A multi-level assessment of shared decision making: An evaluation of clinician and patient attitudes and behaviors and the identification of predictive profiles

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**Abstract:** The objective of this study was to gain a greater understanding of shared decision making (SDM) by identifying the behaviors and attitudes of healthcare professionals (HCP) and patients that are associated with varying levels of SDM performance. The study centered on HCP and patient surveys that assessed a participant’s degree of endorsement of SDM favorable behaviors by asking them to predict how they might address a specific decision point in various healthcare interactions. Using quantitative (descriptive analytics, predictive and mixture modeling) and qualitative methods (grounded theory) to analyze the data, SDM skills were quantified in HCP and patient populations, and demographic and attitudinal factors that facilitate or hinder successful implementation of SDM were identified. Distinct HCP profiles (Motivated but Cautious, Insufficiently Engaged, and Pro-Autonomous) and patient profiles (Pro-Paternalistic, Pro-Autonomous, and Unconcerned but Open-Minded) were then defined. By characterizing these distinct profiles and the attitudes and preferences that are associated with one another, these results can be directly utilized by educational providers interested in teaching

**ABOUT THE AUTHOR**

The work reported in this paper relates to this author’s broader research and projects in the field of shared decision making (SDM). An example of this research includes a study being conducted in collaboration with Valley Health System (Ridgewood, NJ) in which SDM profiles are being created for both clinicians and patients and the impact of various SDM profile matches between patients and clinicians on clinical outcomes are being measured. In addition, the use of a digital platform offering virtual sessions with standardized patients as a technique to teach clinicians basic principles of SDM is also being studied.

**PUBLIC INTEREST STATEMENT**

Shared decision making (SDM) is a clinical framework in which patients and healthcare providers (HCPs) decide together on a specific treatment or management approach based on a common understanding of treatment options and patient preferences. Although SDM is associated with improved patient satisfaction and health outcomes, it is not always adopted. The objective of the current study was to identify the characteristics of HCPs and patients that facilitate or hinder SDM. Through the analysis of patients’ and HCPs’ responses to surveys that addressed SDM related attitudes and behaviors, a number of attributes were identified that correlated with optimal SDM performance. Distinct profiles consisting of specific attitudes and behavioral preferences were then characterized. Future efforts can apply these findings by developing educational opportunities for HCPs and patients on how to improve their interactions based on their recognition of these profiles while also empowering patients on their own impact on clinical outcomes.
SDM skills to enable HCPs to individualize their SDM approach based on the recognition of these profiles while also providing the self-assessment needed to modify their own behaviors.

**Subjects:** Instructional Communication; Interpersonal Communication; Health Communication; Continuing Professional Development; Health Education and Promotion; Medical Education

**Keywords:** shared decision-making; patient-centered care; clinical interactions; medical decision-making; continuing education

1. Introduction

Patient-centered care is defined as “providing care that is respectful of and responsive to individual patient preferences, needs, and values and ensuring that patient values guide all clinical decisions” (Institute of Medicine, 2001). It includes promoting effective communication strategies between patients and providers, educating patients on relevant evidence-based information, and practicing shared decision-making (Balogh et al., 2013). Shared decision making (SDM) occurs when providers and well-informed patients decide together on a specific treatment or management approach, based on a common understanding of treatment options and patient preferences. (Institute of Medicine, 2011; Sheridan et al., 2004). While SDM advocates for a collaborative relationship between HCPs and patients, other types of HCP-patient relationships that have been described include an “autonomous” type, where emphasis is placed on patients making their own healthcare decisions, and a “paternalistic” type, where HCPs decide what is “best” for their patient with regards to treatment (Emanuel & Emanuel, 1992; Kaba & Soroush, 2007; Rodriguez-Oxorio & Dominguez-Cherit, 2008).

In recent decades, patients have been encouraged to play a greater role in medical decision-making (Clancy, 2008). Indeed, when patients become more engaged with their providers during decision-making, they report higher satisfaction and better outcomes (Alston et al., 2012; Hack et al., 2006; Hibbard & Greene, 2013; Lantz et al., 2005; Légaré et al., 2010; Maurer et al., 2012; Roseman et al., 2013; Shay & Lafata, 2015). However, despite the potential benefits of SDM, when examining research that measured SDM in over 3,000 medical decisions, only 9% met the standards for effective SDM, citing barriers such as systemic issues within the healthcare team, along with HCPs’ and patients’ attitudes and behaviors regarding SDM (Jones et al., 2014; Larsson et al., 2011; Lee & Emanuel, 2013). A meta-analysis of 38 SDM studies identified the top barriers to SDM reported by providers as time constraints and patient characteristics, that include perceived patient preferences and non-adherence to specific guideline-recommendations (Cabana et al., 1999; Légaré et al., 2008). HCPs’ behaviors are also influenced by their lack of knowledge or familiarity with SDM, disagreement with the SDM model, perceived impracticality of SDM, belief that SDM is not evidence-based, a perceived lack of resources available to engage in SDM, in addition to patient diagnosis/prognosis (Cabana et al., 1999; Espeland & Baerheim, 2003; Lewis et al., 2015; Nata et al., 2016; O’Brien et al., 2013; Thorne et al., 2013). The meta-analysis by Légaré also reported the top three facilitators of SDM as provider motivation, positive experiences during patient interactions, and perceived impact on patient outcomes. Patient-centered barriers include individual differences in decision-making styles, patient demographics, inequities between patient and HCP in expertise and authority, low or unrealistic expectations of outcomes/SDM, lack of decision support, and lack of trust (Bastiaens et al., 2007; Larsson et al., 2011; Peek et al., 2010; Thompson, 2007).

In order to overcome these barriers, it is essential to identify the HCP and patient attitudes and demographic factors that facilitate or hinder SDM and the motivation to engage in a collaborative HCP-patient relationship. The main objective of the current study was to therefore identify correlates of pro-SDM behaviors among patients and HCPs and to determine if profiles of HCP and patient SDM-related behavior could be established. A survey assessing SDM-related behaviors and attitudes was developed, from which three distinct patient profiles and three distinct HCP...
profiles were identified that were associated with varying levels of SDM behavior. Future efforts can apply these findings by developing continuing education (CE) for HCPs that enables them to better predict patient attitudes and behaviors based on the recognition of these profiles, in addition to providing prescriptive education for attitudinal and behavioral changes among those profiles that are inconsistent with effective SDM practice. Similarly, by providing suitably tailored education to patients that includes a more nuanced understanding of HCP SDM patterns, patients might become equally empowered to navigate and impact their own interactions with their HCPs.

2. Materials and methods
Analogous HCP and patient surveys were developed to measure attitudes and behaviors associated with SDM, based upon previous research on the implementation of SDM in clinical practice (Emanuel & Emanuel, 1992; Kaba & Sooriakumaran, 2007; Rodriguez-Oxorio & Dominguez-Cherit, 2008). These surveys assessed the degree of endorsement of specific SDM behaviors using four clinical vignettes with emotion-triggering scenarios and role-playing opportunities, which were followed by eight action-based statements. Half of the statements reflected endorsement of SDM principles and the other half reflected endorsement of either paternalistic or autonomous HCP-patient relationships. Participants were then asked how they might address a specific decision-point in each vignette by selecting three of the eight action-based statements. For each vignette, participants were also presented with a series of questions where they were asked to rate (on a Likert scale) the quality of the interaction, behaviors that participants would have done differently, and the value of SDM in each interaction, all from both HCP and patient perspectives. Participants also had the opportunity to share their general perceptions and experiences with SDM in an open-ended question. The focus of these surveys was to determine what facilitates successful SDM and what are the driving barriers to SDM from both HCP and patient perspectives. The four disease states presented in the scenarios, non-small cell lung cancer, childhood epilepsy, rheumatoid arthritis, and obesity, are all preference-sensitive conditions for which multiple treatment options exist (Vorhoff et al., 2013). They were selected due to the high degree of patient involvement in decision-making that they present, and the cases were constructed to highlight that opportunity. The surveys took 30–45 minutes to complete and were administered utilizing an online module that allowed access to a regionally diverse sample of HCPs and patients. Participation was promoted through social media networks and was incentivized using gift cards that were sent to participants upon survey completion.

Data analysis centered on the behavior-based statements from which an SDM Performance Score was calculated by determining the number of “pro-SDM” behaviors that a participant selected. Each participant could select three behavior-based statements for each of the four vignettes, resulting in a range of possible scores from zero to twelve points. After calculating the SDM scores, linear regression predictive modeling was conducted using the SDM Performance Score as a target and including all demographic and attitude-oriented items as potential predictors. In search of groups of participants with distinct SDM profiles, variational Bayesian estimation was conducted for a multivariate Gaussian mixture for both patient and HCP populations (Pedregosa et al., 2011). All individual Likert scale attitude-oriented questions were included. ANOVAs were conducted to identify all survey items which showed significant differences among groups.

Grounded theory (GT) was utilized for the qualitative analysis of open-ended items to identify common themes. Participants’ attitudes about SDM were extracted via a systematic analysis of all comments by coding the responses and then determining the percentage of participants whose comments related to a particular theme. Coded items were incorporated into all quantitative analyses.

All research was conducted in accordance with the Declaration of Helsinki.
3. Results
A regionally diverse sample of HCPs and patients completed the surveys (see Table 1). HCP demographics that were assessed included years in practice, practice focus, type of practice, number of clinicians in practice, number of patients seen per week, practice setting, region and gender. Patient demographics included age, education, health status, frequency of visits, whether they have friends or family who are providers, and gender.

SDM Performance Scores were determined for HCPs and patients. The mean score for HCPs (N = 319) was 8.4 (SD = 1.6) out of a possible 12-points (see Figure 1). The mean SDM Performance Score for patients (N = 290) was 5.2 (SD = 2.0) (see Figure 2). Compared with the HCP SDM scores, the patient population demonstrated significantly lower pro-SDM behaviors (p <.0005).

3.1. Predictive modeling
In order to address what attitudinal and demographic items might impact participants’ selection of SDM-favorable behaviors, predictive modeling was conducted using the SDM Performance

| Table 1. Demographics of participants who completed the survey |
|---------------------------------------------------------------|
| **HCP (N = 319)**                                             | **Patient (N = 290)** |
| Profession                                                   | Gender               |
| Physician 44%                                                | Male 58%             |
| Nurse Practitioner 21%                                       | Female 41%           |
| Physician Assistant 10%                                      | Transgender 1%       |
| Nurse 9%                                                     |                      |
| Medical Student 4%                                           |                      |
| Other 12%                                                    |                      |
| Specialty                                                    | Health status        |
| Primary Care 58%                                             | Non-cancer chronic condition 33% |
| Oncology 10%                                                 | Cancer chronic condition 17% |
| Cardiology 5%                                                | Fair 32%             |
| Psychiatry 5%                                                | Great 18%            |
| Other 23%                                                    |                      |
| Patients per week                                           | I care for someone with a chronic condition |
| <25 21%                                                      | Yes 45%              |
| 26–50 26%                                                    | No 55%               |
| 51–75 19%                                                   |                      |
| 76–100 19%                                                  |                      |
| >100 15%                                                    |                      |
| Years in practice                                           | Ethnicity            |
| <5 17%                                                      | White 67%            |
| 5–10 20%                                                    | Hispanic/Latino 14%  |
| 11–20 34%                                                   | Black/African 11%    |
| >20 30%                                                     | Other 7%             |
| Region                                                       | Age                  |
| Northeast 26%                                               | 20–29 9%             |
| Midwest 25%                                                 | 30–39 33%            |
| South 32%                                                   | 40–49 38%            |
| West 17%                                                    | 50–59 13%            |
|                                                              | 60 + 7%              |
| Education                                                   |                      |
| Some HS/HS graduate 5%                                       |                      |
| Some college 17%                                             |                      |
| Associate degree 37%                                         |                      |
| College degree 39%                                           |                      |
| Postgrad degree 3%                                           |                      |
| Region                                                       |                      |
| Northeast 11%                                               |                      |
| Midwest 22%                                                 |                      |
| South 21%                                                   |                      |
| West 46%                                                    |                      |
Score as a target. Predictive modeling showed that among HCPs, SDM-favorable behaviors were significantly associated with eight survey items ($p < .05$, listed in Table 2). Five of the predictors showed positive correlations with the SDM Performance Score; these included the belief that patient involvement improves medical decision making, belief that improving rapport makes patients more receptive to provider input, belief that a provider has a responsibility to prepare patients for potential set backs, belief that a provider should educate patients about all aspects of decision making (including out of pocket costs), and motivation to improve communication skills. Three of the predictors were negative correlations, indicating that greater SDM scores were significantly associated with the belief that frustrated patients are still able to make the right medical decision, lower confidence in the ability to engage and motivate patients, and a smaller number of clinicians in a practice.
### Table 2. Significant predictors of SDM Performance Scores identified through predictive modeling

| Significant Predictors of HCPs' SDM Performance Score | Direction |
|------------------------------------------------------|-----------|
| Medical decision-making would be enhanced if patients were more actively involved. | Positive |
| If Dr. Jons makes a greater effort to improve his rapport with Fred, there is a greater likelihood that Fred will be more receptive to all the surgical options. | Positive |
| Dr. Jefferson should have prepared Monica for a worsening of symptoms at the beginning of her diagnosis. This would have helped her remain motivated about taking her medication. | Positive |
| When making treatment recommendations, I mention a patient's out-of-pocket expenses, so that it can be factored into their decision-making. | Positive |
| To improve my ability to communicate with patients, I would be motivated to take a 2-day course in SDM. | Positive |
| Monica is understandably frustrated with her disease progression. Because of this, it is likely that she may not be able to make the right medical decision for herself. Dr. Jefferson should, therefore, try to involve a family member in the decision making process. | Negative |
| I feel confident that I would be able to engage a patient like Monica, and motivate her to be more adherent with her treatment. | Negative |
| Number of clinicians in practice | Negative |

| Significant Predictors of Patients' SDM Performance Score | Direction |
|---------------------------------------------------------|-----------|
| I feel comfortable calling or emailing my doctors outside of my scheduled appointments if I have a question and don't want to wait. | Positive |
| Because Monica hasn't been taking her medication properly, she should make a greater effort to stick with MTX and see how that goes before asking about switching medications | Positive |
| If Dr. Jefferson had explained to Monica that her symptoms might worsen even with medication, Monica would likely have stuck with her medication and not given up | Positive |
| When I see a healthcare provider, I often feel they are rushed for time and prefer to have brief appointments | Negative |
| There is no way to fully understand all the considerations in a particular medical decision. That is why I would rather not play an active role in selecting a treatment and would prefer to leave it to my doctor. | Negative |
| The differences between procedures are too complex to completely understand. Fred should just trust Dr. Jons' recommendation based on his experience with other patients who have struggled with weight loss. | Negative |
| If his parents imply listen to Dr. Bryant's recommendation, Luke will be better off | Negative |

Among patients, predictive modeling identified seven survey items as significant predictors of patients' SDM Performance Score (p < .05, listed in Table 2). Three of the predictors showed positive correlations with the SDM Performance Score; these included comfort in contacting doctors outside of scheduled appointments, belief that patients should make an effort to adhere to their medications.
before asking to change a treatment plan, and the belief that a provider should prepare patients for potential negative outcomes. The four negative predictors showed that pro-SDM behavior negatively correlates with the feeling that providers are often rushed for time, the belief that there is no way to completely understand a medical decision, the belief that because of the complexity of medical procedures patients should just accept a provider's recommendation, and feeling like patients will always be better off if they follow their provider's recommendation even if it is in contrast with their own preferences.

3.2. Identification of profiles through mixture modeling

Predictive modeling showed that providers' and patients' SDM-related behaviors are related to multiple attitudinal items and behavioral preferences. To confirm this finding, a multivariate Gaussian mixture modeling approach was adopted to identify participant clusters, which were then compared by SDM Performance Score and all attitudinal and demographic characteristics.

Among HCPs, three groups were identified. These groups showed only modest non-significant differences when compared by their SDM Performance Scores: Group A (average SDM Performance Score of 8.1, N = 95), Group B (8.4, N = 99), and Group C (8.5, N = 125). However, when compared using all other attitudinal and demographic survey items, sixteen items showed significant score differences among groups (p < .05, see Table 3). These sixteen items were conceptualized as three distinct HCP profiles, “Motivated but Cautious” (Group A), “Insufficiently Engaged” (Group B), and “Pro-Autonomous” (Group C), which demonstrated variant attitudes about incorporating SDM into practice and had distinctive characteristics that set them apart (summarized in Table 7). The “Motivated but Cautious” HCPs are most likely to believe that patient involvement improves decision-making and that they should take an active role in promoting engagement by encouraging patients to ask questions and by improving their rapport with patients. These HCPs report the highest confidence in engaging patients and are also the most motivated, as they were most likely to report their interest in taking a course to improve their communication skills. Motivated but Cautious providers, however, are most likely to report patients' preconceived ideas, difficulty in understanding complex medical information, and communication challenges as barriers to SDM. In contrast, “Insufficiently Engaged” HCPs are most likely to report that time is the greatest barrier to SDM. These HCPs report a high level of confidence in engaging patients, but would not be interested in spending time to improve their communication skills. Finally, the “Pro-Autonomous” HCPs advocate for an autonomous model of provider-patient interactions. They believe that patients are comfortable asking questions and do not need encouragement and that patients are able to understand complex medical information. Although Pro-Autonomous providers are the least confident in their ability to engage patients, they report the least amount of interest in improving their communication skills. These providers are also the least likely to think that patient-provider rapport impacts patient motivation. No demographic differences were noted among the groups.

Three groups of patients were also identified through mixture modeling. Among these groups, there was a significant difference (p < .0005) in the SDM Performance Scores, with Group C showing a significantly higher score (6.0, N = 160) compared to Groups A (4.2, N = 54) and B (4.4, N = 76). Fourteen additional items from the patient survey (eleven attitudinal and three demographic) also showed significant score differences among groups (p < .05, see Table 4). These items were used to define three distinct Patient-SDM profiles: “Pro-Paternalistic” (Group A), “Pro-Autonomous” (Group B), and “Unconcerned but Open-Minded” (Group C, summarized in Table 7). The Pro-Paternalistic patients think that there is no way to fully understand medical information and would therefore prefer to leave decisions to HCPs. They are the most intimidated asking questions and feel like their HCPs are rushed during appointments. These patients are skeptical about what they watch or read on television or the internet and feel it is the responsibility of HCPs to make sure patients understand all risks and benefits of a treatment. This patient group, which is also most concerned about out-of-pocket costs, consists of the largest proportion of elderly patients with chronic conditions. In contrast, “Pro-Autonomous” patients feel like they can completely understand all considerations of a medical decision and that they will be better off playing an active role in their own
### Table 3. Survey items used to define HCP profiles

| Survey items that showed differences among mixture modeling groups (range: 1–5 for all items)                                                                 | GROUP A N = 95 | GROUP B N = 99 | GROUP C N = 125 | Groups with a significant difference |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|----------------|-------------------------------------|
| One of the greatest challenges to effective SDM is that patients can have incorrect preconceived ideas.                                                                               | 4.39          | 3.85          | 4.00           | A vs. B                             |
| One of the greatest challenges to effective SDM is a patient's ability to comprehend complex medical information.                                                                    | 4.32          | 3.83          | 3.70           | A vs. B                             |
| One of the greatest challenges to effective SDM is time.                                                                                                                             | 4.46          | 4.57          | 4.18           | A vs. C B vs. C                     |
| One of the greatest challenges to effective SDM is a patient’s difficulty in articulated their concerns.                                                                             | 4.03          | 3.16          | 3.26           | A vs. B                             |
| Patients often feel they need to be invited to ask questions.                                                                                                                        | 4.13          | 3.90          | 3.71           | A vs. C                             |
| To improve my ability to communicate with patients, I would be motivated to take a 2-day course in SDM.                                                                                | 4.08          | 3.53          | 3.54           | A vs. B                             |
| Medical decision-making would be enhanced if patients were more actively involved.                                                                                                | 4.52          | 4.26          | 3.96           | A vs. B vs. C                       |
| My patients who are highly educated are more likely to want to play a role in medical decision-making.                                                                               | 4.40          | 4.34          | 3.98           | A vs. C B vs. C                     |
| I feel confident that I would be able to engage a patient like Monica, and motivate her to be more adherent with her treatment.                                                        | 4.29          | 4.25          | 3.30           | A vs. C B vs. C                     |
| I feel confident that I would be able to engage the parents of a young patient like Luke, so that they would be able to make a rational medical decision that is not overly affected by the emotions that come with having a sick child. | 4.12          | 3.91          | 3.29           | A vs. C B vs C                      |
| I feel confident that I would be able to engage a patient like Alex, so that he would be able to effectively evaluate the advantages and disadvantages of starting chemotherapy vs. not undergoing any adjuvant therapy. | 4.25          | 4.09          | 3.52           | A vs. C B vs C                      |
| I feel confident that I would be able to engage a patient like Fred so that he would make the best choice in surgery.                                                             | 4.35          | 4.25          | 3.51           | A vs. C B vs C                      |

(Continued)
### Survey items that showed differences among mixture modeling groups (range: 1–5 for all items)

|                        | GROUP A N = 95 | GROUP B N = 99 | GROUP C N = 125 | Groups with a significant difference |
|------------------------|----------------|----------------|-----------------|--------------------------------------|
| If Dr. Bryant makes a greater effort to improve his rapport with the Ramsey family, there is a greater likelihood that they will be more receptive to his recommendations since they will trust him more. | 4.51           | 4.30           | 3.83            | A vs. B vs. C                       |
| If Dr. Heinz makes a greater effort to improve his rapport with Alex, there is a greater likelihood that Alex will be more receptive to all the therapeutic options. | 4.48           | 4.27           | 3.87            | A vs. B vs C                       |
| Mr. and Mrs. Ramsey are allowing the emotional impact of witnessing their son’s seizure to influence their wish to start Luke on anti-epileptic medication. | 4.48           | 4.59           | 4.11            | A vs. C B vs C                     |
| If Dr. Jons makes a greater effort to improve his rapport with Fred, there is a greater likelihood that Fred will be more receptive to all the surgical options. | 4.63           | 4.51           | 4.06            | A vs. C B vs C                     |

They are most likely to trust the medical information they read or watch on the internet/television and feel it is a patient’s own responsibility to make sure they understand all risks and benefits of a treatment. They are also least likely to feel intimidated by their HCPs or to feel rushed during appointments. This group consists of younger patients, both with chronic conditions and in good health, who discuss their health most frequently. These patients also see doctors the most frequently and are least concerned about out-of-pocket costs. The final group, characterized as “Unconcerned but Open-Minded, also consists of younger patients, both with chronic conditions and in good health. However, these patients rarely discuss their health, see their HCPs less frequently, and are more concerned about out-of-pocket expenses. These patients feel like they have the ability to understand medical considerations and can play an active role in decision making. However, they do not feel as strongly about the individual responsibilities of patients and HCPs, whether decision making would be improved by their involvement, or the reliability of what they read or listen to on the internet/television. Notably, this group achieved a significantly higher SDM Performance Score than the other two patient profiles, suggesting that SDM is better facilitated in patients who are open-minded about the specific roles of patients and HCPs in medical decision making.

### 3.3. Qualitative analyses

At the end of their surveys, providers were asked to share their experiences with SDM and patients were asked to describe the perfect health care provider in open-ended questions. Among the 115 HCPs who provided comments, nine main themes emerged (Table 5): four reflected favorable endorsement of SDM (mentioned by 62% of participants) and five reflected skepticism toward SDM (mentioned by 38% of participants). Among the comments that reflected skepticism, HCPs emphasized the importance of patient adherence and patient responsibility, as well as frustrations regarding what HCPs identified as “poor” decision-making by their patients as well as with their own efforts to effectively guide less proactive patients or those not adhering to treatment plans. Among the 99 patients who provided descriptions of “the perfect health care provider”, five themes emerged (Table 6), including the importance of communication, empathy, and
Table 4. Survey items used to define patient profiles

| Survey items that showed differences among mixture modeling groups (range: 1–5 for all items, except where indicated) | GROUP A N = 54 | GROUP B N = 76 | GROUP C N = 160 | Groups with a significant difference |
|---|---|---|---|---|
| SDM Performance Score (range: 1–12) | 4.2 | 4.4 | 6.0 | A vs. C  
B vs. C |
| Age (range: 20–80; % >60 years old) | 46; 28% | 26; 3% | 26; 1% | A vs. B  
A vs. C |
| Health status (% chronic conditions; % reporting “Great”) | 79%; 0% | 49%; 23% | 41%; 23% | A vs. B  
A vs. C |
| Frequency of seeing a doctor (% having >3 visits/year) | 48% | 82% | 55% | A vs. B  
C vs. B |
| Frequency of discussing health issues (% who speak to friends/relatives who are HCPs) | 15% | 33% | 3% | A vs. B vs. C |
| When I see a healthcare provider, I often feel they are rushed for time and prefer to have brief appointments. | 4.93 | 2.80 | 4.01 | A vs. B vs. C |
| There is no way to fully understand all the considerations in a particular medical decision. That is why I would rather not play an active role in selecting a treatment and would prefer to leave it to my doctor. | 4.96 | 3.38 | 3.55 | A vs. B  
A vs. C |
| I sometimes feel intimidated asking questions for my doctor. | 4.06 | 3.47 | 3.76 | A vs. B vs. C |
| Most of the medical information that I read or watch on the internet/television is unreliable and not accurate. | 4.04 | 2.68 | 3.09 | A vs. B vs. C |
| Out-of-pocket cost is an important factor when I make medical decisions. | 4.02 | 3.50 | 3.92 | A vs. B  
C vs. B |
| The differences between procedures are too complex to completely understand. Fred should just trust Dr. Jons’ recommendations based on his experience with other patients who have struggled with weight loss. | 4.04 | 2.78 | 3.77 | A vs. B vs. C |
| Because Monica hasn’t been taking her medication properly, she should make a greater effort to stick with MTX and see how that goes before asking about switching medications. | 4.02 | 2.96 | 3.84 | A vs. B  
C vs. B |

(Continued)
knowledge. Although all comments’ codes were incorporated into all quantitative analyses, they were not identified as being significantly different among provider or patient groups.

4. Discussion
The main objectives of this study were to measure the correlates of pro-SDM attitudes and behaviors among patients and HCPs and to explore whether distinct profiles associated with varying SDM-related attitudes could be identified. Through the development of a survey that assessed the endorsement of specific SDM-related behaviors, an SDM Performance Score could be calculated to quantify SDM within HCP and patient populations, and the attitudes and preferences associated with different scores could be characterized. Among HCPs, three contrasting profiles were then identified through mixture modeling (Motivated but Cautious, Insufficiently Engaged, and Pro-Autonomous), and among patients, three profiles were identified (Pro-Paternalistic, Pro-Autonomous, and Unconcerned but Open-Minded). While previous studies have also described some of the same attitudes among HCPs and patients (Degner & Sloan, 1992; Ende et al., 1989; Légaré et al., 2008; Levinson et al., 2005), the current approach allowed for the incorporation of these attitudes into distinct profiles associated with varying levels of SDM performance, findings that can be directly applied to the analysis of dyadic decision-making processes and to educational efforts designed to quantify and improve SDM practice.

The complexity of each of the profiles defined highlights the challenges of studying dyadic decision-making and the individual contributions of patients and HCPs to successful implementation of SDM. In the current study, the patient and HCP participants were unrelated so that one could not analyze specific profile dyads. However, the novel findings from this study and the identification of distinct profiles provide the framework for designing concomitant surveys for HCPs and their patient populations to analyze specific profile dyads and to determine whether the alignment of any of the patient and HCP profiles can have an impact on patient satisfaction, quality of care, and the achievement of better outcomes.

An additional application of the current study is the opportunity to develop continuing education (CE) for HCPs that incorporates these profiles so that HCPs can better predict patient attitudes and behaviors and can proactively tailor their SDM approach to improve patient receptivity and collaboration. By increasing awareness of the attitudes and preferences that are associated with one another

| Survey items that showed differences among mixture modeling groups (range: 1–5 for all items, except where indicated) | GROUP A N = 54 | GROUP B N = 76 | GROUP C N = 160 | Groups with a significant difference |
|---|---|---|---|---|
| The information that Monica received about the benefits of turmeric and other herbal supplements kept her from taking her medication properly. It would have been better if she had discussed this with Dr. Jefferson first. | 4.93 | 3.59 | 3.84 | A vs. B vs. C |
| It is Dr. Heinz’s responsibility to make sure Alex understand the risks and benefits of the chemotherapy. | 4.83 | 3.46 | 3.96 | A vs. B vs. C |
| If his parents simply listen to Dr. Bryant’s recommendations, Luke will be better off. | 4.74 | 3.17 | 3.82 | A vs. B vs. C |
Table 5. HCP experiences with SDM

| Theme                                                                 | Sample comment                                                                                                                                                                                                 | %  |
|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| I apply SDM approaches; general enthusiasm for SDM                   | I always make it a point to lay down what the patient has, what to expect, what options he/she has as to management, and eventually let them decide what direction we go with the management.                        | 30%|
| SDM results in better outcomes, better compliance, more satisfied patients | I try to explain medical conditions and the treatment options in simple laymen terms or analogies, while letting the patient know I am not underestimating their intellectual capacity. I find that taking the time to explain conditions and reasons why I recommend once treatment vice another builds trust and makes it more likely they will follow the treatment plan outlined. | 11%|
| It is important for patients to be educated; patients have the ability to make good decisions for themselves if well informed | We present options, explain possible side effects and outcomes. The families and patients have time to think over these and make the right decisions for their loved ones and themselves. I feel if they are armed with knowledge, they make better decisions. | 15%|
| Rapport is an important feature of effective SDM                    | I find that having a good relationship with a patient is very helpful in SDM. They are much more open to differing opinions and more honest/ upfront with the doctor.                                                                 | 6% |
| Providers should be in charge of decision making; patients are unable to process complex medical information | I do try to involve patients as much as possible but I think that expertise of a doctor is too valuable a commodity to allow a layperson to be too empowered.                                        | 7% |
| Patients want providers to do everything and make all decisions      | For the most part, when asked what they would like I most often get back “You tell me. You’re the doctor” as the most common response.                                                                                                                                     | 4% |
| I have no interest in SDM; SDM has no benefits; SDM is too challenging | SDM is a slippery slope that needs to be navigated with due caution.                                                                                                                                                        | 6% |
| Time constraints hinder the ability to apply SDM principles to practice. | Time constraints are making it more difficult to have a detailed discussion. Other sources of information can interfere with the decision making process.                                                                                                                     | 3% |
| Patients’ ability to engage in SDM is influenced by culture, preconceived ideas, how much they care about their own health, and their education | It's difficult, when your patients are influenced by Internet and other sources of information                                                                                                                                       | 17%|

within a given profile, certain recognizable features can be effectively used as markers for profile identification to better predict corresponding behaviors. By also highlighting the HCP specific profiles, CE can facilitate the self-reflection of HCPs’ own SDM approach to encourage the modification of their own behaviors to better support SDM. As patient participation is a key component of successful SDM, by providing similar suitably tailored education to patients that provides a greater understanding of
Table 6. Patient comments on ideal HCP characteristics

| Theme                                           | Sample comment                                                                                                                                                                                                 | %   |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Empathetic and comforting                       | They should know how the patient is feeling. They should have the ability to do their best to comfort the patient and their family.                                                                         | 34% |
| An expert/knowledgeable in their medical field | The perfect health provider understands that every step in the medical field is one that can have far-reaching consequences. Therefore, they pay excellent attention to detail and are careful not to skip steps or make errors. | 28% |
| A good communicator who takes the time explain medical information and address concerns | A great health care professional has excellent communication skills that include speaking and listening. They are able to follow directions without problem and can easily communicate with patients and families to understand their needs and explain treatments. | 21% |
| Considers a patient holistically                | A good doctor doesn’t just respond to the immediate health issue that brought the patient in the door, but considers the bigger picture of that patient’s overall health and how to maintain and improve it. | 9%  |
| It is convenient to make appointments and easy to get advice outside of office hours | Has regular office hours and clear, consistent guidelines for getting medical advice and help during nights and weekends.                                                                                | 7%  |

provider performance patterns, patients might also increase their own skills to more effectively engage with HCPs. As such, education that promotes a better understanding of the varying attitudes and preferences related to SDM can encourage HCPs and patients to become more self-aware and proactive, facilitating professional development of practitioners and enabling patients to become confident, engaged partners in their own care. Ultimately, research can also use these findings to examine when and how clinicians (and patients) might move from one profile to another, and what factors might drive a move toward a more “pro” SDM profile.

One outstanding question that remains from the current study is the reproducibility of the findings and whether the same profiles would emerge among different populations and for different disease states. In the current study, provider and patient samples were selected based on their clinical and demographic diversity to capture a broad distribution of potential correlates, and the four disease states that were selected for the surveys (obesity, cancer, rheumatoid arthritis, and epilepsy) were chosen due to the high degree of patient involvement in each of their decision making processes. Our preliminary analysis of comparable surveys with subsequent populations that are equally representative revealed the emergence of similar profiles, suggesting that the profiles characterized in the current study will be applicable. However, further work will be needed to explore how profile descriptions might vary among specific HCP and patient populations and for varying clinical conditions, in addition to other countries outside the United States.

4.1. **Study summary**

(1) Profiles can be identified to help understand SDM barriers and facilitators.
(2) Each profile is associated with quantified markers and characteristics.
(3) Address the barriers and gaps associated with certain profiles.
Table 7. Summary of HCP and patient profiles

| HCP Profiles | Insufficiently Engaged | Pro-Autonomous |
|--------------|------------------------|---------------|
| Motivated but Cautious | Most likely to believe that time is the greatest barrier to SDM | Believe that patients are comfortable asking questions and do not feel they need to be invited to ask questions |
|               | Most likely to report patients’ incorrect preconceived ideas and difficulty articulating their concerns as barriers to SDM. However, they are most likely to report that patients’ emotions can impact decision making | Least likely to think that patient-provider rapport has an impact |
|               | They report a high level of confidence in their ability to engage with patients | Believe that patients are able to understand complex medical information and do not think that patient education impacts their interest in medical decision making |
|               | Less motivated to improve their communication skills | They are the least confident in their ability to engage with patients |
|               |                       | Less motivated to improve their communication skills |

| Patient Profiles | Pro-Autonomous | Unconcerned but Open-Minded |
|------------------|---------------|-----------------------------|
| Pro-Paternalistic| Believe they can fully understand all considerations of a medical decision and are least likely to think that patients will be better off if they just listen to their HCPs | Believe they can fully understand all considerations of a medical decision and do not think that patients will be better off if they just listen to their HCPs |
|                  | They are not intimidated by their providers and are least likely to feel rushed during appointments | Do not feel strongly about whether patients would be better off just listening to HCPs or the individual responsibilities of patients and HCPs |
|                  | Most likely to trust what they read or watch on the internet/television | Receptive to what they read or watch on the internet/television |
|                  | They do not think it is the HCP’s responsibility to make sure a patient understands risks and benefits | Concerned about out-of-pocket costs |
|                  | Least concerned about out-of-pocket costs | They include younger patients, some with chronic conditions and some who report “great” health. They are least likely to discuss their health with friends/relatives |
|                  | They include younger patients, some with chronic conditions and some who report “great” health. They see their providers most frequently and are most likely to discuss their health with friends/relatives | They include younger patients, some with chronic conditions and some who report “great” health. They are least likely to discuss their health with friends/relatives |
| Pro-Autonomous   | Believe they can fully understand all considerations of a medical decision and are least likely to think that patients will be better off if they just listen to their HCPs | Believe they can fully understand all considerations of a medical decision and do not think that patients will be better off if they just listen to their HCPs |
|                  | Most likely to feel that HCPs are rushed and prefer to have brief appointments | Do not feel strongly about whether patients would be better off just listening to HCPs or the individual responsibilities of patients and HCPs |
|                  | Intimidated asking doctors questions | Receptive to what they read or watch on the internet/television |
|                  | Think that most of the medical information they read or watch on the internet/television is inaccurate | Concerned about out-of-pocket costs |
|                  | Think that it is the responsibility of the HCP to make sure a patient understands risks and benefits and more likely to blame patients for incorrect practices | They include younger patients, some with chronic conditions and some who report “great” health. They are least likely to discuss their health with friends/relatives |
|                  | Concerned about out-of-pocket costs | They include younger patients, some with chronic conditions and some who report “great” health. They are least likely to discuss their health with friends/relatives |
|                  | They include the highest proportion of elderly patients with chronic conditions | They include younger patients, some with chronic conditions and some who report “great” health. They are least likely to discuss their health with friends/relatives |

(4) Consider interventions/tools that “move” clinicians from one profile to a more SDM-favorable profile.

(5) Tailor education to specific clinician and patient profiles.
(6) Educate physicians on how to recognize a patient’s SDM profile and optimally interact with that patient.

(7) Utilize markers (i.e. demographics, education) to identify profile composition of learner audience.

Acknowledgements
The data that support the findings of the study are available from KJ upon reasonable request.

Funding
This work was supported by Genentech.

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Conflict interest
No potential conflict of interest was reported by the authors.

Citation information
Cite this article as: A multi-level assessment of shared decision making: An evaluation of clinician and patient attitudes and behaviors and the identification of predictive profiles, Steven Haimowitz, Karyn Ruiz-Cordell, Katherine Joubin & Regina Shih-Meynier, Cogent Medicine (2020), 7: 1786986.

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