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Patient-Provider Communication in Community Mental Health: How Perceptions of Engagement in Decision-Making Influence Patient-Perceptions of Well-Being

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Patient-Provider Communication in Community Mental Health: How Perceptions of Engagement in Decision-Making Influence Patient-Perceptions of Well-Being

BY

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DISSERTATION

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ABSTRACT

Shared Decision-Making (SDM) is being increasingly advocated for in the fields of physical and mental healthcare as it provides a means for patients and providers to engage in meaningful conversation about treatment decisions. Although there are many reasons for advocating for the implementation of SDM, there is limited information on how SDM impacts patient outcomes throughout treatment and the mechanisms through which these effects occur, and this information is even more limited in the area of mental health. The current research used secondary data analyses to examine patient and provider perspectives on the occurrence of SDM and patient engagement in treatment decisions over a year study and how they influence changes in mental/physical health and well-being. The research aimed to determine: (1) the extent to which patients and providers agreed about SDM and engagement; (2) whether patient decision satisfaction and perceptions of working alliance mediated the relationship between perceived communication and health outcomes; (3) if certain patient demographics were associated with increased preference for engagement in treatment decisions; and (4) what factors mediated the relationship between patient-provider communication and outcomes. The results suggested patient-provider agreement about communication was generally high and that patients tended to perceive better communication than providers. However, when

disagreement was greater, providers tended to perceive better communication than patients. Mediational effects were unsupported by the data, but there are positive associations between perceived SDM/patient engagement and better patient outcomes, decision satisfaction, and working alliance. Younger individuals and females reported greater preference for being engaged in treatment decisions, and preference did not significantly vary race/ethnicity. Finally, age, gender, and continuity of care moderated the relationship between patient perceptions of communication and decision satisfaction/working alliance. Specifically, for those who are younger, female, and who have provider turnover, perceptions of communication have a larger impact on decision satisfaction/working alliance. Although mediation was not supported, findings do suggest that providers should be aware of how communication styles impact outcomes, particularly for women, younger individuals, and individuals who have inconsistent providers. Other implications, limitations, and future directions are discussed.

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The extraordinary societal costs associated with mental illness indicate the need for innovation in public mental healthcare. It is difficult to estimate the total cost of mental illness for society because there are both direct (e.g., medication, clinic visits) and indirect (e.g., lost productivity, public income support payments, incarceration, homelessness) costs that contribute to the societal burden. The indirect cost of mental illness has been estimated at $79 billion (Rice & Miller, 1996). Insel (2008) estimated that serious mental illness is associated with an annual economic burden of $317 billion. Rice and Miller (1996) reported that costs associated with mental health care provision are the third highest of all medical conditions, and cost estimates are likely conservative. In addition to economic burden, there are non-economic costs that are equally important to consider, such as reductions in quality of life.

In response to such worrying statistics, recommendations have been made to attenuate costs by addressing concerns related to access, equity, and efficiency of care (Richardson et al., 2001; Saxena, Thornicroft, Knapp, & Whiteford, 2007). One recommendation comes from models of best practice in healthcare delivery, which calls for a shift away from acute care models to those better suited for chronic conditions. As the prevalence of chronic disease rises, acute care practices, which foster patient passivity, have become increasingly inefficient and ineffective (Holman & Lorig, 2000). There is mounting evidence in support of a shift away from traditional acute-care models in which the provider commands an authoritative role in the patient-provider relationship (Linden et al., 2010). It is suggested that healthcare delivery can be more efficient and

effective if patients are engaged as active partners in the process (Holman & Lorig, 2000).

The term "patient-centered care" was coined in 1988 by the Picker Institute to call attention to the need for healthcare providers to bring the focus of care back to the patient and away from a limited, disease-only focus (Barry & Edgman-Levitan, 2012). The Institute of Medicine (IOM) defined patient-centered care as "care that is respectful of and responsive to individual patient preferences, needs, and values" and that ensures "that patient values guide all clinical decisions" (Richardson et al., 2001). A patient-centered approach promotes a shift in the power dynamic between the patient and provider by leveling the ground on which decisions are made, with the potential to improve care and encourage patients to be more active in their healthcare both in and out of the exam room.

Holman and Lorig (2000) write that, when it comes to chronic disease management, the patient often knows the trends of her disease better than the provider ever could, making the patient an indispensable source of information for healthcare decisions. Thus, when the goal of healthcare is maintaining quality of life given the presence of chronic disease—instead of curing an acute disease—healthcare delivery improves if the patient is an active partner. The IOM has stressed the importance of policies that prioritize informed and patient-centered treatment for those organizations providing mental and medical healthcare (Richardson et al., 2001).

Overview of Shared Decision-Making

Following these recommendations, a process termed shared decision making (SDM) was developed to increase the capacity of healthcare providers to engage with their patients in a meaningful way around important healthcare decisions. SDM outlines a

general approach for patient-centered practice, and some advocate for SDM as the pinnacle of patient-centered care (Barry & Edgman-Levitan, 2012). It is meant to serve as a useful middle ground between the older, but still utilized, paternalistic model of patient-provider communication and an informative model of communication (Charavel, Bremond, Moumjid-Ferdjaoui, Mignotte, & Carrere, 2001).

Although the development of SDM initially aimed to address ethical concerns related to patient autonomy (Godolphin, 2009), the focus of SDM has expanded to include considerations about its impact on patients' health-related outcomes (Frosch & Kaplan, 1999). Post-medical encounter data demonstrate that patients have substantial problems with retaining medical information and implementing recommendations (Shinitzky & Kub, 2001). Research has demonstrated that effective physician-patient communication can increase the likelihood of favorable health outcomes (Stewart, 1995), and empowering patients to become more active in health-related decisions has been associated with improvements in general medical conditions (Brody, Miller, Lerman, Smith, & Caputo, 1989; Speedling & Rose, 1985; Woltmann, 2009).

For over a decade, the IOM has advocated for SDM as a means to increase patient agency, account for patient preferences and idiosyncrasies, and facilitate the flow and transparency of service-related information and decisions, respectively (Richardson et al., 2001). The IOM has also supported the study of evidence-based decision making, proposing that care should be based on high quality empirical knowledge and should not vary between clinicians or settings. In a 2009 brief report, the IOM listed investigating the role of SDM on decision outcomes and the effectiveness of decision support tools

among its top 100 national priority areas for comparative effectiveness research (Iglehart, 2009).

Furthermore, the Agency for Healthcare Research and Quality (AHRQ) identified the following areas as priorities for research focused on serious mental illness: (1) using decision support aides to increase provider compliance with evidence-based guidelines, increase client adherence to guideline-based regimens, and improving continuity of care and communication; (2) examining how the client-provider relationship impacts long-term patient outcomes; (3) using research designs that increase client involvement and utilize longitudinal designs; and (4) utilizing measures that are based on chronic models of care and that are appropriate and meaningful for clients (Jonas et al., 2011).

Defining SDM. Researchers have documented substantial inconsistencies in the definitions and descriptions of the process of SDM in the literature (Makoul & Clayman, 2006; Moumjid, Gafni, Bremond, & Carrere, 2007). However, Moumjid and colleagues (2007) identified several publications that propose the clearest and most widely used definitions. For instance, Charles, Gafni, and Whelan (1997) concisely define SDM as a process that involves the exchange of information in both directions between the doctor and patient, with both parties working towards an agreement and mutual investment in the ultimate decision made. They go on to describe the process of SDM by highlighting four essential attributes of a clinical model for SDM. First, the provider and patient (and others involved in the decision) take steps to participate in the process of treatment decision making. The authors recommend that the provider establish an atmosphere that communicates that the patient's views are valued and necessary. This step also entails eliciting patient preferences for participation in the decision-making process, which is

highlighted as a complex task that will be discussed in more detail in the section dedicated to barriers to SDM.

Second, information is shared between the patient and the provider, with special attention given to the risk/benefit profiles of potential decisions. Technical information is transferred to the patient using clear and simple language, and the provider aids the patient in weighing the options and clarifying any misconceptions. Third, both parties express treatment preferences, but it is made explicit that the patient and provider do not have to completely agree. Finally, a treatment decision is made, and both parties express a mutual acceptance for a treatment plan even if one party is not convinced that this is the best plan of action. It is also important to note that this step could lead to deferring the decision or deciding to not make a decision about treatment.

Decision aids (DAs) have come to play a prominent role in the SDM process to help patients understand information relevant to the decision. DAs are booklets or multimedia tools developed to communicate the best available evidence on treatment options to patients. They are designed to encourage patients to engage with their providers to select an option that is consistent with the evidence and with their personal values (Holmes-Rovner et al., 2007). Some have conceptualized DAs as the bridge between scientific evidence and personal values and quality of life considerations that are invaluable to SDM (Schaucer, Everett, del Vecchio, & Anderson, 2007). However, DAs are not a necessary component of SDM, and they do not, on their own, ensure that SDM truly occurs (Shay & Lafta, 2015). DAs are typically designed to assist the patient and provider in weighing the risks and benefits of the treatment options by providing the information in a simple and unbiased format. After the patient reviews the DA, the

patient and provider should engage in a deliberative conversation about the choices (O'Connor et al., 1999).

Conceptual model of SDM. In addition to having a clear definition and understanding of the process of SDM, it is important to have a clearer overall conceptual understanding of how patient-provider communication can impact patient outcomes. Thus, an important next step for researchers is to explore an overall conceptual model of the path through which patient-provider communication influences outcomes (Street, Makoul, Arora, & Epstein, 2009). Shay and Lafta (2015) proposed a model of patient-provider communication and how it impacts patient outcomes (Figure 1). The model was adapted from previous models of patient-provider communication proposed by Street and colleagues (2009) and Kreps, O'Hair, and Clowers (1994).

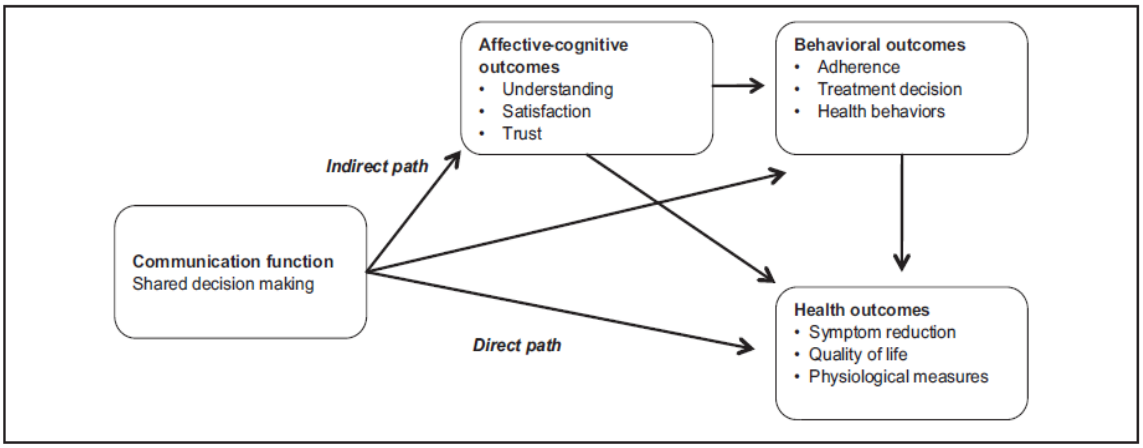

Figure 1. Shay and Lafta's (2015) conceptualization of how communication impacts patient

Mediation refers to a mechanism through which an independent variable (e.g., communication) influences dependent variables (e.g., health outcomes) by a third variable or variables (e.g., affective-cognitive outcomes), termed the mediator or intervening variables (Baron & Kenny, 1986). Thus, the independent variable can influence the dependent variables through both direct and indirect pathways (Figure 1).

The mediating variables lay along the indirect pathway and aid in explaining some of the variance that is not explained in the direct pathways (e.g., between communication and health outcomes). In the previous models proposed by Street et al. (2009) and Kreps et al. (1994), patient-provider communication leads to improved health directly, but this relationship is also partially mediated by more proximal outcomes. Shay and Lafta (2015) adapted these temporal models into a conceptual one that classifies patient outcomes into three general categories: affective-cognitive, behavioral, and health. The affective-cognitive category includes outcomes such as knowledge, understanding, patient-satisfaction, attitudes, and affective-emotional effects. The behavioral category includes outcomes such as treatment adherence and adoption of new health behaviors. The health category includes outcomes such as quality of life, self-rated health, patient functioning, and physiological measures.

In Shay and Lafta's (2015) model, patient-provider communication directly impacts health outcomes, and it also impacts the mediating outcomes (i.e. affective-cognitive and behavioral; see Figure 1). They propose that cognitive-affective and behavioral outcomes partially mediate the relationship between patient-provider communication and health outcomes because they are more closely associated with the processes of communication itself. For example, a patient who perceives that she is actively involved in treatment decisions might endorse greater satisfaction with decisions and working alliance. Feeling more involved and satisfied in these areas could lead to improved adherence behaviors, which could all lead to increases in patient well-being (indirect pathway). This proposed model provides a potentially useful framework to examine the different pathways through which SDM, or patient-provider communication

in general, can influence patient outcomes. However, this framework has never been empirically tested, which limits its ability to explain the relationships between these variables.

Empirical evidence for SDM. Overall, the efficacy of SDM has been under-researched, and the published findings are mixed. Shay and Lafta (2015) conducted the most recent review of the SDM literature, focusing on patient outcomes in the three areas described above: affective-cognitive, behavioral, and health outcomes. They included studies if they: (1) empirically measured SDM in the context of the clinical encounter; and (2) evaluated the relationship between SDM and at least one patient outcome. Thirty-nine studies met the inclusion criteria, five of which focused on mental health populations, demonstrating the lack of research focused on this particular population. Thirty-three used patient-reported measures of SDM, six used observer-rated measures, and two used clinician-reported measures.

Overall, the results suggested that SDM tends to be associated with improved affective-cognitive outcomes, but evidence is lacking for the association between SDM and behavioral and health outcomes. In particular, 54% of affective-cognitive outcomes were positively related to SDM, compared with 37% of behavioral and 25% of health outcomes. None of the physiological measures (e.g., blood pressure) were associated with SDM. The review also revealed that most researchers use patient-reported measures of SDM to ascertain whether or not SDM was occurring. Of the 39 studies included in the meta-analysis, 52% showed significant and positive associations between SDM and patient outcomes when patient-reports of SDM were used, compared to 21% when observer-rated SDM was used and 0% when provider-reports were used.

Thus, patient perceptions of SDM, measured via self-report, might be more predictive of patient outcomes than other measures of SDM. This might be true because patients' experiences are more likely to influence their outcomes than an objective rating. Although other methods of measuring the occurrence of SDM, such as direct observation, may be more accurate and objective, they might not provide a lot of added value in understanding the relationship between SDM and patient outcomes. However, this finding did not account for how these studies differed regarding how they measured patient outcomes (e.g., patient self-report, observations, etc.), which could also impact how communication and outcomes were associated.

Shay and Lafta's (2015) meta-analysis revealed that only two studies examined provider perceptions of SDM. Although it is difficult to draw a conclusion based on just two studies, their findings demonstrated that provider perceptions, alone, may not provide much predictive value of patient outcomes. In addition to exploring these singular perspectives of SDM, it would also be interesting for researchers to consider a dyadic perspective by examining patient-provider agreement on the occurrence of SDM. To the writer's knowledge, very few researchers have examined SDM and patient outcomes from this vantage point (e.g., Heisler et al., 2003, Lagare et al., 2003; Schoenthaler et al., 2012); further, no research has previously reported on patient-provider agreement about whether or not SDM occurred. Previous research found that if patients and providers share similar preferences for patient involvement in decisions, it predicts better patient outcomes (e.g., Jahng, Martin, Golin, & DiMatteo, 2005). Determining if provider self-report and patient-provider agreement regarding perceptions of SDM provide any added value in accounting for variance in patient outcomes is an important next step in SDM

research. Answering this research question would help inform best practices for data collection in subsequent studies.

SDM research in mental health populations. Within SDM literature, the focus is primarily on medical encounters, but there is a growing subset that focuses on mental health encounters. The existing research on SDM in mental health populations, though relatively scant, suggests that patient involvement in decision-making could have a positive impact on affective-cognitive, behavioral, and health-related patient outcomes. Four studies have focused on patient populations being treated for depression in primary or managed care settings. One study demonstrated that individuals with depression who were randomized into treatment conditions with SDM sessions showed significantly improved medication adherence and longer-term symptom reduction (Von Korff et al., 2003). Clever and colleagues (2006) found that patients who were more engaged in decision-making regarding their depression had a higher probability of receiving guideline-concordant care and experienced significantly greater reductions in symptoms over an 18-month period. Other studies demonstrated that SDM increased patient satisfaction with participation and satisfaction with care (Loh et al., 2007; Swanson et al., 2007).

Malm, Ivarsson, Allebeck and Falloon (2003) found that individuals with schizophrenia, who were randomized to a community-based program that included procedures for SDM and patient empowerment, experienced significant improvements in social recovery and increased satisfaction with treatment. Another study examined the use of SDM with inpatients who had schizophrenia and found that the intervention significantly increased patient knowledge about their disorder, perceptions of

involvement in decisions, and uptake of psychoeducation (Hamann et al., 2006). In a later study, Hamman and colleagues (2011) found that teaching individuals who are diagnosed with schizophrenia how to engage in SDM was possible and increased the amount these individuals engaged in treatment decisions. Among patient populations with substance use disorders in the Netherlands, SDM was associated with greater decreases in addiction severity at three months relative to a standard decision-making protocol when used in combination with a well-established intervention (Joosten, de Jong, de Weert-van Oene, Sensky, & van der Staak, 2009).

In addition, researchers have reported that SDM is feasible for those with chronic and severe mental illness (Hamann et al., 2006), and SDM does not increase consultation time (Loh et al., 2007). Joosten and colleagues (2008) published a systematic review of randomized control trials (RCTs) in which there needed to be at least two patient groups, SDM and care as usual. Their results suggested that, although more research is needed to confirm this pattern, SDM could be most effective when used to make long-term treatment decisions over a series of clinical encounters or when making decisions in the context of treatment programs, which are well suited to mental health treatment. Also, in all but one of the studies in which SDM demonstrated desirable outcomes, the patients were from mental health, instead of medical health, populations.

Taken together, the body of literature suggests that SDM can have a positive effect on mental health patient outcomes in a variety of ways. It is also possible that, given the collective findings in the review by Joosten et al. (2008), SDM could be more effective in mental health treatment populations despite being developed for use in medical settings. Alongside these optimistic findings, some research suggests that SDM

may not be associated with improved patient outcomes in mental health populations (Goosensen, Zijlstra, & Koopmanschap, 2007; Mahone, 2008), and limitations or barriers associated with implementing SDM have been well-documented in the literature (e.g., Legare, Batte, Gravel, & Graham, 2008). Barriers will be discussed extensively in a later section.

It is noteworthy that many of the reviewed studies examined SDM in primary care (PC) clinics between a PC provider or psychiatrist and a patient. Few have examined SDM in community mental health (CMH) settings, and none of these studies, to this writer's knowledge, directly examined SDM when used by non-psychiatric mental health care professionals (e.g., case managers, counselors, psychologists). Also, most studies that measured a "health" outcome focused on symptom reduction, and not on increasing quality of life or improved functioning. These outcomes are important to consider given how these outcomes can indicate clinically meaningful improvements for patients (Sainfort, Becker, & Diamond, 1996). Finally, because the findings from the systematic review by Joosten and colleagues (2008) suggested that SDM may have greatest impact in long-term treatment decisions, researchers should incorporate longitudinal research designs and evaluation of SDM when studying longer-term care decisions.

Overall, the conditions, and for whom, SDM is most effective has been given little attention by researchers. One important step to address these questions is to consider potential moderators of the relationship between SDM and patient outcomes. Statistical moderation allows researchers to explore potential variables that change the impact of SDM. In other words, if the ability of SDM to improve patient outcomes depends on some other variable, moderation allows researchers to answer, "what does it depend on?"

For example, examining gender as a moderating factor could reveal that SDM is more beneficial for women than it is for men. Potential moderators of interest in the proposed study include, gender, race, age, and continuity of care. Previous studies that explored gender differences in patient sensitivity to and satisfaction with interpersonal aspects of care demonstrated mixed findings. One reported that women are more sensitive to and satisfied with interpersonal aspects of care (Materko, 1997). Another suggested that men are more sensitive to interpersonal connections in care (Weismen et al., 2000). Swansan and colleagues (2007) examined gender as a moderator and found that men and women did not have different relationships between SDM and patient satisfaction with care. Due to a history of mixed findings, it is important to continue to explore gender as a potential moderating factor.

Although research has demonstrated that SDM occurs less frequently with racial minorities (Peek et al., 2010), researchers have not directly studied race/ethnicity as a moderating factor between SDM and outcomes. Durand and colleagues (2014) conducted a meta-analysis and found that the use of SDM with socially disadvantaged groups (i.e., ethnic minorities, low literacy/low education, low socioeconomic status, and medically underserved) was associated with a moderately positive effect on outcomes. Specifically, the findings suggested that SDM increased knowledge, informed-choice, participation in decision-making, decision self-efficacy, preference for collaborative decision making, and reduced decisional conflict among disadvantaged patents. These findings are important because these groups benefit systematically less from direct medical interactions and suffer the consequences (Alegría et al., 2008; Mayberry, Mili, & Ofili,

2000). This research indicates that SDM could be one path to bridging this gap in healthcare equity that influences quality of care and health.

Race is a potential moderator because it has been well documented that communication difficulties occur disproportionately more frequently between providers (of majority and non-majority ethnicity) and patients from non-majority racial/ethnic backgrounds (Anderson, Scrimshaw, Fullilove, Fielding, & Normand, 2003). Indeed, some research supports the finding that African-American and Hispanic respondents were more likely to prefer that physicians make the decisions (Levinson, Lesser, & Epstein, 2010). Cultural differences in communication styles (e.g., direct vs. indirect), particularly as they pertain to patient-provider interactions, could change the way SDM interacts with patient outcomes (see Sue & Sue, 2012 for a summary of cultural differences in communication). Given the potential importance of race/ethnicity on health care communication, the proposed study will examine this variable as a moderator of the relationship between perceived SDM and outcomes.

Understanding how age can change the relationship between SDM and outcomes is also relevant. Previous research has suggested that SDM is preferred by younger adults (Swenson et al., 2004). This could be explained by differences in patient expectations in patient-provider interactions. For example, older adults (e.g., 65 and older) could be more familiar with acute-care models in which patient-engagement is not emphasized, and the familiarity could lead to preference. Replication of this finding would be helpful to clarify this relationship. The age range of the sample for the proposed study will permit comparison of a group older than 65 years with a younger group.

Finally, continuity of care is another important variable to consider, especially in the context of relationships across time for those with chronic mental disorders. Research has documented the positive effects of continuity of care for patient outcomes (e.g., Adair et al., 2005). One way to assess continuity of care is to examine provider turnover at the patient level. Because continuity of care has been associated with improved communication, trust, and a sustained sense of responsibility (Gutherie, Saultz, Freeman, & Haggerty, 2008), it follows that interruptions in care could negatively impact the relationship between perceptions of SDM and patient outcomes.

SDM shows great potential for improving outcomes for populations of individuals with severe and chronic mental illnesses. However, researchers should examine SDM in CMH settings, with non-prescribing mental healthcare professionals, and over-time. Learning how implementation of SDM influences functioning and quality of life would expand the focus beyond symptom reduction, behavioral adherence, and patient satisfaction. Lastly, the interactive effect of SDM with demographic factors of gender, race/ethnicity, and age in addition to continuity of care with providers should be further studied.

Challenges with implementation, training, and research. In addition to examining the efficacy and effectiveness of SDM, much of the SDM literature deals with overviews of challenges and barriers to the implementation process. Although most of the findings are from studies in which SDM was implemented in general medical settings, there are many findings that likely pertain to mental health populations.

***Challenges from the provider's perspective*.** Legare and colleagues (2008) conducted a systematic review of health professionals' perceptions of SDM. Of the

reported barriers to implementing SDM, the three most cited were time constraints, a lack of applicability due to patient characteristics or the clinical situation, and patient preferences. The authors noted that, although there is no robust evidence that more time is required to engage in SDM than is required for usual care, this perceived barrier is ubiquitous. Other barriers providers commonly perceived included a lack of awareness/familiarity with SDM, feeling overworked, a lack o agreement that SDM is a good method to use with patients, and a lack of self-efficacy around ability to successfully implement SDM (Friedberg, Van Busum, Wexler, Bowen, & Schneider, 2013; Légaré et al., 2008). The important takeaway is that providers perceive many barriers and can be very resistant to adopting SDM.

Researchers have found that some resistance occurs due to the inertia of the providers' existing frameworks for practice, and some providers perceive SDM to be a threat to their autonomy of practice (Cabana et al., 1999). There are also feelings among some medical providers that they are already doing SDM in their practice, so learning how to implement SDM does not apply to them (Légaré et al., 2008). Mental healthcare providers' perceptions about SDM are unknown, but it seems likely that mental healthcare providers would experience similar forms of resistance to engaging in SDM. Introducing and establishing new methods for clinical practice in any existing framework can be difficult and is often met with resistance from those within the framework.

Researchers have also documented provider-perceived facilitators to SDM. Légaré and colleagues (2008) reported that the three most frequently cited facilitators were provider motivation to utilize SDM, a belief that SDM would positively impact the clinical process, and the belief that SDM would positively impact patient outcomes.

These findings highlight that provider buy-in could have a substantial impact on providers' willingness to engage in SDM.

Challenges from the patient's perspective. Adams and Drake (2006) discuss three robust findings from the literature: (1) patients want information about their health and medical care; (2) patients want to choose a practitioner with whom they can foster a trusting relationship; and (3) patients vary in their preferred role in medical decision making. Adams and Drake (2006) point out that there are key differences between wanting information and wanting to partake in decision-making.

Patients may want to build a trusting relationship with their providers so that they can entrust their providers with the task of making the right decision for them. Some patients may be overburdened with life challenges and feel relieved to have decisions related to mental or medical care taken off their hands. Research has also suggested that, for some patients, too many choices can be debilitating. Choice can increase the sense of lost opportunities (Kahneman & Tversky, 1979), and people may have difficulty predicting how they will value certain outcomes because they cannot anticipate how they will adapt to illness (Jansen, Kievit, Nooij, & Stiggelbout, 2001).

Swenson and colleagues (2004) found that, in a sample of 250 adult patients seeking treatment for a medical illness, 69% preferred patient-centered care. Although 69% is majority, the remaining 31% who preferred another communication style also represents a significant portion of the sample. Patients who preferred patient-centered communication were more likely to be younger adults, more educated, use complementary and alternative medicine, and have a patient-centered physician already. This last finding might suggest that mere exposure to patient-centered communication

styles may be related to patient preference for that style and that people prefer what they know. It could alternatively suggest that people who prefer SDM seek out or stay with providers who engage with them in this style. As previously discussed, continuing to explore moderating factors, such as patient preference, is an important next step for SDM research.

Whatever the reason for the patients' preferences around decision making, it is clear that not all patients prefer SDM all of the time. Research demonstrates a need for flexibility on behalf of the provider regarding the way they approach patients about treatment decisions. Goossensen and colleagues (2007) researched patient satisfaction with provider communication styles. They found that providers with a more variable communication style on self-report SDM measures could elicit greater patient satisfaction with decision-making than providers who scored consistently high on self-report measures of SDM. They concluded that one of the most important things providers can do is ask their patients to what extent they desire to be involved in decision-making. This should be an iterative process in which ongoing assessment is used because desired level involvement could change over time.

Supporting this conclusion, Cvengros, Christensen, Cunningham, Hills, and Kaboli (2009) found that congruence between patient-reported preferences for clinical counters and patient-perceptions of providers' actual behaviors is a better predictor of patient outcomes than either predictor on its own. These finding highlight the importance of providers remaining open and flexible regarding their communication styles with patients. The finding emphasizes the step in SDM that prompts the provider to accurately assess the patient's decision-making preferences. This could prove to be complex because

some patients may not know what they prefer or may be hesitant to assert their preferences. Providers need to be trained in how to approach conversations about patient preferences and be prepared to be flexible in their communication style in order to accommodate patients' needs.

Because patient preferences for patient-provider communication style seems to be an important determinant of SDM benefit, future research should focus on how patient preferences change the relationship between patient-provider communication and patient outcomes. It is hypothesized that perceptions of patient-centered communication will be more beneficial for those patients who prefer decision engagement than for those who are ambivalent or who express a disinterest in decision engagement. Patient preferences will be examined in the proposed study as a potential moderator of the relationship between patient-provider communication and outcomes.

The overview of challenges and barriers demonstrates the complexity of SDM and the difficulties that accompany implementation. Any implementation researchers should be aware of such barriers when designing a study and be prepared to address them. In particular, it seems important to address any provider resistance to, and concerns about, utilizing SDM and approaching decision-making with flexibility. Grande, Durand, Fisher, and Elwyn (2014) argue that community based participatory research (CBPR) could be one way to overcome barriers related to resistance because CBPR has historically been a method that engaged resistant stakeholders in areas of public health where implementation is a challenge. Implementing CBPR is associated with greater costs in terms of time, labor, and financial expense when compared to more traditional research methods, but the ecological validity of such research can justify the costs. The

following section is dedicated to introducing a study that utilized CBPR techniques in an attempt to overcome some of these barriers and to investigate the impact of a SDM-based patient wellness tool that was developed and used in CMH settings with patients who had severe and chronic mental illness.

Moving Patient Outcomes toward Wellness and Recovery (mPOWR)

In response to the IOM's calls for patient-centered care and for research on SDM (Saxena et al., 2007), and to the high priority research areas identified by AHRQ (Jonas et al., 2012), researchers at the Center for Rural and Community Behavioral Health (CRCBH) at the University of New Mexico and Felton Institute in San Francisco designed a CBPR study to examine the implementation and impact of the mPOWR system. The system is a CMH-based decision support tool and training package that spans multiple functioning and community living skill domains, and it focuses on client-identified outcomes.

mPOWR includes the use of client-focused decision aides (DAs) that were developed in accordance with the International Client Decision Aid Standards and that focus on six key areas: (1) personal care and daily life skills; (2) social relationships; (3) environment and activities; (4) volunteer and vocational skills; (5) physical health; and (6) psychological health. mPOWR uses community-adapted quality of life and community living skill measures that reflect the six DA domains, allowing providers to track patient progress in these areas. Together, mPOWR incorporates the use of tools, communication strategies, prompts, and DAs that are meant to embody SDM in order to improve patient care and outcomes.

The study, which was conducted between 2013 and 2016, aimed to empirically evaluate the implementation of mPOWR and its ability to: (1) improve patient and provider participation in SDM and engagement in mental health treatment; (2) increase patient understanding of treatment options and to increase their personal treatment progress and general quality of life; and (3) increase patient functionality and sense of perceived support for their therapeutic outcomes. Secondary study aims examined qualitative data, in the form of study exit-interviews, for patient and provider impressions of mPOWR and perceived barriers and benefits of utilizing mPOWR.

In addition to addressing the IOM's and AHRQ's calls to research, the study contributed to the literature by examining SDM in CMH facilities and when used by case managers and their clients, which are major gaps in the SDM literature. The study also utilized a longitudinal design that focused on on-going care for patients with severe and chronic mental illness, which Joosten and colleagues (2008) suggested should be well-suited to SDM. The study also assessed patient functioning and quality of life because they have been identified by patients as important markers of progress beyond symptom reduction (Chu et al., 2017).

The study utilized a CBPR design, enabling the researchers to receive feedback from the participants (both patients and providers) about the study design, measures, implementation, and the mPOWR package itself. Although this does not necessarily mean that all barriers were addressed, it allowed participants to voice concerns and challenges that arose during this implementation study. The study also incorporated feedback from research advisory board members that included invested stakeholders such as professional mental healthcare providers, mental healthcare experts, and mental

healthcare consumers. The feedback allowed the researchers to revise study measures to make them more accessible and user-friendly for participants. For example, questions were removed from the questionnaire if they were redundant in order to decrease participant burden.

Another unique feature of the study's design is that, at each time point, both the patient and the patient's provider were assessed using similar tools to measure congruence between patient and provider perspectives on decision-making and patient outcomes. This allowed researchers to assess to what degree the patients and providers agreed about the extent to which SDM occurred, how satisfied the patient was with the decision, how well the patient and provider worked together, and how well the patient did in areas related to functioning and well-being. To the writer's knowledge, very few researchers have examined SDM and patient outcomes from this vantage point (e.g., Heisler et al., 2003, Lagare et al., 2003; Schoenthaler et al., 2012); further, no research previously has reported on patient-provider agreement about whether or not SDM occurred.

The study took place in urban San Francisco and rural New Mexico CMH facilities, resulting in a sample of patient participants that was very diverse and included individuals who self-identified as Asian, Hispanic, Native American, Black, and White. The sample also included both young adults (20-29 years old) and elderly participants (over 85 years old). Such a diverse sample provided an opportunity to explore whether moderators of interest (i.e., race/ethnicity, age, gender) change the relationship between SDM and patient outcomes. In addition, during the first round of data collection, participants were asked if they felt that they should engage in treatment planning and if

they were interested in treatment planning. This allows for assessment of patient preferences and to determine if patterns of patient preference depend on the moderating variables of interest.

Over the course of the study, there were significant internal difficulties (unrelated to the mPOWR intervention) at both of the intervention sites. Given that these were CMH settings, the fluctuations in the patient outcomes of interest were influenced not only by implementation of mPOWR, but also by the organization crises and significant staff turnover, which are, unfortunately, not uncommon challenges (Prosser et al., 1999). These internal challenges undoubtedly impacted patient care and patient outcomes in addition to making mPOWR training and implementation difficult. Possibly because training and implementation proved to be such a challenge, the intervention effects on patient outcomes were not as strong as predicted. Specifically, previous statistical analyses did not support the prediction that patients' perceptions of SDM were significantly stronger at the intervention sites.

However, even without strong effects at the intervention sites, it is possible to examine the extent that perceptions of a SDM-communication style influenced patient outcomes. Perceptions of SDM are particularly interesting to examine given findings from the implementation literature demonstrating that patients' experiences of the quality of their interactions with their providers may be more important than the presence or absence of SDM per se (Goossensen et al., 2007). This finding may be supported further by the present study. Because the providers' use of the mPOWR tools (e.g., DAs, patient assessments) at the intervention sites were not consistently well-tracked, and SDM was only measured via self-report, there was not an easy way to determine whether "true"

SDM was occurring. As a result, only patient and provider perceptions of SDM and communication could be examined in the present study. Thus, the effect of perceptions of SDM on patient outcomes across all sites were examined, regardless of whether the site was intervention or control.

Research Aims and Hypotheses

The aims of this study were developed to examine how perceptions of patient-provider communication influence patient outcomes. Specific outcomes of interest in the present study include decision satisfaction, perception of the patient-provider working alliance, patient well-being, and patient mental and physical functioning. In addition, moderating factors will be examined to determine if certain patient characteristics change the relationship between patient-provider perceptions of communication and patient outcomes. The results of the study will add to the body of literature that examines the influence of patient-provider communication styles for mental healthcare providers in general, and case managers in particular. It will also illuminate the extent to which patients and providers are endorsing the perception that SDM occurred, regardless of whether the CMH case managers were trained in SDM. Finally, recommendations will be made based on study findings and stakeholder feedback in CMH settings. This research could help shape future researchers' approaches to training mental healthcare providers in SDM and how to best study and implement SDM practices.

Specific Aim 1. The first aim was to determine the level of agreement between patients and providers about their dyadic communication and decision-making. The level of agreement was examined by four different approaches: (1) Group level differences were examined using the Wilcoxon Signed-Rank test; (2) Individual level differences

were examined using Intraclass correlations; (3) Difference scores (=patient-provider scaled scores) were computed; and (4) Bland-Altman plots allowed for visual examination of patient-provider level of agreement. No hypotheses were made for this specific aim because it was largely exploratory.

Specific Aim 2. The second aim was to use the current data to examine the conceptual model of SDM proposed by Shay and Lafta (2015). The proposed model predicts that perceptions of patient-provider communication directly influence patient perceptions of well-being and functioning, and this relationship is partially mediated by patient perceptions of decision satisfaction and satisfaction with the working alliance (Figure 2).

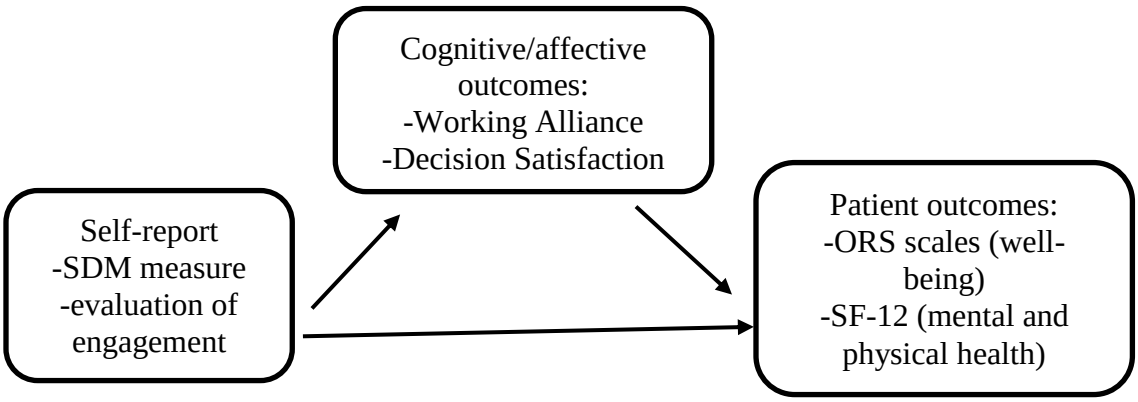

Figure 2. Proposed mediation model of communication effects on patient outcomes.

It was predicted that decision satisfaction and perception of the working alliance would partially mediate the relationship between patient-provider communication and health outcomes because they are more proximal to patient-provider communication. There was not a measure of behavioral outcomes in this study, so this conceptual branch of the proposed model (Shay & Lafta, 2015) was excluded from this study. It was hypothesized that higher perceptions of SDM would predict greater patient perceptions of well-being and functioning, in addition to greater decision satisfaction and perceptions of

the working alliance. This relationship will exist regardless of whether the patient-provider pair comes from an intervention or a control site.

Patient perceptions, provider perceptions, and patient-provider agreement about communication, were entered as the predicting variables in three separate sets of models to test whether patient perceptions, provider perceptions, or level of agreement between patient and provider perceptions of communication accounted for more variance in patient outcomes. Patient perceptions of communication were utilized in the first set of models, and provider perceptions of communication were utilized in the second set of models. Level of agreement between patients and providers, represented by difference scores, were utilized in the third set of models.

It was hypothesized that higher perceptions of SDM and engagement by patients and providers would be associated with higher levels of perceived working alliance, decision satisfaction, well-being, and functioning. Further, it was predicted that higher levels of agreement between patients and providers would be associated with better outcomes when they agree that engagement and SDM is high. In addition, it was hypothesized that positive difference scores, which would indicate that patients perceived higher SDM or engagement than providers, would be associated with better outcomes than negative difference scores, which would indicate the opposite. Finally, it was hypothesized that provider perceptions would account for less variance than patient perceptions. However, because previous studies have not examined patient-provider agreement in this manner, no predictions were made regarding the difference between patient perceptions alone and congruence between patient-provider perceptions.

Specific Aim 3. The third aim was to determine how patient interest in engaging in treatment decisions was associated with: (1) race/ethnicity, (2) age, and (3) gender. It was hypothesized that younger adults would express greater interest for treatment-decision engagement. Because the association between interest and race/ethnicity has been underexplored and because findings related to gender have been mixed, exploratory analyses are indicated.

Specific Aim 4. The fourth aim was to explore potential moderators of the relationship between the perceptions of patient-provider communication about decisions and patient outcomes. Specific moderators of interest include: gender, race/ethnicity, age, continuity of care with the same provider, and reported interest in treatment-decision engagement. Because patient perceptions of SDM and engagement accounted for the most variability in patient outcomes based on results from aim 2, patient perceptions were used as the predictor variables for this aim. Given the mixed findings in research that explored the relationships between SDM and gender, no predictions were made about how gender would moderate the relationship between patient perceptions of SDM/engagement and patient outcomes. Similarly, because researchers have not directly studied race/ethnicity as a moderating factor, no specific predictions were made. Based on previous research, it was predicted that patient perceived SDM/engagement matters more for younger patients than for older patients. Specifically, there were will be a greater positive relationship between perceived SDM/engagement and outcomes for younger patients than for older patients. It is predicted that patients with greater continuity of care will report better outcomes associated with patient perceived SDM/engagement than patients will less continuity. Finally, it is predicted that

individuals who express preference for engagement in treatment decisions will experience more benefit from perceptions of being engaged in SDM.

Methods

Data

The data used for the present study, a secondary-data analysis, was previously collected and all data were de-identified. The data were stored in REDCap, a secure web application for building and managing online databases. The data collection was not a part of the current protocol, and details regarding the collection of data can be found elsewhere (see clinicaltrails.gov, "The Effectiveness of a Decision-Support Tool for Adult Consumers with Mental Health Needs and Their Care Managers").

Participants

Clients were recruited from the existing clientele of four CMH treatment facilities (two in urban California settings and two in rural New Mexico settings), characterized by their long-standing commitment to serving adults with chronic and serious mental illness. Participants had to be over the age of 18, actively participating in CMH services for a serious mental health need, able to provide informed consent, proficient in the languages in which the intervention was offered (i.e., English, Spanish, and Chinese), and not primarily suffering from active substance abuse.

In total, participants included 240 individuals (60 at each rural and urban, intervention and control site) with an overall mean age of 61.6 (SD=15.0; range=26-97). The sample was comprised of approximately half female and half male (46.4% male, 53.2% female, .4% transgender) participants, and racial/ethnic background included 54.9% White, 25.7% Hispanic, 8.9% Asian or Pacific Islander, 6.8% Black, 0.8% Native American or Alaskan Native, 0.4% Mixed race, and 2.5% Other or Unknown. At baseline there were 240 participants, at six months 200 participants engaged in the research check-

in, at 12 months 177 participants engaged, at 18 months 164 participants engaged, and at 24 months 149 participants engaged. However, engaging in the research check-in does not indicate that each measure was completed. In addition, providers were also invited to complete a study measures for each of their clients enrolled in the study at each time point. There were times when providers did not complete the research measures used in this study, which also limited this writer's ability to calculate difference scores using SDM and patient engagement data. The sample size completing each measure used in this study is presented in Table 1 in the results section.

Study design

With four clinical sites total, two were in an urban setting, and two were in rural settings. One site from each setting was randomly selected to be the intervention site and the other site was designated the control site, creating a 4 x 4 research design, with 60 clients at each site. Case managers at the intervention sites were trained in mPOWR, and the control sites were instructed to continue treatment as usual (TAU). The participants and their respective providers were followed over 24 months between December of 2013 and April of 2016, with patient and provider perceptions of patient outcomes and clinical communication assessed at baseline and at six month follow ups. Outcomes of interest included: perception that SDM occurred, perception of communication style, engagement in decision making and treatment planning, patient preferences for treatment engagement, decision satisfaction, perceptions of working alliance, perceptions of well-being, perceptions of functionality via mental and physical health, and perceptions of social and personal well-being. The degree to which patients and providers engaged in SDM was

measured via patient and provider self-report on two separate measures, one that was developed to measure SDM and one that measures patient engagement.

Measures

Demographic information related to gender, race/ethnicity, employment status, marital status, and active diagnoses and medications was collected via patient chart review. In addition, patient and providers also reported on the following treatment outcomes assessed over the course of the two-year study. It is noted that many of the measures were adapted based on stakeholder feedback; however, the original versions of the scales were used at baseline data collection before feedback was obtained. The measure used at six, 12, 18, and 24 month follow ups is included in Appendix A.

Measure modification. Measures were altered through a deliberate process guided by feedback from the research advisory board and participant feedback. During the baseline administration of the research measures, participants provided the feedback that they felt they were being asked to repeatedly answer the same questions and expressed frustration. These were primarily duplicative questions that were included as validation items in the measures. In addition, the peer advisors and research advisory board felt very strongly that it was neither respectful nor user friendly to include these repetitive questions. With this consistent feedback, the duplicative questions were removed. In addition, advice was given to the research assistants who were administering the questionnaires to patient participants about being clearer when asking questions and writing down answers for those who wanted to respond verbally in addition to responding using the Likert scale.

There were also several revisions to questions. For example, the patient engagement measure included questions about whether participants thought they should be involved in treatment planning and if they were interested in being engaged in treatment planning. Participant feedback and feedback from the research advisory board suggested that these questions presumed that individuals were not currently involved in treatment planning. Thus, it was suggested that questions should be revised to provide participants with the option to state their current level of engagement in treatment planning and how difficult they felt it was to engage in treatment planning. Thus, three items were revised to the following: (1) "I am very engaged in my treatment planning;" and (2) "It is hard to engage in my treatment planning."

Patient engagement. Patient engagement was measured utilizing a 19-item measure of communication patterns between providers and their clients (Campbell et al., 2007). A modified version of the scale that used 13 items was administered at six, 12, 18, and 24 month follows ups. The scale focused on the patients' perceptions of how engaged they were in treatment. Items were measured on a seven-point Likert scale (strongly agree, agree, agree somewhat, undecided, disagree somewhat, disagree, strongly disagree). Example items included "My provider checks to be sure that I understand everything" and "My provider involves me in decisions as much as I want." Campbell et al. (2007) found a Cronbach's alpha value of 0.69 for the client version of the questionnaire, indicating adequate internal consistency. In the current study, the 13-item version demonstrated a Cronbach's alpha of 0.86 at baseline. For analyses in this study, the last two items from the 13-item version were not included in the scale score because they addressed qualitatively different questions regarding how much patients were in

engaging in treatment planning and how hard they felt it would be to engage. When the reliability analysis was run with just the 11 items, Cronbach's alpha was 0.91 at each time point. Finally, reliability analyses for this measure were run with patient and provider data separated to determine if reliability was still adequate within each group. This was done because difference scores between patients and providers were created using this measure. Cronbach's alpha of the 11 items when only including patient data ranged from 0.92 to 0.95 across time points, and Cronbach's alpha of the 11 items when only including provider data ranged from 0.84 to 0.89 across time points. Because these scores were above 0.80, reliability of the difference scores between these groups was controlled at a reasonable level.

Shared decision-making. The Shared Decision Making Questionnaire (SDM-Q-9; Kriston et al., 2010) was utilized to assess patient perceptions about the degree to which their provider involved them in understanding treatment options and in actually making a treatment decision. The original scale included nine-items, but a modified six-item version was used at six, 12, 18, and 24 month follow ups based on stakeholder feedback. Example items included "My provider discussed the advantages and disadvantages of options and strategies" and "My provider helped me understand all the information." Items were measured on a six-point Likert scale (completely disagree, strongly disagree, somewhat disagree, somewhat agree, strongly agree, and completely agree). Previous research indicated internal consistency of 0.94, and the current study showed that SDM-Q-9 items had a Cronbach's alpha of 0.94 at baseline. Reliability of the six-item version in this study ranged from .085 to 0.93 across time points. Reliability analyses for this measure were also run with patient and provider data separated to

determine if reliability was still adequate within each group. This was done because difference scores between patients and providers were created using this measure. Cronbach's alpha of the six-item measure when only patient data were included ranged from 0.88 to 0.94 across time points. Cronbach's alpha ranged from 0.84 to 0.94 across time points when only provider data were included. Because these scores were above 0.80, reliability of the difference scores between these groups will be controlled at a reasonable level.

Decision satisfaction. The Satisfaction with Decision scale included six questions to measure a client's sense of having made a reasonable decision, without specificity regarding the type of decision (Wills & Holmes-Rover, 2003). The original version of the Satisfaction with Decision scale was developed to specifically address decisions regarding treatment for depression. A slightly modified five-item version was used at six, 12, 18, and 24 month follow ups. The five items were assessed on a five-point Likert scale (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree), and included questions such as "I have as much input as I want in developing ways to address my situation(s)" and "I am satisfied with the decisions we are making about my situation(s)." Previous research found a Cronbach's alpha of 0.85 for the Satisfaction with Decision scale; in the current sample, internal consistency analyses indicated a Cronbach's alpha of 0.84 both the six-item scale at baseline. Cronbach's alpha for the five item modified version ranged from 0.78 to 0.84 across time points.

Perceived therapeutic support: Working alliance. The Working Alliance Inventory measures the perception of therapeutic alliance in a clinical dyad during the process of developing a relationship required for effective psychotherapy (Hanson, Curry,

& Bandalos, 2002; Horvath & Greenberg, 1989). The current study utilized the client version of the Working Alliance Inventory, which has previously demonstrated a Cronbach's alpha of 0.93. The original scale included 12 items, which was used at baseline, and a modified version, which included seven items, was used at six, 12, 18, and 24 month follows ups. Items were measured on a seven-point scale (never, rarely, occasionally, sometimes, often, very often, always). Example items included "I am confident in my provider's ability to help me" and "My provider and I trust one another." The current study showed Cronbach's alphas of 0.92 for the 12-item version at baseline, and Cronbach's alpha ranged from 0.85 to 0.89 for the seven-item scale across time points.

Treatment progress and well-being. The Outcome Rating Scale (ORS) was utilized as a repeated measure of general therapy outcomes and quality of life changes during the course of therapy (Miller et al., 2003). Four visual analog scales (a horizontal line on which the participants marked how well they were doing within the last week from low to high) assessed patient perceptions of how they were doing in the following areas: general well-being, personal well-being, close relationships, and work/school/friend relationships. Physical marks for each of the four domains on the visual analog scales were measured by a research team member with a standard ruler and converted to a score from 0 to 100. The four items were then averaged for an overall therapy outcome score. ORS items in the current sample indicated a Cronbach's alpha that ranged from 0.83 to 0.92 across time points.

Client functionality: Mental and physical health. The SF-12 (Health Survey Short Form-12) was utilized to assess physical and mental aspects of health and the

patients' sense of well-being (Ware, Kosinski, & Keller, 1996). The SF-12 consists of 12 questions that asked about overall health, limitations due to health conditions, physical health, emotional well-being, and participation in daily activities over the past four weeks. The SF-12 has been applied in many countries (and languages), across multiple physical and mental health conditions, and with adults of all ages (Gill et al., 2007). The breadth of application has been validated to ensure the appropriateness of its use in measuring change in outcomes for a group of clients with chronic mental illness. Instructions were followed to create physical and mental health composite scores by weighting each of the 12 items differently for each score (Ware, Kosinski, & Keller, 1995). Previous research demonstrated Cronbach's alpha coefficients ranged between 0.72 and0 .89 (Resnick & Parker, 2001). In the current study, Chronbach's alpha of the SF-12 ranged from 0.89 to 0.91 across time points.

Statistical Analyses

All of the analyses were conducted using SPSS Version 23 (IBM Corp, 2015) and Mplus version 7.3 (Muthén & Muthén, 2012). Descriptive statistics were calculated for demographic variables. An alpha level of $p < .05$ and 95% confidence intervals were used as the test for statistical significance. Missing data were accommodated using maximum likelihood estimation.

Specific Aim 1. The first aim was to determine the level of agreement between patients and providers about their dyadic communication using four different methods. Each of these methods was used for both the SDM measure and the patient engagement measure. They were also used at each time point separately and overall. First, agreement at the group level was addressed using the Wilcoxon Signed-Rank test to compare

perceptions of communication as assessed by patients and providers. Second, difference scores for each measure (difference score = patient scale score – provider scale score) were calculated to examine the distribution of the level of agreement between patients and providers about their communication. Difference scores were grouped into the following categories: (1) Scores greater than or equal to ± 3; (2) Scores greater than or equal ± 2 and less than 3; (3) Scores greater than or equal ± 1 and less than 2; and (4) Scores less than +1 and greater than -1.

Third, as a measure of agreement at the individual level, intraclass correlation coefficients (ICCs) were computed using a two-way mixed effect model and an absolute agreement definition. ICCs are reported with 95 percent confidence intervals and serve as indicators of chance-corrected agreement at the individual level (Lee, Kohn, & Ong, 1989). Agreement was interpreted as follows: ≤ 0.50 is poor to fair agreement; 0.5-0.75 is moderate agreement, 0.75-0.90 is good agreement, and 0.9-1.00 is excellent agreement (Koo & Li, 2016). Fourth, data were examined visually by plotting the differences between patient and provider scores (difference score = patient scale score – provider scale score) against their means (mean = (patient score + provider score) / 2) in Bland-Altman plots. These plots are useful for evaluating whether there is any systematic difference between the perspectives or whether the degree of random variation changes with the mean value (Bland & Altman, 1986).

Specific Aim 2. The second aim was to statistically examine the conceptual model proposed by Shay and Lafta (2015). Longitudinal mediation using parallel growth processes was used first to test this conceptual model in Mplus version 7.3 (Muthén & Muthén, 2012). *A priori* criteria for acceptable model fit were defined by Comparative Fit

Index (CFI; Bentler, 1990) greater than 0.95 (Hu & Bentler, 1999), Root Mean Square Error of Approximation (RMSEA; Browne & Cudeck, 1993) less than 0.01, 0.05, and 0.08 to indicate excellent, good, and mediocre but adequate fit, respectively (MacCallum, Browne, & Sugawara, 1996), and non-significant chi-square.

First, longitudinal growth curve (LGC) modeling was used to determine the model that provided the best fit for the pattern of data across time for each variable (i.e., SDM, patient engagement, decision satisfaction, working alliance, physical health, mental health, and well-being). In addition to modeling patient perceptions on each of these variables, provider perceptions of and patient-provider agreement around SDM and patient engagement were also modeled. For this aim, patient and provider agreement was modeled using the difference scores calculated in aim one. All variables were treated as observed variables by utilizing composite scores from each of the scales.

Next, longitudinal parallel process growth curve modeling was utilized, which permitted exploration of if and how these variables changed together across time; thus, these models accounted for multivariate change. The best fitting models for each variable from the LGC analyses were used to guide the model specification for the parallel process analyses.

Due to the findings from the longitudinal parallel growth curve models, mediation models were run in Mplus (Muthén & Muthén, 2012). In the final models, baseline SDM and patient engagement predicted patient perceived mental health, physical health, and well-being at 12 months. This relationship was mediated by patient perceived decision satisfaction and working alliance at six months. The mediation models were first run

without controlling for each variable at other time points, and the models were re-run with all of the controlling variables present (Figure 3).

Perceptions of SDM and patient engagement were measured and modeled in three separate ways: (1) patient perceptions; (2) provider perceptions; and (3) patient-provider

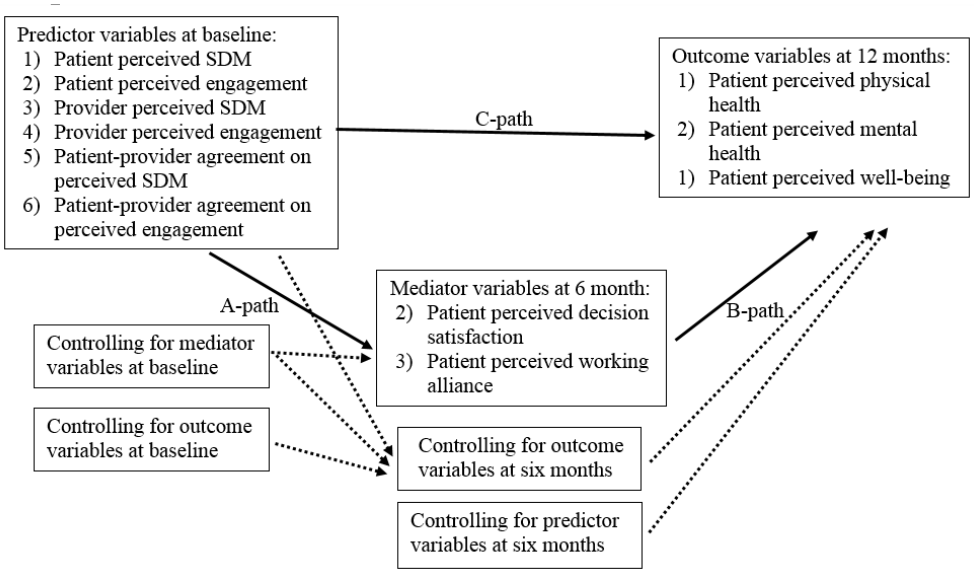

Figure 3. Mediation model, controlling for each variable at each time point included in model. Solid lines indicate the A, B, and C-paths, as noted, and the dashed lines indicate regressions on control variables.

agreement (via difference scores). To do direct statistical comparison, the models would need to be nested, meaning that they would all need to be composed of the same variables. Because this was not the case, direct statistical comparison was not possible; instead, differences in variance in patient outcomes accounted for were explored to determine if one model provided more predictive value relative to the others.

Specific Aim 3. The third aim was to determine if patient demographics were associated with patient interest in engaging in treatment planning. Demographics of interest include race/ethnicity, age, and gender. All analyses were conducted in SPSS Version 23 (IBM Corp, 2015) to determine if certain patient demographics were

associated with greater interest in engagement in treatment decisions at baseline. An analysis of variance (ANOVA) test was used to test the association between patient preference and race/ethnicity because race/ethnicity is categorical. A bivariate correlation was used to test the association between age and patient interest because age is continuous. An independent samples *t*-test was used to test the association between gender and patient interest because gender is binary. All analyses were conducted using baseline data.

Specific Aim 4. The fourth aim was to explore potential moderators of the relationship between the perception of communication and patient outcomes. Specific moderators of interest include: race/ethnicity, age, gender, continuity of care with the same provider, and patient reported interest in treatment decision engagement. Race/ethnicity was a categorical variable, gender was dichotomous, and age was continuous. Continuity of care was measured by provider turnover, which was a dichotomous variable where each patient either had the same provider or the patient experienced at least one change in providers over the course of the study. Interest in treatment decision engagement was a continuous variable. These moderators were added to the set of mediation models that accounted for the most patient variability in outcomes, which were the models with patient perceived SDM/engagement as the predicting variables. None of the fully controlled mediation models reached statistical significance; however, the models with patient perceptions as the predicting variables accounted for the most variance in outcomes, so the moderating variables were added to these models.

Results

Descriptive Data and Correlations

Table 1 contains the mean, standard deviation, and sample size for each measure used in the study. In general, patient perceptions of SDM/engagement were lower than provider perceptions. More specific patterns of changes in variable means across time were explored and described in detail for aim 2.

Table 1. *Descriptive Statistics for all Study Variables*

	Time points, Mean (Standard Deviation)				
	Baseline	6 months	12 months	18 months	12 months
SDM [pa]	4.78 (1.13) *n*=158	4.92 (0.89) *n*=150	5.12 (0.91) *n*=130	5.14 (0.80) *n*=111	4.91 (0.92) *n*=111
SDM [pr]	4.63 (0.86) *n*=203	4.63 (0.86) *n*=194	4.80 (0.71) *n*=193	4.79 (0.69) *n*=156	4.67 (0.91) *n*=130
SDM [d]	-0.01 (1.37) *n*=135	0.28 (1.05) *n*=129	0.32 (1.16) *n*=119	0.29 (0.93) *n*=94	0.29 (1.21) *n*=92
Patient Engagement [pa]	6.27(0.76) *n*=238	6.36 (0.75) *n*=200	6.39 (0.72) *n*=174	6.42 (0.73) *n*=162	6.23 (0.77) *n*=149
Patient Engagement [pr]	6.36 (0.67) *n*=224	6.27 (0.47) *n*=208	6.35 (0.47) *n*=210	6.24 (0.49) *n*=176	6.18 (0.51) *n*=148
Patient Engagement [d]	-0.09 (1.05) *n*=223	0.06 (0.81) *n*=187	0.04 (0.82) *n*=172	0.15 (0.75) *n*=157	0.09 (0.84) *n*=134
Decision Satisfaction [pa]	4.30 (0.62) *n*=219	4.27 (0.58) *n*=197	4.26 (0.60) *n*=175	4.28 (0.60) *n*=159	4.06 (0.63) *n*=149
Working Alliance [pa]	5.92 (1.02) *n*=233	6.03 (0.97) *n*=198	5.97 (1.04) *n*=173	5.88 (0.93) *n*=160	5.78 (1.13) *n*=146
Physical Health [pa]	37.73 (11.08) *n*= 218	36.69 (11.85) *n*=194	35.87 (11.66) *n*=170	36.22 (10.99) *n*=160	36.10 (11.09) *n*=136
Mental Health [pa]	38.90 (13.57) *n*=218	39.69 (12.99) *n*=194	38.82 (13.35) *n*=170	40.40 (13.64) *n*=160	38.18 (12.23) *n*=136
Well-being [pa]	56.23 (25.95) *n*=238	55.82 (26.59) *n*=199	56.41 (26.44) *n*=177	58.52 (25.19) *n*=164	55.53 (27.37) *n*=147

[pa] indicates that the data are from the patient perspective
[pr] indicates that data are from the provider perspective
[d] indicates that data are a difference score (patient scale score-provider scale score)

Table 2 displays the zero-order correlations for providers between the following variables at baseline: (1) SDM; (2) patient engagement with provider; (3) decision satisfaction; (4) working alliance; (5) physical health; (6) mental health; (7) well-being (via the ORS). All variables were significantly and positively correlated with all other variables except for physical health, which was not correlated with any variables save for well-being, and mental health and well-being were not significantly correlated with engagement. Physical health was also not significantly correlated with mental health. Table 3 displays the same correlations at baseline but only includes patient data. The same pattern of correlations were present for patients, except well-being was significantly correlated with engagement and mental health was significantly correlated with physical health. In addition, patient data tended to be more strongly correlated than provider data.

Table 2. *Zero-Order Correlations of Variables at Baseline for Providers*

	1	2	3	4	5	6	7
1. Shared Decision Making	-						
2. Engagement	.458**	-					
3. Decision Satisfaction	.484**	.487**	-				
4. Working Alliance	.495**	.407**	.634**	-			
5. Physical Health	.110	.052	.112	.061	-		
6. Mental Health	.149*	.081	.284**	.247**	.038	-	
7. Well-being	.113*	.073	.332**	.271**	.258**	.527**	-

**Correlation is significant at alpha level 0.01.
*Correlation is significant at alpha level 0.05.

Table 3. *Zero-Order Correlations of Variables at Baseline for Patients*

	1	2	3	4	5	6	7
1. Shared Decision Making	-						
2. Engagement	.579**	-					
3. Decision Satisfaction	.585**	.476**	-				
4. Working Alliance	.565**	.588**	.588**	-			
5. Physical Health	.041	.032	.108	.055	-		
6. Mental Health	.178*	.065	.299**	.207**	.257**	-	
7. Well-being	.277*	.259**	.335**	.343**	.392**	.345**	-

**Correlation is significant at alpha level 0.01.
*Correlation is significant at alpha level 0.05.

Table 4 displays the zero-order correlations between the following variables across the following time points for patient perceptions: (1) baseline SDM; (2) baseline engagement; (3) six month follow-up decision satisfaction; (4) six month follow-up working alliance; (5) 12 month follow-up physical health; (6) 12 month follow-up mental health; (7) 12 month follow-up well-being. Baseline SDM and engagement were significantly and positively related to each other and to decision satisfaction and working alliance at six months, but they were not significantly related to physical, mental health, or well-being at 12 months. Working alliance and decision satisfaction at six months were significantly and positively related to each other and to mental health and well-being at 12 months, but not to physical health at 12 months. Well-being at 12 months was significantly related to mental health and physical health at 12 months, but mental and physical health were not significantly related to each other.

Table 4. *Zero-Order Correlations of Variable Across One Year for Patients*

	1	2	3	4	5	6	7
1. SDM (baseline)	-						
2. Engagement (baseline)	.579**	-					
3. Decision Satisfaction (6 months)	.399**	.286**	-				
4. Working Alliance (6 months)	.399**	.363**	.728**	-			
5. Physical Health (12 months)	.024	-.011	.021	.031	-		
6. Mental Health (12 months)	.036	-.046	.273**	.199*	-.008	-	
7. Well-being (12 months)	.148	.066	.273**	.306**	.218**	.658**	-

**Correlation is significant at alpha level 0.01.
*Correlation is significant at alpha level 0.05.

Table 5 displays the zero-order bivariate correlations between the following variables across the following time points for: (1) baseline provider perceptions of SDM; (2) baseline provider perceptions of engagement; (3) six month follow-up patient perceptions of decision satisfaction; (4) six month follow-up patient perceptions of working alliance; (5) 12 month follow-up patient perceptions of physical health; (6) 12

Table 5. *Zero-Order Correlations of Variable Across One Year for Provider Perceptions of SDM and Engagement at Baseline Predicting Patient Perceived Outcomes at Six and Twelve Months*

	1	2	3	4	5	6	7
1. Provider SDM (baseline)	-						
2. Provider Engagement (baseline)	.458**	-					
3. Decision Satisfaction (6 months)	.009	.057	-				
4. Working Alliance (6 months)	.019	.093	.707**	-			
5. Physical Health (12 months)	-.097	-.092	.010	.062	-		
6. Mental Health (12 months)	.048	.070	.306**	.184*	-.008	-	
7. Well-being (12 months)	.042	.064	.273**	.353**	.218**	.658**	-

**Correlation is significant at alpha level 0.01.
*Correlation is significant at alpha level 0.05.

month follow-up patient perceptions of mental health; (7) 12 month follow-up patient perceptions of well-being. Provider perceptions of SDM and engagement were significantly and positively correlated, but they were not significantly correlated with any other variables. All other correlations are the same as those described in Table 4.

Table 6 displays the zero-order correlations between the following variables across the following time points for: (1) baseline patient-provider agreement about SDM; (2) baseline patient-provider agreement about engagement; (3) six month follow-up patient perceptions of decision satisfaction; (4) six month follow-up patient perceptions of working alliance; (5) 12 month follow-up patient perceptions of physical health; (6) 12 month follow-up patient perceptions of mental health; (7) 12 month follow-up patient perceptions of well-being. Patient-provider agreement about SDM and engagement were significantly and positively correlated. They were also significantly and positively correlated with patient perceptions of working alliance and patient perceptions of decision satisfaction. All other correlations were the same as those described in Table 4.

In summary, at baseline, most variables were significantly and positively correlated with each other. Exceptions included physical health, which was only correlated with well-being for providers and with both well-being and mental health for

Table 6. *Zero-Order Correlations of Variables Across One Year for Patient-Provider Agreement about Perceptions of SDM and Engagement at Baseline and with Patient Perceived Outcomes at Six and Twelve Months*

	1	2	3	4	5	6	7
1. SDM agreement (baseline)	-						
2. Engagement agreement (baseline)	.510**	-					
3. Decision Satisfaction (6 months)	.235**	.198**	-				
4. Working Alliance (6 months)	.277**	.232**	.728**	-			
5. Physical Health (12 months)	.007	.046	.021	.031	-		
6. Mental Health (12 months)	-.001	-.100	.273**	.199*	-.008	-	
7. Well-being (12 months)	.017	.003	.273**	.306**	.218**	.658**	-

**Correlation is significant at alpha level 0.01.
*Correlation is significant at alpha level 0.05.

patients. In addition, engagement was not correlated with physical health, mental health, or well-being for providers, and it was not correlated with mental or physical health for patients. When examining correlation patterns across time, patient perceptions of and patient-provider agreement around SDM/engagement at baseline were significantly and positively related to patient perceptions of working alliance and decision satisfaction at six months. However, provider perceptions of SDM/engagement at baseline were not significantly correlated with patient perceived working alliance or decision making at six months. Patient perceived working alliance and decision making at six months were significantly and positively related to patient perceived mental health and well-being at 12 months, but not to physical health.

Aim 1

The first aim was to determine the level of agreement between patients and providers about their dyadic communication and decision-making.

Wilcoxon Signed-Rank test. Results from the Wilcoxon Signed-Rank test revealed that, at the group level, providers reported lower perceived shared decision-making than

Table 7. *Perceived shared decision-making and patient engagement by patient and providers*

			Mean (SD)	Wilcoxon signed-rank test[a]	*p*
Shared Decision-Making	Overall	**Patient**	**4.963 (0.955)**	-6.532	<0.001
		Provider	4.721 (0.751)		
	Baseline	**Patient**	**4.782 (1.130)**	-1.009	0.313
		Provider	4.634 (0.860)		
	6 month follow up	**Patient**	**4.923 (0.893)**	-4.341	<0.001
		Provider	4.710 (0.563)		
	12 month follow up	**Patient**	**5.121 (0.910)**	-3.664	<0.001
		Provider	4.802 (0.713)		
	18 month follow up	**Patient**	**5.140 (0.804)**	-3.466	0.001
		Provider	4.794 (0.690)		
	24 month follow up	**Patient**	**4.912 (0.916)**	-2.447	0.014
		Provider	4.670 (0.910)		
Patient Engagement	Overall	**Patient**	**6.332 (0.749)**	-3.877	<0.001
		Provider	6.290 (0.535)		
	Baseline	**Patient**	**6.270 (0.760)**	-0.900	0.368
		Provider	6.356 (0.670)		
	6 month follow up	**Patient**	**6.360 (0.752)**	-2.514	0.012
		Provider	6.272 (0.472)		
	12 month follow up	**Patient**	**6.394 (0.720)**	-1.793	0.073
		Provider	6.350 (0.471)		
	18 month follow up	**Patient**	**6.417 (0.727)**	-3.974	<0.001
		Provider	6.245 (0.489)		
	24 month follow up	**Patient**	**6.228 (0.770)**	-2.306	0.021
		Provider	6.182 (0.509)		

[a] Wilcoxon signed-rank test calculations are based on ranking of the differences found by subtracting the providers' scale scores from the patients' scale scores.

patients at each time point and overall, except for baseline (Table 7). The differences were statistically significant at 6 month follow-up ($p<0.001$), 12 month follow-up ($p<0.001$), 18 month follow-up ($p=0.001$), 24 month follow-up ($p=0.014$), and overall ($p<0.001$). The difference was not significant at baseline ($p=0.313$). Similarly, provider perceptions of patient engagement were, on average, lower than patient perceptions at all time points and overall, except for baseline and 12 month follow-up (Table 7). The differences were significant at 6 month follow-up ($p=0.012$), 18 month follow-up ($p<0.001$), 24 month follow-up ($p=0.021$), and overall ($p<0.001$). The differences were not significant at baseline ($p=0.368$) or at 12 month follow-up ($p=0.073$).

Difference Scores. Direct differences in patient-provider agreement, at the individual level, were calculated via difference scores (difference score = patient scale score – provider scale score). For both scales (i.e., SDM scale and patient engagement scale), the majority of differences scores fell between -1 and +1 (Table 8). When all time points were taken together, 61.2% and 81.8% of the differences scores fell between -1 and +1 for the SDM scale and patient engagement scale, respectively. Only 9.14% and 3.32% of the difference scores were greater than or equal to ±2 for the SDM and patient engagement scales, respectively. These overall percentages are generally representative of both scales' difference scores at each time point.

Intraclass Correlation Coefficients. At the individual level, patient-provider agreement was evaluated using intraclass correlation coefficients (ICC, Table 9). The ICCs for the SDM composite scores at each time point and overall fell at or below 0.333, indicating poor agreement between patients and providers. The highest ICC occurred at 18 months follow up (ICC=0.333), and the lowest occurred at baseline (ICC=0.042).

Table 8. Difference scores between patients and providers on measures of shared decision-making and patient engagement

		Difference Score Ranges						
		-3[a]	*-2*[b]	*-1*[c]	*0*[d]	*1*[e]	*2*[f]	*3*[g]
Shared Decision-Making	Overall	12 **2.11%**	17 **3.00%**	43 **7.56%**	111/46/191 **61.16%**	126 **22.14%**	19 **2.81%**	4 **0.70%**
	Baseline	5	8	14	28/6/37	33	3	1
	6 month follow up	3	2	8	22/9/52	31	2	0
	12 month follow up	2	2	10	22/13/35	28	6	1
	18 month follow up	1	2	2	22/9/35	19	4	0
	24 month follow up	1	3	9	17/9/32	15	4	2
Patient Engagement	Overall	14 **1.60%**	11 **1.26%**	45 **5.15%**	261/73/380 **81.79%**	85 **9.74%**	2 **0.002%**	2 **0.002%**
	Baseline	4	4	22	74/15/82	20	0	2
	6 month follow up	2	4	6	59/11/91	13	1	0
	12 month follow up	3	1	10	51/19/68	20	0	0
	18 month follow up	3	0	0	39/20/79	16	0	0
	24 month follow up	2	2	7	38/8/60	16	1	0

Difference scores = Patient scale score – Provider scale score.
[a] Difference scores ≤ -3; [b] -3 < difference scores ≤ -2; [c] -2 < difference scores ≤ -1; [d] -1 < difference scores < 0 / difference scores = 0 / 0 < difference scores < 1. ; [e] 1 ≤ difference scores < 2; [f] 2 ≤ difference scores < 3; [g] difference scores ≥ 3.

When all time points were considered together, ICC=0.170. Analysis at the item level (i.e., examining the ICC for each item rather than the composite score) demonstrated consistent findings regarding this marker of agreement.

The ICCs for the patient engagement scale all fell below 0.392, also indicating poor agreement between patients and provider. The highest ICC occurred at 18 month follow up (ICC=0.392), and the lowest occurred at baseline (ICC=-0.103). A negative ICC is not theoretically possible, so the negative ICC should be interpreted as disagreement. Again, analysis at the item level demonstrated consistent findings regarding this marker of agreement.

Table 9. Difference scores and intraclass correlation coefficients for patient-provider pairs

		N	Mean (SD)[a]	ICC[b]	*95% CI*
Shared Decision-Making	Overall	569	0.222 (1.168)	0.170	0.026, 0.294
	Baseline	135	-0.009 (1.367)	0.042	-0.350, 0.320
	6 month follow up	129	0.276 (1.164)	0.180	-0.138, 0.413
	12 month follow up	119	0.320 (1.164)	0.123	-0.230, 0.379
	18 month follow up	94	0.289 (0.934)	0.333	0.018, 0.550
	24 month follow up	92	0.287 (1.210)	0.232	-0.141, 0.486
Patient Engagement	Overall	873	0.392 (0.876)	0.192	0.078, 0.293
	Baseline	223	-0.088 (1.050)	-0.103	-0.435, 0.152
	6 month follow up	187	0.064 (0.808)	0.326	0.101, 0.494
	12 month follow up	172	0.038 (0.823)	0.125	-0.183, 0.353
	18 month follow up	157	0.147 (0.748)	0.392	0.172, 0.554
	24 month follow up	134	0.039 (0.876)	0.330	0.060, 0.523

[a] Means are based on difference scores calculated by subtracting provider scale scores from patient scale scores.
[b] Intraclass correlation coefficient, two way mixed effect model; absolute agreement definition; average measure ICC.

Bland-Altman Plots. The patient-provider difference scores (difference score = patient scale score – provider scale score) were assigned as the ordinate (y-axis) and the patient-provider means (mean = (patient score + provider score) / 2) as the abscissa (x-axis), in Bland-Altman plots (Figures 4 and 5). At all time points and for both measures, better agreement occurs as mean scores increase. The plots also reveal that, for the patient

engagement scale, at lower mean scores, providers tended to report higher patient engagement than their patients. This trend was also present for the SDM scale, but it was less pronounced.

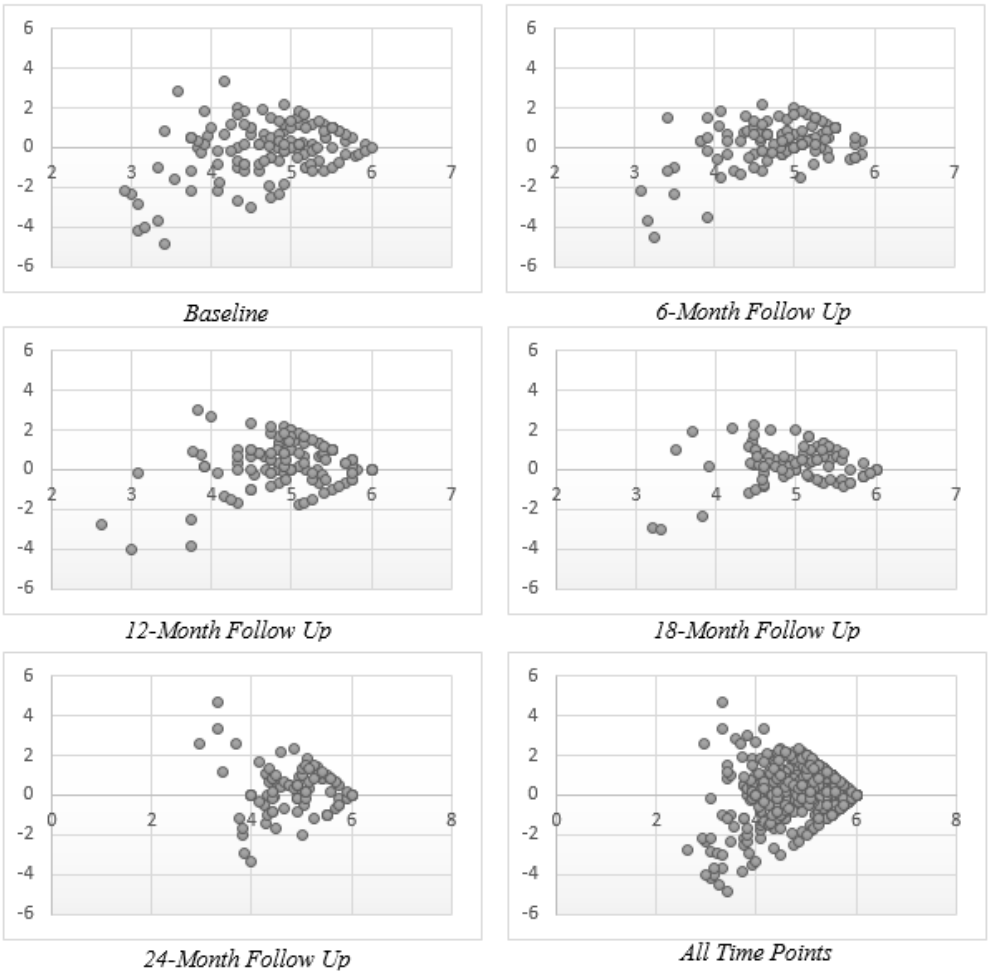

Figure 4. Bland-Altman plots for Shared Decision-Making (SDM) at each time point. The difference between patient and provider scores (y-axis, difference score = patient scale score – provider scale score) plotted against mean symptom score (x-axis). Zero on the y-axis indicates the line of equality. Markers above this line indicate patients' perceptions of SDM were higher than providers' perceptions. Markers below this line indicate the opposite.

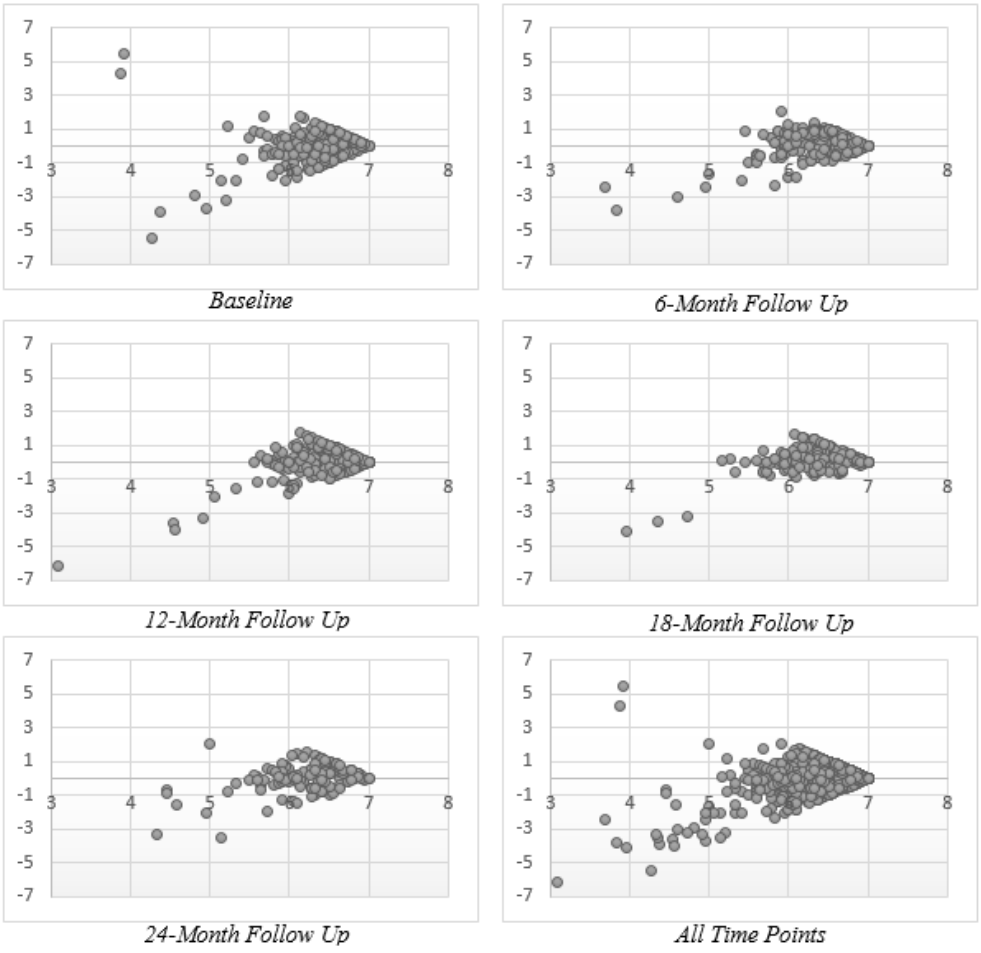

Figure 5. Bland-Altman plots for patient engagement in communication at each time point. The difference between patient and provider scores (y-axis, difference score = patient scale score – provider scale score) plotted against mean symptom score (x-axis). Zero on the y-axis indicates the line of equality. Markers above this line indicate patients' perceptions of SDM were higher than providers' perceptions. Markers below this line indicate the opposite.

Aim 2

The second aim was to examine the conceptual model of SDM proposed by Shay and Lafta (2015) using latent growth curve and mediation analyses and current study variables. The goal was to determine if patient perceptions of working alliance and decision satisfaction mediate the relationship between SDM/engagement and patient

perceptions of mental/physical health and well-being. SDM and engagement was measured using patient perceptions, provider perceptions, and patient-provider agreement.

Longitudinal growth curve modeling. Seven separate latent growth curve models were specified using the patient self-report data to determine how the following variables changed over time: 1) SDM; 2) patient engagement with provider; 3) decision satisfaction; 4) working alliance; 5) physical health; 6) mental health; 7) well-being (via the ORS). Models were re-specified using model-fit information (i.e., chi-square, RMSEA, CFI), variance of the slope and intercept, the estimated covariance matrixes, and visual inspection of the sample vs. estimated means plot. Many iterations of models were run, including models with fewer than five time points and with various model estimates constrained or freed, to find the best fitting model. However, only the best fitting model results are presented in this manuscript.

Shared decision-making. A quadratic growth model with quadratic variance constrained to zero provided the best fitting model (Table 10). The final model demonstrated mediocre but adequate fit according to *a priori* criteria. The mean of the intercept was 4.700, the mean of the slope was 0.348, the mean of the quadratic was

Table 10. *Fit Statistics for Patient Latent Growth Curve Models*

Measure	Model	Chi-Square *p*	RMSEA	CFI
Shared Decision-Making	Quadratic	0.0685	0.059	0.939
Patient Engagement	Quadratic	0.1341	0.051	0.972
Decision Satisfaction	Quadratic	0.2859	0.031	0.991
Working Alliance	Cubic	0.8515	<0.001	1.000
Physical Health	Linear	0.4056	0.013	0.999
Mental Health	Linear	0.3349	0.023	0.997
Well-being	Quadratic	0.4002	0.012	0.999

0.073, and all were significant at $p<0.001$. The mean intercept indicates that, at baseline, the mean perceived SDM score was 4.700. The variance around the mean intercept was significant at $p<0.001$. The mean of the slope (0.348, $p<0.001$) and the quadratic (-0.073, $p<0.001$), together, indicated that patient perceptions of SDM were increasing, but the change became less positive over time. The variance around the slope estimate was not significant ($p=0.120$), and the variance of the quadratic was not estimated because it was constrained to zero.

Visual inspection of the estimated versus sample means plot confirms the data follow a quadratic pattern (Figure 6). The correlation between the quadratic and intercept estimates and between the quadratic and slope estimates were not estimated because the variance of quadratic was constrained to zero. The correlation between the linear slope and intercept estimates was significant and negative ($r=-0.512$, $p=.006$), indicating that higher initial perceptions of SDM are related to less positive increases over time. Overall,

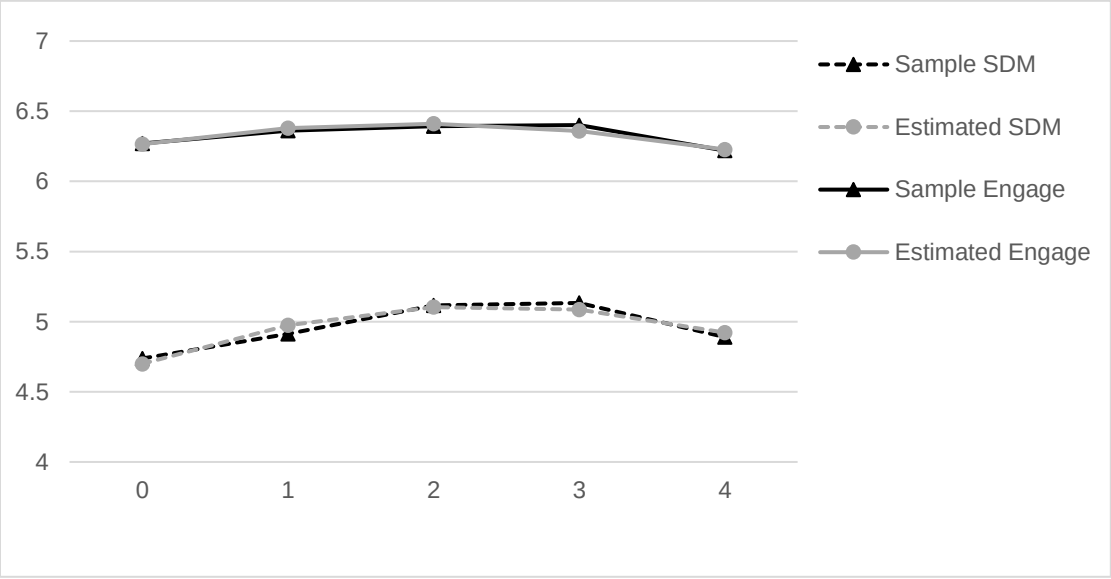

Figure 6. Sample and estimated longitudinal growth curves for patient perceptions of the Shared Decision-Making scale and the Patient Engagement scale across the five study time points (on the x-axis: 0=baseline, 1=6 months, 2=12 months, 3=18 months, 4=24 months). Scale means are represented on the y-axis.

the model suggests a pattern of change such that, on average, patients' perceptions of shared-decision making increased overtime, but that increase leveled off and began to regress to the baseline mean by 24 months.

Patient engagement. A quadratic growth model also provided the best fitting model and demonstrated good fit according to *a priori* criteria (Table 10). The mean of the intercept was 6.265 ($p<0.001$), the mean of the slope was 0.155 ($p=0.002$), and the mean of the quadratic was -0.041 ($p=0.001$), and all were significant. The mean intercept indicates that, at baseline, the mean score on patient perceived engagement was 6.265. The mean of the slope and the quadratic, together, indicate that patient perceptions of engagement were increasing, but the change became less positive over time. There was significant variance around the mean intercept ($p<0.001$), slope ($p=0.014$), and quadratic ($p=0.017$) estimates. Visual inspection of the estimated versus sample means plot confirms this pattern (Figure 6).

The correlation between the slope and intercept estimates was -0.622 ($p<0.001$), suggesting that higher baseline patient engagement is associated with less positive change in patient engagement over time. The correlation between the quadratic and the intercept estimates was 0.429 ($p=0.013$), suggesting that higher baseline patient engagement was associated with more quadratic change. The correlation between the slope and the quadratic estimates was -0.897 ($p<0.001$), suggesting that as the steepness of the positive slope increased, the more negative the quadratic effect was over time. Overall, the model suggests a pattern of change such that, on average, patients' perceptions of engagement increased over time, but that increase leveled off and regressed to the baseline mean by 24 months. This demonstrates the same pattern of change as SDM.

Decision Satisfaction. The quadratic model provided the best model fit and demonstrated good overall fit according to *a priori* criteria (Table 10). The mean of the intercept was 4.271 ($p<0.001$), which indicates that the mean of patient decision satisfaction was 4.271 at baseline. The mean of the slope was 0.052 ($p=0.190$), suggesting a non-significant positive increase over time, and the mean of the quadratic was -0.025 ($p=0.008$). The significant and negative quadratic indicated that, over time, the slope became less positive. The variance of the intercept was significant ($p=0.001$), but the variance around the slope ($p=0.317$) and quadratic ($p=0.541$) were not significant.

Visual inspection of the estimated versus sample means plot shows that decision satisfaction remained essentially the same over the first four time points, hence the non-significant slope, and decision satisfaction decreases slightly at the final time point at 24 months (Figure 7). The correlations between the slope and intercept estimates ($r=-0.423$, $p=0.141$) and between the quadratic and intercept estimates ($r=0.132$, $p=0.786$) were not

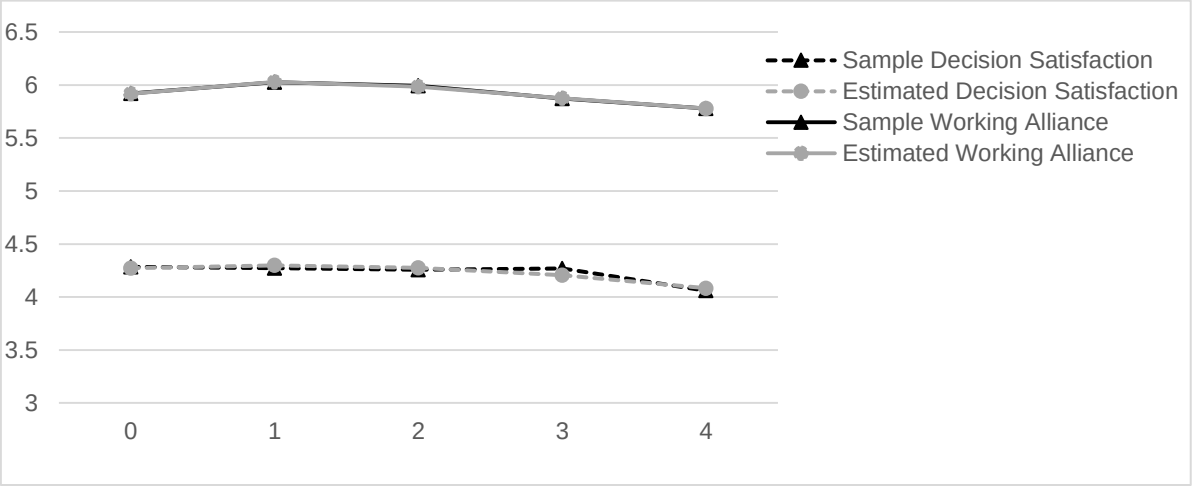

Figure 7. Sample and estimated longitudinal growth curves for patient perceptions of the Decision Satisfaction scale and the Working Alliance scale across the five study time points (on the x-axis: 0=baseline, 1=6 months, 2=12 months, 3=18 months, 4=24 months). Scale means are represented on the y-axis.

significant. The correlation between the slope and quadratic estimates (r=-0.794, p<0.001) suggested that as the steepness of the positive slope increases, the larger the negative quadratic effect was over time. However, this needs to be interpreted in the context of a non-significant slope estimate. Overall, the model suggests a pattern of change such that, on average, patients' decision satisfaction remains stable from baseline to 18 months followed with a slight decrease at 24 months follow up.

Working Alliance. The cubic growth model provided the best model fit and demonstrated excellent fit per *a priori* specifications (Table 10). The means of the intercept was 5.918 (p<0.001), indicating that the mean of the patient perceived working alliance was 5.918 at baseline. The mean of the slope (0.214, p=0.133), quadratic (-0.118, p=0.183), and cubic (0.014, p=0.331) were all non-significant. This indicates that, on average, there was no significant change in patient perceived working alliance across time. The variance around the intercept mean was not significant (p=0.175), but the variances around the slope, quadratic, and cubic mean estimates were all significant at p=0.036, 0.001, and 0.002, respectively. Visual inspection of the estimated versus sample means plot confirms this pattern (Figure 7). Because none of the mean growth estimates were significant, the correlations between the change estimates were not interpreted. The correlations between the intercept and growth estimates were all non-significant.

Physical Health. The linear growth model demonstrated good and close to excellent fit per the *a priori* criteria (Table 10). Visual inspection of the sample verses estimated means plot suggested a linear pattern of data across the five time points (Figure 8); thus, it was selected as the final modal. The mean of the intercept was 37.463, indicating that the mean patient perceived physical health at baseline was 37.463. The

mean of the slope was -0.441 (p=0.021), suggesting a slight, but significant linear decrease in patient perceived physical health across the five time points. The variances around the means of the intercept and slope were significant at p<0.001 and p=0.021, respectively. The correlation between slope and intercept estimates was -0.401 (p<0.001), which indicates that patients with higher baseline means of perceived physical health have greater decreases (i.e., more negative slope) across time points.

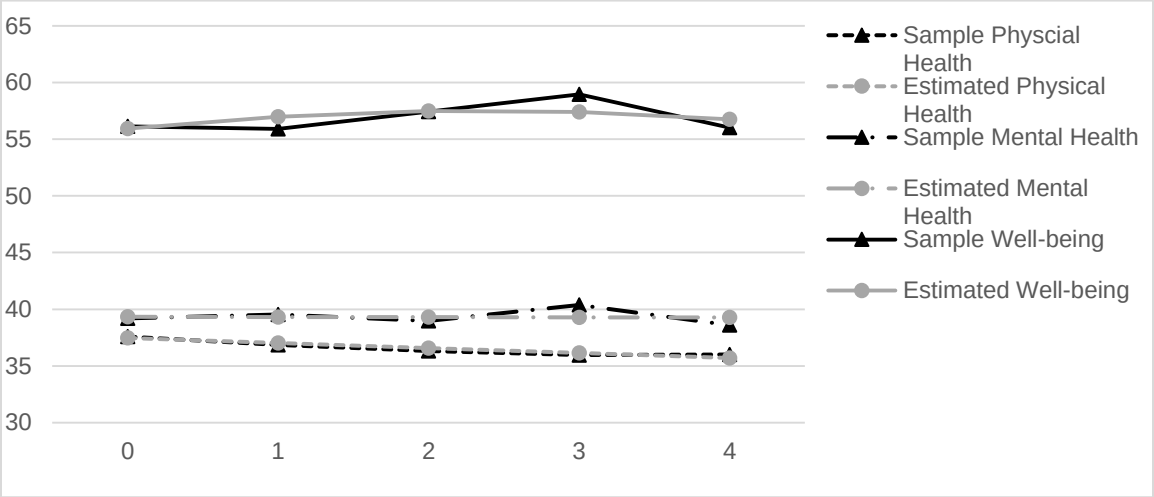

Figure 8. Sample and estimated longitudinal growth curves for patient perceptions of physical and mental health and well-being across the five study time points (on the x-axis: 0=baseline, 1=6 months, 2=12 months, 3=18 months, 4=24 months). Scale means are represented on the y-axis.

Mental Health. The linear growth model demonstrated good model fit per the *a priori* criteria (Table 10). Visual inspection of the sample verses estimated means plot suggested a linear pattern of data across the five time points (Figure 8); thus, it was selected as the final modal. The mean of the intercept was 39.336, indicating that the mean patient perceived physical health at baseline was 39.336. The mean of the slope was -0.015 (p=0.0948), suggesting a slight and non-significant decrease, on average, in patient perceived mental health from baseline to 24 months follow up. The variance around the intercept mean was significant (p<0.001), and the variance around the slope

mean was not was significant (p=0.188). The correlation between slope and intercept estimates was -0.561 (p<0.001), which indicates that patients with higher baseline means of perceived mental health have greater decreases (i.e., more negative slope) in patient perceived mental health across time points; however, it is important to note that the slope estimate is not significant.

Well-being. The quadratic growth model provided the best model fit and demonstrated nearly excellent fit per the *a priori* specifications (Table 10). The mean of the intercept was 55.933, indicating that the average patient perception of well-being was 55.933 at baseline. The mean of the slope was 1.345 (p=0.376) and the mean of the quadratic was -0.284 (p=0.459), and neither were significant, suggesting a non-significant pattern of negative quadratic change over time. The variance around all of the means was significant (p<0.001). Visual inspection of the estimated versus sample means plot confirms this pattern (Figure 8).

The correlation between slope and intercept was -0.510 was significant (p<0.001), which indicated that the higher the patient's perception of well-being was at baseline, the greater this perception decreased over the time points. The correlation between the quadratic and the intercept was significant (r=0.418, p=0.014), suggesting that higher baseline well-being was associated with more positive quadratic change over time. Because none of the mean growth estimates were significant, the correlations between the change estimates were not interpreted.

Provider perceptions. Part of Aim 2 was to determine if provider perceptions or patient perceptions of decision engagement serve as a better predictor of patient outcomes

across time. In order to explore this, the growth curves of providers' perceptions of shared decision making and engagement in decision making were examined across the five time points.

Table 11. *Fit Statistics for Provider Latent Growth Curve Models*

Measure	Model	Chi-Square *p*	RMSEA	CFI	Comment
Shared Decision-Making	Quadratic	0.0027	0.087	0.917	Quadratic variance constrained to zero
Patient Engagement	Linear	0.0142	0.072	0.944	
	Quadratic	0.0251	0.077	0.961	

First, provider perceptions of SDM were examined. The quadratic growth model with quadratic variance constrained to zero was selected as the final model even though it still did not demonstrate adequate fit per the *a priori* criteria (Table 11). Because the final model demonstrated poor fit according to *a priori* criteria, the model was interpreted cautiously. The mean of the intercept was 4.603 (p<.001), the mean of the slope was 0.146 (p=.005), the mean of the quadratic was -0.031 (p=.018). The mean intercept indicates that, at baseline, the mean score on provider perceived SDM was 4.603. The variance around the mean intercept was significant at p<0.001. The means of the slope and the quadratic, together, indicate that patient perceptions of SDM were increasing, but the change became less positive over time. The variance around the slope estimate was significant (p=0.028), and the variance of the quadratic was not estimated because it was constrained to zero.

Visual inspection of the estimated versus sample means plot confirms the data follow a quadratic pattern (Figure 9). The correlation between the quadratic and intercept estimates and between the quadratic and slope estimates were not estimated because the variance of the quadratic was constrained to zero. The correlation between the slope and intercept estimates was significant (-0.448, p=.003), indicating that higher initial perceptions of SDM are related to less positive increases over time. Overall, the model

suggested a pattern of change such that, on average, providers' perceptions of SDM increase overtime, but the increase slows between 12 and 18 months and then to regresses to the baseline mean by 24 months.

Next, provider perceptions of patient-provider engagement were examined across the five time points. The quadratic growth model demonstrated adequate CFI, but RMSEA was slightly worse than it was in the linear growth model. Visual inspection of the plot of sample means suggested that, although the quadratic model demonstrated a slightly improved fit, the data appear to be following more of a linear trend than a quadratic trend. Thus, the linear model was selected as the final model. The indexes demonstrated poor fit according to *a priori* criteria (Table 11), so the model was interpreted cautiously. The mean of the intercept was 6.323 (p<0.001) and the mean of the slope was -0.038 (p=0.001). The mean intercept indicates that, at baseline, the mean

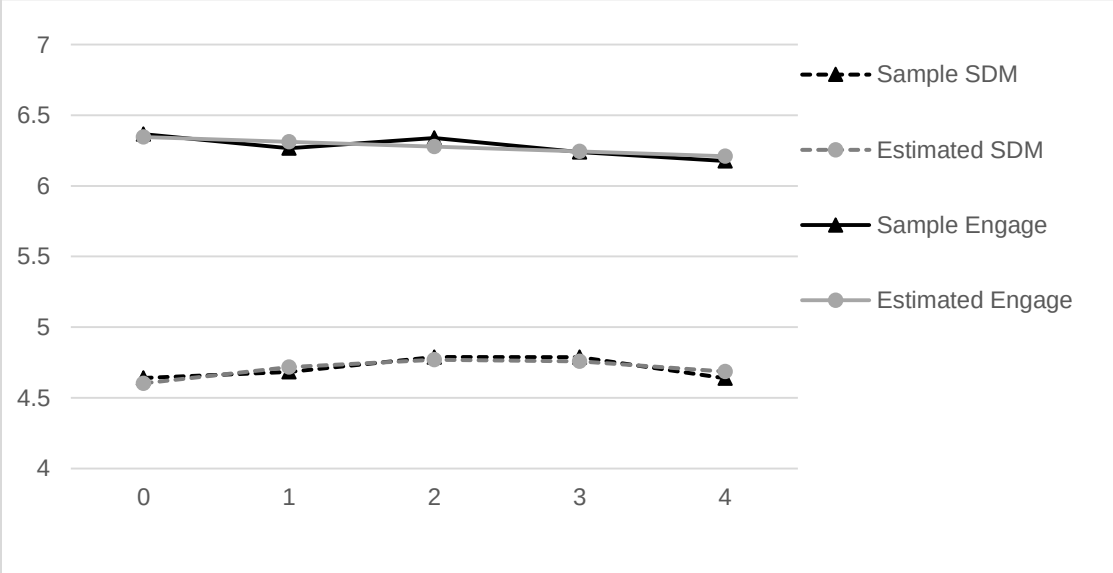

Figure 9. Sample and estimated longitudinal growth curves for provider perceptions of the Shared Decision-Making scale and the Patient Engagement scale across the five study time points (on the x-axis: 0=baseline, 1=6 months, 2=12 months, 3=18 months, 4=24 months). Scale means are represented on the y-axis.

score on patient perceived engagement was 6.323. The mean of the slope indicates that provider perceptions of engagement decreased slightly but significantly over time. There was significant variance around the mean intercept (p<0.001), but the variance around the slope was not significant (p=0.076). Visual inspection of the estimated versus sample means plot confirms this pattern (Figure 9). The correlation between the slope and intercept estimates was -0.609 (p<0.001), suggesting that higher baseline patient engagement is associated with more negative changes in patient engagement over time. Overall, the model suggests a pattern of change such that, on average, providers' perceptions of engagement decrease slightly over time.

Patient-Provider Agreement around Decision-Making. In addition to determining if provider perceptions or patient perceptions of decision engagement serve as a better predictor of patient outcomes, Aim 2 also sought to determine if the degree of agreement between patients and providers about their communication serves to best predict patient outcomes. Longitudinal growth curves analyses were used to model level of agreement across time using the difference scores (patient perceptions – provider perceptions).

Table 12. *Fit Statistics for Latent Growth Curve Models for Differences between Patient and Provider Perceptions of Decision-Making*

Measure	Model	Chi-Square *p*	RMSEA	CFI	Comment
Shared-Decision Making	Linear	0.0198	0.072	0.859	Not positive definite
	Quadratic	0.0131	0.089	0.873	Not positive definite
Patient Engagement	Quadratic	0.0164	0.082	0.924	

Agreement on the perceptions of SDM was modeled first. Linear and quadratic growth models showed poor fit and were not positive definite, respectively (Table 12). The irregular growth pattern could not be adequately modeled without freeing so many parameters that the model would be uninterpretable. Thus, the pattern of data over time is

described without a corresponding model. As seen in Figure 10, patient-provider agreement has a nonlinear, quadratic shape, in which the baseline average difference score is close to zero, and the average difference score increases to about 0.25 at the six month follow up. The average difference score slightly increases again at 12 months follow up, but it then deceases slightly at both 18 and 24 month follow ups.

Level of agreement between patient and provider perceptions on the engagement measure were also examined. The quadratic growth model resulted in a poor fitting model, but it provided the best fitting model relative to other iterations (Table 12, Figure 10). The mean of the intercept was -0.079 (p=0.241), the mean of the slope was 0.138 (p=.036), and the mean of the quadratic was -0.025 (p=.111). The mean intercept indicates that, at baseline, the mean difference score was -0.079. The variance around the mean intercept was not statistically significant. The means of the slope and the quadratic estimates, together, indicate that difference scores on perceptions of engagement around decision-making increased in value, but this pattern slows and changes direction over

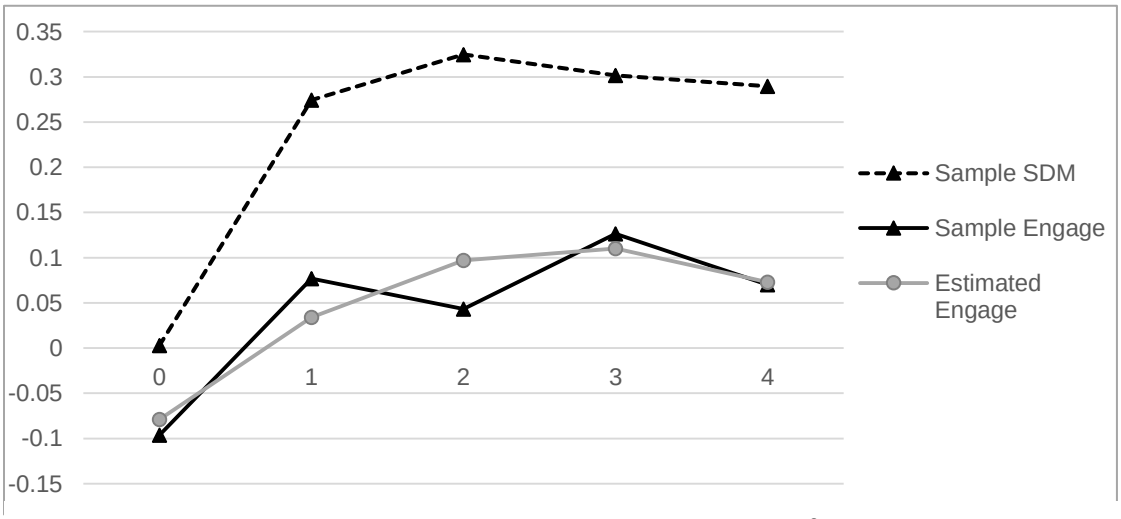

Figure 10. Sample and estimated longitudinal growth curves for patient-provider agreement on the Shared Decision-Making scale and the Patient Engagement scale across the five study time points (on the x-axis: 0=baseline, 1=6 months, 2=12 months, 3=18 months, 4=24 months). Scale means are represented on the y-axis. Agreement is indicated by difference scores (patient scale score-provider scale score).

time. The variance around the intercept estimate (sd=0.543, $p<0.001$), slope estimate (sd=0.316, $p=0.013$), and quadratic estimate (sd=0.020, $p=0.006$) were all significant.

Visual inspection of the estimated versus sample means plot shows that the data follow an irregular pattern that is somewhat quadratic in shape; however, at the 12 month follow up, there is a decrease in average difference scores (Figure 10). The correlation between the slope and intercept estimates was significant (r=-0.643, $p<0.001$), indicating that more initial positive difference scores (i.e., when patients perceive more engagement than providers) are related to more negative slope estimates. However, when the initial difference scores are more negative (i.e., providers perceive more engagement than patients), slope estimates are more positive. The correlation between the quadratic estimate and the slope estimate was also significant (r=-0.930, $p<0.001$), indicating more positive slopes are associated with more negative quadratic change over time. The correlation between the quadratic estimate and intercept estimate was significant (r=0.463, $p=0.002$). This indicates that, as the intercept moves from negative to positive, the quadratic estimates also moves from negative to positive. Overall, the model suggests a pattern of change such that, on average, patients' perceptions of engagement become increasingly greater than providers' perceptions over time, but this trend slows and reverses at the 24 month follow up (Figure 10). The sample data does deviate from this pattern at the 12 month follow up when it dips closer to zero.

Longitudinal Parallel Growth Curve Processes. To test Shay and Lafta's (2015) conceptual model, in which the relationship between patient-provider SDM/engagement and health/well-being outcomes is mediated by affective-cognitive factors, longitudinal parallel growth curve processes were employed. First patient

engagement/communication variables were paired with patient affective/cognitive variables; then, patient affective-cognitive variables were modeled with patient health and well-being outcome variables. Provider engagement/communication variables were then paired with patient affective/cognitive variables to see how provider perceptions of decision-making could influence and predict patient variables. Finally, agreement between patients and providers on engagement/communication variables were paired with patient/cognitive variables to see how agreement influences or predicts patient variables. In general, the first versions of the parallel process models were specified using the best fitting model of each factors' longitudinal growth pattern described in the previous section. Many iterations of these models were run, and not all models are reported in this manuscript to keep it succinct. Only models that converged and were positive definite are reported and reviewed, and summaries can be found in Tables 13 and 14.

Patient Perceptions of Communication. Most models using patient data exclusively did not converge or were not positive definite, the latter making the model results uninterpretable. The majority of these models had extremely poor model fit per the *a priori* criteria and there were many internal problems with the models (e.g., multiple negative residual covariances), so it was not possible to find a model that was positive definite without placing an untenable number of constraints.

However, there were several models that terminated normally with good fit that are given some consideration here. When decision satisfaction (quadratic growth) was modeled with mental health outcomes (linear growth), the model demonstrated good fit per the *a priori* criteria (Table 13). The change estimates (i.e., slope and quadratic) of the two factors were not significantly related, suggesting the two factors did not change together over time. Similarly, when decision satisfaction (quadratic growth) was modeled with physical health (linear growth), over the five time points, the model demonstrated good fit per the *a priori* criteria (Table 13). The change estimates of the two factors were not significantly related, suggesting the two factors did not change together over time. Finally, when patient decision satisfaction (quadratic growth) was modeled with patient general well-being (linear growth) over the five time points, the model demonstrated mediocre fit per the *a priori* criteria (Table 13). Like the previous models, the change estimates between the two factors were not significantly related, suggesting the two factors did not change together over time.

Table 13. ***Fit Statistics for Longitudinal Parallel Growth Curve Processes, All Patient Data***

Measures	Chi-Square *p*	RMSEA	CFI
Decision Satisfaction (quadratic growth) with Physical Health (linear growth)	0.2781	0.023	0.993
Decision Satisfaction (quadratic growth) with Mental Health (linear growth)	0.0418	0.044	.973
Decision Satisfaction (quadratic growth) with Well-being (linear growth)	0.0007	0.063	0.939
Working Alliance (quadratic growth) with Physical Health (linear growth)	0.0901	0.037	0.983
Working Alliance (quadratic growth) with Mental Health (linear growth)	0.0410	.044	0.974

Similar patterns were found when patient working alliance was modeled with patient health and well-being outcome variables. When patient working alliance (quadratic growth) was modeled with physical health (linear growth), the model

demonstrated good fit per the *a priori* criteria (Table 13). However, the two factors' change estimates were not significantly related, suggesting the two factors did not change together over time. When patient working alliance (quadratic growth) was modeled with mental health (linear growth), the model demonstrated good fit per the *a priori* criteria (Table 13). Again, the two factors' change estimates were not significantly related, also suggesting the two factors did not change together over time.

Provider Perceptions of Communication. Next, the parallel growth processes of provider engagement/communication variables with patient affective/cognitive variables were examined, and a summary of the findings are displayed in Table 14. Several models did terminate normally and were positive definite so are given some consideration here. When provider SDM (quadratic growth) was modeled with patient working alliance (cubic growth), and SDM's quadratic variance was constrained to zero, the model fit was good according to *a priori* criteria (Table 14). When examining the model results, the slope estimate for provider SDM was significantly and negatively correlated with the slope estimate for patient perceived working alliance (r=-0.578, p=0.040). In addition, the quadratic estimate for patient working alliance was significantly and positively correlated with the slope estimate for provider SDM (r=0.566, p=0.018). After viewing the sample versus estimated plots, it appeared that both have quadratic shapes, but provider SDM

Table 14. Fit Statistics for Longitudinal Parallel Growth Curve Processes, Provider with Patient Data

Measures	Chi-Square *p*	RMSEA	CFI	Comment
Provider Shared Decision-Making (quadratic growth) with Patient Working Alliance (cubic growth)	0.0240	0.050	0.960	SDM quadratic variance constrained to zero
Provider Engagement (quadratic growth) with Patient Decision Satisfaction (quadratic growth)	0.0118	0.051	0.945	Quadratic variance of decision satisfaction set to zero

increases until the 18 month follow up and then begins to regress toward the baseline mean, while patient working alliance increased until six month follow up and then regressed toward the baseline mean. The different inflection points likely account for the negative correlation between the slope estimates. However, it is important to note that patient perceived working alliance, when examined as a singular longitudinal growth curve, did not have any growth estimates that suggested significant change over time while SDM did change overtime. Thus, these findings do not suggest that these two measures change together over time.

When provider engagement (quadratic growth) was modeled with patient decision satisfaction (quadratic growth), and decision satisfaction's quadratic variance was constrained to zero, the model fit was mediocre per the *a priori* criteria (Table 14). The two factors' change estimates were not significantly related, suggesting the two factors did not change together over time.

Patient-Provider Agreement about Communication. Finally, the parallel growth processes of patient-provider agreement on the perceived communication variables were modeled with patient affective/cognitive variables, and none of the model terminated normally, thus, no findings are reported here.

The findings in this this section demonstrated some small but significant changes in variables overtime. However, when the changes were modeled together in parallel growth curve models to assess mediation, there were major limitations such as poor model fit, non-positive definite models, and non-convergence. Of the models that could be interpreted, the change estimates were not significantly related, indicating that factors

were not changing together over time. Due to these findings, simple mediation models were run in order to address the hypotheses in Aim 2.

Mediation. Mediation models were run in Mplus in order to test the model hypothesized by Shay and Lafta (2015). Predictor variables included baseline patient perceived SDM and engagement around decision making, baseline provider perceived SDM and engagement around decision making, and baseline patient-provider agreement around SDM and engagement around decision making (as measured by difference scores). Mediating variables included patient perceived decision satisfaction and working alliance at 6 month follow-up. Outcomes included patient perceived physical health, mental health, and well-being at 12 month follow-up. The A-paths include the predictor variables predicting the mediating variables, and the B-paths include the mediating variables predicting the outcome variables. The C- paths are the predictor variables directly predicting the outcome variables.

First, simple mediation models were specified without controlling for each variable at all time points (Table 15). The results of these mediation analyses resulted in several significant models. In these models, patient perceived SDM and engagement always significantly predicted patient perceived decision satisfaction and working alliance in a positive direction (A-path). Patient perceived decision satisfaction and working alliance often significantly predicted patient perceived mental health well-being in a positive direction, but they never significantly predicted physical health (B-path, see Table 15 for significant paths). Provider perceived SDM and engagement never significantly predicted patient-perceived decision satisfaction and working alliance (A-path). Patient-provider agreement around SDM (indicated by difference scores)

Table 15. Results from mediation analyses, not fully controlled models.

Predictor	Mediator	Outcome	*A-Path, B (SE)*	*B-Path, B (SE)*	*Indirect (95% CI)*
Patient perceived SDM	Decision Satisfaction	Physical Health	0.21 (0.06)*	-2.10 (2.01)	-0.43 (-1.40, 0.49)
		Mental Health†	0.21 (0.06)*	7.74 (2.47)*	1.59 (0.43, 3.25)
		Well-being	0.21 (0.06)*	11.84 (6.00)*	2.45 (-0.01, 5.89)
	Working Alliance	Physical Health	0.32 (0.10)*	-0.67 (1.39)	-0.22 (-1.35, 0.69)
		Mental Health	0.32 (0.10)*	2.63 (1.85)	0.85 (-0.27, 2.45)
		Well-being	0.33 (0.10)*	4.92 (3.98)	1.61 (-0.82, 5.09)
Patient perceived Engagement	Decision Satisfaction	Physical Health	0.21 (0.10)*	0.20 (1.65)	0.04 (-0.81, 0.98)
		Mental Health†	0.21 (0.10)*	7.76 (1.84)*	1.65 (0.38, 3.64)
		Well-being†	0.21 (0.09)*	13.40 (4.01)*	2.87 (0.63, 6.75)
	Working Alliance	Physical Health	0.46 (0.17)*	0.88 (0.90)	0.40 (-0.48, 1.46)
		Mental Health†	0.46 (0.17)*	3.20 (1.25)*	1.45 (0.25, 3.36)
		Well-being†	0.46 (0.16)*	7.73 (2.30)*	3.53 (1.19, 7.38)
Provider perceived SDM	Decision Satisfaction	Physical Health	0.01 (0.04)	-0.25 (1.75)	-0.00 (-0.23, 0.16)
		Mental Health	0.00 (0.04)	7.59 (1.82)*	-0.00 (-0.71, 0.70)
		Well-being	0.00 (0.05)	13.24 (4.33)*	0.04 (-1.18, 1.48)
	Working Alliance	Physical Health	0.02 (0.07)	1.08 (0.90)	0.02 (-0.18, 0.25)
		Mental Health	0.02 (0.07)	2.41 (1.25)	0.04 (-0.37, 0.51)
		Well-being	0.02 (0.07)	7.38 (2.35)*	0.14 (-0.93, 1.37)
Provider perceived Engagement	Decision Satisfaction	Physical Health	0.06 (0.06)	0.29 (1.61)	0.02 (-0.27, 0.34)
		Mental Health	0.05 (0.06)	7.54 (1.84)*	0.39 (-0.59, 1.44)
		Well-being	0.05 (0.06)	13.64 (4.16)*	0.72 (-1.18, 2.82)
	Working Alliance	Physical Health	0.15 (0.10)	1.08 (0.88)	0.17 (-0.15, 0.63)
		Mental Health	0.15 (0.10)	2.80 (0.65)*	0.43 (-0.17, 1.16)
		Well-being	0.15 (0.10)	7.66 (2.27)*	1.17 (-0.46, 2.88)
Patient-Provider Agreement about SDM	Decision Satisfaction	Physical Health	0.10 (0.05)*	-2.56 (2.05)	-0.26 (-0.86, 0.24)
		Mental Health†	0.10 (0.05)*	7.34 (2.40)*	0.75 (0.03, 1.97)
		Well-being †	0.10 (0.05)*	12.03 (5.76)*	1.25 (0.01, 3.861)
	Working Alliance	Physical Health	0.19 (0.09)*	-0.25 (1.38)	-0.05 (-0.73, 0.54)
		Mental Health	0.19 (0.09)*	2.49 (1.85)	0.47 (-0.18, 1.36)
		Well-being	0.19 (0.10)*	6.73 (3.71)	1.29 (-0.13, 3.96)
Patient-Provider Agreement about Patient Engagement	Decision Satisfaction	Physical Health	0.12 (0.07)	0.09 (1.61)	0.01 (-0.47, 0.45)
		Mental Health	0.12 (0.07)	7.80 (1.88)*	0.93 (0.05, 2.31)
		Well-being	0.12 (0.07)	14.01 (4.23)*	1.69 (0.13, 4.33)
	Working Alliance	Physical Health	0.23 (0.13)	0.86 (0.88)	0.62 (-1.31, 2.40)
		Mental Health	0.23 (0.13)	3.23 (1.14)*	0.75 (0.06, 1.97)
		Well-being	0.24 (0.13)	8.09 (2.29)*	1.90 (0.20, 5.04)

*Correlation is significant at alpha level 0.05.

† Significant mediation.

Predictor variables are at baseline, mediator variables are at six months, and outcome variables are at 12 months.

Table 16. Results from mediation analyses, fully controlled models.

Predictor	Mediator	Outcome	A-Path, B (SE)	*B-Path, B (SE)*	*Indirect (95% CI)*
Patient perceived SDM	Decision Satisfaction	Physical Health	0.09 (0.08)	-1.63 (1.66)	-0.14 (-0.70, 0.17)
		Mental Health	0.08 (0.08)	4.45 (1.97)*	0.35 (-0.25, 1.38)
		Well-being	0.08 (0.08)	4.07 (4.75)	0.31 (-0.63, 1.92)
	Working Alliance	Physical Health	0.24 (0.12)*	-1.16 (1.07)	-0.28 (-1.17, 0.17)
		Mental Health	0.24 (0.12)*	1.30(1.41)	0.31(-0.34, 1.33)
		Well-being	0.25 (0.11)*	3.51 (3.22)	0.87 (-0.59, 3.14)
Patient perceived Engagement	Decision Satisfaction	Physical Health	0.05 (0.08)	-2.00 (1.60)	-0.10 (-0.76, 0.19)
		Mental Health	0.05 (0.80)	4.50 (1.94)*	0.19 (-0.45, 1.08)
		Well-being	0.04 (0.80)	4.16 (4.56)	0.18 (-0.97, 1.78)
	Working Alliance	Physical Health	0.24 (016)	-1.89 (0.91)*	-0.46 (-1.61, 0.02)
		Mental Health	0.25 (0.16)	1.67 (1.46)	0.41 (-0.39, 1.66)
		Well-being	0.25 (0.16)	4.28 (3.26)	1.06 (-0.71, 4.54)
Provider perceived SDM	Decision Satisfaction	Physical Health	-0.02 (0.04)	-0.72 (1.31)	0.02 (-0.11, 0.18)
		Mental Health	-0.02 (0.04)	3.73 (1.67)*	-0.10 (-0.46, 0.24)
		Well-being	-0.02 (0.04)	4.98 (4.03)	-0.12 (-0.74, 0.38)
	Working Alliance	Physical Health	0.03 (0.06)	-0.24 (0.61)	-0.01 (-0.10, 0.08)
		Mental Health	0.03 (0.06)	1.03 (1.01)	0.03 (-0.15, 0.27)
		Well-being	0.03 (0.06)	3.50 (2.40)	0.10 (-0.40, 0.74)
Provider perceived Engagement	Decision Satisfaction	Physical Health	-0.01 (0.07)	-0.86 (1.38)	0.01 (-0.23, 0.24)
		Mental Health	-0.01 (0.07)	3.45 (1.63)*	-0.05 (-0.66, 0.42)
		Well-being	-0.02 (0.07)	4.53 (4.08)	-0.09 (-1.07, 0.81)
	Working Alliance	Physical Health	0.10 (0.10)	-0.34 (0.63)	-0.03 (-0.23, 0.15)
		Mental Health	0.10 (0.10)	0.85 (1.01)	0.08 (-0.17, 0.45)
		Well-being	0.09 (0.10)	3.19 (2.41)	0.30 (-0.44, 1.40)
Patient-Provider Agreement about SDM	Decision Satisfaction	Physical Health	0.02 (0.06)	-1.31 (1.42)	-0.03 (-0.31, 0.15)
		Mental Health	0.02 (0.06)	3.97 (1.66)*	0.06 (-0.39, 0.59)
		Well-being	0.01 (0.05)	4.56 (3.99)	0.06 (-0.53, 0.90)
	Working Alliance	Physical Health	0.11 (0.09)	-0.87 (0.78)	-0.10 (-0.50, 0.10)
		Mental Health	0.11 (0.10)	1.25 (1.22)	0.14 (-0.18, 0.71)
		Well-being	0.11 (0.09)	3.47 (2.45)	0.39 (-0.30, 1.62)
Patient-Provider Agreement about Patient Engagement	Decision Satisfaction	Physical Health	0.03 (0.06)	-1.21 (1.42)	-0.04 (-0.36, 0.13)
		Mental Health	0.03 (0.06)	4.50 (1.76)*	0.14 (-0.29, 0.82)
		Well-being	0.03 (0.06)	5.21 (4.12)	0.16 (-0.45, 1.25)
	Working Alliance	Physical Health	0.07 (0.10)	-0.82 (0.74)	-0.06 (-0.44, 0.11)
		Mental Health	0.07 (0.10)	1.97 (1.18)	0.13 (-0.27, 0.74)
		Well-being	0.07 (0.11)	4.57 (2.55)	0.31 (-0.57, 1.85)

*Correlation is significant at alpha level 0.05.
Predictor variables are at baseline, mediator variables are at six months, and outcome variables are at 12 months.

significantly predicted patient-perceived decision satisfaction and working alliance in a positive direction; however, patient-provider agreement around engagement did not significantly predict either of the mediating variables (A-path). Of these models,

significant mediation models are indicated in Table 15. In all models, the C-path was not significant.

However, when these mediation analyses were re-run controlling for each variable at each time point, there were no significant mediation effects. Patient perceived SDM significantly predicted patient perceived working alliance, but not decision satisfaction (A-path). Patient perceived engagement did not predict either of the mediating variables (A-path). Provider perceived SDM and engagement, and patient-provider agreement about SDM and engagement did not significantly predict mediating variables (A-path). In these controlled mediation analyses, patient perceived decision satisfaction significantly predicted patient perceived mental health in a positive direction (B-path). Other mediator-outcome relationships were not significant, except patient perceived working alliance which predicted physical health in a negative relationship when patient perceived engagement was the predictor (Table 16). As in the initial mediation models, no C-path predictions were significant.

Aim 3

The third aim was to determine if selected patient demographics are associated with patient interest in engaging decision-making about treatment. This was assessed using one item administered at baseline: "I am interested in being involved in my treatment planning," (seven-point Likert scale, 1 = strongly disagree and 7 = strongly agree). The association between patient preference for engagement in treatment planning and race/ethnicity was examined using an ANOVA, and the association was not significant, F (7, 221) = 1.21, p = 0.30. Groups with five or fewer responses were removed, which included "American Indian or Alaskan Native" (n=2), "Mixed" (n=1),

"Other (*n*=5), "Unknown (*n*=1). Groups that were included in the analysis were "White, non-Hispanic" (n=130), "Black, non-Hispanic" (*n*=16), "Hispanic" (*n*=61), and "Asian or Pacific Islander" (*n*=13). The ANOVA was re-run, and the association was still non-significant (Figure 11).

The association between age and patient interest in engaging in treatment planning was significant, as the bivariate correlation was -0.145, $p = 0.028$. This indicates that older individuals are less interested in engaging in treatment planning. Finally, an

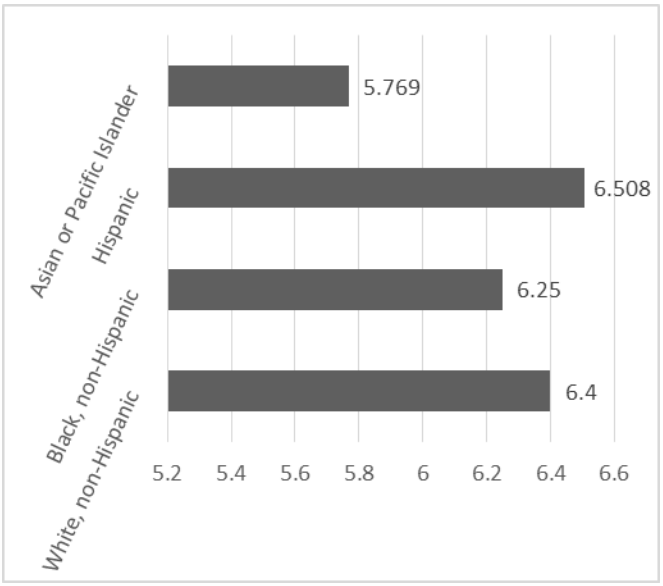

Figure 11. Patient responses by race at baseline to prompt: "I am interested in being involved in my treatment planning." Responses are on a 7-point scale where 1 = strongly disagree and 7 = strongly agree.

independent samples *t*-test was used to test the association between gender and patient preference for engagement in treatment planning. There was one individual who self-identified as transgender, and this person was excluded from the analysis because it was not considered a representative sample from which a conclusion could be drawn. There was a significant difference between men and women in interest regarding engagement, $t(226) = 2.08$, $p = 0.04$. Women (mean=7.25, sd=0.75) expressed significantly more interest in engagement than men (mean=6.49, sd=1.08).

Aim 4

The fourth aim is to explore potential moderators of the relationship between the perception of SDM and patient outcomes. Specific moderators of interest include: race/ethnicity, age, gender, continuity of care with the same provider, and patient reported interest in treatment-decision engagement. Moderation analyses were added to the mediation models in which patient perceptions of patient-provider communication were the predictor variables, as these variables accounted for the most variance in the outcomes. However, it is important to note that none of fully controlled mediation models were significant. Race/ethnicity was the first moderating variable added to the mediation models. Results demonstrated that race/ethnicity did not significantly change the relationship between patient perceived SDM at baseline and working alliance or decision satisfaction at six months. Similarly, this variable did not change the relationship between patient perceived engagement at baseline and working alliance and or decision satisfaction at six months.

Age was added as the next moderating variable, and results demonstrated that age significantly changed the relationship between patient perceived SDM at baseline and working alliance at six months (age x SDM, B(SE)=-0.013(0.006), p=0.039). Upon visually examining the interaction effect (Figure 12), older individuals were more likely to rate working alliance as high regardless of whether they perceived SDM to be high or low, and those who are younger are more likely to rate working alliance lower when

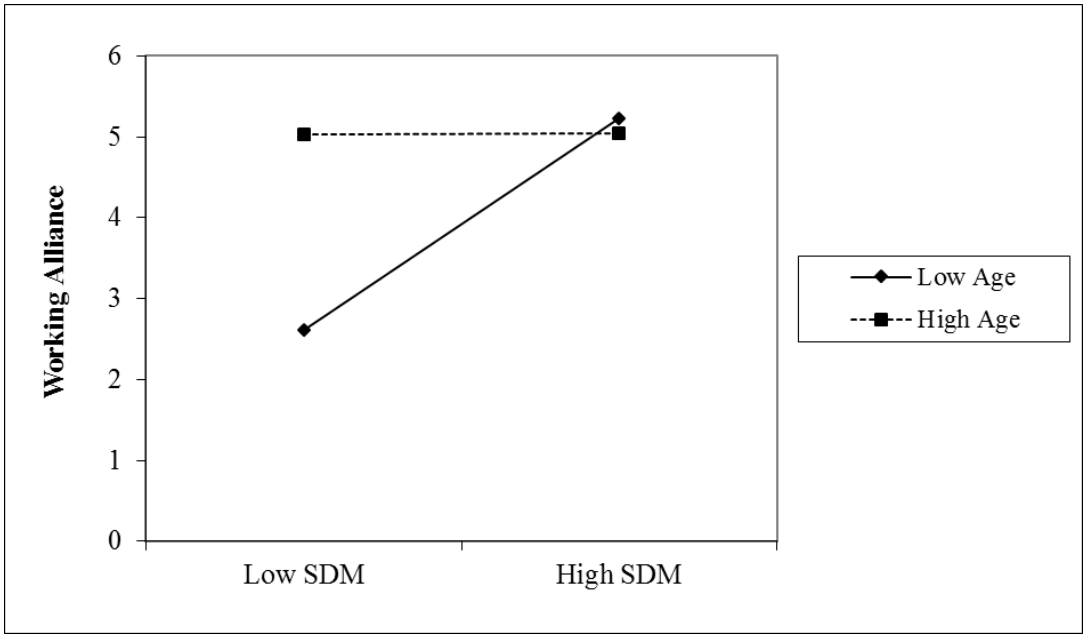

Figure 12. The relationship between patient perceived SDM and working alliance is significantly moderated by age.

perceived SDM is low and rate working alliance higher when perceived SDM is high. This moderation effect was present when each different outcome variable (patient perceived mental health, physical health, and well-being) was present in the model. Age did not significantly moderate the relationship between patient perceived SDM at baseline and decision satisfaction at six months or between patient perceived engagement at baseline and either moderating variables at six months.

Next, gender was added as a moderating variable, and it significantly moderated the relationship between patient perceived SDM at baseline and perceived working alliance at six months (gender x SDM, *B* (SE) = 0.410(0.140), p=0.003). Results suggested that, for female participants there is a positive and significant association between baseline SDM and working alliance at six months (*B*(SE)=0.489(0.079), p<0.001), but the level of perceived SDM did not impact perceived working alliance for

males (*B*(SE)=0.053(0.082), *p*=0.518; Figure 13). This same pattern held when gender moderated the relationships between patient perceived SDM at baseline and decision satisfaction at six months (gender x SDM, *B*(SE)=0.163(0.065), *p*=0.012; females, *B*(SE)=0.279(0.046), *p*<0.001; males, *B*(SE)=0.073(0.063), *p*=0.250; Figure 14) and between patient perceived engagement at baseline and working alliance at six months (gender x patient engagement, *B*(SE)=0.346(0.135), *p*=0.010; females, *B*(SE)=0.826(0.144), *p*<0.001; males, *B*(SE)=0.052(0.099), *p*=0.601; Figure 15).

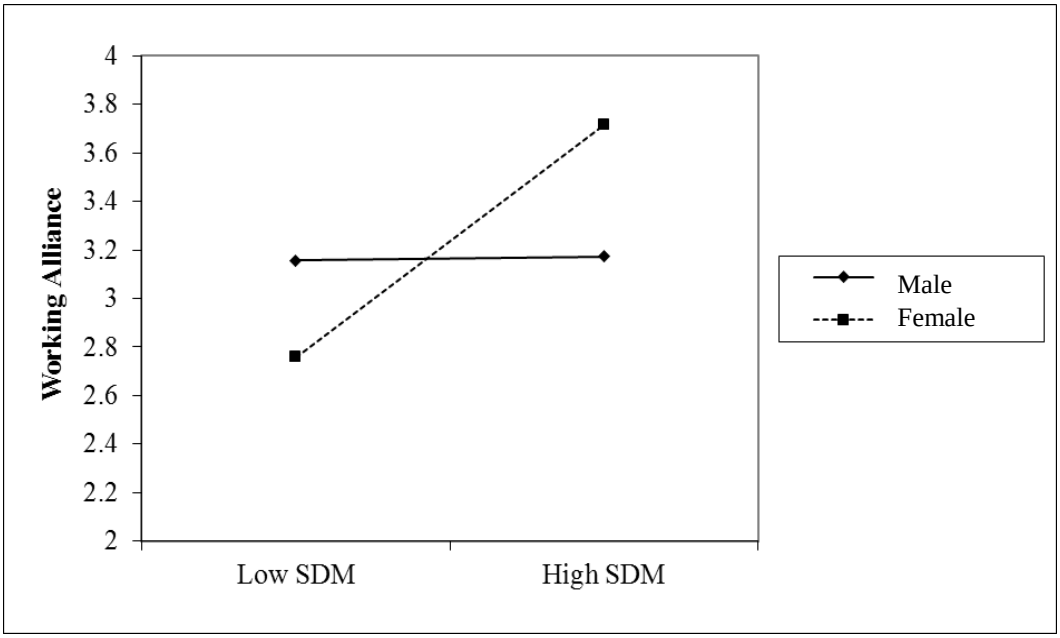

Figure 13. The relationship between patient perceived SDM and working alliance is significantly moderated by gender.

The moderation effect was significant when each of the outcome variables (patient perceived mental health, physical health, and well-being) was present in the model. Paired-sample *t*-tests revealed that there is no significant different, on average, between males and females on either perceived SDM, *t*(153) = 0.752, *p*=0.453, or perceived engagement, *t* (232)=- 1.375, *p*=0.170. Males and females also did not differ on either

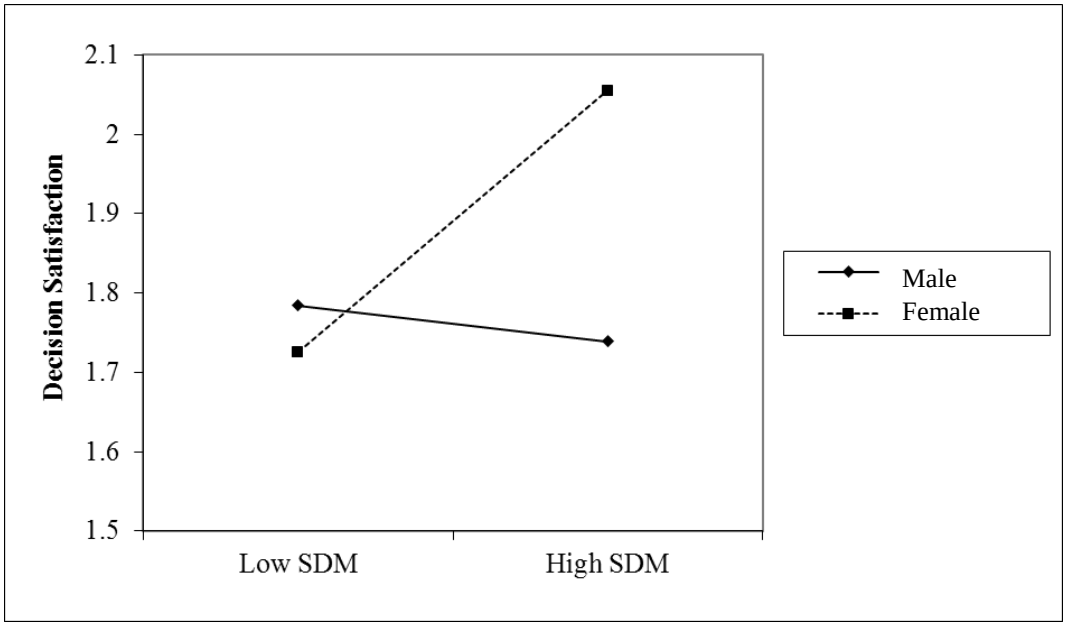

Figure 14. The relationship between patient perceived SDM and decision satisfaction is significantly moderated by gender.

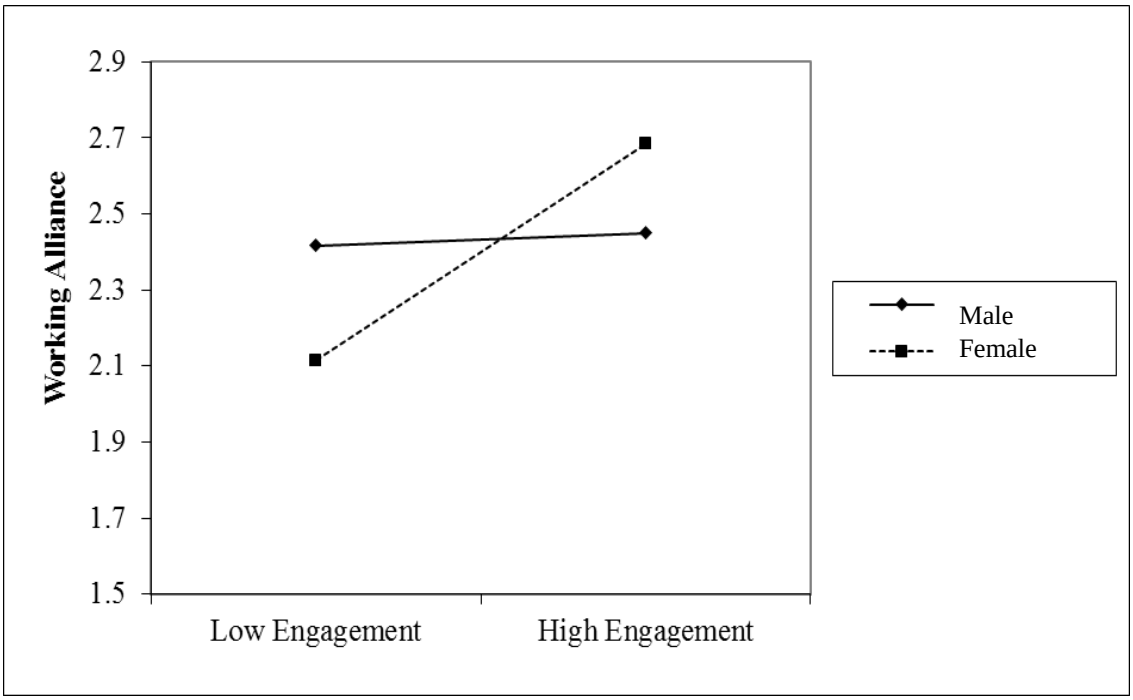

Figure 15. The relationship between patient perceived engagement around communication and working alliance is significantly moderated by gender.

perceived working alliance, t (193)=-0.752, p=0.755, or decision satisfaction, t (192)=-1.083, p=0.280. Gender did not significantly moderate the relationship between patient

perceptions of engagement at baseline and decision satisfaction at six months (gender x patient engagement, *B*(SE)=0.189(0.099), *p*=0.056.

Continuity of care with the same provider was added as another moderation variable. It significantly moderated the relationship between patient perceived SDM at baseline and working alliance at six months (continuity x SDM, *B*(SE)=0.748(0.224), *p*=0.001, Figure 16). In this relationship, if patients experienced a change in providers over the course of the three time points included in this analysis (change, *n*=41, no change, *n*=156), higher levels of perceived SDM were associated with higher perceived working alliance and lower levels of SDM were associated with lower levels of perceived working alliance. However, if patients did not experience a change in provider, patient perceived SDM could be low or high and perceived working alliance was unaffected (no change, *B*(SE)=0.121(0.091), *p*<0.405; change, *B*(SE)=0.379(0.067), *p*<0.001). The

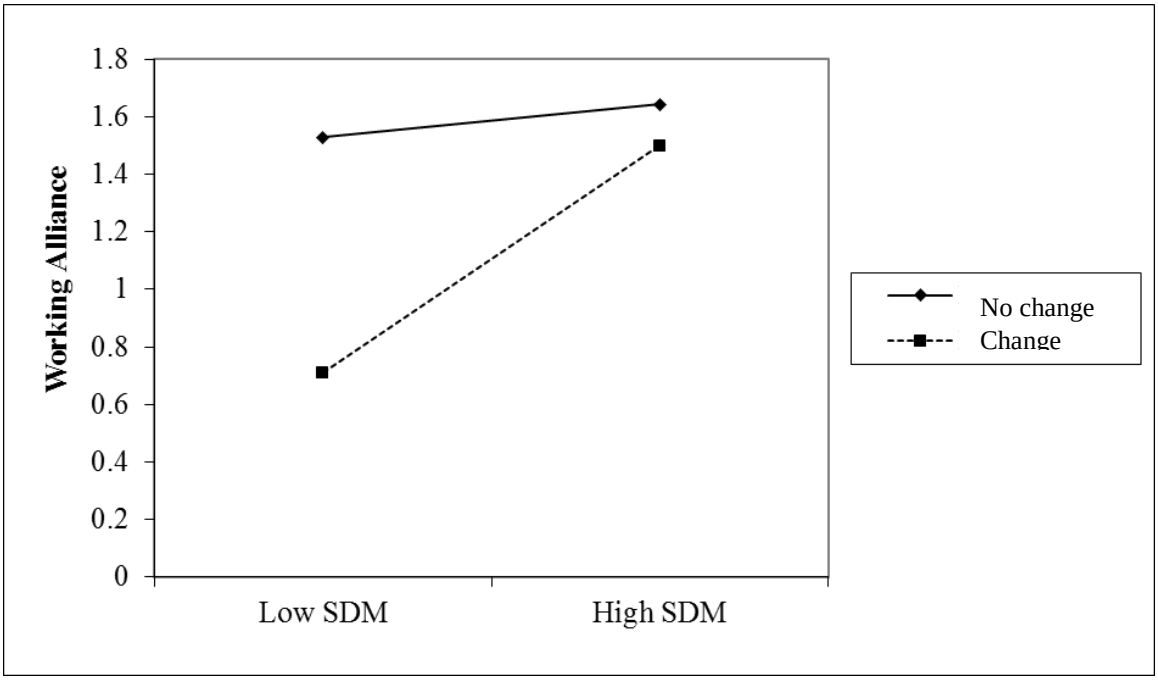

Figure 16. The relationship between patient perceived SDM and working alliance is significantly moderated by continuity of provider care.

relationship held when each outcome variable (patient perceived mental health, physical health, and well-being) was present in the model. This variable did not significantly moderate the relationship between patient perceived SDM at baseline and decision satisfaction at six months or between patient perceived engagement at baseline and working alliance/decision satisfaction at six months.

Finally, patient interest in engaging in treatment decisions was added as a continuous moderating variable. This variable did not significantly moderate the relationship between patient perceived SDM and working alliance/decision satisfaction or between patient perceived engagement and working alliance/decision satisfaction.

Discussion

This multi-site study included self-reports by patients with chronic and severe mental illness and their providers from community mental healthcare settings. The purpose of the study was to explore how patient and provider perceptions of communication (i.e., SDM and engagement) differ and how their perceptions predict patient outcomes. Specifically, this research explored if patient perceptions, provider perceptions, or agreement between patient-provider perceptions about communication best predicted patient reported mental/physical health and well-being. This relationship was predicted to be mediated by patient perceptions of decision satisfaction and working alliance based on Shay and Lafta's (2015) hypothesized model. In addition, the research examined moderators of this relationship, including gender, race/ethnicity, age, continuity of care with provider, and patient-reported interest in engaging in treatment decisions. Finally, this study explored how patient interest in engaging in treatment decisions is associated with race/ethnicity, age, and gender.

The data indicated that, while patients and their providers tended to have similar perceptions about SDM and engagement, overall agreement was low. Greater agreement tended to occur when the average of the patient and provider scores on these measures was higher (i.e., higher perceptions of SDM/engagement). Also, providers tended to report lower perceptions of SDM and engagement than patients. However, when averages of patient and provider scores were lower and difference scores were larger, it appeared that providers tended to report higher perceptions than patients.

In addition, although study variables are associated with each other across time, there was little predictive value when the variables were controlled for themselves at

prior time points. The exceptions were that patient perceived SDM at baseline predicted higher patient perceived working alliance at six months and patient perceived decision satisfaction at six months predicted better patient perceived mental health at 12 months. No mediational effects were found.

The data suggested that age, gender, and continuity of care significantly moderated the relationship between some combinations of patient perceived SDM/engagement and patient perceived working alliance/decision satisfaction. Also, women and younger individuals expressed significantly more interest in engaging in treatment decision-making. Interpretations and discussion of implications of these findings are discussed in the following sections.

Agreement between Patients and Providers

Examining agreement between patient and provider perceptions of SDM at the group level showed that providers reported lower perceptions of SDM than patients at each time point and overall, except for baseline. Similarly, provider perceptions of engagement were lower than patient perceptions at all time points except for baseline and 12 month follow-up. Previous studies that examined SDM and that included both patient and provider level variables (Heisler et al., 2003, Lagare et al., 2003; Schoenthaler et al., 2012) either did not measure or did not report on agreement between patients and providers on SDM or patient-engagement. Other studies have examined patient-provider agreement around symptom intensity related to medical conditions and quality of life (e.g., Langsand et al., 2010, Sprangers and Aaronson, 1992). These studies found that providers tend, in general, to underestimate symptom intensity and quality of life. Sprangers and Aaronson (1992) reported in a review that providers tend to overestimate

anxiety, depression, and distress. Although these findings are not concerned with perceptions of SDM or engagement, it does promote an expectation that providers might overestimate SDM and engagement compared to patients.

The finding that patients tend to perceive greater SDM and engagement than providers could be explained by providers being more critical of the interactions than patients and believing that there were more opportunities for patients to be engaged. The patients, on average, appear to report feeling very engaged in decision-making and treatment planning. In addition, SDM was initially developed for provider-patient interactions in medical settings because medical providers tend to be trained in more paternalistic models of care (Charavel et al., 2001). Mental healthcare providers may naturally approach clinical interactions with less paternalism, and patients may compare these interactions to their interactions with non-mental healthcare providers and find that they are comparatively more engaged in the process. Mental healthcare providers may also have more clear and developed ideas about what SDM is than many patients. Given the chronic and severe nature of the mental health conditions of patients in this study, it is also possible that there are barriers to engagement for some patients (e.g., cognitive barriers, limited insight, clear treatment decisions not being set) that providers are more insightful about than their patients.

When differences were examined at the individual level using difference scores calculated via scaled scores, it was determined that the majority of scores across all time points (i.e., 61.2% for SDM and 81.1% for patient engagement) fell between -1 and +1. A second way of examining agreement at the individual level using intraclass correlation coefficients (ICC) demonstrated poor absolute agreement for both measures at all time

points. These two findings, taken together, suggest that, although absolute agreement was low, the difference in perceptions between patients and providers is relatively narrow. One possible explanation for low absolute agreement is that patients and providers have different expectations regarding SDM and engagement and different mental strategies used to measure SDM and engagement. For example, patients can only compare the interactions with their own previous experiences, while providers can compare the interaction to a large pool of interactions including those with other patients. Their different subjective anchors for SDM and engagement could reasonably explain the disagreement. Still, it is important to emphasize that, even though absolute agreement was low, the difference scores show that the differences tended to be less, rather than more, extreme.

Finally, the Bland-Altman plots revealed that difference scores were smaller when the average of the patient and provider scores on these measures was higher (i.e., higher mean perceptions of SDM/engagement). This trend held at every time point and for both measures. The other interesting trend these plots revealed was that providers tended to report higher patient engagement and SDM than their patients when difference scores were larger and average reported perceptions on these measure were lower. This is supported by the spread of difference scores which shows that there are more negative difference scores smaller than -2 (5.11% for SDM, 2.86% for engagement) than positive difference scores greater than +2 (3.51% for SDM, 0.004% for engagement). Negative difference scores indicate that provider perceptions were greater than patient perceptions of SDM and engagement.

Thus, these results indicate that, although the majority of difference scores fell between -1 and +1 (and the majority of these scores were positive), more extreme disagreements are associated with patients reporting lower perceptions of SDM and engagement than their providers. This finding suggests that patients who feel less engaged in their treatment decisions and mental healthcare tend to have larger disagreements with their providers about communication. Also, their providers tend to overestimate engagement/SDM compared to providers of patients who report feeling more engaged and who are in greater agreement with their providers. Because patients and providers likely have different anchors for mentally measuring communication processes, it could be helpful for patients and providers to communicate with each other about how they think the clinical interactions went. Future studies could examine what predicts better or worse agreement and how providers and patients can engage in communication about clinical interactions to increase an understanding of how the other perceives communication/engagement. This could lead to fewer assumptions about communication processes in clinical interactions and could be another way to increase how engaged patients feel in these interactions.

Longitudinal Growth Models

Patient Perceptions. The results from the longitudinal growth curve analyses indicated that participants, on average, experienced relatively little to no change on any of the seven measures across the time points. In brief review, patient perceived SDM and engagement both followed negative quadratic growth patterns, with perceptions slightly increasing before beginning to regress back to the baseline level. This makes theoretical sense given that these two measures are meant to tap into assessing communication.

Patient perceived decision satisfaction and working alliance showed little significant change over the five time points. Patient perceptions of physical health and mental health both demonstrated a slight negative linear trend over time, and patient perceived general well-being did not show significant changes across time.

Even with significant slope and quadratic estimates for some of the measures, visual inspection of the plots (Figures 6-8) showed that, on average, little change occurred. The most notable pattern of change was the slightly quadratic pattern of both the SDM and patient engagement measures. On these measures, the trend line increased over the first three time points before leveling off and beginning to regress to the baseline mean. Many factors may have influenced this effect, such as provider turnover, idiosyncratic changes in the patient-provider relationship, or systemic changes in the respective community mental health systems where the individuals were being seen. To explore how these changes in patients' perceptions of engagement in decision making influence patient outcomes, parallel process models were examined to determine how the two measures of patient perceived engagement changed with the other outcome measures across time.

Provider Perceptions. Examining provider perceptions of SDM and patient engagement yielded problematic models in that neither demonstrated adequate fit per the *a priori* criteria. Therefore, both models had to be interpreted with caution. SDM followed a general pattern of negative quadratic growth and engagement followed a negative linear slope. Not being able to find adequate fitting models for SDM or engagement using provider data were not anticipated. A possible explanation for this challenge is provider turnover throughout the study, which the researchers were aware

occurred frequently but were unable to accurately document. In addition, providers may have had a more difficult time remembering the nuances of the visits with their patients than the patients did because the providers had many patient interactions which may interfere with specific memories. This may have been particularly challenging for providers because the assessments were not completed directly after a patient-provider visit, they were completed at regular six-month intervals. Thus, providers were completing the assessment for all of their patients in one sitting every six months. Patients also completed the assessment at regular six month intervals, but they only completed one at each time point. Finally, results could simply mean that change estimates are non-meaningful, so that there are not real patterns of change across time.

Patient-Provider Agreement. Finally, longitudinal growth curve analyses were conducted using scaled difference scores between patients' and providers' perceptions of SDM and engagement. Agreement around perceptions of SDM was modeled first, and many iterations of the model did not produce one that was positive definite. Visual inspection of the sample data showed that the data took a somewhat quadratic shape where the average difference score at baseline was about zero, indicating patient-provider agreement. The difference score increased at six and 12-months, indicating that patients perceived greater SDM than providers. This pattern leveled off and decreased slightly at months 18 and 24. This is consistent with the finding in Aim 1 that, on average, patients perceived higher SDM than providers except at baseline.

Agreement around engagement was best modeled using quadratic estimates, but the model demonstrated poor fit. The shape of the sample data are irregular, in which the average difference score is about -0.1 at baseline, indicating providers reported slightly

more engagement than patients. However, the difference scores were positive at the subsequent time points, with small dips occurring at 12 and 24 months. This pattern is also consistent with the finding regarding agreement about engagement from Aim 1.

Although interpretations of patient-provider agreement were discussed in previous sections, no explanation has been provided for why differences in perceptions were smaller for both measures at baseline compared to the other time points. Baseline does not necessarily represent the beginning of a clinical relationship between patients and providers, so it is not reasonably explained by the newness of a relationship. Perhaps there was some effect related to completing the research assessments for the first time that is somehow related to higher levels of agreement. Without more information, it is not possible to determine why this occurred.

Longitudinal Parallel Growth Curve Processes

Longitudinal parallel growth curve processes were employed to test Shay and Lafta's (2015) conceptual model of mediation. Many iterations of models were run, and the overall conclusion was that these analyses either did not converge or resulted in poor fitting models. When there was adequate model fit, the correlation estimates indicated that the change estimates of the paired variables were not changing together over time, suggesting that the hypothesized model of mediation is not supported by the current data. Additional consideration regarding this finding is given in the Integration and Clinical Implications section below. However, mediation models are given consideration first in the following section.

Mediation

Mediation models were run both with and without controlling for each variable at prior time points, but only the fully controlled models are focused on in this discussion. In review, predictor variables in these models included baseline perceived SDM and engagement, baseline provider perceived SDM and engagement, and baseline patient-provider agreement about SDM and engagement (as measured by difference scores). Mediating variables included patient perceived decision satisfaction and working alliance at six months follow-up. Outcomes included patient perceived physical health, mental health, and well-being at 12 month follow-up.

The models demonstrated that, although variables tended to be associated with each other in the expected directions, significant mediation did not occur in the fully controlled models. This pattern suggests that variables are related to each other, but they are not related in a way that allows for predictive value across time. Therefore, the current data do not support Shay and Lafta's (2015) hypothesis that affective outcomes (e.g., decision satisfaction, perceived working alliance) mediate the relationship between patient-provider communication variables and patient outcomes variables such and health and well-being. Possible explanations for this null finding include: (1) significant provider turnover between time points made it difficult to measure the true effects of communication variables on outcomes at the succeeding time points; (2) this dataset did not include a proxy measurement for behavioral variables (e.g., patient adherence, follow-through with agreed upon plan), which is specified as another mediating variable between affective-cognitive variables and health/well-being outcomes in Shay and Lafta's (2015) model. The behavioral measurements could be an important mediating link between communication/affective-cognitive variables and health outcomes; (3) as

the longitudinal growth curve models suggest, there is not a lot of change occurring for each variable across time, especially for patient health outcomes, which could be attributable to the chronic and serious nature of mental illness in this sample. This would make it hard to find mediation effects over time; and (4) the diminishing sample size could have reduced the ability of detecting significant results.

All the variables were associated with each other in the expected directions, except for patient perceived physical health, which was negatively associated with decision satisfaction and working alliance in the fully controlled models. These associations were non-significant, but not in the expected direction. Previous research suggests that patient-provider communication can predict improved physical health through proximal pathways (e.g., Street et al., 2009); however, this particular study may not be ideal for demonstrating this because providers were mental healthcare professionals who were not necessarily focused on decisions to improve physical conditions or to manage chronic diseases. Patient-provider communication was likely more often focused on improving or managing mental health and well-being, which is reflected in the mediation models. In fact, patient perceived mental health was significantly related to patient perceived decision satisfaction (the mediating variable) in each of the fully controlled models. It was not significantly related to patient perceived working alliance (the other mediating variable), but this relationship was consistently positive.

Other significant paths in the fully controlled models included patient perceived SDM predicting working alliance. In the uncontrolled model, patient perceived SDM and engagement always significantly predicted decision satisfaction and working alliance.

Provider perceived SDM and engagement did not significantly predict either of the affective-cognitive variables, and patient-provider agreement around SDM, but not engagement, predicted these variables. One interpretation of this finding is that patient perceptions of communication and patient-provider agreement about communication are better predictors of patient perceptions of outcomes than provider perceptions alone. Although, all outcomes were measured from the patient's perspective, so this relationship is also expected. More objective outcomes such as changes in clinical diagnoses or changes in behaviors related to health could reveal different findings. This result was only found in the uncontrolled models, so additional research is warranted. In addition, this study could not clarify if measuring patient-provider agreement about communication added meaningful predictive value above and beyond patient or provider perspectives alone. However, the results of the study do suggest that, if researchers were to choose, patient perspectives of communication seem to be the best predictor of outcomes, at least for the kinds of outcomes measured in this particular study.

Patient Interest in Engaging in Treatment Decisions

Results revealed that patient preference for engaging in treatment planning was not significantly related to race/ethnicity. Some previous research suggested that African-American and Hispanic respondents were more likely to prefer that physicians make the decisions (Levinson, Lesser, & Epstein, 2010). Although this was not supported in the current data, it is important to consider its implications. This previous research finding could indicate a true cultural difference in preference compared to White patients, or, it could have more to do with contextual barriers (e.g., sensing a power differential, awareness of historical and current barriers to equal care for minority patients). In any

case, it is clear that this area deserves further investigation so that appropriate care is provided to all patients.

Patient preferences were significantly related to age such that older individuals expressed less interest. This fits with the proposed hypothesis that younger adults would express greater preference for SDM. This finding also fits with previous research findings (Swenson et al., 2004), and can possibly be explained by differences in patient expectations in patient-provider interactions. For example, older adults could be more familiar with models of care in which patient engagement is not emphasized, and the familiarity could lead to preference. Future researchers could qualitatively explore this association to understand differences in preference for engagement. They could also examine if preference for involvement in treatment decisions declines as individuals age, or if the finding in this study is the result of a cohort effect.

Finally, women were significantly more interested in engaging in treatment decisions than men. Previous studies have shown mixed results regarding how women and men differ on how sensitive they are to interpersonal aspects of care (Materko, 1997; Weismen et al., 2000). However, these studies did not address if men and women differ regarding preferences for patient-provider communication. Many researchers have studied and documented differences in communication styles between women and men (Hyde, 2012). However, this writer is not aware of research that has specifically focused on differences in preferences between men and women when engagement in treatment decisions is the focus.

Traditional gender stereotypes may have suggested the opposite finding: that women are more inclined to defer to their providers for treatment decision guidance.

However, this outdated generalization is likely not helpful, and is certainly not helpful in explaining the results in this study. Previous research has shown that women engage in more health information seeking behaviors (Manierre, 2015). This suggests that women may engage in more conversations with providers than men to acquire additional information, which could partially explain the current finding. However, additional research, including more qualitative research is indicated.

Moderated Mediation

Race/ethnicity, age, gender, continuity of care, and patient interest in engagement in treatment decision-making were added as moderating variables between patient perceived SDM/engagement and patient perceived working alliance/decision satisfaction. Neither race/ethnicity nor patient interest in engaging in treatment decisions significantly moderated the relationship. Age, gender, and continuity of care did have some significant moderating effects between these variables. Age significantly moderated the relationship between patient perceived SDM and working alliance. As expected, for older individuals, it did not appear to matter if they perceived SDM to be low or high as this this not change how they perceived working alliance. However, for younger individuals, there was a positive relationship between perceived SDM and working alliance such that higher perceptions of SDM were related to higher perceptions of working alliance. This was expected because, as discussed in the previous section, older adults expressed a lower preference for engaging in treatment decisions than younger individuals. It follows that low or high perceptions of SDM will not impact perceptions of working alliance for older individuals as much as it would for younger individuals.

Gender significantly moderated the relationships between patient perceived SDM and working alliance and decision satisfaction and between patient perceived engagement and working alliance. These interactions demonstrated that men's perceptions of SDM/engagement did not impact perceptions of decision satisfaction or working alliance. For women, there was a significant positive relationship between perceptions of SDM and working alliance/decision satisfaction and between perceptions of engagement and working alliance. This also follows findings in the previous section. The results, combined, suggest that women are more interested in engaging in treatment decisions and are more sensitive to the level of perceived SDM/engagement. Possible explanations were suggested in the previous section, and it is important to reiterate the importance of additional research to aid in fleshing out this finding.

Continuity of care (measured by provider turnover) significantly moderated the relationship between patient perceptions of SDM and working alliance. The effect showed that individuals who did not experience provider turnover had higher perceptions of working alliance regardless of perceived SDM. However, individuals who did experience provider turnover were more sensitive to perceptions of SDM in that it influenced their perceptions of working alliance. Specifically, there was a positive correlation between perceived SDM and working alliance for those with provider turnover. A proposed explanation is that individuals who have a longer-standing relationship with their provider may be more likely to feel that working alliance is high regardless of how much SDM they perceive is occurring. In other words, a consistent relationship with a provider serves as a kind of buffer between changing perceptions of SDM and how it impacts perceptions of the working alliance.

It is not surprising that race/ethnicity did not significantly moderate these relationships given the findings in the previous section about preference for engagement in treatment decisions. However, this should not be considered a conclusive finding. Race/ethnicity is not a linear variable; it involves many factors that vary among different groups, and preferences and behaviors will vary depending on the context of the individuals' interactions. Closer examination could reveal important differences in preference and how group membership influences the relationship between communication and outcomes. The mPOWR study did not include this as a primary research aim, so its methods are likely not optimal for answering questions related to race/ethnicity and SDM. Future research could continue to explore how race/ethnicity may influence patient-provider communication and subsequent outcomes.

The finding that patient preference did not significantly moderate the relationship between these variables was surprising given research that suggests that providers who are more flexible in their communication styles in order to match their clients' preferences tend to elicit greater patient satisfaction with decision-making (Goossensen et al., 2007). It was expected that greater preference for engaging in treatment decisions would be associated with a more positive relationship between SDM/engagement and working alliance/decision satisfaction. Future research could examine this more closely and intentionally. However, it is possible that, as the findings suggest, patients' personal preferences are less important than was initially suspected.

Integration and Clinical Implications

Although the main aim of the study, which was to examine Shay and Lafta's (2015) mediational model, was not supported by the current data, other valuable,

preliminary findings arose. Nonetheless, it will be important to reexamine Shay and Lafta's (2015) proposed model in different populations, with different measures, and in different settings. This study demonstrated that perceptions of SDM and patient engagement are associated with higher levels of decision satisfaction and working alliance, as well as with better mental health and well-being, but not physical health, in a sample of individual with severe and chronic mental disorders. In addition, the majority of patient expressed preference for more involvement in treatment decisions. These finding provides impetus for: (1) researchers to further understand the relationship between communication/SDM factors and clinical outcomes; and (2) clinical organizations to familiarize themselves with SDM methods, strategies for assessing patients' preferences for communication, and how to implement SDM effectively. This could mean increasing opportunities for individuals to be engaged in treatment decisions during individual appointments and engaging patients in conversations about the kind of clinical care they prefer. This is a conversation that many patients may have never had with their providers before, so providers should be prepared for some discomfort or uncertainty. These suggestions are written with caution as the available data does not indicate high perceptions of SDM/engagement lead to improved outcomes; the data only supports positive associations.

The data suggested that providers tended to report lower perceptions of SDM and patient engagement than patients. The discrepancies highlight the potential importance of including more objective measures of SDM, such as direct observation of clinical interactions, in research. The finding also suggests that providers may, in general, have a more critical perspective about when and to what extent SDM and patient engagement is

occurring. Although provider data were less correlated with patient perceived outcomes (as would be expected), it is possible that provider perspectives provide a more stringent view on perceived SDM if self-reports, rather than direct observation, are being used to measure SDM. However, studies should to determine how patient and provider perceptions correlate with direct observation measures of SDM.

The spread of the difference scores suggested that the greatest discrepancies in perceptions occurred when the average of patient and providers' perceptions of SDM and engagement were lower. In these instances, providers tended to rate SDM and engagement higher than patients. Although absolute agreement between patient and provider is probably best, it is this writer's opinion that if disagreement is occurring, it is probably better that patients are reporting higher perceptions of SDM/engagement than providers (rather than the opposite). The latter could mean that the provider is missing something important in the clinical interaction that is impacting the patient's perceptions. Because the data supports that perceptions of SDM are associated with better outcomes, lower patient perception without provider awareness could be detrimental. Clinically, it could be important to understand why these discrepancies in perspectives are occurring, and, if the patient would like to be more engaged, clinicians should find ways to make this happen using SDM or other techniques.

Finally, the data indicated that older individuals and women expressed more interest in being involved in treatment decisions. Replication of these findings will be important, as well as future studies that explore the qualitative differences in preference between younger and older patients and between men and women. Examination of moderating effects showed that, for younger individuals and women, perceptions of

SDM/engagement had a greater impact on their decision satisfaction and perceived working alliance with their provider. This tended to be less true for older individuals and men. The clinical implication is that providers may benefit from being more aware of how they are communicating and engaging with younger individuals and women because these groups appear to be more likely to experience deleterious effects when they perceive SDM/engagement to be low. Similar implications apply for those without provider continuity. The data suggested these individuals are more likely to rate working alliance lower when they report low perceptions of SDM. Thus, they may also benefit from providers who are willing to intentionally engage them in treatment decisions. This said, all individuals deserve and may benefit from opportunities to be engaged in treatment decisions.

Limitations

There were several major limitations in this project. One was the rate of provider turnover without a reliable way to capture this data. Provider turnover was not documented throughout the course of the study; instead, it was determined via chart review at the end of the study. In some cases, participants met with several providers within one six month period between research check-ins, so it was not always easy to know which provider the participant had in mind when completing the measures. In addition, the provider turnover impacted the course of perceived SDM/engagement. The longer the study progressed, the more individuals there were who experienced a change in providers, which undoubtedly changed the perception of the clinical relationship. This factor alone may explain the negative quadratic growth curves of both patient perceived SDM and engagement.

Relatedly, non-adherence in implementing SDM and poor documentation of the extent to which SDM occurred at the intervention sites made it impossible to know to what degree SDM was intentionally occurring, if at all. There were not significant differences between perceptions of SDM at the control and intervention sites, so all indicators of SDM were based on patient and provider perceptions of SDM rather than any objective differences in care. Although patient and provider perceptions are valuable, they do not inform us about what kind of communication is truly occurring between the patients and providers. Self-report perspectives also do not give us an opportunity to say if SDM predicts any changes in patient cognitions/affect, health behaviors, or health outcomes (as Shay and Lafta's (2015) model hypothesizes).

Another limitation is the rate of attrition throughout the course of the study. By 24 months follow up, 149 of the original 240 participants (62.08%) engaged in the research check-in. Although maximum likelihood estimation is a robust method for accommodating for such missing data, this is still a notable attrition rate. In addition, participants did not necessarily complete every measure even when participating in the follow up check-in, and providers did not always complete the companion measure. This means that, in most cases, even fewer data points exist at each time point for each measure used in the study (see Table 1 for details).

The researchers sought to minimize the burden placed on participants by keeping the research check-in measures brief, which is always an important consideration in any study. However, it is possible that the selected measures missed important elements of change for participants, such as participants' beliefs that they are making progress, hope they are or can make clinical improvements to their well-being, or other clinical measures

of improved mental health. For example, many participants struggled with substance abuse, and none of the measures directly measured progress in moderating or abstaining from substances. Perhaps more sensitive outcome measure could have caught changes that the current study did not. Because Shay and Lafta (2015) also highlight the role of behavioral changes in mediating the relationship between SDM and health outcomes, it would also be important to include such measures in future studies. However, issues related to measurement selection are present in all studies, so this is less of a limitation and more of a hypothesis that other measures could have captured other kinds of change that occurred. At conception, this study did not seek to test the Shay and Lafta (2015) mediation hypothesis. However, it could be the case that there was little change occurring within the population and other measures would have generated similar findings.

Additionally, objective measurements of SDM and patient-provider communication could have been useful. For example, researchers have developed scales and methods for objectively measuring SDM using observation of clinical encounters (Elwyn et al., 2005; Hauer et al., 2010). In fact, the OPTION scale seems to be one of the best scales available for objectively measuring a number of foundational features of SDM via direct observation (see Table 2 in Elwyn et al., 2005), and many agree that it is the gold standard for assessing SDM. Without objective measurement, it is impossible to say if and what elements of SDM are occurring, and we cannot compare alignment of perceptions of SDM with objective measurement. Measuring perceptions of SDM is certainly easier and less burdensome on the researchers, and perceptions, particularly patient perception, seem to play an important role in influencing outcomes. However, it

will be important to understand if subjective measures of SDM can provide adequate information relative to objective measures.

Future Directions

Guided by the findings and limitations of the current study, future researchers should consider the following. First, including both subjective and objective measures of SDM can provide opportunity to determine how well they correlate with each other and if subjective measures, while valuable in their own respect, are an acceptable substitute for objective measures. It will be helpful for researchers to continue to explore the additive value of measuring provider perspectives and patient-provider agreement around SDM and communication. The current study suggested that these measurements did not predict patient perceptions of outcomes as well as patient perceptions of SDM/communication, but this finding might be different if other kinds of outcome measures were included.

Second, future studies could benefit from measuring (tracking and verifying) implementation of SDM procedure and protocols, creating a system of accountability to assure that SDM is actually occurring at intervention sites. This could, in part, be facilitated by including more provider training and follow up trainings in SDM, facilitating provider buy-in utilizing SDM and its tools, and utilizing more objective measures to determine if SDM occurred. This would allow researchers to test the proposed mediational effects without solely relying on patient/provider perceptions of communication. As previously suggested, it would also be helpful to add a measure of behavioral change to the study (e.g., adherence to treatment plan, lifestyle changes) in order to tap into this mediational effect proposed by Shay and Lafta (2015).

Third, researchers can continue to study individuals' differing preferences of patient-provider communication styles as well as increase understanding of what predicts and explains the differences. Addressing these preferences will continue to increase our understanding of how different demographic factors influence the effect of SDM on outcomes. This could involve other quantitative measures, but using qualitative methods may help to answer these questions more fully. For example, interviewing patients about their preferences, expectations, concerns, and experiences when communicating with providers can help to flesh out the findings. As SDM becomes more integrated in healthcare settings, providers and advocates of SDM should have a better understanding of how it impacts outcomes variably depending on the individual.

Conclusions

There is still a lot to be learned about the preferences for and impact of SDM for individuals seeking care for mental and physical conditions. The current study highlights the difficulty of implementing and accurately measuring the implementation of SDM in community mental healthcare clinics. The available data suggested that little change occurred over the course of the two year study in terms of patient/provider perspectives about communication and patient perceptions of working alliance, decision satisfaction, mental/physical health, and well-being. The data also indicated that mediation, as proposed by Shay and Lafta (2015), did not occur, but this deserves future research using other methodological designs. The data does provide some insight into how individuals differ regarding preferences for communication and how different factors may influence the strength of the impact of perceived SDM on outcomes. Despite the many implementation challenges, some of its strengths included that (1) it is highly

generalizable because it took place in community clinics and did not utilize overly stringent inclusion criteria; (2) it utilized feedback from patients, providers, and other important stakeholders to develop and modify mPOWR and research tool; and (3) it utilized a longitudinal design and collected data from both patient a provider perspectives. There is a clear need for ongoing research, but this study provides a strong foundation for future researchers to further understand the role of SDM in improving mental and physical healthcare and outcomes for individuals seeking care.

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Appendix A

Patient check in used at 6, 12, 18, and 24 months follow up.

Patient RESEARCH CHECK-IN

REGISTRATION

1) Who is completing this survey?

   Self ___ Other (write in name/relationship)

   _____

2) What clinic do you visit?

   GSW GOS TCCS MHR

3) How do you get to your appointment (method of transportation)?

   --Car (self) --Car (friend/relative) --Car (non-emergency medical transport)

   --Bicycle --Walk --Public transportation

   --Taxi -- we meet at my Residence --Other _____

4) What is the usual time between visits with your provider? _____

   [If you've only seen this clinician once, mark 'Not Applicable']

5) I find it easy to get an appointment with my provider.

Always Often Sometimes Rarely Never

(comment):_____

6) My wait time in the reception area is reasonable.

Strongly agree Agree somewhat Agree

Undecided N/A

Disagree somewhat Disagree Strongly disagree

Overall Evaluation

Strongly agree - Agree - Agree somewhat - Undecided - Disagree somewhat - Disagree - Strongly disagree

	SA	A	As	U	Ds	D	SD
1. My provider greets me in a way that makes me comfortable.							
2. My provider asks me what I'd like to cover/accomplish at the start of each session.							
3. My provider encourages me to express my thoughts about my health problems							
4. My provider listens carefully to what I have to say.							
5. My provider encourages me to ask questions.							
6. My provider responds to my questions and concerns.							
7. My provider involves me in decisions as much as I want.							
8. My provider checks to be sure that I understand everything.							
9. My provider shows care and concern about me as a person.							

10. My provider spends the right amount of time with me.							
11. Overall, I am satisfied with my visit (today/most recent).							
12. I am very engaged in my own treatment planning.							
13. I feel it is hard to engage in my treatment planning.							

Working Alliance

Never - Rarely - Occasionally - Sometimes - Often - Very Often - Always

	N	**R**	**O**	**S**	**O**	**vO**	**A**
1. My provider and I agree about the steps to be taken to improve my situation.							
2. What I am doing with my provider gives me new ways of looking at my issues or problems.							
3. I believe my provider likes me.							
4. My provider seems to have trouble understanding what I am trying to accomplish.							
5. I am confident in my provider's ability to help me.							
6. My provider and I trust one another.							
7. My provider and I have different ideas on what my challenges are.							

Decision Satisfaction

Strongly Disagree - Disagree - Neither agree nor disagree - Agree - Strongly Agree

	SD	**D**	**N**	**A**	**SA**
1. The decision(s) I am making is/are the best for me personally.					
2. My decisions reflect my personal values.					
3. I expect to successfully carry out (or continue to carry out) the decisions that I am making.					
4. I have as much input as I want in developing ways to address my situation(s).					
5. I am satisfied with the decisions we are making about my situation.					

Patient Wellness Assessment [SF-12:]

1. In general, would you say your health is:

   Excellent Very good Good Fair Poor

The following is a list of activities that you might do during a typical day. Please respond if your health now limits you a lot, a little, or does not limit you at all.

2. Limitations in moderate activities? (Such as: moving a table, pushing a vacuum cleaner, bowling, pushing a grocery cart, carrying one bag of groceries, or walking to transportation source.)

   A lot A little No limitations

3. Limitations in climbing several flights of stairs?

   A lot A little No limitations

The following two questions ask you about your physical health and your daily activities.

4. During the past 4 weeks, have you accomplished less than you would like as a result of your physical health?

   A lot A little No limitations

5. During the past 4 weeks, were you limited in the kind of work or other regular daily activities you do as a

result of your physical health?

A lot A little No limitations

The following questions ask about your emotions and your daily activities.

6. During the past 4 weeks, have you accomplished less than you would like as a result of any emotional troubles or problems, such as feeling depressed or anxious?

A lot A little No limitations

7. During the past 4 weeks, did you not do work or other regular activities as carefully as usual as a result of any emotional issues, such as feeling depressed or anxious?

A lot A little No limitations

8. During the past 4 weeks, how much did any type of pain interfere with your normal activities/work, including both work outside the home and housework?

Not at all A little bit Moderately Quite a bit Extremely

As you read the following questions, please give the one answer that comes closest to the way you have been feeling during the past 4 weeks:

(is it all of the time, most of the time, a good bit of the time, some of the time, a little of the time, or none of the time?)

9. How much of the time during the past 4 weeks have you felt calm and peaceful?

All Most A good bit Some A little None [of the time]

10. How much of the time during the past 4 weeks did you have a lot of energy?

All Most A good bit Some A little None [of the time]

11. How much of the time during the past 4 weeks have you felt downhearted and blue?

All Most A good bit Some A little None [of the time]

12. How much of the time has your physical health or emotional problems interfered with your social activities, like visiting with friends or relatives?

All Most A good bit Some A little None [of the time]

ORS:

Looking back over the last week, including today, help us understand how you have been feeling by rating how well you have been doing in the following areas of your life

(Marks to the left mean low level; marks to the right indicate high level).

Individually:

Personal well-being

(LOW) _____ **(HIGH)**

Interpersonally:

Family, close relationships

(LOW) _____ **(HIGH)**

Socially:

Work. School. Friendships.

(LOW) _____ **(HIGH)**

Overall:

General sense of well-being

(LOW) _____ **(HIGH)**

SDM-mod:

Our last meeting was about:

The action plan developed or decision that was made was:

Regarding the last meeting, please indicate how much you agree or disagree:

Completely disagree - Strongly disagree - Somewhat disagree - Somewhat agree - Strongly agree - Completely agree

	CD	**SD**	**sD**	**sA**	**SA**	**CA**	**n/a**
1. My provider told me that there are different options for treating my condition/dealing with my situation.							
2. My provider discussed the advantages and disadvantages of options and strategies.							
3. My provider helped me understand all the information.							

4. My provider and I thoroughly weighed the different options.							
5. My provider asked me which options I prefer.							
6. My provider and I prioritized action steps /reached an agreement on how to proceed.							