PROVIDER PERCEPTIONS OF PATIENT CARE IN TELEMEDICINE: EXPLORING TECHNOLOGY FEATURES AND AFFORDANCES, PRESENCE, AND SOCIAL SUPPORT

By

Katharine M. Mitchell

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ABSTRACT

Telemedicine, the delivery of health care services via technology, has been in use since the 1950s. Since then, the development of telemedicine technologies has increased exponentially, with research supporting the effectiveness and satisfaction of the technology but also noting key barriers for full utilization. However, during the COVID- 19 pandemic, there was a massive increase in dependence on telemedicine, which highlighted the need for a thorough examination of the provider-patient interaction within a mediated environment. Past telemedicine research has considered this interaction from the patient's perspective. However, the interpersonal aspects of the technology-mediated interaction from the provider's perspective have not been fully considered. In particular, the provider's perspective of the effectiveness of the social support they can provide to patients via telemedicine has not been explored. Social support is a key factor in provider- patient interactions and has been associated with positive health outcomes for patients. The objective of this study is to characterize health care providers' perceptions of providing social support to patients during a telemedicine clinical visit. Using a qualitative approach, this study explored the technology features and affordances of telemedicine technology that may influence social support within provider-patient interactions from the perspective of medical providers. Findings indicate that technology features such as video, screen share, and chat trigger affordances such as synchronicity, reciprocity, and movability. The features and affordances of telemedicine have both positive and negative impacts on presence and social support.

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CHAPTER 1: INTRODUCTION

The COVID-19 pandemic triggered many changes, including an increased reliance on telemedicine. This dependence on telemedicine during the pandemic has sparked new conversations about access, usability, and satisfaction of telemedicine from the perspective of patients (Holtz, 2021), but also from the perspective of medical providers. Research has shown that medical providers generally have high satisfaction of using telemedicine (Cottrell et al., 2018) and that they perceive numerous benefits for their patients who use health technologies (Holtz et al., 2019). However, little is known about the current provider perspective of telemedicine use beyond their thoughts on reimbursement, liability, technical challenges, and licensure/credentialing (Nguyen et al., 2020). Under- studied are their perspectives on their ability to provide social support in a synchronous mediated environment as interpersonal skills often fall to the wayside (Meuter et al., 2021). The objective of this study is to characterize health care providers' perceptions of providing social support to patients in a telemedicine clinical visit.

Telemedicine is the delivery of health care services via technology and includes video consultations, email, and electronic medical records (Whitten, Holtz, & Nguyen, 2010). Research suggests that telemedicine improves clinical outcomes and that both patients and providers are predominantly satisfied with telemedicine (Aashima et al., 2021; Bishop et al., 2013; Nguyen et al., 2020; Ramaswamy et al., 2020; Whitten, Holtz, & LaPlante, 2010; Whitten & Holtz, 2008; Whitten & Mackert, 2005). Since 2020, there has been a significant expansion in the use of telemedicine as a result of the COVID-19 pandemic and in an effort to reduce rates of virus transmission (Doarn & Merrell, 2020; Gold et al., 2021; Holtz, 2021). There is also evidence to suggest that telemedicine is here to stay with CMS adding two new telemedicine billing codes and extending the use of existing codes for many disease management categories to the final rule

for 2024 (HCCA, 2023). This shift in care delivery led to considerations about workflow and reimbursement. However, less attention has been paid to the communication impacts of providing care in a mediated environment. Specifically, support-giving in a virtual environment such as telemedicine likely looks different compared to in-person care. To better understand how telemedicine may impact social support, it is crucial to ask providers about their experiences and feelings around social support within a telemedicine context and about their experiences communicating and building relationships with patients in a mediated environment.

Some have argued that technology hinders communication between providers and their patients (Gold et al., 2021; Nies et al., 2021), while other work suggests some aspects of technologies may have a positive impact on communication (Kalyanaraman & Wojdynski, 2015; Sundar et al., 2015; Walther, 1996). Identifying and exploring provider perceptions of the features and affordances of telemedicine that have a positive impact on supportive communication is also crucial. Affordances are properties of a technology that suggest ways in which the system could be used and what that use provides to the user (Sundar et al., 2015), and this work explores how telemedicine affordances may influence communication outcomes related to social support. In addition, the proposed project considers the role of presence (i.e., the sense that virtual objects are actual objects) in the relationship between telemedicine affordances and outcomes of social support.

The following section presents a literature review of the topics of interest for this project including, social support, telemedicine, computer-mediated communication, technology features and affordances, and social presence. Based on this literature, the research questions are presented. The subsequent sections include the methods for the proposed study, expected outcomes, and potential implications.

CHAPTER 2: LITERATURE REVIEW

2.1. PROVIDER-PATIENT SOCIAL SUPPORT

Provider-patient communication is the exchange of information between a medical provider and their patient (Gao et al., 2009). The goal is to have a mutual understanding between the provider and the patient on health status and plan for care. Effective provider- patient communication involves relationship building, gathering information, considering the patient's perspective, providing information, and making good clinical decisions (Cole & Bird, 2013; Makoul, 2001). Provider-patient communication is central to the health care process (Matusitz & Spear, 2014). The quality of this communication is a key factor in the effectiveness of care and has known associations with patient satisfaction, compliance, and better health outcomes (Bensing, 1991; Duberstein et al., 2007; Jensen et al., 2010). Communication between providers and their patients has been noted as one of the most essential components of health care because of the potential for impacting all aspects of care (Matusitz & Spear, 2014). Existing literature suggests that there is potential for improvement in communication between providers and their patients (Hack et al., 2005). However, evidence suggests communication skills can be learned and these skills can have long-lasting positive impacts on the provider-patient relationship (Fallowfield & Jenkins, 2004).

One specific form of communication, *supportive communication*, is a key factor in positive provider-patient interactions and has been associated with positive outcomes of both mental and physical health for patients (e.g., Gao et al., 2013; Uchino, 2006; Zhou et al., 2021). In addition, providing social support can be rewarding and stress-reducing (Inagaki & Orehek, 2017). Social support has various definitions, with a basic one defining it as "an exchange of resources between at least two individuals perceived by the provider or the recipient to be

intended to enhance the well-being of the recipient," (Shumaker & Brownell, 1984, p. 13). While others state that supportive communication is "verbal and nonverbal behavior produced with the intention of providing assistance to others perceived as needing that aid," (MacGeorge et al., 2011, p. 317). For this study, social support is defined as enacting verbal and nonverbal behaviors to help patients by understanding their experiences and perspectives (MacGeorge et al., 2011; Nazione et al., 2020).

Providing social support through supportive communication can create connection and build relationships. In general, patients want to feel personally connected to their physicians (Cunningham & Barbee, 2000), yet there is evidence that patients do not perceive receiving adequate support from their providers (Salmon, 2000). Providing social support is considered a prosocial behavior in which providers recognize the needs of the intended recipient and feel they have the necessary skills, self-efficacy, motivation, and resources to provide support (Shumaker & Brownell, 1984). However, providers may lack critical communication skills such as listening, empathy, and attending to non-verbal communication (Ranjan et al., 2015). Similar to general provider-patient communication (Fallowfield & Jenkins, 2004), supportive communication skills can be taught.

Gaining these skills is critical, as research indicates that engaging in supportive communication with patients can improve the provider-patient relationship (Cunningham & Barbee, 2000). Despite the potential for providers to learn how to provide effective social support, it can still be challenging because the social support exchange between two individuals is complex, with many factors influencing support giving, support receiving, and outcomes of the support. It is crucial to elucidate the factors that are most influential in the support process. In addition to the factors that may influence social support giving, the types of support that are

given within a provider-patient context are important to explore. The following sections overview social support types with examples of what each specific type of support could look like in provider-patient relationships.

2.1.1. SOCIAL SUPPORT TYPES

Problem-focused support and emotion-focused support are the two overarching categories of social support, each containing more specific types of support (Goldsmith & Albrecht, 2011). Instrumental and informational support are two types of support within the problem-focused support category. Emotional and esteem support are two types of support within the emotion-focused support category (see Table 1). The following sections will explain each of these support types within the context of provider-patient social support.

Table 1. Definitions of Social Support Types

Problem-Focused Support	**Instrumental:** Instrumental support includes helping behaviors such as giving one's time, skill, or resources. **Informational:** Informational support includes providing information and advice.
Emotion-Focused Support	**Emotional:** Emotional support includes the expression of love, trust, and empathy and is intended to provide comfort to and relieve distress of the recipient. **Esteem:** Esteem support focuses on promoting the skills, abilities, and intrinsic value of the recipient.

2.1.1.1. PROBLEM-FOCUSED SUPPORT IN PROVIDER-PATIENT RELATIONSHIPS

Problem-focused support includes two specific forms of support: instrumental support and informational support (Goldsmith & Albrecht, 2011). Benefits from instrumental and informational support are typically contingent on the recipient's problem or needs.

2.1.1.1.1. INSTRUMENTAL SUPPORT

Instrumental support includes helping behaviors such as giving one's time, skill, or resources (Tardy, 1985). Patients often require tangible aid such as money, transportation, or

childcare in order to get care for themselves and adhere to medical advice (D J Goldsmith & Albrecht, 2011). This form of support is typically provided by individuals in their interpersonal support network. However, in the provider-patient relationship, providers may have the ability to provide instrumental support by offering telemedicine visits in order to limit certain types of barriers a patient may face to attend an in-person visit (D J Goldsmith & Albrecht, 2011). For example, a provider may learn that their patient must travel a long geographic distance to seek their care and the patient delays the frequency of their visits because of lack of transportation (Jordan et al., 2021). The provider can support this patient by providing access to care via telemedicine. Providers also have the ability to enhance their patient's access to other health resources, such as reputable websites with disease management information, informational handouts, online or in-person health-focused support groups and other resources.

2.1.1.1.2. INFORMATIONAL SUPPORT

Informational support typically refers to providing advice (Tardy, 1985). Informational support from providers can help patients make informed decisions about their healthcare (Goldsmith & Albrecht, 2011). Providers can help their patients understand complicated information such as the side effects of a medication or evaluating risks of medical treatments and provide suggestions for how to move forward (Ford et al., 1996). However, many recipients of advice react poorly when they perceive it as critical or controlling (Bodie & Burleson, 2008; Goldsmith & Fitch, 1997). Yet, a provider's role is to provide informational support or advice so these negative effects have been shown to be tempered in this relationship type (Anderson et al., 2021), but advice to patients could be accompanied by additional messages of support, in particular emotion-focused support, to ensure that patients feel fully supported by their provider (Goldsmith & Albrecht, 2011).

The added value of emotion-focused support has been a particular focus with the rise of patient-centered care compared to the more paternalistic practice of medicine (Eklund et al., 2019). The patient-centered perspective requires the medical provider to consider the patient in a holistic manner, consider them as a unique human being, and involve them in the process of their care decisions (Eklund et al., 2019). Patient-centered care and communication (e.g., showing empathy and responsiveness to the emotional needs of the patient) has been noted as the key factor in patient satisfaction in general, particularly within telemedicine (Mason, 2022).

2.1.1.2. EMOTION-FOCUSED SUPPORT IN PROVIDER-PATIENT RELATIONSHIPS

Emotion-focused support includes expressions of empathy, concern, belonging, esteem, and comforting (Goldsmith & Albrecht, 2011). Emotion-focused types of support are applicable within a wider variety of situations than problem-focused support and include emotional support and appraisal or esteem support.

2.1.1.2.1. EMOTIONAL SUPPORT

The essential element of emotional support is caring (Tardy, 1985). Emotional support includes the expression of love, trust, and empathy. Emotional support messages are intended to provide comfort to and relieve distress of the recipient (Goldsmith & Albrecht, 2011). Emotional social support often falls under the study of empathy in the medical field (Nazione et al., 2020). Throughout the current study, emotional social support and empathy will be used interchangeably. It's important to note that emotional social support and empathy are not completely equivalent concepts. However, many providers conflate emotional support with network support and are better able to understand the concept of emotional support when thinking of empathetic communication and behaviors providers may use toward their patients (Nazione, 2013). Negative emotions and affective distress that often accompany the illness

experience can be addressed by providers by delivering emotional support to their patients (Burleson & Holmstrom, 2008). However, this is likely influenced by the context (e.g., telemedicine) in that delivering tangible emotional support likely looks different via telemedicine. Emotional support can also promote coping and self-esteem as well as improve the quality of the relationship between the provider and their patient (Burleson & Holmstrom, 2008). Messages that are emotion-focused and high in verbal person-centeredness, which acknowledge and legitimize the feelings of the patient are typically seen as more helpful and effective (Bodie & Burleson, 2008; Goldsmith & Albrecht, 2011; Holmstrom et al., 2015). Although emotional support may require greater skill on the part of the provider, this type of support has the potential to be very effective particularly when the patient desires support from their provider.

2.1.1.2.2. ESTEEM SUPPORT

Esteem support often refers to evaluative feedback (Tardy, 1985) and is focused on promoting the receiver's skills, abilities, accomplishments, and intrinsic value (Holmstrom, 2012; Ko et al., 2013). A form of emotion-focused support, esteem support can enhance how the recipient feels about themselves and their abilities (Holmstrom & Burleson, 2011). A need for this type of support stems from when an individual makes an internal attribution (i.e., explanations about the person, such as their traits, abilities, and physical characteristics) regarding the upsetting event they are faced with, and it results in the individual experiencing shame, embarrassment, and guilt. Patients who need esteem support likely feel fault over the illness that they are confronting or may have low self- efficacy in managing the illness. It is possible that the distance created by a mediated space such as telemedicine may actually be an advantage in these types of situations because the provider may idealize the patient, have increased self-awareness and greater control over their self-presentation, and increased intensity

of communication (Miller, 2017; Walther, 1996).

2.2 TELEMEDICINE

The development of new health technologies has a profound impact on the provider-patient interaction in that the exchanges between providers and patients using mediated electronic devices, such as telemedicine, are likely to increase (Weiner, 2012). Telemedicine includes the delivery of health care services over a variety of technologies including video consultations, email, and electronic medical records (Whitten, Holtz, & Nguyen, 2010). For the current study, telemedicine is defined as the synchronous interaction between a person and a provider using audiovisual telecommunication technology.

2.2.1. TELEMEDICINE HISTORY

Telemedicine has been in use since the 1950s, but in the 1990s, telemedicine use and research flourished (Brennan et al., 2008). The amplified focus on telemedicine was driven by advancements in data networks and connectivity, as well as new tools like video conferencing, email, and patient portal applications. Despite the excitement around the potential of telemedicine during the early years, few conclusions were drawn about the specific role or effects of telemedicine mainly because of practical limitations (Bashshur, 1995; Whitten, Holtz, & LaPlante, 2010).

From the 1990s to 2019, much of the focus of telemedicine research included patient perspectives and satisfaction of the technology (F. Mair & Whitten, 2000), clinical outcomes associated with telemedicine use (Kruse et al., 2017; Whitten, Holtz, & LaPlante, 2010), as well as provider satisfaction and barriers to telemedicine use (Mair et al., 2005; Varkey et al., 2008; Whitten et al., 2007; Whitten & Buis, 2008; Whitten & Holtz, 2008; Whitten & Mackert, 2005). Although research suggests that telemedicine improves clinical outcomes and that both patients

and providers are predominantly satisfied with telemedicine, many barriers such as reimbursement concerns and technology issues continue to impact the adoption of telemedicine (Bishop et al., 2013; Whitten, Holtz, & LaPlante, 2010; Whitten & Buis, 2008; Whitten & Holtz, 2008; Whitten & Mackert, 2005). These barriers remain a focus of telemedicine research.

Early in 2020, the United States joined other countries in facing the implications of the global coronavirus (COVID-19) pandemic. COVID-19 is a highly transmittable virus that affects lung cells and produces pneumonia-like symptoms (Velavan & Meyer, 2020). To date, it is estimated that 53,275,589 individuals in the US have been infected with COVID-19 (CDC, 2021b), and approximately 814,819 deaths of US citizens can be attributed to COVID-19 between the years of 2020-2021 (CDC, 2021a). During this time, there was a significant expansion in the use of telemedicine in an effort to reduce rates of virus transmission (Doarn & Merrell, 2020; Gold et al., 2021; Holtz, 2021). In fact, the pandemic essentially forced health systems to use telemedicine because of the need to social distance as a precaution against exposure to the virus (Doarn & Merrell, 2020; Gold et al., 2021). Some clinics reported less than 25% of providers used telemedicine before the pandemic but during the height of the pandemic that grew to rates as high as 95% (Metzger et al., 2021). Furthermore, providers indicate high satisfaction with telemedicine and a desire for telemedicine to make up a significant portion of their clinical practice even post-pandemic (Gentry et al., 2021; Holtz, 2021; Nies et al., 2021). The increased rate of provider uptake as a result of the pandemic and high provider satisfaction with telemedicine coupled with the fact that approximately 91% of American adults report owning at least one technology that gives them access to the internet, indicates great potential for continued use of telemedicine post-pandemic (Henry, 2020; Pew Research Center, 2021).

These are positive findings, but there remain concerns among some providers (Nies et al.,

2021). Worries include inadequate patient care, lack of physical interaction with the patient, and technology issues (Connolly et al., 2020). Some providers have indicated there will not be a necessity to use telemedicine post-pandemic (Nies et al., 2021). Other providers felt that particular medical situations are actually more efficient when conducted via telemedicine and should continue to be used post-pandemic. Some example situations include some follow-up visits, medication refills, urgent care, and for the convenience of patients. These findings speak to the significance of implementing evidence-based practices to ensure successful telemedicine programs (Gold et al., 2021). Although this historic event may be the key to telemedicine becoming common practice in health care, questions remain about implementation and adoption challenges, and provider perceptions of care quality, including support giving, that must be addressed.

2.2.2. BENEFITS OF TELEMEDICINE

Telemedicine has evolved over the past several decades with rapid uptake during the COVID-19 pandemic (Doarn & Merrell, 2020; Gold et al., 2021; Holtz, 2021; Kichloo et al., 2020). Research both prior to the pandemic (e.g., Hjelm, 2005) and since the pandemic (e.g., Jordan et al., 2021) demonstrate there are many benefits to telemedicine.

Early research on telemedicine indicates some evidence that physician productivity was enhanced using telemedicine systems (Doermann et al., 1975) and that telemedicine reduced health-care costs (Hjelm, 2005). Cost reduction likely results from decreased missed appointments, lower wait and visit times, preventable hospitalizations as well as less readmissions (Breen et al., 2010; Everett & Kerr, 2010; Iqbal et al., 2017; Jordan et al., 2021; Lua & Neni, 2012). Telemedicine also has the potential to reduce pressure on hospitals, which has been critical during the height of the pandemic. In fact, one study found that telemedicine

helped to avoid 90% of hospitalizations in a pediatric infectious disease department (Esposito et al., 2020). Other noted benefits include improved patient access to information and services (Hjelm, 2005) and increased delivery of care (i.e., more frequent visits) (Hjelm, 2005; Jordan et al., 2021). Perhaps most importantly, there appears to be an overall tendency of improved patient health outcomes (Bradbury et al., 2016; Dias et al., 2016; Everett & Kerr, 2010; Hatcher- Martin et al., 2020; Levy et al., 2015; Whitten, Holtz, & LaPlante, 2010).

Despite an abundance of evidence that telemedicine provides useful economic and clinical outcomes, the majority of existing research lacks generalizability, which indicates a need for further research in telemedicine (e.g., Hailey et al., 2002). Furthermore, implementation and adoption challenges remained key factors in telemedicine outcomes even after the start of the COVID-19 pandemic (NCI, 2024). Although the pandemic has forced many health systems to quickly remove these barriers and find ways to overcome these challenges, many still remain.

2.2.3. TELEMEDICINE IMPLEMENTATION AND ADOPTION CHALLENGES

Although there are numerous positive clinical and satisfaction-related outcomes of telemedicine, there remain barriers to successful implementation and adoption of telemedicine (Bishop et al., 2013; Whitten, Holtz, & LaPlante, 2010; Whitten & Holtz, 2008; Whitten & Mackert, 2005). Issues of reimbursement, legal liability, data security, technical, and organizational issues are frequently noted barriers (Scott Kruse et al., 2018; Whitten, Holtz, & LaPlante, 2010; Whitten & Holtz, 2008). Results from one study found that organizational issues (e.g., staffing and technology support) created significant provider burden (Whitten & Mackert, 2005). Last, telemedicine is not for every patient or clinical situation (Jordan et al., 2021; Whitten et al., 1998), which may create a burden on the providers in determining which patients should be candidates for receiving care via telemedicine.

These challenges likely lead to some provider perceptions that delivering care via telemedicine is more complicated than to in-person care (Bishop et al., 2013). In addition, a lack of training likely negatively impacts telemedicine adoption in that providers and clinical staff do not have the capacity to self-teach without being offered clinical time off to learn how to use the system (Perry et al., 2020). Even when the noted barriers have been minimized or eliminated, the challenges of telemedicine adoption remain (Whitten & Mackert, 2005). Although many providers have positive perceptions of telemedicine technologies, there still remain a number of providers with less enthusiastic rates of acceptance (Garavand et al., 2022; Whitten & Mackert, 2005) and resistance to change (Bishop et al., 2013), which seem to be key barriers that extend beyond reimbursement, and organizational and technical issues. It is likely that it is a combination of factors that lead to barriers with adopting telemedicine platforms in health care. Therefore, it is critical to gain comprehensive insight into provider perceptions of communicating with patients via telemedicine and the features of the technology that may impact the outcomes of the supportive interaction within telemedicine.

2.3. COMPUTER-MEDIATED COMMUNICATION

At its conception, computer-mediated communication (CMC) was a byproduct of the internet (i.e., linking geographically distant computers together) (Rapaport, 1991; Walther, 1996). CMC use, including phone calls, text messaging, social media, and video conferencing, grew in multiple settings to facilitate group communication needs, as did research around its effectiveness. A key consideration in CMC research is the difference between synchronous communication and asynchronous communication (Cristian, 1996). Synchronous CMC includes communication occurring in real-time through phone calls, text messaging, social media, and video conferencing. Asynchronous CMC is delayed communication and is most often reflected

by text-based communication. Much of the interpersonal CMC literature focuses on asynchronous, text-based communication (Walther, 1996). However, more current work, and the work proposed here, focuses on synchronous CMC, specifically video-based communication (Rains et al., 2017; Scott & Fullwood, 2020).

Two main schools of thought have emerged from research on the effectiveness of interpersonal CMC. From one perspective, CMC is thought to have fewer interpersonal features (e.g., fewer cues and a higher propensity for conflict) than face-to-face (FtF) communication (Garton & Wellman, 1995; Walther et al., 1994). In opposition to the depersonalized perspective, there is support for CMC's potential to create a hyperpersonal environment (Carr, 2020; Walther, 1996). The next two sections will expand on these two different viewpoints on the interpersonal nature of CMC.

2.3.1. IMPERSONAL PERSPECTIVE

When communicating via technology was first developed, the need to achieve task-focused goals (i.e., decision-making oriented tasks) was the main focus, which prompted the development of the impersonal perspective (Walther, 1996). The impersonal perspective of CMC suggests a reduction of non-verbal cues and fewer interactive components compared to communicating FtF, which this perspective argues, diminishes interpersonal connection (Culnan, & Markus, 1987). In other words, there is less social presence (i.e., feeling as though virtual social actors are actual social actors, see section 2.5 below for more information on presence) and fewer non-verbal cues in CMC (Walther, 1996).

Non-verbal cues, such as vocal tone, body posture, and eye contact can help convey a sense of warmth and help to establish rapport and trust with patients (Hill & Gormally, 1977; Tepper & Haase, 1978). Enacting non-verbal cues effectively via telemedicine can be more

challenging (Faucett et al., 2017; Sauppé & Mutlu, 2014), but patients look for non-verbal cues from their providers to help understand what is verbally communicated and discern the feelings their provider has about them (Faucett et al., 2017). However, there are examples of when cues filtered out may be beneficial for interaction. For example, some undesirable cues (e.g., shaky hands) may be hidden even in synchronous video, which could help bolster the support giver's confidence (Scott & Fullwood, 2020), particularly when discussing difficult or uncomfortable topics (Sobczak, 2023). CMC exchanges that are impersonal lack social interaction and are often primarily focused on completing tasks, which may lead to more profane behavior. However, it is important to note that cues filtered out and impersonal interactions are not necessarily mutually exclusive. In fact, having an environment with reduced cues may potentially lead to a hyperpersonal exchange rather than an impersonal exchange because the mediated environment allows users more control over their non-verbal behaviors.

2.3.2. HYPERPERSONAL PERSPECTIVE

Although there is support for the ability of CMC to be impersonal, much of the research suggests that CMC has the potential to achieve interpersonal levels and may even result in hyperpersonal exchanges (Walther, 1996). Interpersonal CMC exchanges are thought to closely resemble FtF interactions. The hyperpersonal perspective of CMC is used to describe interactions that are more socially desirable than FtF exchanges (Walther, 1996). There are four features that contribute to achieving hyperpersonal CMC: Idealization of the receiver, augmented self-presentation of the sender, asynchronous communication channel, and the ability for increased intensity of reciprocal information exchange. Social information processing (SIP) theory (Walther, 1992) focuses primarily on the last feature of increased intensity of information exchange and posits that the exchange of social information is important for increasing intimacy

in relationships. The hyperpersonal perspective doesn't necessarily argue against the idea that CMC reduces cues, but instead argues that the reduction in cues allows interactants to control and manipulate their self-presentation to appear more preferable, therefore providing a greater ability to control cues compared to FtF interactions. Individuals can be more deliberative in creating friendly and knowledgeable impressions.

Much of the existing work on the hyperpersonal perspective focuses on text-based, asynchronous communication. Therefore, this perspective may not hold true with more rich mediums such as synchronous video (Scott & Fullwood, 2020; Wu et al., 2022). However, similar to the traditional hyperpersonal perspective, there are differences between video and FtF communication, which suggests a potential for achieving hyperpersonal communication. Traditional, text-based CMC hides differences about the individuals in the interaction from one another that would be more easily detected and more salient through FtF interaction (Walther, 1996), but this can also be true in synchronous video-based CMC. For example, an advantage of video-based CMC is being located physically distant yet still able to communicate in real-time. In other words, video- based CMC still has cues filtered out even though it's less filtered out than phone or text (Rains et al., 2017; Scott & Fullwood, 2020). This may result in bolstered confidence and the ability to reach a more hyperpersonal communication interaction. There is some evidence to suggest that idealization and interpersonal connection, which are key to the hyperpersonal text-based perspective (Spears, & Lea, 1992), can also be experienced via video (Ruppel et al., 2017). This is an area of CMC research that warrants deeper investigation particularly within the context of providing social support, which will be discussed in greater detail below.

2.3.3. HYPERPERSONAL CMC AND SOCIAL SUPPORT

The possibility for interactions taking place in synchronous video CMC to reach hyperpersonal interaction likely has important consequences on giving and receiving social support within synchronous telemedicine consultations. CMC may create feelings of a safer environment to communicate within, and some research argues that as a result, social support provided via CMC can be equivalent and perhaps even superior to FtF social support (Caplan & Turner, 2007; Robinson & Turner, 2003). Patients communicating with their providers through CMC have the ability to receive care and social support in their home, which may create an ideal environment for support to occur because they likely feel less self-conscious and more comfortable (Rains et al., 2017). Furthermore, CMC may be particularly helpful for those in need of objective information about their illness or treatment (Robinson & Turner, 2003). This objective information can be classified as informational support (Goldsmith & Albrecht, 2011), which is one of the most prevalent types of social support shared in a CMC context (Rains et al., 2015). Although informational support is critical to the provider-patient relationship, emotional support messages are also often shared and are a crucial support type within the illness experience. Furthermore, providing and receiving social support via CMC eliminates geographic barriers that are typical of FtF communication (Walther & Boyd, 2002). For example, instrumental support can be offered by providing telemedicine services to patients who may benefit from not traveling to in-person appointments (Jordan et al., 2021). Each type of social support plays an important role in the provider-patient relationship and CMC can serve as a meaningful conduit for the social support interaction between providers and their patients (Rains & Wright, 2016).

CMC research is primarily focused on two individuals communicating via mediated

channels and the influence that the channel has on various communication outcomes (Walther, 1996). In addition to outcomes of social support discussed in previous sections, outcomes of presence are a focus of this study.

2.4. PRESENCE

Presence is defined as the psychological experience of interacting with virtual objects as though they are actual objects (Lee, 2004). There are three types of presence, which are closely connected to the domains of human experience, they are physical, social, and self. *Physical* presence, often also referred to as spatial presence, is defined as a psychological state when virtual objects are experienced as actual physical objects. Spatial presence is the perceptual illusion of actually "being there" in a virtual environment (Biocca, 1997; Lombard & Ditton, 1997; Riva et al., 2007). *Social* presence is defined as a psychological state in which virtual social actors are experienced as actual social actors. Finally, *self-presence* is defined as a psychological state in which the virtual self is experienced as the actual self. Involvement and realness are additional concepts that are key to achieving a state of presence. Involvement is the attention and awareness to the environment and realness is an individual judgment of the authenticity of the virtual environment compared to the known reality (Hein et al., 2018). Although all components of presence are important to consider within a telemedicine context, the proposed study is particularly concerned with social presence.

Some research argues that social presence is greater in CMC compared to FtF interaction. For example, one study found higher rate of turn taking between medical providers and patients in a telemedicine visit compared to face-to-face visits (Tachakra & Rajani, 2002). It appears that patients felt more empowered to ask questions in the telemedicine visit and that the medical providers took greater time and care in communicating during the telemedicine visit compared to

in-person. This signals the potential for greater involvement during telemedicine compared to in-person care (Hein et al., 2018).

Considerations related to the technology channel (i.e., telemedicine) in which communication occurs are crucial to this study. However, the interaction between each individual and the technology (i.e., channel) is also an important consideration related to the outcomes of patient-provider communication via telemedicine. Therefore, this study aims to explore how social presence contributes to the creation of a hyperpersonal environment from the perspective of providers.

2.5 TECHNOLOGY AFFORDANCES

To understand the individual-technology interaction, particular technology features and the resulting affordances should be identified and assessed. Technology features refer to the capabilities of a technology (Fayard & Weeks, 2014), whereas technology affordances are perceivable properties of a technological system that suggest ways in which the system could be operated and what that operation provides to the user (Sundar et al., 2015). Affordances are exhibited through unique technology features that shape communication between the user and the technology or the interactants within a mediated space such as telemedicine (Sundar et al., 2015; Wu et al., 2022). Each technology affordance, for example, the video feature, provides the user with visibility and synchronicity that establishes a sense of realism, which then shapes the nature of the use of the technology as well as the communication within the technology and of the user's psychology. Importantly, technology features and technology affordances should be considered separate concepts even though they are often conflated in existing research (Fayard & Weeks, 2014). According to Evans et al. (2017), affordances should be considered from a multidimensional perspective. This means not only considering the relationship between the

technology and the user, but also how that relationship can potentially facilitate a hyperpersonal environment for providing social support. Taking this perspective on affordances into account is important for the proposed study. The proposed study is focused on how features and affordances may play a role in medical providers achieving a hyperpersonal connection (Walther, 1996) and to provide social support to their patients in a telemedicine visit.

There are four broad categories of affordances, including modality, agency, interactivity, and navigability (Sundar, 2008). In addition, the proposed study explores social presence as an outcome of affordances. *Modality* affordances focus on the medium in which information is exchanged or conveyed by the technology (Molina & Sundar, 2021; Sundar, 2008). *Agency* affordances focus on the variety of sources of information that can be curated within a mediated environment (Molina & Sundar, 2021; Sundar, 2008). Unlike in traditional media sources, new technologies offer the user agency in which they have the ability to receive information from multiple sources and to be the creator of information. *Interactivity* is a key affordance of communication within a mediated environment and is classified into multiple types of interactivity, including the interaction within the technology (i.e., message exchanges), as well as the functionality of the technology, and source interactivity (Molina & Sundar, 2021; Sundar, 2007, 2008; Sundar et al., 2015). *Navigability* affordances are focused on exploring and interacting within the mediated environment and how perceptions and experiences are shaped by this interaction and exploration (Molina & Sundar, 2021; Sundar et al., 2015).

Communication technologies like synchronous telemedicine platforms have features and affordances that can have influential, persuasive effects on the relationship between medical providers and their patients (Molina & Sundar, 2021). The proposed study aims to elucidate a richer understanding of how technology features and affordances impact provider perceptions of

the telemedicine technology as well as about the outcomes of supportive communication with patients. In the proposed study, the role of presence (Lee, 2004) is also explored. To begin, each type of affordance and presence will be described in more detail within the context of telemedicine technology.

2.5.1. TECHNOLOGY AFFORDANCES IN TELEMEDICINE

The focus of the proposed work is on the affordances of modality, interactivity, and navigability. Discussion about affordances is often limited to the intended function of the technology (Conole & Dyke, 2004). However, the work presented here is focused on the features as well as the potential resulting affordances that facilitate or impede the effectiveness of telemedicine for supportive communication.

2.5.1.1. MODALITY AFFORDANCES

Modality affordances focus on the medium through which information is delivered and the features of the particular medium (Sundar et al., 2015). Modality affordances include text, audio, video, swiping, gesturing, etc. and they differ in the degree to which they map onto real life. Synchronous telemedicine, for example, has the potential to afford users a high level of realism since the video modality provides real-time interaction between a patient and provider. Although the main modality of synchronous telemedicine is video, the other modalities should be considered in the overall assessment of the user experience of telemedicine because, for example, text-based communication is a feature of telemedicine. The text or “chat” feature available within telemedicine may amplify the interaction further and create an environment for potentially reaching a hyperpersonal interaction. Furthermore, providers have the ability to share their screen with patients via telemedicine. Having multiple modalities has been shown to increase positive perceptions of telemedicine as well as the probability of using telemedicine in

the future (Connolly et al., 2020; Varkey et al., 2008; Whitten & Buis, 2008). Telemedicine modality affordances, such as having the video turned on and meeting synchronously, likely increases presence within the mediated environment, which may lead to greater comfort and trust between patients and providers and thereby creating an environment ideal for social support interactions (Rains et al., 2017; Walther, 1996). Considering Walther (1996)'s hyperpersonal perspective, the modality of telemedicine may create an environment for hyperpersonal communication, increased social presence, and therefore more effective social support. Aside from lacking the ability to touch the patient during the physical exam, the telemedicine visit can essentially be the same as a face-to-face encounter because of the modality features and affordances such as synchronous video and audio provided by telemedicine platforms.

Telemedicine offers the provider with a naturalistic encounter in which they can provide support to their patient. The video modality that is used in telemedicine allows for providers to see most, but not all, of their patient's nonverbal cues and address their communication with their patients in a fluid manner (Sundar et al., 2015). Telemedicine as a modality affords opportunities to affect and be affected because virtual video-based communication is so similar to FtF communication (Vidolov, 2022). Although the telemedicine modality affords providers an environment with a potential for a high amount of presence, there remains a distance between the provider and patient, and it is possible that the mediated environment may allow for better communication with the patient because of the potential for a hyperpersonal encounter as discussed above (Rains et al., 2017; Varkey et al., 2008; Walther, 1996). This study aims to explore this potential within a healthcare context as touch and presence are central to communication between providers and patients (Chang, 2001; Christensen et al., 2023; Kelly et al., 2018).

2.5.1.2. INTERACTIVITY AFFORDANCES

Interactivity is a fundamental affordance of communication technologies, particularly telemedicine (Sundar et al., 2015). Interactivity encompasses the opportunities for users to connect and have reciprocal exchanges of communication with others within the telemedicine environment (Sundar et al., 2015). The critical component for achieving a hyperpersonal interaction via telemedicine is the ongoing reciprocity between the interactants (Rafaeli, 1988; Walther, 1996).

Video consultations have been noted by providers as being a less personable experience compared to FtF consultations because of the inability to touch their patients, which impacts both instrumental and emotional support functions (Gold et al., 2021; Goldsmith & Albrecht, 2011; Nies et al., 2021; Tardy, 1985; Whitten & Mackert, 2005). However, many platforms have developed different interactivity affordances that allow for the expression of support despite the inability to physically touch. For example, the features of sending emoticons and other electronic texting and gestures add detail to the interaction taking place via telemedicine. Furthermore, the synchronous telemedicine environment allows for the expression of nonverbal communication, which has the potential to create a hyperpersonal interaction, possibly increase social presence, and solidify supportive communication from the provider to their patient. Despite the realism that telemedicine provides, provider uncertainty has been noted to be increased around the patient physical exam in the mediated environment (Nies et al., 2021; Whitten & Mackert, 2005). However, the interactivity of telemedicine provides adjustments to the provider's engagement with their patient that, with the proper training, can result in effective gathering of physical exam information and assurance that patients understand their diagnosis and care plan (Kalyanaraman & Wojdynski, 2015; Wong et al., 2021).

Although interactivity is often explored textually, the dialogue via synchronous telemedicine can be akin to interpersonal communication between patients and providers in face-to-face consultations. Interactivity has the potential for providers to develop a strong, potentially hyperpersonal, connection with their patients and explore components of relatedness, which will likely have a positive impact on outcomes of social support (Sundar et al., 2015).

2.5.1.3. NAVIGABILITY AFFORDANCES

Navigability affordances encompass the extent to which users can easily explore the mediated telemedicine environment (Sundar et al., 2015). Affordances related to navigation allow providers to move from one window to another, moving around the screen space while communicating with their patients (Dey-Plissonneau, 2017). This can eliminate the negative interpersonal interaction that takes place in-person when the provider has to look away from the patient and down at their computer. Instead, they may be perceived as making eye contact even if they are switching between windows to chart or review information. However, it could also potentially lower perceived eye contact because it may be noticeable that they are looking elsewhere on their screen. Exploring perceptions of eye contact and other non-verbal behaviors within a telemedicine environment, as discussed in more detail in previous sections, is critical to untangling interpersonal interactions between providers and their patients particularly related to social support within telemedicine.

Navigability affordances also have the potential to build provider-patient competence, which likely leads to more use of the technology (Adams et al., 2021). Research on telemedicine confirms that satisfaction of telemedicine technology improves greatly over time and use (Cunningham, 1978; Higgins et al., 1984; Whitten et al., 2007). Having satisfaction with and being comfortable with using telemedicine has positive impacts on the communication between

the provider and their patient.

While the literature supports the potential for technology features and affordances to influence hyperpersonal communication, presence, and social support between providers and their patients via telemedicine, there is a lack of understanding regarding the specific mechanisms that may be at play.

CHAPTER 3: AIMS AND RESEARCH QUESTIONS

This project explored social support from the perspective of medical providers during a provider-patient interaction via telemedicine. The aim of this study was to comprehend the features and affordances of telemedicine technologies that are and are not beneficial for providers in providing support to their patients, and to investigate how presence may influence the relationship between technology affordances and social support. See Figure 1 below for a visual model of RQ2-3. The following research questions were posed for this study:

RQ1: What are the perceptions and attitudes of healthcare providers toward telemedicine in general and in providing social support to patients via telemedicine?

RQ2: To what extent do specific technology features of telemedicine contribute to health care providers' perceptions of a) telemedicine generally and b) specifically around providing social support?

RQ3: How do specific affordances of telemedicine relate to a) social presence and b) perceptions of social support?

CHAPTER 4: METHODOLOGY

To explore the research questions posed for this study, in-depth interviews with medical providers were conducted to gain insight on giving social support via telemedicine and how they perceive the features and affordances of telemedicine technology.

4.1. PARTICIPANTS

Medical providers from hospitals and clinics in the United States were recruited to participate through study fliers posted on social media, emails through hospital connections, and word of mouth. Study fliers included the researcher's contact information and interested providers sent an email expressing their desire to participate. A short screening questionnaire was sent via email to each interested provider and interviews were scheduled for all individuals who met the inclusion criteria. To be eligible for the study, providers had to be a practicing Medical Doctor, a Doctor of Osteopathic Medicine, a Nurse Practitioner, or a Physician Assistant. Providers had to use currently or have used telemedicine in the past. A total of 25 individuals contacted the researcher. Of those, one provider was ineligible because they had not used telemedicine before. Eight providers met screening criteria but were not able to schedule an interview. Originally, the study aimed to recruit 30 participants. However, data saturation was reached after interviewing 17 participants. Data saturation occurred when additional interviews ceased to yield new insights relevant to our research questions, suggesting that the collected data were sufficient to understand the phenomena under study. Consequently, in adherence to qualitative research principles, further recruitment was deemed unnecessary (de Moura et al., 2022; Hennink & Kaiser, 2022; Saunders et al., 2018).

4.2 INTERVIEW PROCEDURE

Interviews took place during the month of June 2023. Each interview was audio recorded

and transcribed verbatim using Zoom technology. The in-depth interviews were semi-structured and divided into four sections (see Appendix A for the Interview Guide). First, participants were given a definition of social support. This definition characterized social support as the enactment of verbal and nonverbal behaviors to assist patients by understanding their experiences and perspectives (MacGeorge et al., 2011; Nazione et al., 2020). The next section of the interview focused on their perceived benefits and barriers to providing social support to patients via telemedicine. An example question included, "Tell me about your ability to feel empathy for a patient within a telemedicine visit." The third section of the interview probed the participants about the specific technology features and how those features offer benefits or challenges in providing social support. For example, "What technology features (i.e., capabilities of a technology, e.g., ability to chat in Zoom) are important to you in telemedicine?" In addition, questions aimed to understand social presence were asked such as, "How do you feel about the realness of your patient when communicating with them via telemedicine?." In the final section, clinical scenarios were presented, and participants were asked to describe what they would say or do if they were the provider in the scenario. The goal of this section was to explore if types of social support were considered by the participants. An example scenario included:

> I am going to read a few short scenarios depicting interactions with patients via telemedicine. These scenarios are examples of patients in a heightened emotional state. As the medical provider, what would you say and/or do in these situations?
>
> A 42-year-old man with a history of total hip arthroplasty presented for a new patient visit via telemedicine with complaints of hip pain. One year ago, he had a displaced left femoral neck fracture requiring total hip arthroplasty with subsequent chronic hip pain. His pain was managed by his orthopedist with oxycodone and more recently with

ibuprofen. Recent extensive reevaluation of his hip pain was negative. He requested that you prescribe something stronger like "oxys" for his pain, as the ibuprofen was ineffective. You can tell that he's agitated and is making comments about you not believing that he is still in pain.

The scenarios were developed from multiple sources (American College of Obstetricians and Gynecologists, 2014; Evidente et al., 2003; National Institute on Drug Abuse, n.d.) and modified to reflect a patient interaction via telemedicine. Participants received a $100 Amazon gift card as compensation for their time.

In addition to the interview questions and at the end of the interview, participants were asked demographic questions in order to characterize the sample including provider type, medical specialty, length of time in practice, telemedicine use experience and sociodemographic characteristics (see Appendix B). Provider type included medical doctors (MD), doctors of osteopathic medicine (DO), physician assistants (PA), and nurse practitioners (NP). Length of time in practice was measured in years and then categorized into 1) Early-stage providers, which includes medical residents and individuals who have practiced medicine for 5 years or less; 2) Mid-career providers, which includes those who have practiced more than 5 years, but less than 15 years; and 3) Late-career providers, which includes those who have practiced for more than 15 years. To measure the telemedicine use experience, variables included asking participants if they used telemedicine before the COVID-19 pandemic, and if yes, how long before or if their experience with telemedicine began because of the pandemic. Providers were also asked to indicate an estimated amount of their total clinical time is spent seeing patients via telemedicine. Provider sociodemographic characteristics measured included participant age, gender identity, race/ethnicity, zip code, and annual income. See Appendix B for the demographic questions.

4.3. ANALYSIS

Braun and Clarke's thematic analysis method was used to identify and analyze patterns found within the interview data (Braun & Clarke, 2006). An iterative process consisting of six steps was used. The first step is to become familiar with the data, and this included cleaning the transcription documents, reading the data, and organizing the data into the research questions. The lead researcher completed step one. Next, interesting features of the data were systematically organized into the appropriate research question category. This step was completed by the lead and one additional researcher. Both researchers coded a random selection (10%, n = 2) of the transcripts to ensure inter-coder reliability. Themes were then generated by organizing the coding categories into sets of relevant themes within the specific research question. This step was also be completed by the lead, and additional researcher and inter-coder reliability was ensured using an additional selection (10%, n = 2) of the transcripts. The full list of themes was then be reviewed by both researchers to ensure the codes and themes coordinate with the entire data set. Any disagreements were identified and resolved among the two researchers. The lead researcher then created a list of named themes. The other researcher was given an opportunity to review and provide feedback. Lastly, exemplar quotes were selected by the lead researcher to provide an example of the theme and how it relates to the goals of the study.

CHAPTER 5: RESULTS

5.1 PARTICIPANTS

Seventeen participants completed the interview. The majority of participants (n = 13) were female, and the average age of all participants was 36 years (SD = 7.75, range = 29- 59 years). In addition, the majority of participants indicated their race as white (n = 10). Most of the participants indicated their degree as either Medical Doctor (MD) or Doctor of Osteopathic Medicine (DO) (n = 10). There were four participants who were Physician Assistants (PA) and three who were Nurse Practitioners (NP). All participants had been practicing medicine for less than 10 years, and their specialties varied from Neurology (n = 5) to Family Med (n = 3) among others.

In addition to questions to characterize the demographics of the sample, the participants were asked questions about their use of telemedicine. When asked about the number of current visits that utilize telemedicine, seven participants indicated some visits and four indicated about half of their visits. Only one participant indicated having nearly all the visits via telemedicine and five indicated hardly any of their visits took place via telemedicine. The majority of participants planned to use telemedicine in the future (n = 14). See Table 2 for the overall demographics and Table 3 for individual participant demographics.

Table 2. Participant Demographics and Telemedicine Use

Participant Demographics (N = 17)	n(%)
Gender	
Male	4(24)
Female	13(76)
Race	
White	9(53)
Black or African American	1(6)
Asian	6(35)
Hispanic, Latino, or Spanish Origin	1(6)
Age (Years)	
29-35	11(65)

Table 2. (cont'd)

36-45	4(23)
46-55	1(6)
56-65	1(6)
Degree	
Medical Doctor (MD)	5(29)
Doctor of Osteopathic Medicine (DO)	5(29)
Nurse Practitioner (NP)	3(18)
Physician Assistant (PA)	4(24)
Specialty	
Neurology	5(29)
Psychiatry	3(18)
Family Medicine	3(18)
Urgent Care	1(6)
Pediatric Gastroenterology	1(6)
Occupational Medicine	1(6)
Pulmonology	1(6)
Surgery	1(6)
Internal Medicine	1(6)
Length of Time in Practice	
Resident	1(6)
Less than 5 years	8(47)
5-10 years	8(47)
More than 10 years	0(0)
Practice Type	
Hospital	10(59)
Private Practice	5(29)
Academic Center	1(6)
Residential Care Center	1(6)
Telemedicine Use	n(%)
Telemedicine Use Before COVID Pandemic	
Yes (less than a year before COVID)	3(18)
No	14(82)
Number of Visits Currently Using Telemedicine	
Nearly all	1(6)
A large majority	0(0)
About half	4(24)
Some	7(41)
Hardly any	5(29)
No visits	0(0)
Confidence in Using Telemedicine	
Very confident	13(76)
Somewhat confident	4(24)
Neutral	0(0)
Somewhat unconfident	0(0)

Table 2. (cont'd)

Very unconfident	0(0)
Planning to Use Telemedicine in the Future	
Yes	14(82)
No	0(0)
Unsure	3(18)

5.2 EMERGING THEMES

Participant responses were initially coded into the main research questions. Then, within the research questions, seven main themes emerged, including positive and negative perceptions of telemedicine (RQ1); perceptions of telemedicine technology features in general and for social support (RQ2); and modality, interactivity, and navigability affordances (RQ3). The following sub-sections will be organized by research question with specific themes described within the section and participant quotes used as exemplars. Each quote includes the participant identification number, their gender, and their age.

Table 3. Individual Participant Demographics

ID	Gender	Age	Race	Degree	Specialty	Length of Practice
1	Male	35	White	DO	Psychiatry	Less than 5 years
2	Female	48	White	NP	Pulmonology	Less than 5 years
3	Female	31	White	PA	Family Med	5-10 years
4	Male	31	Asian	PA	Urgent Care	Less than 5 years
5	Male	59	Asian	MD	Psychiatry	Less than 5 years
6	Female	30	White	NP	Family Med	Less than 5 years
7	Female	29	Asian	DO	Family Med	Less than 5 years
8	Female	32	White	PA	Surgery: Trauma	5-10 years
9	Female	40	White	NP	Pediatric Gastroenterology	5-10 years
10	Female	37	White	MD	Neurology	5-10 years
11	Female	41	Asian	MD	Neurology	5-10 years
12	Female	29	Black or African American	MD	Occupational Medicine	5-10 years

Table 3. (cont'd)

15	Female	35	White	DO	Neurology	Less than 5 years
17	Female	35	Hispanic, Latino, or Spanish Origin	PA	Psychiatry	5-10 years
19	Female	31	Asian	DO	Neurology	Resident
20	Female	37	White	MD	Neurology	5-10 years
21	Male	32	Asian	DO	Internal Med: Gastroenterology	Less than 5 years

5.3 RESEARCH QUESTION 1

Research question 1 explored the perceptions and attitudes of healthcare providers toward telemedicine in general and providing social support to their patients via telemedicine. Responses fell into two opposing themes including positive perceptions of telemedicine's impact on social support and negative perceptions of telemedicine's impact on social support.

5.3.1. POSITIVE PERCEPTIONS

Accessibility, efficiency, comfortability, and potential for relationship building were benefits noted to impact patients as well as providers. An example of accessibility included a thought from one participant who noted that using telemedicine has improved the number of patients who attend their follow-up appointments:

> I think it's [telemedicine] pretty helpful, especially with patients who have a really hard time getting into the office. Whether it's because they have kids and can't find a babysitter or are at work and can't financially afford to take work off. It's opened up a lot of opportunities. And I think it's probably made a difference in our lack of follow ups because it's just simpler and patients are more willing to do it [meet over telemedicine]. (P3, F31)

Other participants agreed, stating, "I feel like telemedicine has opened the door for more options

for care" (P7, F29), as well as, "It (telemedicine) really helps people who otherwise have barriers to getting care. It helps a whole bunch of people who, realistically, if they didn't have a virtual option, would not be getting the care they need" (P11, F41), and:

> There's a big positive [to using telemedicine] because in my situation, a lot of my patients don't want to leave the house. They're very severe. And so, leaving the house can, you know, be very difficult for them. So, being able to provide care into their homes is so vitally important. And [telemedicine is] just such an amazing tool. (P6, F30)

Many of the participants also noted that they appreciated the efficiency of telemedicine. For example:

> It doesn't utilize the same amount of office time, and the way my staff works is different because the front desk people will make the call versus one of the MAs [medical assistants] who's in the back and rooming other people. So, they can double-book me a little bit easier. We can squeeze people into appointments where we wouldn't have been able to in the office. (P2, F48)

Another participant noted that telemedicine is more convenient for them, they are more efficient and can see a greater number of patients, and they feel good for providing patients with a more convenient way to receive care. This participant said:

> It's also sometimes more convenient for me as well. I'm able to see more patients because of that [telemedicine], and oftentimes these patients are happy because of the convenience for them. They'll express like, 'oh, like, you know, this is great. Appreciate you being able to do this virtually. It's kind of a pain to get to the office.' And so that makes me feel good. I enjoy that. (P21, M32)

Another participant talked about how thankful they were for telemedicine:

> I'm grateful for it [telemedicine]. It's been a luxury for many reasons, not only for [patients with] no accessibility purposes but I mean even for you know, being a mother and things like that, having other responsibilities, having accessibility to it. And still being able to do something that I'm passionate about outside of my home. It's really a gift and I think, you know, I think when we have these evolving momentous things [like telemedicine] that we need to appreciate them and just try to make the most out of the out of the technology… I'm just grateful for it. (P17, F35)

Comfort for both patients and providers was also noted as a positive perception. For example, one participant said, "The big difference, I think, that the patient would have is that they're at their own home or wherever they are. So, they might be more comfortable" (P3, F31) and "I feel like I can connect with patients quite well and provide the same care [as in-person] and I feel very comfortable doing it" (P3, F31).

> Building relationships over telemedicine was also positively noted by one participant: It's kind of wild how much I feel like I can like bond with the patient via a computer and seeing each other through a computer and not in person. I think it's pretty impressive how I feel like I'm just as much able to form that patient- provider relationship via the telemedicine platform just as much as I am doing in person when I was in clinic. (P6, F30)

5.3.2. NEGATIVE PERCEPTIONS

Participants also expressed some negative thoughts about telemedicine. In particular, technology issues were discussed. In addition, participant responses suggest that there is a barrier to empathy and human connection in telemedicine interactions. Technology issues were a frequently noted negative perception of telemedicine. In some instances, providers have to use

less rich forms of telemedicine because the patient does not know how to use the telemedicine features. For example, "[Telemedicine can be] definitely, a lot harder, especially when I have elderly patients that don't know how or don't have access to video. And we've just done phone calls" (P2, F48). That same participant noted that social cues can be lacking because of the technology issues that are present:

> Sometimes I feel like they don't understand because of the lack of social cues. The non-verbal and the interrupting, the sound, disturbances that are sometimes there with audio and video, if they have a poor connection. I'm not entirely sure they heard me. Things like that. (P2, F48)

Another participant noted that these technology issues can be time consuming:

> It's just kind of working with technology which I'm really not best at so that check that barrier in kind of getting with technology. Some patients that are not tech savvy at all, and you may spend more time trying to help them figure out how to even use the system on their end. (P12, F29)

Even further, a participant noted that visits sometimes have to be ended because of telemedicine, which costs everyone time and resources:

> Definitely technological difficulties have been probably the number one barrier especially in in the older population. They have a hard time with technology and then even the younger population, all generations have technical issues. Whether it's Wi-fi issues or a bad connection. So that's probably been a number one barrier to use. I've had to end meetings, rescheduled meetings… (P1, M35)

Many participants indicated that interactions in telemedicine feel less personal, can lack empathy, and are missing true human connection. One participant noted that telemedicine is

more focused on the medical issue stating, “I think it's more straight to the point with telehealth. So, the rapport isn't there” (P4, M31). Another participant felt similarly noting:

> I mean, I feel like it's like a very robotic experience when I'm seeing them virtually, like check boxes like, make sure this is the case, make sure they're going to get their meds, make sure they did this. But it's not like a human encounter. (P10, F37)

Interacting in a virtual space feels less human according to another participant:

> Just being a virtual thing is not as human as being face to face. So, you know, it [being in person] really does add a little extra just personable [experience]. It's more personable when you're face to face. So, you know the words spoken yes, are the same. But it's just that emotional piece that you're missing virtually. (P12, F29)

Additionally, some participants noted that the lack of humanness created an impersonal exchange. One participant said:

> I just feel telemedicine is very impersonal. So, it's not like I could walk in and be like, oh, cute shoes or you know, I really like your purse or sorry we're running late like there's not a whole lot of you know conversation it's very super short. It’s informal I would say. (P8, F32)

Another participant agreed stating:

> So, like I was saying, telemedicine is less personalized. You really can get a full picture of a person when they're sitting in front of you. Verbal and non-verbal cues, and then in telemedicine, it's just a little bit more difficult. You can hear what they're saying, and look at their expressions on their face, but I feel like it's hard to get as good of a full picture compared to in person. (P19, F31)

Overall, it’s possible that this disconnect from humanness impacts the support that is given and

received, “I think there is a component of being in the room with the patient and making them feel so supported and heard that perhaps at times may be missed over telemedicine” (P20, F37).

5.4 RESEARCH QUESTION 2

Research question 2 explored the specific features of telemedicine that influence providers’ perceptions about telemedicine generally in addition to providing social support. Each of the features that were noted by participants are discussed in general and about social support in the paragraphs to follow.

5.4.1 PERCEPTIONS OF TELEMEDICINE FEATURES IN GENERAL

Multiple features of telemedicine technology, such as video capabilities, screen share, and chat to name a few, were mentioned by participants as influential to their overall perceptions. The following sections will present each feature mentioned by participants and their general perceptions of each feature.

The video and audio features in telemedicine were described by participants as expected features. For example, one participant said, “Video, audio of course… It's audio and video that is the most important” (P6, F30). The quality of these features was also noted to be important to the interaction via telemedicine:

> So, if you have good audio and video quality, I feel like, you know, you can get better communication. And then no lag. It's like less frustrating to the patient, less frustrating to you. So, you can just conduct a visit more smoothly. (P19, F31)

Another feature that many participants noted was the chat feature. Some participants noted that they did not have much use for the chat function when conducting a video telemedicine visit. However, others noted that it was a helpful feature. For example, one participant said, “I think the chat box is helpful, for when we're having technological issues, I can

type in there and say, ‘hey, I can't hear you’ or ‘hey, I'm having XYZ problem’” (P1, M35). Another participant noted the utility of text-based communication stating:

> They're always going to ask me how to spell something. You know, I spend a lot of time like maybe, like discussing certain medications and I will ask them to go look it up. They often times ask me to spell it out, and so the chat feature is so nice. I could send them links through the chat feature; I can type out whatever exactly I'm talking about. It makes the conversation flow easier that they don't have to stop and get a piece of paper and write everything down. (P20, F37)

The participants had positive feedback about the screen share feature in general. For example, one participant said, “Screen share is important, like I use that when I'm showing patients their own images” (P10, F37). Another noted that they use this feature often, “Yeah, I use it (screen share) a lot. I think it's really important in neurology” (P20, F37).

Participants indicated mixed feelings about the recording feature. Some participants thought the feature would be really helpful. For example:

> I think that if the patient is comfortable with it [recording feature], it could be extremely useful, because it just it can create a record of something, or it can provide a visual record of something that might be important from a care perspective. For example, I mentioned, sometimes we see voluntary movements in patients. So, if we had a recording of that, that's something that I could potentially share with a colleague, you know, if I wanted to consult somebody and get their opinion as to what should be done. That could be very useful. (P5, M59) (See also RQ3, 5.5.1 Modality affordances)

Whereas other participants worried about the implications of recording. “I would never do it. Never. No, no, that I feel like that's you can get in trouble for that in my world so I would never

do it. I wouldn't have a reason to either" (P6, F30).

Other features noted by participants that could be helpful in telemedicine included backgrounds, the ability to control the patient's camera, and drawing tools. One participant said, "I don't use a background. I use whatever background I'm using. But I think it is nice that you can set a photo background to set the, like, professional stage from that perspective. I like that"(P10, F37). One patient noted that it could be helpful to have control over the patient's camera. For example:

> I don't know what you would change about this, but you know, doing like an actual neuro exam over telemedicine can be quite challenging and asking the patient. For example, like, you know, steady your camera over here, so I can ask to watch you try. And, you know, do a heel toe walk? It's very difficult, you know, so there are features such as that that would. I don't know what you would change about that something with like the camera or something. (P20, F37)

Lastly, a participant said that drawing tools within the telemedicine would be helpful. "The ability to doodle for them would also be good. I draw on exam paper in person a lot, so I think that would be super helpful" (P9, F40).

5.4.2 PERCEPTIONS OF TELEMEDICINE FEATURES FOR SOCIAL SUPPORT

Similar to the previous section, video capabilities, screen share, and chat were some of the features of telemedicine technology mentioned by participants as being influential to providing social support. The following sections will present the findings of each feature mentioned by participants.

Similar to the general perceptions of the video feature in telemedicine discussed above, some participants indicated that the video increases the connectedness between the provider and

their patient. For example, “I think the obviously the video, like, be able to see somebody and to be able to speak with them. I think really enhances the connectedness that they may feel” (P20, F37) and “I would say that having the video instead of just doing voice call or phone call. Video is extremely important. That'll bring you probably the closest to an in person visit as possible: having video” (P21, M32).

Another participant noted that feeling empathy and knowing when a patient needs support is contingent upon the video feature:

> I definitely think this is one area where you know, when you, when I would be in clinic seeing patients, and you know being able to feel empathy. I think no matter what, being able to see them via video. That is not as affected versus seeing a patient in person. I feel like being able to see a video, see how they're reacting. And during conversation, I would have the same amount of empathy as if I was in person with the patient versus if I'm doing telemedicine without video, I think that would be affected, not being able to see their facial expressions and, see if they're shaking, trembling, you know, any of those things. Or seeing if they're disheveled and not taking care of themselves, not showering, you know, all these things you can see through the camera and I think that is very helpful in, you know, having empathy for patients and, being able to see those, you know, thing, those objective things that they're not able to just share with me via maybe a phone call. (P6, F30)

However, other participants noted that eye contact via video can be a barrier to support and connectedness and that other forms of communication need to be relied upon. For example, one participant said:

> I guess in person, I would look for with eye contact as one means of engaging

> engagement. Sometimes it can be a little difficult over the camera, just because it's video chat. But I feel like they listen, they respond appropriately, they ask appropriate questions, and that's how I know that, you know, they are engaged. (P7, F29)

The chat feature was noted as a tool to provide support to patients. For example:

> I do utilize that chat bubble that I talked about earlier a lot, especially in if you know, if I'm starting a new medication, I can type it right out for them, and they could see right away what it is. If I have directions, I can, you know, type them out, as I'm saying, and they can see everything. (P7, F29)

This is especially helpful because medical terminology can be difficult for patients to comprehend, “I will write it out for them whether it's like what disease or imaging or lab that I was specifically looking at; especially if it's hard to spell” (P21, M32).

The screen share feature was highly touted by many of the participants. For example, one participant stated:

> I think it [screen share] could be really useful, because, for example, if I have some lab results or some imaging results, we don't really do imaging much in psychiatry. But just thinking back to monthly experiences I had in my medical rotations. I think that could be really helpful because you can look at something together and you can talk it through. I think that's something that patients are usually really appreciate. When a doctor takes time to go through specific lab results or imaging and point to things and say, you know, this is something important, or you know, I've looked at this, and everything is normal, and you know it all, everything looks as it should. Yeah, I think it's more comforting, I think, to the patient. It helps with support. (P5, M59)

Another participant agreed that the screen share feature adds a dimension of support. This

participant said:

> Patients often want to see what may be wrong with them. Like if there's an abnormal finding on an MRI, then 90% of the patients want to see that, and so to spend the time physically go through it - that is really important. And then, you know, additionally, an example would be like an EEG file. If there's some sort of, you know, electrical abnormality on that brainwave study, it's very easy to actually show them instead of describing it. (P20, F37)

A third participant agreed stating:

> I mean, for example, if they had a tumor, you could show them the tumor on the radiology images and go through those. I feel like I could share more information with them. It would enhance communication and understanding of their condition. (P19, F31)

Another participant noted that the screen share feature has the potential to help build trust between patients and providers:

> Well, I think it helps them kinda trust that we know what we're talking about or that we're understanding, you know, what they're going through by kind of showing them and explaining to them the anatomy or why it's happening. You know, one of the main things that I use it for is when people are saying they have back pain that's like radiating and I like to show a picture of the nerves that run through your back and down your leg to kind of explain like this is why you're having that pain because this nerve is doing this. So, I think they kind of just trust that you know what you're talking about and then they can understand what's happening and that helps them understand, you know, maybe why their symptoms aren't better the first day after treatment or you know why it's not just the easy fix. (P3, F31)

Virtual waiting rooms was a feature that one participant noted could be helpful for providing care and support to their patient effectively:

> I think an important one is probably having the ability to place certain members in waiting rooms because there are sometimes difficult interactions with families. Often, they are in a separate location, and so you want to talk to one individual by themselves, or I guess individually, and so I think that's really important that we have that ability. There's definitely circumstances where I feel like I need to talk to the patient alone, or even the patient advocate, or a parent of a patient. Whatever the case may be, so I think it's important to be able to separate participants within the zoom call. (P1, M35)

Telemedicine as a whole was noted to have an impact on social support. For example:

> I think it [telemedicine] does [impact social support]. It's improved because in our patients' minds, they know that they can make that appointment. So, offering virtual, they can have a peace of mind knowing that they won't have to either reschedule or skip an appointment just because they can't make it [into the office] and I think that idea alone, that piece of mind, does improve their willingness and in a way, you know the support that they probably feel. (P21, M32)

5.5 RESEARCH QUESTION 3

Affordances of telemedicine were the focus of research question 3. Specifically, the goal was to elucidate if specific telemedicine technology features elicit affordances that relate to social presence and perceptions of social support. Participants reflected on three different categories of affordances including modality, interactivity, and navigability. Within these categories, examples of the technology features, their technological affordance, and the potential influence on social presence and perceptions of social support are presented. Example quotes are

included to support the themes. See Table 4 for each affordance, definition, and a telemedicine example that represents the findings.

Table 4. Affordances, Definitions, and Telemedicine Examples and Descriptions

Affordance	**Definition**	**Telemedicine Example/Description**
Visibility	Video tool and quality	Allows an inside look into patients' lives and homes
Dimensionality	Dimensions of the physical virtual space	2D compared to 3D, illusion of togetherness, perception of transcending geographical distance, feeling like the provider is in the same space as the patient
Mirroring	Ability to see and evaluate one's own expression on the computer screen	The provider watching their own face on the screen while talking or listening to the patient
Synchronicity	Simultaneous interaction and communication, abstraction, clarity	Providers can talk with patients about their medical needs in real time, Loss of humanness, lower social presence, and lack of touch v Transparency and understanding, Providers feel like the patient isn't a real person; it feels like there's a middleman
Verifiability	To confirm or substantiate	Providers can record parts of the visit to share with other providers to get feedback
Reciprocity	Mutual exchange of information	The provider can share their screen to show a patient how to access a resource and then have the patient teach-back or talk through how to access the resource
Movability	The ability to move around among multiple screens; impacts of perceptions of eye contact	Providers can begin charting while their patient talks

5.5.1 MODALITY AFFORDANCES

The main modality of telemedicine focused on for this work was that of video

capabilities. Participants noted how the quality and dimensional aspects (e.g., two- dimensional, or three-dimensional) of the video feature afford (or do not afford) them with the ability to see and engage with their patients similarly to in person. For example, one participant said, “Video, I would say, would be at least 70% as effective as seeing the person in just because through video calls, sometimes you still miss on obvious cues just because, you know, It's 2D versus 3D” (P4, M31). Visibility was key for another participant who said, “The better the quality of the video, you know, [the better] you can read the patient's body language and facial expressions” (P1, M35). A third participant noted how the video modality feature affords users the illusion of togetherness, transcending the geographical distance. This participant said:

> I think the human mind is adept. It's very skilled at basically kind of accepting certain kinds of illusions. You know. For example, when we go to the movies, you know, we can see a flat, 2-dimensional image. And then, you know, perceive it as a 3-dimensional depiction of reality. But there are limitations to that, to that setting, that the filmmaker has to make sure they are aware of to make an effective movie. I think the same thing in telehealth. When you start talking to someone on a telehealth visit, at first it might feel a little bit artificial, but within a few minutes usually both sides are very immersed in the conversation, and you are, you know, you really accept the fact that you're having a meaningful discussion with another person. So, I think that the technology, I think, works really, really well with the human mind and the way it works. (P5, M59)

The participants indicated that the video feature affords users an immersive experience that simulates an in-person interaction and likely influences presence and social support. However, participants noted that despite this positively perceived affordance, there are both positive and negative impacts on the presence they feel as well as the level of presence or

engagement that they receive from their patients. One participant noted that the video platform allows for mirroring, or for them to see their own expressions, which impacts how present and thoughtful they are within the interaction:

> I am watching my face to some extent, which is kind of awareness thing which you don't have that input when you're in person, like you can see how you're reacting to them. It's probably in some ways a good cue to remember how to interact with people when you're getting your own face back, looking at you. (P10, F37)

In addition, some non-verbal communication is easily seen, which has positive impacts on presence. However, the video platform may require more intentionality:

> I think I might be a little bit more demonstrative with things like, Yeah, you know, hands arms, just, you know, just because it kind of, adds a little when you're together, you know, it's easier to express emotions in just kind of you know, more normal life but sometimes cause you're limited in the range of what the patient can observe. It may help to be a little bit more demonstrative with body language that the patient can see. And I would do that if I thought it helped to emphasize point. (P5, M59)

Yet other participants noted that the lack of presence requires them to spend more time to ensure the patient understands and feels supported:

> I think I get a certain feel if someone [the patient] feels a little more detached from the conversation, I might take a little more time with that patient. I might explain things a little bit more in depth or more. There might be some redundancy to make sure they understand what's going on, make sure they heard me. (P1, M35)

The video feature also affords unique visibility and synchronicity in that it gives providers an inside look into their patients' lives in a way that would be impossible to see in the

clinic. For example:

> In a telemedicine [visit], you see even what you can't see in person. I mean, most of the time when they're doing it from their home, you can kind of get a gauge of what their background looks like, what their home life looks like. Is, you know, is it kept? I think you can almost see in their lives quite a bit more [than in person] and maybe make you more empathetic. (P3, F31)

Other participants agreed stating:

> I can see more sometimes via with telehealth than I could have seen if they came into the clinic if that makes sense. I can see that the background of their house when they say they can't clean their house, I can physically see their background, their house. I can see that it's not clean, you know, and there's a picture into their house that or their life that I wouldn't have seen if I was in person. (P6, F30)

And:

> I actually think it's very informative. You know, the examples of like somebody was on the toilet. I was like, okay, I think they have very poor judgment, that is like helpful [to know] that they made that decision to do that. Another time I saw a guy who I think is a truck driver, and he was in a cab of his truck smoking while I'm like talking to him about stroke prevention. Like these are things that you can see in their native environment that you would not see in a clinic…Those are the things that are happening when they're not in my office. (P11, F41)

With this inside look into patients' lives comes the potential for greater distractions. Participants noted that often these distractions take away from the professional nature of the visit and decreases presence despite the technology affordances of visibility and synchronicity that

accompany the video feature. One participant said:

> I don't know, sometimes the informal nature that the environment creates. For some patients, they don't take it as serious and are very distracted within the interview, the TV on in the background, or and then patient confidentiality.
>
> Sometimes it is a challenge, you know, we always confirm who's in the room, who's not in the room, but you know often the patient will say no one's in the room right now then you hear somebody, and you just kind of feel, you know, again, it's kind of hard to manage the confidentiality aspect that's kind of up to the patient, despite us trying to confirm that is happening, so that's probably my least favorite. Just the informal nature of it. (P1, M35)

That same participant also gave another example of the lack of professionalism that sometimes accompanies telemedicine visits stating:

> The patient's behavior is a little different [in telemedicine]. I've had patients do a Zoom Meeting from a boat, which can go either way as far as bad and good, but patients that are in their pajamas laying down, or there's people that sit at a desk and it's like they're at a meeting, you know. It's interesting to see the perception amongst what is socially acceptable with patients as far as attending a physician or doctor's appointment, and it's just there's a wide array. (P1, M35)

While many participants felt that these distractions were negative, one participant noted that having less of a power dynamic could be a beneficial thing for patient-centered care. This participant said,

> But that [power] physicians have in general, that is lost a little, and maybe that's good. Maybe it's good that there's like less of a power dynamic. But I do think there's less of a

> power dynamic if you think about like, even like the all the messaging that happens in an office space where somebody's like wearing a white coat, and they're like the doctor, and then there's an MA [Medical Assistant], they're going to take your vitals. And then you're going to be like waiting for the doctor. And then the doctor's going to have all that signaling of like prestige, which is lost when you have a virtual encounter, and maybe that's part of what my patients are reacting to. (P10, F37)

Although the features of telemedicine technology afford visibility and synchronicity in a way that feels comparable to in-person interactions, the mediated nature of interacting through a technological device was noted by multiple participants to create feelings of distance. These feelings of distance appear to be outcomes of the inability to physically touch their patients but is also a result of a loss of humanness or abstraction. For example, one participant commented on the lack of touch, saying:

> I think I probably have trouble transferring my empathy to them, because much of what I do is nonverbal it's like nodding. Like I said, if they get teary, I give them Kleenex and we've offered to get them a cup of water, you know. Those are the things, or like pat them on their shoulder. And so, I've done that, you know, during the 10 plus years I've been in attending, but if you can't really do any of that, obviously, virtually, most of what you can do is nodding. (P11, F41)

Another participant agreed particularly in a context in which difficult news was just shared with the patient:

> I don't think it really alters the emotional aspect, whether you are doing it [communicating] in telemedicine versus in person. But if you were meeting with somebody who, you know, recently found out they had cancer, or maybe they recently

> underwent surgery for their cancer, things like that, and you really wanna dig into providing them emotional support, really providing them that understanding of what their diagnosis was, what their pathology report said. Then, you know, you're kind of missing the emotional connection on telemedicine, whereas in person you could, you know, if there are tears shed, you could reach out your hand or you can really just show that body language that you're displaying empathy. (P12, F29)

This was echoed by another participant who talked about how they have noticed their patients feel differently when human touch is involved:

> I feel like when the component of human touch is involved, and with the physical exam, the patients tend to have more comfort that they're being taken care of in a way. Having that [touch] component in person does help with that. They tend to feel a little bit better that 'someone's looking at me,' 'someone's checking me out,' 'someone's telling me that I'm okay or not okay.' (P21, M32)

One participant labeled this experience as a loss of humanness stating:

> It's so intangible what happens in a like a human encounter that's in person that it's very hard for me to think of like the right words, for it. But I do feel like there, like the humanism of medicine, is like almost entirely lost doing it virtually. But it's not like an easy thing to say other than well, also that you lose the physical exam, which may or may not matter. I certainly think that there are things get missed when you don't examine patients so that's obviously a problem. But also, the humanism, I guess, of medicine. I think, really, it's hard to replicate that virtually. (P10, F37)

Another participant noted how the technology makes patients feel more abstract:

> I think they're [patients] more abstract and perhaps less likely to have a handle on their

> medical condition. They don't really feel like a real person at all. For example, the rash patient, you know, they were describing their rash and, I eventually asked them to send me a photo. But the way they were describing it and, you know, playing it off as not really severe. It's just when you see that in real life and you're like oh my god that rash versus when they're talking about, you know, just any other rash or, you know, oh, I have a pimple or, 'it's not that bad' or 'it's just on my side'. It just doesn't really feel official. It feels more casual, I think. (P4, M31)

Another participant agreed that this abstraction makes it difficult to really engage with the patient and have a good handle on what is going on with them. This participant said:

> You know, sometimes it's not as easy to determine exactly what's happening with the patient over telehealth. Sometimes they can mask their symptoms more easily in the telehealth environment. So, I think it's very important to be extremely clear with the patient, and if I notice anything, I will ask them about it, whereas I might not ask them in a face-to-face encounter, because it will be very clear to me what's happening, even though the signs are subtle. So, for example, if I see someone who's withdrawn, looking nervous on a telehealth call, I will really want to flesh out just how anxious are they? Are they really preoccupied and worried about something in a very significant way? Whereas if I am with them face-to-face, I might just ask them a question like 'Well, how would you rate your anxiety on a scale from one to 10', and they could give me a numerical answer and I can just look at them and judge whether the number fits everything else I'm saying. But I have seen patients on telehealth visits where follow-up visits showed a different picture that was more severe than what I could see in the telehealth, just because the patient, I think, was trying to, you know, naturally people tend to downplay things

> when they're not feeling that well, and in the telehealth situation it's easier to do that than it is in person. (P5, M59)

Another participant noted that it felt like there was a "middleman" in the interaction, which appeared to be their way to describe the outcomes of interacting in a mediated environment. This participant said:

> They (patients) definitely feel more abstract (in telemedicine). Really, I mean, just because you're not face to face, you know, you're looking at a 2D image of somebody. And you're really just trying your best to communicate via mode of communication. It's almost like you have a middleman. So yeah, it just doesn't feel as real. (P12, F29)

Another participant described is simply as, "It's just you're looking at the computer, not at a person" (P15, F35).

Although most participants noted that the perceived distance was an affordance of telemedicine that had negative impacts on presence and social support, some participants noted examples of when the distance between users in a telemedicine encounter could be a major benefit. For example, one participant said:

> [Telemedicine] can actually make the patient more real to the provider, depending on who the patient is. I'm dealing with a patient that is dangerous [e.g., prisoner]. It's much safer to be in a telehealth setting with that person, and I may actually be much more observant of the person. (P5, M59)

Another participant noted that this distance has the potential to reduce stigma for some patients:

> Some people are embarrassed, and you know they don't want to come in or they don't want to talk to someone about it. They're not proud of it. So, I think the telemedicine route kind of shields some of that, you know, because you're kind of like hiding behind a

screen in a way. (P8, F32)

The chat modality was another main feature that participants noted affords users clarity that has a positive impact on solving technical issues and giving informational support. One participant said, “The chat box is helpful when the video goes awry, the connection goes awry, it helps to kind of alleviate those issues and try to help hopefully find a solution and get everything back on track” (P1, M35). The chat feature also affords clarity that reduces the potential for miscommunication around medical information. For example:

> You know, I think it [chat feature] can be really helpful, because if I'm offering information in that form, it's usually because it's something that patient wants, they have an interest in getting that information. So, by typing it out so that they can see it without any miscommunication. (P5, M59)

Another feature, recording, affords verifiability, or the ability to verify medical decisions and therefore provides increased confidence to providers. For example, one participant said they, “Record the encounter with the patient and if there's anything that we don't ever know, we'll take a picture, and you know ask our colleagues” (P4, M31). Another participant agreed stating:

> I think that if the patient is comfortable with it [recording feature], it could be extremely useful, because it just it can create a record of something, or it can provide a visual record of something that might be important from a care perspective. For example, I mentioned, sometimes we see voluntary movements in patients. So, if we had a recording of that, that's something that I could potentially share with a colleague, you know, if I wanted to consult somebody and get their opinion as to what should be done. That could be very useful. (P5, M59)

5.5.2 INTERACTIVITY AFFORDANCES

The participants noted that the screen share and chat features afford reciprocal communication, which may increase patient-centered care. Beyond the visibility and synchronicity of sharing information, which was noted to be a key modality affordance, the screen share feature was noted by participants to afford them an opportunity to show patients how to interact with the resources they have suggested. One participant noted for example, that:

> the social support where I showed them the epilepsy foundation website, I'll share my screen and I actually physically pull it up so they can see which buttons to click, and which resources are out there. So again, you know, I think overall, it's a very positive experience. (P20, F37)

This same participant continued along this line of thinking, noting that, "It [screen share] may reinforce their understanding of the diagnosis" (P20, F37). Another participant agreed stating:

> I think to a certain extent that (a chat feature) could be helpful, because again, it's just another way to share information, right? So, if I tell them about something, I could also put links to certain websites in the chat or type diagnoses in there so that they could have something to like Google later. So, I think that I mean a chat feature would be helpful. I also think it would be good, so that they could. You know jot down questions, you know. Like, if I'm in the middle of a spiel, and a question pops up, they could jot it into the chat really quick, so that we don't forget about it, and then I could make sure that I go through the chat before I get off with them and make sure I've addressed all of their concerns. (P9, F40)

This reciprocal communication was noted by other participants to have a positive impact on the interaction. For example, "It [screen share] definitely improves the interaction. It gives you

something tangible to look at and talk about. Helps them feel involved" (P2, F48).

5.5.3 NAVIGABILITY AFFORDANCES

Telemedicine technology affords users movability, or the ability to move around among multiple screens while appearing to continue eye contact with the patient. For example, one participant noted:

> I do think that I myself am very distracted when I'm on there, I'm like, 'Oh, let me check [this other thing]'. Like they're talking about something, and I'm like, 'Okay, well, I can like, go look at their labs while they're talking'. [This can be done] virtually because it's like they won't see me, and they will not know. And I like we'll just go look at their logs, and like, they'll be going to certain things while they're talking. To be honest, which is terrible, but it's like it's possible to do without looking bad. (P10, F37)

One participant noted that eye contact is just different in telemedicine, "Especially now with technology, you know, most people are pretty used to that screen [viewing]. So, you know, they kind of realize that they might be looking at you, although it doesn't look like they're looking at [them]" (P3, F31). However, that same participant noted that the affordance may actually have a negative impact on social support. They said:

> Trying to connect but I would say that maybe this is just me but it's easier for me to I'm sure it looks more to them that I'm just looking at the computer and typing as they talk when it's more to them that I'm just looking at the computer and typing as they talk when it's virtual. Cause I'm not making eye contact into the camera. So maybe a little less personable. (P3, F31)

CHAPTER 6: DISCUSSION

6.1 REVIEW OF FINDINGS

The present study aimed to explore social support via telemedicine from the perspective of medical providers. In particular, this study elucidated the technology features and affordances that have the potential to influence the mediated patient-provider interaction. The results suggest that providers have both positive and negative perceptions of telemedicine in general and for social support. Telemedicine provides accessibility and efficiency, but it also comes with potential technology issues and even acts as a barrier to empathy and human connection. When asked about specific technology features of telemedicine that influence their perceptions, providers noted that video and audio features were key. Participants also liked the chat and screen share features in general, but specifically for providing informational and instrumental support (see Section 6.4 for a detailed discussion on features that aid in providing social support and other outcomes).

Technology affordances was the last topic explored in the present study. Results aligned with three categories of affordances including modality, interactivity, and navigability. In terms of modality affordances, the video feature in telemedicine afforded participants with the ability to see and engage with their patients in real time, which had both positive and negative implications on outcomes such as presence, engagement, social support, and power dynamics. The chat and recording modalities were also mentioned by participants to have an impact on outcomes of social support. The screen share and chat features were noted to have interactivity affordances by providing reciprocal communication, which was noted to have positive impacts on informational support and power dynamics. The last category of affordances that was represented in the results is that of navigability. Telemedicine allows users movability, or the

ability to move around multiple screens while also engaging in the mediated interaction. Participants noted opposing thoughts on if this feature affords the ability to multi-task or if it reduces engagement and connection. The following sections will discuss these findings in relation to the existing literature.

6.2 INSIDE LOOK INTO PATIENTS LIVES VERSUS DISTRACTIONS

Telemedicine affords users unique visibility and synchronicity in that providers are able to get an inside look into their patients' lives. This has been noted in previous research as a positive feature of telemedicine (Andreadis et al., 2023; Gomez et al., 2021; Wilhite et al., 2022). This affordance that offers a holistic view of the patient's life has the potential to positively influence the social support the provider can offer as social support is more effectively given and better received within trusting relationships (Arora et al., 2007; Spake & Bishop, 2009). In addition, telemedicine may offer the affordance of comfortability in that patients may feel more comfortable communicating with providers in the safety of their home environment (Rains et al., 2017). However, a parallel consequence to the unique visibility of telemedicine is the potential for greater distractions compared to an in-person visit. These distractions were noted to take away from the professionalism of the visit, which has also been noted in recent research (Uscher-Pines et al., 2020). Reduced professionalism may also correlate with lower patient perceptions of provider credibility and trust (Svensson, 2006; Van Velsen et al., 2016), lower patient adherence to provider recommendations (Śliwińska et al., 2015), and compromised patient safety (DeJong, 2018). Although many participants felt that telemedicine had negative impacts on the professionalism of the encounter because of the distractions, one participant noted that the impact on power dynamics may actually be positive by reducing prestige and focusing on patient-centered care. Unfortunately, paternalistic values are still common within provider-

patient communication (Ocloo et al., 2020), but there is evidence both from the current study and past research that suggests telemedicine as a computer mediated communication technology, has the potential to reduce social boundaries and level power differentials that are characteristic of in-person interactions (Postmes et al., 1998). This is an area of study that warrants future research.

6.3 PRESENCE

One affordance of telemedicine mentioned by a participant was the ability to see their own expressions, or nonverbal synchrony of facial expression and movement (Elliott et al., 2020). This affordance had implications for the participant's level of presence within the interaction. This participant described the opportunity as offering awareness of one's own reactions, which is not available during in-person interactions and likely has a positive impact on rapport building, support giving, trust, engagement, and social presence (Hamel et al., 2018). However, "Zoom fatigue" is a challenge that has risen from continuous video meetings as a result of the COVID-19 pandemic (Bailenson, 2021; Fosslien & West Duffy, 2020). The video feature was repeatedly noted as key to engagement and social presence. Video provides an authenticity to telemedicine interactions that are comparable to reality (Hein et al., 2018). Furthermore, one participant noted that telemedicine allows for the illusion of togetherness, which aligns with the definition of social presence (Biocca, 1997; Lombard & Ditton, 1997; Riva et al., 2007). However, it is clear from the results of the current study that distractions and the challenges of conveying non-verbal communication take away from the social presence that is offered by telemedicine. As mentioned above, distractions are more common in telemedicine, which has been explained as "context collapse", or the challenge of maintaining clear separation between home and public personas (Marwick & boyd, 2011). The "context collapse" that occurs

during a telemedicine visit may potentially lead to decreased social presence (Uscher-Pines et al., 2020). Conveying non-verbal communication via telemedicine is a known barrier, and this was confirmed by participants in this study who noted needing to put in extra effort to deliver non-verbal communication, such as using bigger gestures and looking right into the camera (i.e., eye-contact) (Pinedo-Torres et al., 2023). Patients have repeatedly noted that effective non- verbal communication is key to positive feelings about interacting with their provider via telemedicine (E. A. Miller, 2001, 2003). Educational opportunities should consider how to teach providers strategies for altering their non-verbal expressions to ensure their patients receive their intended messages.

6.4 FEATURES AND AFFORDANCES AID IN PROVIDING SPECIFIC TYPES OF SUPPORT

Informational support has been noted as key to patient satisfaction with interactions taking place via telemedicine (Elliott et al., 2020). Past research on patient satisfaction along with the results from the current study, align that existing and future telemedicine technology features should continue to bolster the exchange of informational support. Telemedicine features provision the delivery of information and communication in a remote setting by providing a multitude of affordances that attempt to transcend the distance that accompanies mediated interaction (Wu et al., 2022). The synchronous nature of telemedicine offers the opportunity for users to connect and have reciprocal exchanges of communication with others within the telemedicine environment (Sundar et al., 2015). One critical component for achieving a an interpersonal or hyperpersonal interaction via telemedicine is the ongoing reciprocity between the interactants (Walther, 1996), which is afforded to users because of the features inherent in telemedicine. Features such as the chat feature provide informational support by providing

technology tools that afford users verifiability, or the ability to give text-based directions and spelling of medications and diagnoses. Difficult medical terminology is a known obstacle to health literacy, or the individual capacity to communicate and understand the demands posed by the health care system (Baker, 2006). The chat feature allows the provider to give informational support and adapt the medical terminology to be more easily understood, which then may have a positive impact on the patient's health literacy (Fage-Butler & Nisbeth Jensen, 2016). In addition, the screen share feature affords users a synchronous space for reciprocity that allows for providing informational support by sharing images such as MRI results with patients. Participants noted that being able to share the images made it easier to share this information rather than having to describe it without visuals.

Spending time to go through medical findings was noted multiple times by participants to be a type of instrumental support that could occur because of the screen share feature. Telemedicine offers a unique experience for providers to give one's time to patients since virtual visits alleviate much of the time consuming waiting the accompanies in-person appointments (Breen et al., 2010; Everett & Kerr, 2010; Iqbal et al., 2017; Jordan et al., 2021; Lua & Neni, 2012; Tardy, 1985). Although this is characteristic of instrumental support, spending extra time with the patient can also be an expression of emotional support (Nazione et al., 2020).

Emotional support was expressed by providers as giving and experiencing empathy. For example, one participant talked about how the video feature affords a unique visibility that allows an inside look into their patients' homes, which may elicit feelings of empathy. This inside look into patient lives and homes is a relatively new area of telemedicine research and should be expanded to consider how this information can be harnessed for patient care and for providing emotional support to patients (Andreadis et al., 2023; Gomez et al., 2021). In addition, esteem

support was mentioned by one participant who talked about the screen share feature. This provider noted that these tools provided a synchronous and reciprocal environment in which they were able to provide informational and esteem support about certain resources and how to use these resources to learn about and manage their illness.

Participants also frequently mentioned the difficulties of conveying empathy in telemedicine, which is crucial in order to successfully support patients (Baile et al., 2000; Nazione et al., 2016). A large part of the difficulty mentioned by participants was a result of the lack of touch that accompanies interacting via telemedicine. One participant noted that in person, they give patients a Kleenex or a cup of water. They also mentioned patting their patient on the shoulder. These non-verbal expressions of empathy and emotional support are not possible in a mediated space like telemedicine and continue to be a top noted limitation of telemedicine (Gomez et al., 2021). In addition, there are challenges to the examination via telemedicine as a result of the lack of touch. However, there are adjustments that providers can learn to effectively gather some physical exam information (Kalyanaraman & Wojdynski, 2015), but should be limited to areas of medicine in which a virtual exam is sufficient and/or for patients who may not have access to any form of in- person care.

6.5 TELEMEDICINE CAN BE A BARRIER FOR CONVEYING EMPATHY

Participants from the current study noted that telemedicine interactions often felt less personal, lacked empathy, and were missing elements of the human connection. These characterizations suggest an impersonal exchange (Walther, 1996), which diminishes interpersonal connection (Culnan, & Markus, 1987). It's possible that this is the foundation for the lack of professionalism from certain patients and could be why some patients are easily distracted during telemedicine visits as discussed above and ultimately may have negative

impacts on social presence and effective social support (Uscher-Pines et al., 2020). One participant noted that interacting via telemedicine feels as if there is a "middleman", which is an interesting way to describe how it feels to have mediated communication since much of computer mediated communication tools were initially developed to replace or circumvent a human middleman with a technology (Spar & Bussgang, 1996). Future research should aim to disentangle the concepts of impersonal and hyperpersonal communication as it relates to social presence and social support in telemedicine. It is likely that individual differences play a key role, but there may be an ideal balance of impersonal to achieve reciprocal, patient-centered communication and hyperpersonal to achieve heightened interpersonal connection. Future research and telemedicine technology development should also consider how to reduce the mediated nature of interacting via telemedicine, which was noted to produce feelings of having a "middleman" in the interaction.

Additionally, although hugging and holding hands with the patient is not possible over telemedicine, which could help achieve an interpersonal connection, some of the key actions to convey empathy and improve the interpersonal connection are possible, such as spending extra time with the patient, using a warm tone of voice, quietly listening, and looking into the patient's eyes, which have been noted both by the participants in this study and in past research (Nazione et al., 2020). These non-verbal cues can help establish rapport and trust with patients (Hill & Gormally, 1977; Tepper & Haase, 1978) and may be one strategy for improving the interpersonal nature of the exchange via telemedicine. Target education on conveying empathy via telemedicine is key to ensuring that this gap of human connection is reduced, and this education should be continuing as provider empathy has been shown to decrease over the course of medical school, residency, and as an attending physician (Hojat et al., 2004; Nazione et al., 2020;

Neumann et al., 2011).

6.6 IMPLICATIONS FOR THE FUTURE

Much of the recent literature asserts that telemedicine is here to stay (Gentry et al., 2021; Henry, 2020; Holtz, 2021; Nies et al., 2021; Pew Research Center, 2021). Thus, it is crucial to understand providers' perspectives on a multitude of aspects of telemedicine including providing social support. Research has shown repeatedly that social support positively impacts patient outcomes (Bensing, 1991; Duberstein et al., 2007; Jensen et al., 2010). Therefore, teaching providers strategies for conveying social support both in-person and in a mediated environment such as telemedicine is crucial. Future work should consider how the benefits and barriers of providing social support to their patients via telemedicine impacts their choice of using it.

This study extended theory in the areas of technology affordances, social support, and social presence. By using technology features and affordances as a framework for understanding providers' interactions with the technology, a better understanding of the uses of specific telemedicine features and what the features afford to the providers as users of telemedicine was illuminated. This study also produced a connection between technology features, their affordances, and outcomes of social support as well social presence. This is one of the first representations of the relationship of these variables in the context of provider-patient communication and sets the stage for further hypothesis testing. In particular, these results suggest a need for experimental studies to uncover causality between these variables. Perhaps a manipulation of a specific feature and affordance to assess if there is a change in social support and presence outcomes. This study is also a springboard for future technology ideas, such as considering how artificial intelligence (AI) may play a role in telemedicine interactions in the future. Furthermore, there are additional considerations that weren't explored in this study (and

will be discussed in the following limitations section). For example, provider gender, race and ethnicity, and age, among other characteristics undoubtedly play a role in the interaction (Duberstein et al., 2007; Roter et al., 2002), but this remains understudied in regard to telemedicine visits.

Companies responsible for developing telemedicine technologies should consider using the feature, affordance, outcome framework to better understand how the technology may impact its users. To do this, developers should consider talking with all potential user groups to gather their insight on what outcomes are important to them and how particular features may offer a way to achieve those outcomes. These two strategies have been suggested in previous research on technology (Mitchell et al., 2019). Future technology ideas may also stem from formative research. For example, one participant from this study mentioned the ability to doodle while on the telemedicine call using a screen share-type feature in order to provide informational support to their patients. Designing tools that offer users a robust experience is critical to positive outcomes of communicating and providing care via telemedicine.

There are also policy and insurance implications of this work. Telemedicine provides a multitude of benefits to providers and patients by delivering accessible and efficient healthcare solutions, but there are specific contexts in which telemedicine is ideal and most effective (Jordan et al., 2021). Policymakers and insurance companies should consider research such as the present study for decision-making around how to expand and protect the availability of care via telemedicine.

Lastly, there are educational implications of this work for providers. The results suggest that empathetic language and active listening are key communication and support strategies regardless of where the interaction is taking place (Nazione et al., 2020). However, eye contact

and other non-verbal expressions are different in a telemedicine interaction. Therefore, it's crucial that providers learn to use the technology features and affordances to their advantage. For example, providers should check in on their expression as their patient is talking to ensure that the expression elicits empathy and caring.

6.7 LIMITATIONS

Healthcare involves many complex human interactions, which makes qualitative methods a good starting point for exploring a phenomenon such as what was explored in this study. However, as with all studies, this interview study has limitations that should be discussed. First, findings may be subject to interviewer bias or social desirability bias, which is a highly cited limitation of qualitative work when focused on foundationalist perspectives (Anderson, 2010; Roulston & Shelton, 2015). Participants' responses may be influenced purely by the presence of the researcher. To avoid this, all interviews were conducted via Zoom technology without video. Although there is still presence detected from the researcher by the participant, it is likely less than in an interview being held in- person (Archibald et al., 2019). Furthermore, the research design and methodology align with the theoretical paradigms set forth in the literature review, in particular the methods used for coding and analysis utilized a neutral researcher to ensure reliability and increase objectivity (Braun & Clarke, 2006; Roulston & Shelton, 2015).

Another limitation of this work was the sampling method. Since recruitment took place over social media, email, and word of mouth, the sample included only individuals in the author's extended network. Many of those individuals are in the field of neurology and therefore, there is an overrepresentation of participants from that specialty. Although this is a limitation, neurology has been noted as a high-use specialty that has utilized telemedicine effectively for many years, which makes study this sample preferable for this topic area than studying those who

have less experience with telemedicine (León-Salas et al., 2023; Levine & Gorman, 1999; Wechsler et al., 2013). There is also a potential limitation in that the data may not be generalizable to all providers because of the small sample size, overrepresentation of particular specialties, as well as an overrepresentation of female participants and a slight underrepresentation of white participants compared to the general US population (*Data USA: Physicians*, 2021; Yang, 2023, 2024). Additionally, saturation was reached but only within the limited sample, which as stated above, consisted of individuals within the researcher's network. There is a likelihood that demographics of both the provider and the patient influence outcomes of social support. For example, concordance of demographic characteristics has shown to have impacts on communication and care outcomes (Thornton et al., 2011). In addition, female and male providers often obtain positive patient outcomes through different means of providing support (Mast & Kadji, 2018), suggesting that gender influences outcomes. Age and race/ethnicity have also been shown to influence outcomes (Singh et al., 2018; Spooner et al., 2017). Lack of generalizability is a known and controversial limitation of qualitative work (Carminati, 2018), which calls for future work to include a more robust sample.

This pilot project aimed to investigate perspectives in a theoretical space that has not yet been explored, which will provide direction for larger scale projects that will be able to better generalize to populations of providers. Lastly, participants may have had a tendency to report more positive perceptions of telemedicine because only users of telemedicine were included. However, the aims of this work required that participants have used telemedicine before. Furthermore, due to the COVID-19 pandemic, nearly 85% of providers in the US currently use telemedicine (Deutsch, 2022; Omboni et al., 2022).

CHAPTER 7: CONCLUSION

This study contributes to the fields of health communication, interpersonal communication, and health technology by exploring how medical providers feel about giving support to their patients via telemedicine. Theoretical perspectives of interpersonal communication, computer mediated communication, and technology affordances were connected within the context of telemedicine to better understand provider-patient interactions. The COVID-19 pandemic brought telemedicine use and research to the forefront, and despite being past the shutdowns and back to seemingly normal in-person clinic visits, telemedicine is here to stay (Henry, 2020; Pew Research Center, 2021). This study sought to better understand providers' perspectives on using telemedicine, supporting their patients in a mediated space, and the technology features and affordances that help or hinder that process. Results suggest that providers have positive and negative perceptions of telemedicine. There are specific technology features that influence their perceptions including video, screen share, and chat. In addition, these features trigger certain affordances, such as synchronicity, reciprocity, and movability, that have the potential to influence outcomes of presence and social support. Future work should aim to uncover how best these features can be utilized for positive outcomes of social support between providers and their patients. Specifically, the relationships between these variables should next be experimentally tested for causality using both providers and patients. Then, once there is a more substantial understanding of telemedicine technology features, affordances, and outcomes of social support and social presence, targeted education for providers on using the tools within telemedicine for assistance with providing social support in patient care.

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APPENDIX A: INTERVIEW GUIDE

1. Social Support
    a. How would you define social support in patient care?
        i. PROBE: What is social support to you?
    b. For this study, I define social support as enacting verbal and nonverbal behaviors to provide assistance/help to patients (MacGeorge et al., 2011, p. 317; Nazione et al., 2020).
    c. Using that definition, what do you say or do to help patients?
    d. What does this help (i.e., social support) look like in face-to-face (or in- person) patient care?
        i. PROBES:
            1. Listening
            2. Giving information
            3. Talk about their interests
            4. Let them know they are doing well following their medical plan (e.g., taking their medications)
            5. Let them know it's a safe space
            6. Assist with goal setting
            7. Physical touch (e.g., hand on shoulder)
            8. Etc.
    e. What does this help (i.e., social support) look like in virtual patient care (i.e., telemedicine visits)?
        i. PROBE: How (if at all) is it different from in-person care?
    f. Why do you (if you do) provide help (i.e., social support) to your patients?
        i. PROBE: What motivates you to provide help (i.e., support)?

2. Telemedicine
    a. How do you establish rapport with patients via telemedicine?
    b. How does telemedicine impact your ability to communicate with patients about their medical situation?
    c. How does telemedicine impact your ability to help (i.e., provide support) to patients about their medical situation?
    d. Tell me about your ability to feel empathy for a patient within a telemedicine visit.
    e. Do you use any nonverbal cues to enhance communication via telemedicine?
        i. PROBE: Are these different in telemedicine than in-person?
    f. What do you like about helping (i.e., providing support) patients via telemedicine?
        i. Probe about the benefits, no shows, etc.
    g. What do you dislike about helping (i.e., providing support) patients via telemedicine?
        i. Probe about challenges, patients can't connect, can't

see the non- verbal's, etc.

3. Technology Features and Affordances
    a. Describe how you feel when you are interacting with someone via telemedicine – particularly someone you want to provide support to.
        i. PROBE: Nervous? Confident?
        ii. Describe the engagement of your patients (likely a range)
            1. What was your impression of your patient's awareness of you being in the virtual space with them? (i.e., did they make eye contact with you or provide other non- verbal behaviors that made you aware of their engagement in the conversation?)
    b. What technology features (i.e., capabilities of a technology, e.g., ability to chat in Zoom) are important to you in telemedicine?
        i. What do these features allow you to do?
        ii. What features are important specifically for social support?
    c. What do you wish telemedicine could do?
        i. What technology features are missing in telemedicine?
        ii. How could telemedicine be improved?
            1. Particularly for providing support to your patients.
        iii. Consider even "futuristic" ideas.
        iv. What would these features allow you to do?
        v. What features would be helpful for providing social support?
    d. What are your thoughts about the screen share feature in telemedicine technology?
        i. How does (or would) this feature impact your interaction with your patient, if at all?
    e. What are your thoughts about the chat feature in telemedicine technology?
        i. How does (or would) this feature impact your interaction with your patient, if at all?
    f. What are your thoughts about the recording feature in telemedicine technology?
        i. How does (or would) this feature impact your interaction with your patient, if at all?
    g. Are there any other features that come to mind now that we have discussed a few that could be important to you in telemedicine?
        i. What do these features allow you to do?

4. Social Presence
    a. What are your feelings about telemedicine as a medium for communicating and providing social support?
    b. Tell me about your ability to form impressions of your patients via telemedicine.
    c. How do you feel about the realness of your patient when communicating with them via telemedicine?

        i. PROBE: Does your patient feel like a real person or are they more abstract?
    d. How would you describe the communication with your patients within telemedicine?
        i. PROBE: Personal or impersonal
        ii. PROBE: Insensitive or sensitive
        iii. PROBE: Cold or warm
        iv. PROBE: Passive or active

5. Scenarios
    a. I am going to read a few short scenarios depicting interactions with patients via telemedicine. These scenarios are examples of patients in a heightened emotional state. As the medical provider, what would you say and/or do in these situations?
        i. A 15-year-old patient who you have seen before is accompanied by her mother and comes to a telemedicine visit with you to discuss birth control options. During the discussion, the mother continues to express disagreement with her daughter's decision to become sexually active. You can sense that there is conflict between the mother and daughter.
        ii. You enter the zoom room and greet a long-term patient and notice that she is tearful. She states, "I'm just having a bad day."
        iii. A 42-year-old man with a history of total hip arthroplasty presented for a new patient visit via telemedicine with complaints of hip pain. One year ago, he had a displaced left femoral neck fracture requiring total hip arthroplasty with subsequent chronic hip pain. His pain was managed by his orthopedist with oxycodone and more recently with ibuprofen. Recent extensive reevaluation of his hip pain was negative. He requested that you prescribe something stronger like "oxys" for his pain, as the ibuprofen was ineffective. You can tell that he's agitated and is making comments about you not believing that he is still in pain.

APPENDIX B: DEMOGRAPHIC MEASURES

Did you provide telemedicine services before January 2020 (the start of the COVID-19 pandemic)?

1. Yes, I provided telemedicine on or before December 2019
    a. If yes, how long have you been providing telemedicine services?
2. No, I provided telemedicine for the first time in 2020

How many of your patient visits use telemedicine?

1. Nearly all visits
2. A large majority of the visits
3. About half of the visits
4. Some of the visits
5. Hardly any visits
6. No visits

How confident are you in your ability to successfully conduct a telemedicine visit?

1. Very confident
2. Somewhat confident
3. Neutral
4. Somewhat unconfident
5. Very unconfident

Do you think that you will provide telemedicine services in the future?

1. Yes
2. No
3. Unsure

To which gender identity do you most identify?

1. Female
2. Male
3. Transgendered Female
4. Transgendered Male
5. Gender Non-Conforming
6. Not listed, _____
7. Prefer not to answer

What is your age in years? _ _

What is your household

income?

1. $49,999 or below
2. $50,000 to 74,999
3. $75,000 to $99,999

4. $100,000 to $199,999
5. $200,000 to $299,999
6. $300,000 or more
7. Prefer not to answer

Please indicate your professional degree.

1. Nurse Practitioner (NP)
2. Physician's Assistant (PA)
3. Doctor of Osteopathic Medicine (DO)
4. Medical Doctor (MD)
5. Doctor of Osteopathic Medicine (DO) and Doctor of Philosophy (PhD)
6. Medical Doctor (MD) and Doctor of Philosophy (PhD)

Please indicate your medical specialty (and subspecialty if applicable).

1. Allergy & Immunology, subspecialty:
2. Anesthesiology, subspecialty:
3. Dermatology, subspecialty:
4. Radiology, subspecialty:
5. Emergency Medicine, subspecialty:
6. Family Medicine, subspecialty:
7. Internal Medicine, subspecialty:
8. Genetics, subspecialty:
9. Neurology, subspecialty:
10. Obstetrics and Gynecology, subspecialty:
11. Ophthalmology, subspecialty:
12. Pathology, subspecialty:
13. Pediatrics, subspecialty:
14. Physical Medicine & Rehabilitation, subspecialty:
15. Preventive Medicine, subspecialty:
16. Psychiatry, subspecialty:
17. Surgery, subspecialty:
18. Urology, subspecialty:

How long have you been practicing medicine?

1. Resident
2. <5 years
3. 5-10 years
4. 11-20 years
5. 21-30 years
6. >30 years

How would you describe the organization of your practice?

1. private practice
2. hospital employee
3. government
4. other

What is your race? (select all that apply)

1. White
2. Black or African-American
3. American Indian, Alaska Native, Native Hawaiian
4. Asian Indian
5. Asian:_____
6. Pacific Islander: _____
7. Other: _____
8. Prefer not to answer

Are you of Hispanic, Latino, or Spanish origin?

1. No, I am not of Hispanic, Latino, or Spanish origin
2. Yes, Mexican, Mexican American, Chicano
3. Yes, Puerto Rican
4. Yes, Cuban
5. Yes, another Hispanic, Latino or Spanish origin:_____

What is your zip code? _ _ _ _ _