care partners face [28, 44, 94], as conflicts often emerge around the perceptions of care needs, division of responsibilities, and the appreciation accorded to caregivers [74, 86, 107]. Further, care partners often experience relational deprivation [see 21] as they experience the loss of roles and relationships (e.g., husband-wife, mother-daughter) that preceded intensified care practices [138]. These circumstances underscore tensions between care and independence. The former term necessitates a degree of dependence, while the latter term implies a sense of autonomy and self-reliance, where individuals make decisions and take actions based on their own preferences and needs. HCI scholars argue that care involves interdependence, where care partners rely on each other for support, creating a potential conflict between maintaining personal autonomy and needing assistance from others [13, 14, 17]. Amidst these discussions, we sought to develop an understanding of the interplay among care communication, tensions between care and independence, and how care partners perceive the role of technology in care relationships (e.g., husband-wife, mother-daughter).

1.1 Research Questions

Our interpretation of the literature on the effects of communication difficulties on care partners' relationships and ongoing debates about the role of technology in this context led to the development of a two-part study. In Study One (Section 2), we conducted a diary study with care partners to ask:

- **RQ1**: What communication challenges do caregivers and older adult care recipients encounter in their care practices?
- → Diary study entries provided insight into the challenges that care partners face in their day-to-day activities. Caregivers sought positive emotional connections with older adult care recipients and struggled to manage emotional burdens. Care recipients expressed concerns about emotional fluctuations and losing autonomy.

In Study Two (Section 3), we discuss how we synthesized findings from Study One with existing literature to guide prototype development efforts. We conducted prototype evaluation interviews with 20 pairs of care partners (40 participants in total), using CareJournal to elicit responses to the following research questions:

- **RQ2**: How do care partners navigate the tension between care and independence through communication practices?
- → Care partners discussed the specific strategies they used to confront and manage conflict in light of these tensions. We found that distance—referring to physical, emotional, experiential, cultural, and power-based differences—between care partners impacted the strategies that they used to navigate conflicts.
- **RQ3**: How do pairs of older adult care recipients and caregivers envision computer-mediated care communication in their relationships?
- → While some participants expressed skepticism towards the prototype, care partners in more distant relationships discussed its potential to mediate conflict. Care partners in closer relationships noted that the prototype could encourage useful reflection on care practices and experiences.

We discuss these findings and their implications in the context of contemporary care relationships in the U.S., highlighting how design can support intimacy and cooperation rather than replacing these relational dynamics. As such, we make contributions to practice and theory. Design considerations and participant feedback provide guidelines for HCI practitioners seeking to develop technologies to support care relationships. Deep discussions of how participants in different relationships confronted and managed tensions between care and independence provide insight into how these abstract ideas materialize, contributing to HCI discourse about the role of computer-mediated communication in intimate relationships.

2 STUDY ONE: DIARY STUDY

In this study, we sought to understand older adult care recipients' and unpaid caregivers' communication challenges. First, we discuss how HCI researchers have investigated the role of technology in care relationships. Then, we present work that underscores the complexity of care relations involving older adults. Communication issues pose a challenge to caregivers' and care recipients' well-being. These contributions motivated our two-week diary study with older adult care recipients and caregivers, which provided perspective on communication challenges in care relationships. We close with a brief discussion of how participants' views informed Study Two (Section 3).

2.1 Care and Communication

Care work has garnered significant attention from researchers investigating its relationship to human-computer interaction (HCI) and computer-supported cooperative work (CSCW); scholarship has sought to understand how technology can support and enhance various aspects of care provision. Researchers have studied the specific contexts in which care work takes place [e.g., 72, 103, 115, 117, 123, 125], explored designing technologies to support care work [e.g., 12, 73, 108, 136], emphasized the importance of including older adults' perspectives when designing technologies meant to support them [e.g., 109, 111, 141], investigated how technologies exacerbate challenges for caregivers and care recipients [e.g., 63, 71, 92, 119, 128], and offered commentary that encourages HCI and CSCW researchers to reconceptualize care in their scholarship through empirical research [i.e., 26] and critical reflection [i.e., 15, 78].

Care relationships are complex, often rooted in affection and intimacy between care partners. However, researchers have demonstrated that tensions may characterize interactions between caregivers and care recipients [22]. One of the most significant sources of conflict between care partners is communication [36], characterized by challenges in effectively transmitting, receiving, and understanding information. Researchers have identified that interaction timing, (geographic) distance [126], and caregiving styles [84] pose challenges to care partners' interpretation and awareness of each other's practical and existential concerns. These problems contribute to emotional tension, misunderstandings, and a heightened sense of burden, all of which negatively impact care relationships. As such, communication challenges between older adult care

recipients and caregivers stand out as an important area for HCI research.

2.2 Methods

We sought to improve our understanding of the communication gaps between older adult care recipients and caregivers. We conducted a two-week diary study to understand the routine behaviors and emotions of participants [112], focusing specifically on challenges and communication issues between care partners. A research team member sent participants a text message once every day for two weeks, asking participants to respond to an online questionnaire to understand the relationship between communication, emotional connection, and care-related burdens/stress using the following questions:

- On a scale of 1-5, how much stress did you experience in providing support, assistance, or care today? (1 = *No stress*; 5 = *A lot of stress*)
- What was the most meaningful interaction or conversation that you had today with your care partner? (*Free response*)
- What made this interaction or conversation meaningful? (*Free response*)
- Have you experienced this interaction or had this conversation before? (*Yes*; *No*)
- If comfortable sharing, what did you want to communicate? (*Free response*)

2.2.1 Participants. After IRB approval, we recruited through our university's participant recruitment pool, a university-affiliated caregiver support group, and social media posts (e.g., Twitter, Reddit, Facebook). We also used snowball sampling Bernard [16], asking diary study participants to recommend additional caregivers or older adult care recipients interested in participating in our study. Care receivers were eligible if they were over the age of 65 and received help in day-to-day tasks from a family member, friend, or unpaid caregiver. Caregivers were eligible if they were over the age of 18 and provided unpaid assistance or support to someone over the age of 65 for health or mobility reasons. For our study, we did not recruit pairs of caregivers and care receivers, recognizing a power dynamic may exist between care partners and to reduce potential coercion [131]. Fifty-one care recipients (ages 65 - 83, avg. age = 72.8, 31 women, 20 men) and 110 caregivers (ages 26 - 72, avg. age = 44.2, 42 women, 63 men, 3 prefer to self-describe) completed our initial questionnaire. Of this sample, five caregivers (ages 44 - 80, avg. age = 60.2, 4 women, 1 man) and 14 care recipients (ages 65 - 80, avg. age = 71.5, 8 women, 6 men) participated in the diary study (see Table 6). Participants received $10 compensation for completing the questionnaire and $30 compensation for completing the diary study.

2.2.2 Data Collection & Analysis. We collected a total of 65 diary entries from caregivers (mean number of entries = 13.6) and 128 diary entries from care recipients (mean number of entries = 9.14)[3]. We coded data inductively, and analyzed the diary study entries using an emergent themes approach Williams [143] following an iterative coding process Srivastava and Hopwood [122]. First, two

research team members began with rounds of open coding, writing analytic memos to identify patterns in the data after reading each diary entry multiple times. Then, we generated a codebook through discussion with the research team, focusing on difficulties experienced by care recipients (e.g., feelings of despair, interpersonal difficulties, safety concerns) and caregivers (e.g., expressing desires for positive emotional attachment, concerns about managing emotional burden). Through constant comparison and group discussions with the research team, we resolved discrepancies and merged codes into preliminary themes of closely related concepts Corbin and Strauss [39]. We applied finalized themes to excerpts from participants' diaries to formalize our analysis (Table 1).

2.3 Findings

We found differences between caregivers and care recipients when analyzing responses about communication gaps. Care recipients were uncommunicative about difficulties they experienced in receiving care, yet caregivers often reported not communicating about positive aspects of their care interactions. These findings provide insight into emotional imbalance in care relationships and highlight the difficulties of receiving and providing care, informing our initial prototype designs.

2.3.1 Communication, Emotions, and Connection. In diary entries, caregivers discussed the role that positivity had in their communication practices, underscoring how they desired to use conversations with care recipients to convey attachment, strength, and encouragement. For example, Kiran_{CG}[4] reflected on how she communicated with her care recipient, noting the necessity of staying positive *"The most effective way to get through my care recipient is with positives... today was amazing!"* Reinforcing this point, Maria_{CG} noted that she was *"proud"* of her care recipient and that the prompt to record a diary entry reminded her to convey this sentiment to him. Maria_{CG} added, *"He is always worthy of and worth the effort; I will remind him that we are partners through it all."* Emphasizing her commitment to her husband/care recipient, Maria_{CG} underscored the unconditional terms of their care relationship.

In contrast to caregivers' focus on positivity and emotional connection, care recipients discussed encounters with loss, emotional turbulence, and loneliness. Reyes_{CR} wrote about her desire to connect with her adult daughter about her husband's declining health, *"I wanted to talk to my daughter about my husband getting worse and what I need to do!"* Reyes_{CR}'s absence of communication emphasizes how the loss of family can be isolating, leaving older adults unsure of what resources to utilize as they cope with changing social circumstances and connections. Fiore_{CR} wrote about the frustrations and sadness accompanying loneliness in old age *"I feel sad today...I was alone instead of the visit I wanted."* In the face of decreased mobility, Fiore_{CR} felt limited ability to seek interactions independently. Finally, Franny_{CR} reflected on the struggles associated with emotional volatility, reflecting internalized stigmatization of her emotional state *"My moods are up and down... Makes me disappointed."* While caregivers used diary entries to reflect on how they did not communicate positive sentiments, care recipients

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[3]See Table 7 for more information on diary study responses.

[4]Throughout this paper we use subscripts $_{CG}$ to denote that a participant entered our study as a caregiver, and $_{CR}$ to denote that a participant entered our study as a care recipient.

Table 1: Diary study themes and example excerpts

Theme	Explanation	Example Excerpt
Caregiver Communication and Emotional Connection	The importance of positive communication and emotional engagement for better interactions and well-being.	*"The most effective way to get through to my care recipient is with positives... today was amazing!"*
Care Recipient Emotions and Connection	Expressions of varying emotional states and the desire for communication and connection with loved ones.	*"My moods are up and down... Makes me disappointed."*
Maintaining Support Despite Challenges	The challenges of caregiving and the desire to alleviate worries and maintain support.	*"I'm more than a little stressed about being in charge of both of our well beings on this trip."*
Care Recipient Autonomy, Independence, and Frustration	Struggles with loss of autonomy, independence, and frustration over needing assistance.	*"Please stop. I can do stuff for myself. Let me help you."*

wrote about their struggles in communicating negative emotional states, coping with the loss of loved ones, physical independence, and emotional stability.

2.3.2 Maintaining Support Despite Challenges. Caregivers generally expressed positivity and commitment, as their diary entries also highlighted the tangible burdens that accompany caregiving. For example, Maria$_{CG}$ highlighted the stresses of feeling obligated to look after the emotional well-being of two people, even as they went on vacation: *"I'm more than a little stressed about being in charge of both of our well-beings on this trip."* At the same time, caregivers described engaging in efforts to protect their care receivers from the pressures they faced. Maria$_{CG}$ also reflected on this complexity, *"he already feels like a burden, so I didn't want to pile on more worry."* These diary entries drew attention to the fact that caregivers worked to balance the emotional challenges of caregiving with awareness and sensitivity to the issues that care recipients faced.

2.3.3 Care Recipient Autonomy, Independence, and Frustrations. Diary entries from care recipients demonstrated the struggles older adults faced as they grappled with the loss of independence and autonomy, demonstrating the difficulties and frustrations that accompanied support and assistance. Specifically, Mitra$_{CR}$ wrote about how accomplishing functional tasks with the help of her caregiver increased feelings of being a burden, *"I wanted to grocery shop alone, I need to have time to browse. Instead, this becomes a chore and a mission to accomplish in the minimum amount of time."* Obi$_{CR}$ discussed feelings of shame related to assistance with technology, expressing that she didn't want to burden her primary caregiver with further asks for help, *"I need more help getting my laptop and printer set up...I need to find someone I could pay to help me."* In addition, Fiore$_{CR}$, described the difficulties that he faced providing and receiving care. When her caregiver fell sick, it was difficult for her to switch roles and provide care, contributing to palpable feelings of frustration, *"Please stop. I can do stuff for myself. Let me help you."* Here, diary entries from care recipients emphasize communication difficulties associated with loss of independence, autonomy, and role-switching.

2.4 Summarizing Communication Gaps

Our diary entry analysis provides insight into the challenges that participants faced in providing and receiving care. Findings underscore the power of communication and emotional connection between care partners as they navigated their circumstances and relationships. Caregivers discussed the efficacy of employing positivity to engage older adult care recipients, emphasizing the importance of conveying attachment, strength, and encouragement to ensure smooth interactions and continued engagement in developmental activities (e.g., physical therapy). This theme was best demonstrated in diary entries where caregivers provided commentary on their strategies for reaching older adult care recipients, describing how positive evaluations fostered meaningful interactions and enhance the experience of both caregivers and care recipients. Caregivers also repeatedly mentioned the challenges that they faced. In diary entries, caregivers candidly discussed their efforts to balance offers of functional support with efforts to alleviate worry for older adult care recipients. Caregivers openly expressed feelings of stress, mainly when they felt an obligation to manage both their own and their care recipients' well-being. The internal emotional struggles and the physical challenges of caregiving showcase participants' efforts to manage their emotions while providing holistic care to loved ones.

On the other hand, diary entries from care recipients demonstrated communication difficulties related to autonomy, frustration, and independence. Entries from care recipients captured frustrations as they grappled with desires to maintain their independence and sense of identity in the face of increased needs for assistance. This theme was most evident as care recipients discussed their need for technical assistance and yearning for the freedom and ability to engage in functional tasks (i.e., grocery shopping) and recreational activities (i.e., gardening). These findings show the difficulties of striking a balance between needing care on the one hand while striving to preserve a sense of self and agency on the other. Care recipients also discussed how their emotional states impacted communication practices. Specifically, care recipients underscored their hesitation to talk about sadness and disappointment—sometimes associated with a sense of loss—with caregivers. This finding reveals the difficulties care recipients felt communicating openly with

caregivers, reflecting the potential for improving support, empathy, and mutual respect between care partners.

3 STUDY TWO: PROTOTYPE EVALUATION

In this section, we discuss our approach to developing CareJournal, a prototype conversational agent for supporting care relationships. Prior work and findings from Study One highlighted the significance of communication in care relationships, which motivated prototype design. Concerns about the scalability and resource constraints associated with existing solution to improve care relationships [40, 81], prior work, and findings from Study One motivated prototype design. At the same time, we recognize that technology should not replace the valuable human touch and empathy provided by informal and family caregivers. We provide an overview of prior work on distance, self-disclosure, and conversational scaffolding, which informed design considerations. Then, we introduce the protocol we used to elicit and analyze participants' perspectives on our prototype and its relationship to their current communication practices. We close with a discussion of the significance of our findings.

3.1 Prior Work

We drew inspiration from HCI researchers' recent explorations of digital experiences to support relationships [e.g., 33, 65, 104, 148] and the success of voice-based tools and technologies [12, 23, 29, 110] to create CareJournal. We reviewed this literature critically, observing that some authors [i.e., 133] argue that the mass adoption of computer-mediated forms of communication (e.g., social media, texting) raises questions about their negative influence on human connection. Specifically, Turkle [133] problematizes these technologies because they undermine interpersonal intimacy, thus challenging meaningful relationships. With this critique in mind, we reviewed ongoing discussions about the role of computer-mediated communication in intimate relationships, focusing on the significance of distance and self-disclosure.

3.2 Supporting Intimate Relationships in HCI

Distance has always challenged the creation and maintenance of social relationships. While the advent, advancement, and adoption of information technologies facilitate new communication practices, different dimensions of distance (e.g., physical context, time, culture, and language) continue to shape the human experience [104]. HCI researchers have long sought to support human relationships and interactions, exploring communication between two households in a family [65], geographically distributed family members [89, 116], siblings with a large age difference [69], and parents and children in divorced [147] and work-separated [148] families. These contributions highlight the diversity, complexity, and dynamism of family relationships [80], and prompted reflexivity in terms of the methods that HCI researchers use to understand family life, metrics for evaluating interventions, and approaches to defining the concept of the family [98].

Despite these developments, most efforts to support older adult care recipients and caregivers have involved building technologies that enable caregivers to monitor care recipients [e.g., 38, 68, 114]. This approach overlooks contributions detailing the complexity of intimate relationships. In addition, critics argue that monitoring technologies challenge care partners' existing care routines and ideals [19, 20, 43]. In turn, HCI researchers have started to advocate in favor of alternative approaches to supporting care relationships. For example, Morrissey et al. [95] [95] suggest that instead of focusing on technologies explicitly meant to monitor or improve health and well-being, design efforts ought to support reflection and discussion about experiences of care and well-being between family members.

The development, implementation, and widespread adoption of technologies for computer-supported care communication have yet to be achieved. Huber et al. [64] [64] draw on interviews with older adult care recipients to demonstrate that a significant barrier to adoption is older adults' concern that in-home technologies will reduce or replace human contact. Humanists argue that technology negatively transforms humans' relationships with each other and ourselves [see 132]. HCI researchers have thus sought to emphasize the importance of respect for existing stakeholder routines and the need to align implicit and explicit asymmetries between these actors as cornerstones of designing for care interactions [61, 85, 93, 117]. Therefore, systems designed to support care partners' interactions represent an appealing alternative to technologies that supplement or replace existing communication practices.

3.2.1 Supporting Self-Disclosure. To better understand how we could support communication practices, we turned to the field of psychology. Decades of research support the notion that the act of self-disclosure, defined as the act of sharing personal information about oneself in a conversation [4, 8], is an essential component of intimate relationships. Self-disclosures may be descriptive (e.g., sharing one's thoughts, feelings, aspirations, goals, successes, failures, fears, and dreams) or evaluative (e.g., sharing how you feel about your relationship with another person) [96]. In care relationships, care partners may share more information about themselves and their feelings with each other, suggesting that disclosure has an important role in supporting emotionally rich conversations. Therefore, we sought to understand how the HCI community has studied and designed for self-disclosure across various settings and contexts.

HCI researchers have primarily studied self-disclosure as it takes place in online environments (e.g., social media websites [34, 87, 139], news commentaries [134], platform economy profiles [134]), and non-human agent interactions (i.e., chatbots [62, 121], realistic avatars [66, 75, 76]). These authors frame self-disclosure as providing benefits to individuals, as it can facilitate social bonding and connection [101]; foster a sense of belonging within online communities [82]; support psychological well-being [10]; and empower individuals by enabling them to exercise a sense of agency [83]. Notably, Noguchi et al. [101] [101] demonstrated that conversational agents can support remote self-disclosure between older adults and their family members and friends. Though designers often aim to facilitate disclosure, they have also acknowledged risks, such as privacy concerns [87], information misuse [3], and concerns about sharing sensitive information [25, 66]. As such, this literature supports system design to maximize the benefits of disclosure while minimizing its potential downsides.

Table 2: Design considerations

Considerations	Description	Source
Positive and Negative Aspects of Care Experiences	To facilitate open dialogue and collaboration between caregivers and care recipients, we encouraged users to share positive and negative feedback with each other.	Importance of reciprocity (see Subsubsections 2.3.1 and 2.3.2, Altman and Taylor [4], Aron et al. [8]).
Forward-looking Disclosure	We sought to foster a sense of autonomy in care relationships by encouraging forward-looking feedback.	Care recipient concerns about autonomy (see Subsubsection 2.3.3, [46]).
Short and Simple Prompts	Long prompts may be distracting and cause confusion.	Principles of designing tech for older adults [see 24].
Skipping and Confirmation blocks	We provided users with options to skip prompts or re-record their responses to support agency and clarity.	
Optional Sharing to Partners	If users were concerned about the impact on their existing relationships with care partners and only want to vent, they had the option to opt-out of sharing feedback.	Respect for caregivers and care recipient autonomy in technology design (see Subsubsection 2.3.3, [18, 20]).

3.2.2 Conversational Scaffolding. While emotionally intimate conversations that feature reciprocal acts of self-disclosure can be challenging to start [41, 77], HCI researchers [33] have presented the concept of "conversational scaffolding"[5] as a potential tool to support self-disclosure in computer-mediated interactions. Researchers generally use the term "scaffolding" to describe human- or technology-provided supports, prompts, or guidance to help individuals accomplish a particular task. For example, Baker et al. [9] [9] used social virtual reality (social VR) to scaffold memory activities between geographically separated older adults, providing perspective on the efficacy of 3D conversation starters and individual artifacts that can support reminiscence and self-reflection. Cerna et al. [32] [32] used the term in a more traditional sense, using it to describe instructional supports provided to older adults when engaging them in online participatory design activities. In this paper, we extend Chen et al. [33] [33] use of conversational scaffolding to design a system for supporting evaluative self-disclosure between care partners.

3.3 Design Considerations

Following scholarship on intimacy, care relationships, and findings from Study One, we designed our prototype to induce personal and reciprocal conversations [8]. We modeled prompts after the interactions where diary study participants expressed difficulty communicating with each other. Specifically, we solicited reflection on positive and negative aspects of care experiences, as well as care-related hopes and expectations. The system allows participants to skip questions that they did not want to answer, confirms the accuracy of recorded responses, and asks participants for consent to share reactions with their care partners (Table 2).

3.4 Methods

To elicit reactions from care partners and understand how they thought a conversational agent might support interactions, we evaluated the prototype in remote interviews with 20 pairs of caregivers and care recipients. We used prototype evaluation interviews to gain contextual insight into care partners' communication practices [50, 51], their interaction with conversational agents [109], and their reactions to computer-mediated care communication [64]. Observing users interacting with the prototype also provided valuable data about participants' thought processes, decision-making, and interaction patterns [57]. We designed the semi-structured interview protocol to understand how participants evaluated the prototype and its prompts in light of their routines and communication practices.

3.4.1 Prototype Implementation. We integrated design considerations (Table 2) into separate conversational workflows for caregivers and care recipients using Voiceflow[6] [see also, 27], a block-based web-based platform for designing high-fidelity, voice-based conversational agents. Conversational workflows[7] consisted of an introduction to the prototype, three prompts to encourage self-disclosure and reflection, confirmation blocks, and a question that asks permission to share responses with the user's care partner (Figure 1).

3.4.2 Participants. After IRB approval from our institution, we recruited pairs of informal caregivers and older adult care recipients for our study through our university's participant recruitment pools and local caregiver support groups. We again used a snowball sampling approach [16]. In contrast to the diary study, we recruited pairs of caregivers and older adult care recipients as we hoped to gain insight into communication practices between care partners

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[5]Wood et al. [145] [145] introduced the idea of "scaffolding" in the context of tutorial interactions to describe the support that an adult provides to a child as the child learns how to perform a task that they otherwise are unable to master independently. Today, HCI researchers have since used the term in various contexts, expanding and developing its meaning in the process.

[6]https://www.voiceflow.com/
[7]Readers can interact with the prototypes using the following links: caregiver and older adult care recipient.

Figure 1: CareJournal conversational workflow. See Subsection A.1 for a detailed textual description of the conversational workflow.
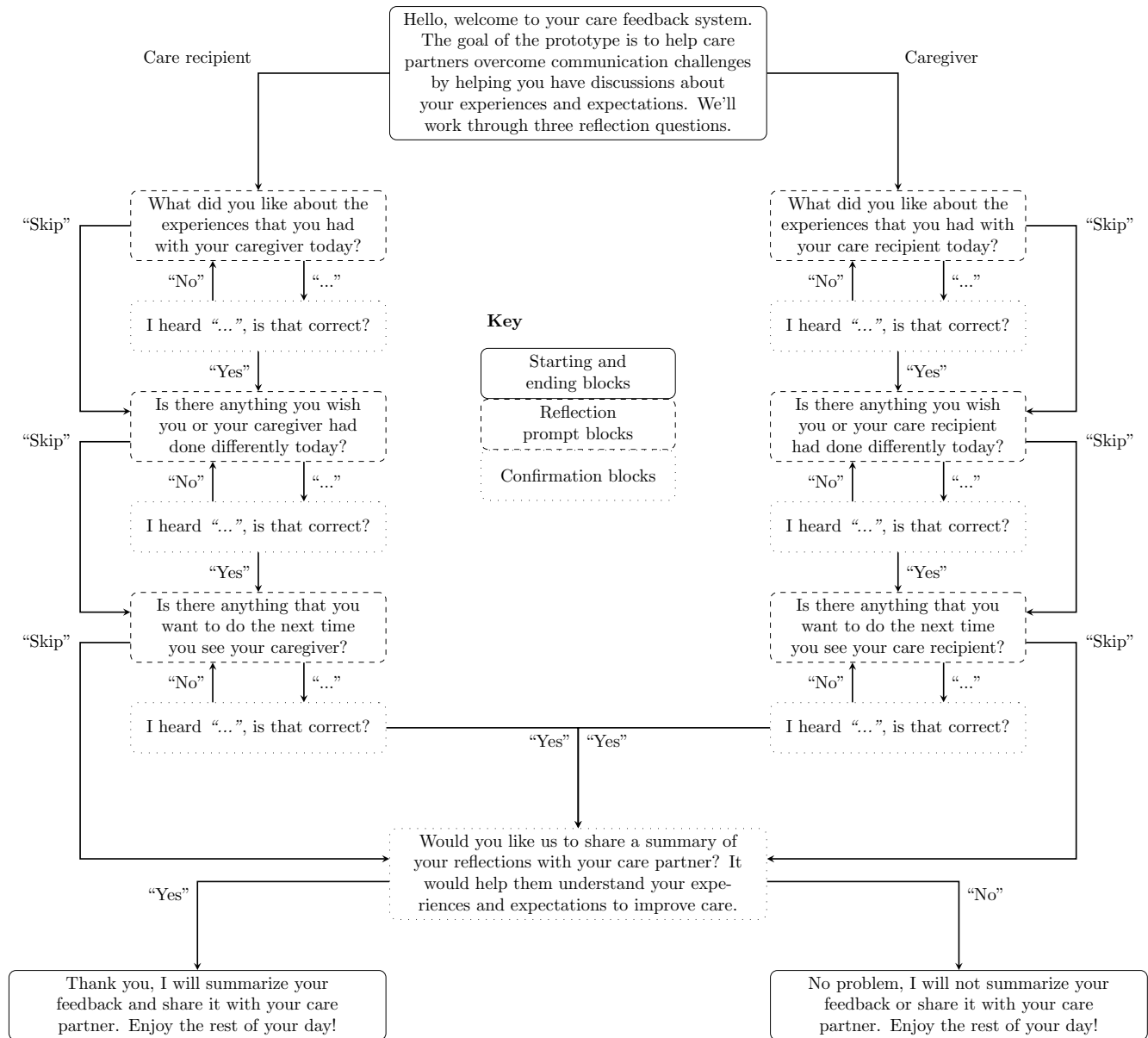
and how they might integrate a conversational agent for scaffolding evaluative disclosure into their care practices.

We designed a screener using Qualtrics[8] to assess participant eligibility, gain insight into participant's demographic information (Table 8), and understand their care practices and relationships. Older adult care recipients (n = 20, ages 65 - 94, avg. age = 76, 8 men, 12 women) were eligible if they were over 65 and received help in daily tasks from a family member, friend, or unpaid caregiver.

We did not recruit older adult care recipients living with severe cognitive disabilities. Caregivers (n = 20, ages 23-84, avg. age = 55, 6 men, 14 women) were eligible if they provided unpaid assistance or support to someone over the age of 65 because of health or mobility reasons. Though recruiting pools from Study One and Study Two overlapped, no participants participated in both studies.

3.4.3 Data Collection & Analysis. We conducted all prototype evaluation interviews over Zoom. Interviews lasted between 45 and 90 minutes and were conducted by two members of the research

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[8]https://www.qualtrics.com/

team, interviewing both care partners together. We began study interviews with a description and demonstration of the Voiceflow interface and invited participants to share their screens as they navigated through a tutorial. After participants had a chance to gain familiarity with the prototype, we engaged participants in semi-structured interviews to learn how they interacted with conversational agents designed to scaffold evaluative disclosure.

During the interview, we asked participants to describe their prior experience with voice technologies[9]. We asked care recipients to work through the conversational workflow, encouraging them to "think aloud"[10] [see 57]. After completing the conversational workflow, we asked care recipients to discuss and rate[11] the usability and utility of the prototype, a practice common in evaluative design interviews [31, 42, 55, 70].

Not all participants answered our questions directly. Fourteen participants commented about the prototype's usability and utility without providing discrete ratings. In these cases, three research team members worked to assign a rating based on our observations of their interaction with the prototype and participant-provided feedback. For usability, if the Voiceflow prototype had significant technical issues, such as failing to capture the participant's voice throughout evaluation sessions, a researcher assigned a usability score of one. If participants encountered no trouble interacting with the prototype but reported some concerns about the interface, a researcher assigned a score of three. To generate ratings for utility, if a participant discussed the prototype with phrases like *"very very useful,"* we assigned a score of five; if a participant made a statement like *"I think it would be useless for us,"* we assigned a utility score of one. Five participants did not provide ratings or mention anything about the usability or utility of our prototype; in these cases, we decided not to assign ratings, as it was impossible to infer assessments without discrete feedback. Three members of the research team cross-referenced interview transcripts, recordings of prototype interactions, and their recollections of evaluation interviews to check the validity of assigned ratings.

After both care partners evaluated the prototype, we engaged them in a discussion about their communication practices and how they imagined a conversational agent might impact their relationship. Specifically, we asked care partners to talk about how they currently provide feedback to each other, care expectations, and care inconveniences, asking them to describe what does and does not work well for them. We also asked participants to imagine how a conversational agent like our prototype might impact their relationship, topics they would be unwilling to discuss, and their favorite and least favorite features of the conversational workflow. Each participant received a $30 check or Visa gift card after they completed the evaluation interviews.

We recorded and transcribed interviews using Zoom. Three research team members cleaned and de-identified Zoom's automatically generated transcripts. We utilized an inductive approach to understand participants' communication practices and interactions with the prototype. We analyzed the interview transcripts using a highly structured grounded theory approach [39]. Three research team members open-coded the data, writing analytic memos to identify patterns in the data after reading each interview transcript. Then, the first author generated a codebook based on analytic memos and the first round of open coding. We refined the codebook through discussion with the research team. Using axial coding, we grouped codes into categories related to the phenomenon under study (i.e., communication practices), the conditions related to that phenomenon (e.g., types of care received and provided), the strategies participants used to share feedback and resolve disagreements (e.g., apologizing after a fight), and the consequences participants' actions (e.g., a stable spousal/care relationship). After discussing categories and supporting excerpts, we engaged in selective coding, integrating codes into overarching categories (i.e., the impact of differences between care partners on communication practices and how participants navigated ambivalent relationships between independence, autonomy, and care). As our framework developed, we interpreted coded excerpts through the analytic of *distance* to support further insight into participants' communication practices, how they navigated tensions between care and independence, and the role of technology in mediating intimate conversations between caregivers and care recipients. Five dimensions of distance emerged in our analysis (Table 3).

We analyzed utility ratings with respect to variation in role (i.e., whether participants were caregivers or care recipients), relationship type (i.e., whether care partners shared a spousal, parental, or friend relationship), and the distance between care partners (i.e., physical, emotional, experiential, cultural, and power-based differences). We assessed the statistical significance of these variations using Mann-Whitney U tests and Kruskal-Wallis H tests to compare responses, as these non-parametric tests are well-suited to comparing groups where sample sizes are small and dependent variables are ordinal [48]. We triangulated results from our statistical tests, observational data, and interview excerpts to understand participants' communication practices and perceptions of CareJournal.

3.4.4 Ethical Considerations. Interviewing caregivers and care recipients about their communication practices in care contexts raised several ethical considerations in terms of acknowledging the potential power imbalances between caregivers and older adult care recipients; protecting participants' privacy, confidentiality, and sense of agency throughout the interview process; and maintaining sensitivity to cultural differences in care practices. Keeping these considerations in mind, we gained informed consent from both older adult care recipients and caregivers throughout recruitment and interviews. We contacted caregivers and care recipients separately to confirm their genuine interest in the study and allotted time at the beginning of each interview to hear potential concerns and answer questions from each care partner. In addition to informing participants about our data storage practices and our intention to publish findings from interviews, we allowed participants to select their pseudonyms or have researchers choose one. Before asking interview questions about sensitive topics (i.e., disagreements and communication difficulties), we reminded participants

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[9]In interviews, we defined voice technologies as "any technology you speak to or that speaks back to you."

[10]We asked participants to, "talk about what you think the voice assistant is asking you and what you think is useful for before recording your response."

[11]We asked participants two Likert-scale questions about usability ("on a scale of 1-5 with one being very hard and five being very easy, how was your experience of using the prototype?") and utility ("on a scale of 1-5 with one being not useful at all and five being extremely useful, how would it be to use something like this with your care partner?").

Table 3: Different dimensions of distance, how we defined them, and excerpts implying their impact on communication practices

Dimension	Description	Example Excerpt
Physical	Whether or not participants lived together.	*"Since we're living together, we tend to give immediate feedback all the time."*
Emotional	Determined by differences in care partners' different responses to discussions about disagreements.	*"To a certain extent, I get kind of emotional about it, and then sometimes, she gets a little defensive about it."*
Experiential	Related to differences in lived experiences as participants navigated transitions between life stages and health challenges.	*"Because of my injury, I have neuropathic reactions to sounds, and so what my caregiver thinks is a light touch is annoying to me."*
Cultural	Reflected in discussions of participants' background and worldviews.	*"We come from very different cultural backgrounds and I sound more gruff than I mean to."*
Power	Explicit references to and implicit displays of authority.	*"I try to tell him what I want, I didn't want to spend any money on groceries this week, but he'll come home with groceries, so I realize there's no use in that."*

that they could skip answering any question without explaining their rationale to the interviewers.

3.5 Findings

Two themes emerged from our analysis: distance and the ambiguous relationship between care and independence. First, we found that distance—defined as physical, emotional, experiential, cultural, and power-based differences within and between relationships—shaped communication practices between the care partners we interviewed. Second, we found that distance impacted the specific strategies that participants used to navigate tensions between care and independence. Our analysis underscores the fact that care is simultaneously a precondition and threat to particular notions of independence and unpacks how participants perceived the utility of our prototype in light of these dynamics.

3.5.1 Distance & Communication Modalities. Our analysis started with attention to variations in care partners' communication modalities with respect to differences within and between different types of care relationships (see Table 4). In this section, we focus on how attention to these differences impacted the modalities participants used to communicate with each other (e.g., face-to-face conversations, text messages, emails). Our findings highlight how *distance* grants insight into participants' communication strategies in terms of their implications for resolving disagreements and balancing the need for care with notions of independence.

Care partners' relationships (i.e., whether participants shared a spousal, parental, or friend care relationship) and circumstances were strongly linked with the communication modalities that they used. Spousal care partners (n = 8 pairs)—who lived together and often experienced similar life stages—discussed face-to-face communication as a cornerstone of daily interactions, juxtaposing these practices with computer-mediated communication. For example, Tom_{CG} described the content of everyday conversations with his wife as intrinsically valuable (*"we talk about our experiences together because we like to talk about them together."*), and $Jerry_{CR}$ contrasted this *"old-fashioned"* communication modality with communication practices made possible through our prototype. On the other hand,

parental care partners (n = 9 pairs) described using both face-to-face and digital modalities (e.g., text messages, emails, social media platforms) to communicate. Parental care partners who were close to each other across some dimensions of distance (e.g., $Selma_{CG}$ and $Louise_{CR}$, $User1234_{CG}$ and $Susan_{CR}$) discussed using digital modalities more frequently, because these channels helped care partners maintain continuous communication with each other. However, the use of multiple platforms sometimes challenged caregivers' capacity to manage multiple conversations. As $User1234_{CG}$—said, *"it's about tracking down those various pieces of information...which email address? Where did you send it from? Was it a text? Was it on Facebook Messenger?"* Parental care partners in more distant relationships (i.e., $Indra_{CG}$ and $Rita_{CR}$) relied primarily on face-to-face communication, mainly when providing and receiving functional care. Friend care partners (n = 3 pairs), whose relationships involved the greatest amount of distance, discussed using face-to-face modalities for communication and third-party intermediaries (i.e., one older adult care recipient discussed communicating with his caregiver through his wife) to clarify expectations. We use the notion of distance to unpack participants' discussions of their communication practices, their influence on specific articulations of care and independence, and expectations of the prototype within and across relationship types.

3.5.2 Articulating Care & Independence through Disagreement. To understand how participants navigated interpersonal difficulty and care-related tensions, we asked them to describe how they resolved disagreements and overcame conflicts in their relationships. Distance influenced the specific strategies participants drew on to address conflict while remaining attentive to each other's autonomy and independence. Participants in relationships characterized by greater physical and experiential closeness (e.g., care partners living in the same household, experiencing similar life stages) used direct communication practices (i.e., direct, honest, and open dialogue). In contrast, participants in relationships characterized by greater experiential and emotional distance utilized diplomatic strategies (e.g., enacting boundaries, using third parties, avoiding confrontation) to manage conflicts. Our findings demonstrate the complex link

Table 4: Participant information and relationship characteristics

Pseudonym & (Role)		Distance				
Caregiver	Care Recipient	Physical	Emotional	Experiential	Cultural	Power
Giraffe (Wife)	GolfBuddy (Husband)	Together	Close	Close	Close	Small
Jolie (Daughter)	Hona (Mother)	Apart	Close	Far	Close	Large
Selma (Daughter)	Louise (Mother)	Apart	Close	Far	Close	Large
LG (Daughter)	Mrs. G (Mother)	Apart	Close	Far	Close	Small
Tom (Husband)	Jerry (Wife)	Together	Close	Close	Close	Small
Mark (Friend)	Legend (Friend)	Apart	Far	Far	Far	Large
Pablo (Husband)	Christina (Wife)	Together	Close	Close	Close	Small
User1234 (Daughter)	Susan (Mother)	Together	Close	Far	Close	Large
Bill (Husband)	Marilyn (Wife)	Together	Close	Far	Close	Large
Margarete (Wife)	Dr. Ron (Husband)	Together	Close	Far	Far	Large
Lisa (Daughter)	Gloria (Mother)	Apart	Close	Far	Close	Large
Joyce (Wife)	Steven (Husband)	Together	Far	Far	Close	Small
Indra (Daughter)	Rita (Mother)	Together	Far	Far	Close	Large
Sheila (Daughter)	Ann (Mother)	Together	Far	Far	Close	Large
Sandeepa (Daughter)	Indrapala (Father)	Apart	Far	Far	Far	Large
Louis (Son)	Thomas Harrison (Father)	Together	Far	Far	Close	Large
Chalan (Son)	Pauline (Mother)	Together	Close	Close	Close	Small
Tuts (Daughter)	Alfred (Mother)	Together	Close	Close	Close	Small
Justine (Wife)	Robert (Husband)	Together	Close	Close	Close	Small
OJ (Friend)	EE (Friend)	Apart	Far	Far	Far	Large

between communication strategies and the dimensions of distance that we analyzed.

Participants in relationships characterized by closeness across dimensions of distance generally discussed using direct communication, openness, and honesty as they talked about the strategies they used to navigate conflict. Participants used metaphors to emphasize the directness with which they spoke to each other. For example, Giraffe$_{CG}$ and GolfBuddy$_{CR}$ described their relationship as *"government in the sunshine" [Giraffe$_{CG}$]*, emphasizing that they had *"no secrets"* [GolfBuddy$_{CR}$]. Similarly, Joyce$_{CG}$ and Steve$_{CR}$ described their relationship as an *"open book" [Steve$_{CR}$]*. These metaphors materialized as participants discussed how long relationships (e.g., *"over 40 years of marriage"* [GolfBuddy$_{CR}$]) helped care partners *"understand each other"* [GolfBuddy$_{CR}$] and ensure that they *"don't have hurt feelings"* [GolfBuddy$_{CR}$]. Steve$_{CR}$ and Joyce$_{CG}$ noted that such direct communication practices entailed *"loving and yelling"* [Joyce$_{CG}$], underlining how close relationships involved at least occasional confrontation.

In contrast, participants in relationships that involved cultural and experiential differences discussed using different communication strategies. For example, Dr. Ron$_{CR}$ and Margarete$_{CG}$ described coming from *"very different cultural backgrounds"* [Dr. Ron$_{CR}$], and

how Dr. Ron$_{CR}$'s neuropathy creates communication challenges. Specifically, Dr. Ron$_{CR}$ discussed how these distances led to conflict with Margarete$_{CG}$, which needed to be managed: *"an issue that we sometimes have is that I want to clarify something with Margarete$_{CG}$, and I have to be careful that it doesn't sound like I'm complaining, because she has so much on her that I have no grounds for complaint. But at the same time, I want to fight, I know what my needs are better sometimes."* Here, Dr. Ron$_{CR}$ described attempting to strike a balance between considering the needs of his caregiver and maintaining autonomy and independence. These excerpts shed light on how, in relationships characterized by greater amounts of distance, care recipients attempted to express appreciation and their care-related needs.

Participants in relationships that involved more distance due to differences in experiences and physical location—discussed using different strategies to resolve conflicts. Parental care partners, Susan$_{CR}$ and User1234$_{CG}$, described a relationship similar to Dr. Ron$_{CR}$ and Margarete$_{CG}$'s. While they live in the same household, Susan$_{CR}$'s health limits her mobility. Susan$_{CR}$ described getting *"emotional"* and *"defensive"* about disagreements, explaining that while *"User1234$_{CG}$ is doing the best she can,"* Susan$_{CR}$ felt as if her own needs are *"unimportant."* Despite the tensions in their care

relationship, Susan$_{CR}$ described avoiding confrontation so as to not seem ungrateful. During this conversation, Susan$_{CR}$ drew attention to how particular notions of independence informed her communication needs and practices: *"I just need to know that I'm being heard and that my needs are important. I would do anything to be able to take care of all this on my own, but right now I can't."* This discussion suggested that differences in independence and autonomy between caregivers and care recipients are a source of conflict and tension in care relationships.

In parental care relationships, distance necessitated participants' use of strategies to maintain independence and autonomy. Specifically, we found that care recipients used strategies to manage and minimize interpersonal conflict. Thomas Harrison$_{CR}$—who lived with Luis$_{CG}$—discussed using his judgment to determine which conflicts could be resolved directly, *"if I can correct Luis$_{CG}$ or talk to him, I'll just talk to him. If I know that talking to him will do no good, I just walk away."* Thomas Harrison$_{CR}$'s response shows his assumed understanding of Luis$_{CG}$'s perspective, as Thomas Harrison$_{CR}$ discussed taking Luis$_{CG}$'s supposed receptiveness to criticism and dialogue into account when deciding to engage him in conversations about areas of disagreements. Put differently, Thomas Harrison$_{CR}$ discussed raising issues with his caregiver when he believed communication could resolve disputes and avoided confrontation when he sensed it might be unproductive. Thomas Harrison$_{CR}$'s account illustrates a pragmatic, self-preserving tactic to conflict resolution adopted by older adult care recipients in parental relationships characterized by more significant amounts of distance.

Similarly, Selma$_{CG}$ described how her mother responded to conflicts: *"...she just hangs up on me (laughing)."* While Selma$_{CG}$ remained lighthearted, her account of Louise$_{CR}$'s behavior portrays a more drastic approach to conflict management. Throughout our interview, Selma$_{CG}$ and Louise$_{CR}$—who lived apart from one another—exhibited disagreement, suggesting that Louise$_{CR}$'s abrupt cutoffs served as a tool to regain control over a situation or prevent conflict escalation in a parental relationship with a greater degree of distance. These conflict-management strategies highlight the potential impact of power asymmetries in care relationships. Accounts from friend care partners supported this conclusion, as Legend$_{CR}$ talked about using a third-party intermediary to navigate tensions, as he said, *"I'll speak with my wife, who can let Mark$_{CG}$ know exactly what I want."* Our sample had few ($n = 3$) pairs of friend care partners, limiting the conclusions that we can draw about these relationships; however, few discussions of disagreement in interviews with friend caregivers, coupled with Legend$_{CR}$'s account of them using intermediaries suggest that power asymmetries may have a significant role in limiting direct confrontation between friend care partners.

Our findings suggest that participants in close relationships leveraged existing dynamics to resolve disagreements directly. In contrast, care partners in relationships that involved greater amounts of distance discussed how they managed controversy within relationships, and participants in relationships with the greatest amounts of distance drew on support from other people to mediate conflicts. In the closest relationships, maintaining respect and recognizing independence while resolving disagreements was often—but not always—achieved through confrontation. As discussed by participants, confrontations indicated a greater degree of relational closeness and mutual recognition of independence and autonomy by care partners. Care partners in more distant relationships discussed using other strategies to exert autonomy and independence in the presence of power asymmetries. Focusing on care recipients' accounts, we found that they enact boundaries (i.e., have conversations on their terms) or use intermediaries (in the most distant relationship circumstances) to exert autonomy and independence and autonomy. In the discussion, we call attention to the specific ways in which care partners manage tensions between care and independence. Differences in how participants managed disagreement also determined how participants interacted with and perceived the prototype.

3.5.3 Evaluating Prototype Utility. We explored participants' perceptions of the prototype by asking them to rate how useful they thought the prototype might be in supporting their care practices. To understand the relationship between these responses, participants' roles (i.e., caregiver or older adult care recipient), and the impact of different dimensions of distance, we analyzed variation in utility ratings concerning these independent variables. Below, we supplement quantitative analysis (Table 5) with participant quotes. Our analysis underscores the importance of understanding the impact of distance, as differences between care partners influenced how they saw the prototype fitting into their relationships.

While we did not find significant differences between caregivers' and care recipients' perceptions of utility, we did find statistically significant differences ($p < 0.01$) across relationship types. The median utility rating for the prototype was the highest among friend care partners (Mdn = 5.00), followed by parental care partners (Mdn = 4.50). Spousal care partners provided the lowest utility ratings (Mdn = 2.00). The Kruskal-Wallis test by ranks demonstrated that the differences in utility ratings were significant between relationship types ($H = 13.88$, $p < 0.01$). These findings suggest that the nature of the care partners' relationships influences how participants perceived the prototype and provides further insight into the influence of distance on care communication practices. Spousal care partners, who generally experienced closer relationships, attributed less utility to the prototype. On the other hand, parental and friend care partners—who reported more distance in their relationships—assigned higher utility ratings to the prototype.

Participants in more distant relationships rated the utility of the prototype significantly higher than participants in closer relationships. The former group of care partners discussed how they thought that the prototype could aid their communication practices by providing more opportunities for discussion (*"the thing that pops into my head is a lack of communication, so the device could help with that"* [User1234$_{CG}$]), helping care partners provide actionable feedback to each other (*"it provides opportunities to make sure that needs are better met on both sides"* [Rita$_{CG}$]), and more personalized feedback (*"I like that it would be able to actually have her hear what I'm saying...you get a lot more out of it that way than just text"* [Susan$_{CR}$]). Caregivers who had more experience with voice-based technologies than care recipients explained the functionality and potential benefits of the prototype. For example, Indra$_{CG}$ explained the purpose and potential benefits of the prototype to Rita$_{CR}$, *"it's a machine to help me talk to you, and for you to talk to me...you would be able to tell me better any time you want something here."* In

Table 5: Analysis of participant-provided utility ratings. We observed significant differences in groupings marked with the following superscripts: $^1H = 13.88, p < 0.01$; $^2U = 81, p < 0.05$; $^3U = 72, p < 0.05$; $^4U = 39, p < 0.05$; $^5U = 83, p < 0.05$.

	Utility (Mean)	Utility (Median)	Utility (n)
All	3.62	4.00	37
Role			
Care recipient	4.00	4.00	17
Caregiver	3.30	3.75	20
Relationship^1			
Spousal	2.71	2.50	12
Parental	4.08	4.50	18
Friend	5.00	5.00	3
Physical Distance^2			
Together	3.17	3.25	24
Apart	4.46	5.00	13
Emotional Distance			
Close	3.33	3.75	24
Far	4.15	5.00	13
Experiential Distance^3			
Close	2.68	2.00	11
Far	4.02	4.50	26
Cultural Distance^4			
Close	3.33	3.75	30
Far	4.86	5.00	7
Power Difference^5			
Small	2.90	3.00	15
Large	4.11	5.00	22

addition, care recipients identified communication challenges that the prototype might help them overcome. For example, Legend$_{CR}$ and Louise$_{CR}$ discussed how they found it challenging to provide specific feedback to caregivers. These care recipients noted that the prototype allowed for reflection on the emotional aspects of receiving care and helped them identify feelings they found worth sharing. Specifically, Legend$_{CR}$ said, *"it would help me tell Mark$_{CG}$ exactly what I want. I can use the application or the platform to communicate my feelings, and it can summarize them and present them to him."* To summarize, participants in more distant relationships discussed how the prototype could supplement existing strategies they used to communicate.

On the other hand, participants in close relationships rated the prototype's utility significantly lower than participants in more distant care relationships. For example, spousal care partners—who often shared close relationships—discussed a preference for face-to-face interactions, as these were well-suited to supporting direct communication practices. Participants described how retrospective feedback—facilitated by the prototype—might introduce new challenges. Giraffe$_{CG}$ said, *"we are so communicative at the moment that [feedback] could get lost. Our communication is ongoing, you know,*

it's a moment-to-moment thing." Here, Giraffe$_{CG}$ demonstrated that conversational scaffolding might disrupt communication styles developed over years of living together. Amidst providing low utility ratings, spousal care partners described how the prototype would be more useful in relationships with greater degrees of physical distance. Bill$_{CG}$ elaborated, *"I can see where there is a lot of usefulness where the caregiver and cared for are in different places...it might help them with things that they want to remember...so, for where the caregiver and the patient [sic] are separate, it's got possibilities."* Care partners in spousal relationships often reminded us of the length of their relationship (*"you have to remember, we've been married 65 years"* [Marilyn$_{CR}$]) to emphasize that they saw no room for the prototype in their relationship (*"there would be no point for us because we can just simply talk to each other."* [Marilyn$_{CR}$]) Instead, participants (e.g., Joyce$_{CG}$ and Giraffe$_{CG}$) redirected conversations to discussions about their interest in a prototype that could support functional tasks such as household chores and managing medications. These discussions and the lower utility ratings underscored spousal care partners' perceived efficacy of their existing communication practices.

Interestingly, several spousal care partners provided higher utility ratings for the prototype. In these interviews, both caregivers and care recipients positioned the prototype as a tool for self-reflection rather than direct communication with each other. As Margarete$_{CG}$ said, *"I like in particular that it kind of makes space to have a reflection, as you go through your day, something happens that didn't work, but you often let it go and never come back to it."* Here, Margarete$_{CG}$ drew attention to the challenges that caregiving presented to identifying recurring issues in her care practices, noting that a busy schedule prevented opportunities for reflection and deliberate attempts at change. Pablo$_{CG}$ and Christina$_{CR}$ discussed how reviewing feedback from care partners provided an opportunity to reflect on their care partners' perspectives, which potentially supported conflict resolution. In Pablo$_{CG}$'s words, *"maybe you have a little bit more time to reflect on it instead of just automatically reacting to what someone says instead of automatically assuming something."* Importantly, these care partners emphasized the benefits of reflection despite direct communication practices (i.e., *"we just talk about [our disagreements]...if we're not happy with something and expect something more, then we have no problem just saying it."* [Pablo$_{CG}$]) Care recipients also discussed how the prototype might be used for self-reflection. For example, Thomas Harison$_{CR}$ compared CareJournal to daily video-diary entries, saying that he sometimes found it more helpful to *"talk to the machine"* compared to *"talking with people"*, as he was sometimes frustrated by responses to disclosure. Even amidst lower utility ratings and skepticism about how useful the device might be, spousal care partners' discussions of the benefits of self-reflection highlight additional opportunities for improving care relationships.

While not all participants viewed introducing conversational scaffolding agents with positive expectations, our findings suggest that there is space for technology to support care practices and relationships. Participants in close relationships discussed their communication practices as open, oriented towards mutual understanding, and effective tools for conflict resolution. However, some participants in these relationships described finding benefits in opportunities for reflection. On the other hand, participants in more distant relationships (e.g., parental care partners and friend care partners) anticipated direct benefits in providing specific feedback, overcoming communication barriers, and managing conflict and disagreement. While we observed heterogeneous reactions to the prototype during our evaluation interviews, these findings suggest that conversational scaffolding is compatible with existing communication practices in intimate care relationships.

3.6 Summarizing Communication Practices and Prototype Expectations

We conducted prototype evaluation interviews with 20 pairs of older adult care recipients and caregivers (40 participants in total), using CareJournal to start discussions about participants' communication practices and how they imagined computer-mediated communication fitting into their care routines. As we analyzed data from prototype evaluation interviews, we used the concept of distance (i.e., physical, emotional, experiential, cultural, and power-based differences between care partners) to interpret communication

practices, how participants described their approach to conflict resolution, and their discussion of the prototype's utility. We also drew attention to the specific strategies that participants used to navigate tensions between care and independence in their communication practices. We found that distance influenced how participants articulated notions of care and independence and determined how they envisioned our prototype fitting into their existing care practices. Participants in more distant relationships discussed the utility of the prototype as supporting communication between care partners. In contrast, participants in closer relationships described benefits primarily in terms of how the prototype could help reflection. Our findings affect how the HCI community can balance tensions between care and independence by designing tools to support care communication practices across different types of relationships.

4 DISCUSSION

In the United States, care practices and relationships are structured by the problem of independence. Researchers have highlighted the taken-for-granted nature of independence both inside [13] and outside [5] of the HCI community. Independence, autonomy, and self-reliance are often defined as universally desirable values, anchoring approaches to designing policies [6] and technologies [99, 144] to enable "independent aging". However, the physical and cognitive changes often accompanying old age introduce new forms of dependence. Transitions to old age visibilize material and conceptual tears in commonplace notions of independence [13, 37] . Tensions between conceptual ideals and material realities trouble care relationships and strain communication practices between older adult care recipients and unpaid caregivers. Despite these tensions, policymakers, advocates, and researchers in the HCI community have traditionally framed care and dependence as "problems" to be solved by introducing new technologies [137]. Critics take issue with this approach, arguing that (1) such technological interventionism perpetuates negative stereotypes against aging and old age [17, 30]; (2) introducing digital technologies into intimate relationships depersonalizes care and reduces emotional attachment [64, 132]; and, (3) digital technologies pose a threat to older adult's privacy and autonomy [20].

In this paper, we used a two-part approach to intervene in these discussions. In Study One (Section 2), we made an empirical contribution, foregrounding older adult care recipients and caregivers' concerns about communication to better understand care relationships. We synthesized these findings with literature on self-disclosure and conversational scaffolding to develop design considerations (Table 2) and CareJournal (Figure 1), a prototype conversational agent designed to support balanced communication between care partners. In Study Two (Section 3), we used prototype evaluation interviews to elicit care partners' perspectives on their current communication practices and gain insight into the potential role of computer-mediated communication in supporting their care practices. Because understanding sources of conflict is important to understanding communication challenges, we drew attention to the specific strategies that participants used to navigate tensions between care and independence, analyzing differences in relationships (Table 3), and contributing to ongoing discussions about the role of digital technologies in intimate relationships. These findings

offer implications for theory and practice. Specifically, we contribute to ongoing discussions about the tensions between care and independence, add nuance to the HCI community's perspectives on distance and intimate relationships, and outline directions for future research.

4.1 Articulating Care and Independence

Diary entries from Study One revealed that tensions between care and independence manifest differently for caregivers and care recipients in the context of their communication practices. Caregivers sought positive emotional connection and struggled to manage emotional burdens, while care recipients expressed concerns about emotional fluctuations and losing autonomy. Our findings show that participants encountered different emotional needs as they navigated challenges associated with providing and receiving care. This analysis contributes to ongoing discussions about interdependence in the HCI community [13] and the notion that care is a relational quality of life [129], as we show that care relationships encompass complex dynamics and emotional experiences of both caregivers and care recipients. Further, accounts from caregivers and care recipients provide empirical evidence that care can inspire joy [45] and the fact that both care partners require care in some fashion [130].

To develop a prototype to support care relationships, we combined findings from Study One with research on communication in care relationships. Specifically, scholarship on caregiving associates positive, balanced, emotional connection with reduced depression [102], increased self-esteem [102], and improved well-being [35]. Further, Gorawara-Bhat et al. [60] argue that caregivers use positive emotional connection as a tool to reappraise the challenges that they face. Attention to the perspectives of older adults reveals that reciprocity [49, 53, 56, 91], respect and attentiveness [56, 91, 140, 142], and safety and security [54, 56] stand out as pillars of "good care" [46]. We synthesized these contributions and literature from the HCI community, to design CareJournal, a prototype conversational agent to scaffold conversations between care partners that facilitate reciprocal, positive interactions while providing opportunities to exchange constructive feedback. Our design considerations (Table 2) provide a foundation for future efforts to design technologies that support care relationships by mediating communication between care partners. In particular, we highlight the need to design technologies that facilitate reciprocity and honest feedback in communication practices.

Prototype evaluation interviews in Study Two provided deeper insight into care partners' communication practices, as we used the prototype to explore how participants communicated with each other and the potential role of the prototype in their care practices. We focused on participants' "articulations" of care and independence to analyze how care partners operationalized these concepts within their own practices. Participants did not refer to care and independence as universal, overarching principles. On the contrary, our analysis revealed the situated and relational character of these values. Care partners constructed care and independence as they dealt with conflict in their relationships. Further, participants envisioned a variety of roles for the prototype, supporting the importance of designing for interpersonal conflict, mixed feelings

towards technology, and shifting relations [106] as HCI researchers seek to support emotional work in care relationships [120]. Considered as a whole, our findings align with previous calls for HCI researchers to move beyond unidirectional understanding of care relationships [13, 129], and highlight the need to facilitate specific formulations and articulations of care and independence.

4.2 Distance in Care Relationships

Inspired by discussions about the relationship between technology and emotion, we used the distance between care partners (i.e., physical, emotional, experiential, cultural, and power-based) as a framework to understand how participants discussed their communication practices. Turkle [133] argues that digital technologies erode the social and emotional connections that undergird care relationships. In response to this and other critiques, HCI researchers have sought to develop technologies to support intimate relationships across geographic distance [146] and age differences [69] through modalities such as mediated touch [105] and play [149]. Practitioners can draw on our findings to design technologies that are sensitive to variations in both degrees and dimensions of distance.

Specifically, we found differences between *and* within different types of relationships. In spousal relationships[12], care partners discussed articulating care and independence through direct communication practices. Participants discussed how the emotional attachment, cultural similarities, and shared experiences enabled trust and confrontation on the part of caregivers and older adult care recipients. Parental and friend care partners[13] implied that differences necessitated conflict-management strategies in their relationships. However, because communication practices varied across different types of care relationships (i.e., spousal, parental, friend) and distances, we caution about generalizing based on one dimension of difference. Instead, we argue that HCI researchers should understand distance as a constellation of differences rather than as any one dimension of dissimilarity.

4.3 Limitations and Opportunities for Future Work

While interviewing pairs of older adult care recipients and caregivers provided valuable insight into their perspectives and experiences, our approach to recruitment and data collection entailed several methodological limitations. In Study One, more older adult care recipients participated than caregivers, potentially limiting the generalizability of our findings. However, older adult care recipients are often underrepresented in studies about care and technology use [11, 47, 88, 135]; as such, we attempt to provide a more comprehensive perspective in this paper.

Next, the online screening questionnaire and remote interview format of Study Two biased our sample toward participants who were more familiar and comfortable with technology. Though we provided participants with the option to complete the screener over the phone and allowed care partners to participate in interviews

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[12]We often described these relationships as "close" due to participants' co-location, similar life stages and experiences, and relatively balanced power relations.
[13]We analyzed these relationships as characterized by greater amounts of distance due to differences in life stage and experiences and the presence of potential power asymmetries.

synchronously, the content and form of the study may have intimidated less technologically-savvy participants. Participants may have been influenced by social desirability biases, as care partners may have under-reported communication difficulties. Further, there were some inconsistencies in data collection. Some participants ($n = 14$, 35%) did not respond directly to Likert-scale questions about the prototype's usability or utility. Though we collected data on the types of care that participants provided and received across studies, we did not systematically collect information about participants' medical conditions. Variation in participants' condition may result in an over- or under-identified set of needs for communication challenges.

In paired, synchronous interviews, one care partner may have hesitated to discuss the full extent of communication difficulties to avoid upsetting their care partner. Although including caregivers in paired interviews was helpful as these participants paraphrased questions for their care recipients, others answered on their behalf. In these interviews, a research team member took extra time to repeat questions and politely solicit care recipients' direct responses. Power imbalances between caregivers and older adult care recipients may have impacted participants' responses to our questions, especially in Study Two—where we often interviewed care partners together. These participants mentioned wanting to conduct the interview together to navigate the Zoom interface. One opportunity for future work is conducting additional one-on-one interviews with caregivers and care recipients to mitigate power imbalances and social desirability biases.

Before we point out more opportunities for future research, we reflect on the contextual limitations of our approach. We acknowledge the material reality of care. In the U.S., care is heavily gendered and culturally devalued, contributing to the inequalities experienced by both paid and unpaid care workers [52, 59]. Technology is often discussed in terms of its potential to address care-related issues. However, it does not represent a comprehensive solution to structural challenges and the difficulties of care as they are experienced on the ground by caregivers and care recipients. Instead, we frame our work as one avenue—among several—to advance research and design efforts to benefit older adult care recipients and caregivers. That said, our study offers several opportunities for future research.

First, we only recruited participants from the United States. Because concepts such as "care" and "independence" are culturally specific, future work might examine how care partners articulate these concepts in non-Western contexts. Such a study would provide contextually specific and comparative insights. Second, the care partners in Study Two were located close to each other, even when they lived apart (i.e., care partners discussed residing within driving distance of one another). Given the prevalence of long-distance caregiving[14] and the centrality of distance in our analysis, researchers might seek to incorporate the perspective of care partners who live farther apart from each other. Third, we acknowledge that conversational technologies are not the sole solution to care-related communication challenges. While we directly linked the communication challenges that participants discussed to CareJournal's design, simpler technologies (i.e., post-it notes, scheduled text messages, or email reminders) may be just as effective at supporting

balanced communication or encouraging reflection. It is possible that comparatively "low-tech" solutions are more compatible with care partners' existing routines, suggesting opportunities for future research. In addition, interviews provide limited insight into participants' actual practices of use. Researchers seeking to extend our work might conduct a field trial to understand whether (or not) and how people incorporate a conversational agent into their daily care practices. Finally, opportunities for future work include understanding how conversational agents can be integrated into other care tools and relationships (e.g., care notes for paid caregivers providing care in the home and institutional settings, conversational agents for long-distance caregivers) to improve communication and reduce care burdens across contexts.

5 CONCLUSION

In this paper, we conducted a two-part study to develop and evaluate CareJournal, a prototype conversational agent to scaffold disclosure between older adult care recipients and caregivers. Participants discussed their communication practices and provided insight into the potential utility of the prototype in their own relationships. We highlighted the role of distance, finding that care partners articulated care and independence in ways unique to the specific circumstances of their relationship. Our analysis contributes to ongoing debates about the relationship between technology and emotional connection, provides design considerations, and highlights opportunities for future research within and beyond the HCI community.

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A APPENDIX

A.1 CareJournal Conversational Workflow Narration

A.1.1 Initiation. Upon starting the prototype in VoiceFlow, the assistant introduces itself with the following text: "Hello, welcome to your care feedback system. The goal of the prototype is to help care partners overcome communication challenges by helping you have discussions about your experiences and expectations. We'll work through three reflection questions."

A.1.2 Specific Conversational Workflows for Caregivers and Care Recipients. Depending on whether the user is a caregiver or older adult care recipient, conversational workflow asks users to provide feedback to their respective care partner.

A.2 Positive Feedback

The first prompt asks the following question: "What did you like about the experiences that you had with your caregiver [or care recipient] today?" Participants may ask to "skip" this prompt or provide an answer.

A.3 Confirming Responses

After the first prompt and subsequent free-response questions, the prototype repeats what it "heard" back to the participant, using speech-to-text and then text-to-speech to repeat the response. The CareJournal conversational agent seeks confirmation with the following prompt: "I heard [response], is that correct?" Participants may say "Yes" to confirm accuracy and proceed to the next prompt or "No" to go back to the first prompt and re-record their response.

Table 6: Diary study sample demographics. [1]Includes activities like chores, medicine management, and bill pay. [2]Includes getting around inside, outside, and getting out of bed. [3]Routine self-care tasks, including bathing, dressing, toileting, continence, and feeding [see 79]. [4]Engaging in conversation with care partner. [5]Talking to care partner about their feelings or challenges. [6]Being a reliable source of transportation for this person and/or helping with activities around the house.

	Caregivers	Care recipients
Age (years)		
Mean	60.2	71.9
Std. deviation	14.8	5.23
Median	58	70.5
IQR	21	9.75
Gender		
Female	4	8
Male	1	6
Race/Ethnicity		
Asian or Pacific Islander	-	1
Other or Mixed Race	-	3
White	5	10
Education		
High school diploma/GED	1	-
Some college	1	5
Bachelor's degree or equivalent	3	8
Graduate degree or equivalent	-	1
Household		
By myself	-	6
With my spouse or significant other	4	7
With other family members	1	1
Care Activities		
Household[1]	5	12
Mobility[2]	4	6
Activities of Daily Living[3] (ADLs)	4	5
Support Provided/Received		
Social[4]	5	9
Emotional[5]	5	7
Functional[6]	5	13

Table 7: Number of diary entries by participant

Role	Pseudonym	Diary Entries
Caregiver	Kiran	15
	Liraz	7
	Mosi	13
	Maria	15
	Reyes	18
	Mitra	14
Care Recipient	Fiore	14
	Franny	15
	Obi	18
	Narinder	14
	Huang	10
	Taiwo	12
	Buhle	7
	Islay	10
	Gal	1
	Samnang	10
	Haris	1
	Wynne	1
	Grey	1

A.4 Negative Feedback and Future Desires

The conversational agent asks two additional questions to gather feedback from users in terms of areas for improvement ("Is there anything you wish you or your caregiver [or care recipient] had done differently today?") and future desires ("Is there anything that you want to do the next time you see your caregiver [or care recipient]?" Participants have the option to respond to these open-ended questions, or can "skip" either prompt. As before, these prompts are followed by confirmation prompts.

A.5 Summarizing and Sharing Feedback

After users have the opportunity to respond to the three reflection prompts, CareJournal asks users the following question: "Would you like us to share a summary of your reflections with your care partner? It would help them understand your experiences and expectations to improve care." Users may respond with "Yes", or "No". If the user responds affirmatively, CareJournal confirms this selection with the following statement "Thank you, I will summarize your feedback and share it with your care partner. Enjoy the rest of your day!". If the user declines sharing feedback, CareJournal responds with the statement "No problem, I will not summarize your feedback or share it with your care partner. Enjoy the rest of your day!"

Table 8: Prototpye evaluation participant demographics

	Caregivers	Care Recipients
Age (years)		
Mean	55.19	75.61
Std. deviation	18.42	7.45
Median	53	75
IQR	29	10
Gender		
Woman	14	12
Man	7	9
Race & Ethnicity		
Black or African American	7	6
Asian or Pacific Islander	2	3
Multiracial	2	-
Other	1	2
White	9	10
Care Activities		
Household	18	20
Mobility	14	16
Activities of Daily Living (ADLs)	14	12
Support Provided/Received		
Social	20	18
Emotional	16	17
Functional	12	20