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## Systematic Literature Review

## Understanding Patients' Preferences: A Systematic Review of Psychological Instruments Used in Patients' Preference and Decision Studies

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## A B S T R A C T

**Background:** Research has been mainly focused on how to elicit patient preferences, with less attention on why patients form certain preferences. **Objectives:** To assess which psychological instruments are currently used and which psychological constructs are known to have an impact on patients' preferences and health-related decisions including the formation of preferences and preference heterogeneity. **Methods:** A systematic database search was undertaken to identify relevant studies. From the selected studies, the following information was extracted: study objectives, study population, design, psychological dimensions investigated, and instruments used to measure psychological variables. **Results:** Thirty-three studies were identified that described the association between a psychological construct, measured using a validated instrument, and patients' preferences or health-related decisions. We identified 33 psychological instruments and 18 constructs, and categorized the instruments into 5 groups, namely, motivational factors, cognitive factors, individual differences, emotion and mood, and health beliefs. **Conclusions:** This review provides an overview of the psychological factors and related

instruments in the context of patients' preferences and decisions in healthcare settings. Our results indicate that measures of health literacy, numeracy, and locus of control have an impact on health-related preferences and decisions. Within the category of constructs that could explain preference and decision heterogeneity, health locus of control is a strong predictor of decisions in several healthcare contexts and is useful to consider when designing a patient preference study. Future research should continue to explore the association of psychological constructs with preference formation and heterogeneity to build on these initial recommendations.

**Keywords:** decision making, instruments, measurements, patient preference, psychological variables, stated preferences

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## Introduction

Patient preferences (PPs) are defined by the US Food and Drug Administration as the “relative desirability or acceptability to

patients of specified alternatives or choices among outcomes or other attributes that differ among alternative health interventions.”<sup>1</sup> In medical settings, patients are often asked to decide from various treatments or services. In these cases,

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patients are asked to engage in informed deliberation of the risks, benefits, and other aspects of alternate interventions and decide between them. Researchers have developed various methods for eliciting preferences.<sup>1,2</sup> Although studies using these methods can provide an indication of what patients prefer, they often provide little information about why patients form certain preferences.

Although little is known about the influence of psychological variables on the construction of individuals' preferences in health-related fields,<sup>3,4</sup> there has been more investigation of their role in the field of consumer behaviors.<sup>5</sup> The relationship between personality and economic preferences is notoriously spurious and no clear picture emerges from literature.<sup>5–7</sup> Evidence on the link between social preferences and personality is somewhat stronger. Significant associations have been found between trust, as well as positive and negative reciprocity and personality traits.<sup>7</sup>

Evidence on the link between locus of control and economic preferences is equally mixed.<sup>8</sup> Basic emotions that are directly related to the decision or may be anticipated from its outcome seem to play an important role in economic decision making.<sup>9,10</sup> Less clear is whether incidental emotions, which occur at the moment of the decision but are irrelevant to the payoffs, affect economical preferences. Incidental emotions have been shown to influence stock market performance,<sup>11,12</sup> but no effect has been found on preferences for public goods.<sup>13</sup>

Beliefs, attitudes, and personal values seem to offer important insights into drivers of consumer preferences. Values resulted to be correlated with preferences for product category, and individual differences in values significantly predicted product preference in the supermarket.<sup>14</sup>

Evaluating patients' psychological profile may therefore reveal critical determinants of the decisional processing of patients and may detect crucial factors to explain and predict PPs and health-related decisions.

No systematic review has been performed to provide a framework of psychological constructs that have been assessed in PP and decision studies. The aims of this review were therefore to provide an overview and categorization of the psychological variables and instruments used in PP and decision studies conducted in healthcare settings; to assess which psychological constructs have been shown to affect PPs and decisions; to identify areas where further research is needed; and to provide the first important steps toward setting up a framework that can guide researchers with directions on which psychological tools they can use in their future PP studies.

## Methods

### Search Strategy and Selection of Articles

An exploratory search on psychological constructs and instruments used in PP studies was performed in PubMed to create a terminological framework and identify suitable search terms for a subsequent comprehensive search. The following search string was used: ((patient preference\$ OR decision making) AND (psychological factor\$ OR psychological determinant\$ OR psychological variable\$)).

Following this exploration, an extended bibliographic search was conducted in MEDLINE, PubMed, PsycINFO, EMBASE, and Google Scholar (see [Supplemental Materials](https://doi.org/10.1016/j.jval.2018.12.007) found at <https://doi.org/10.1016/j.jval.2018.12.007> for the used search strings). We progressed with a further citation search through Scopus and Web of Science. The articles identified were screened according to the following inclusion criteria:

1. studies that incorporated a psychological instrument in relation to PPs or health-related decisions;

2. studies that presented instruments' psychometric information or used previously validated instruments;
3. quantitative method studies;
4. studies that focused on human beings;
5. studies published from January 1, 1980, to December 30, 2016;
6. studies in English; and
7. full-text articles.

The manual review was performed in 2 phases. Abstracts and titles were screened to identify those relevant to the research question. When too little information was available to determine eligibility, full articles were screened. Relevant articles were then selected by cross-examining the articles. Disagreements in article selection were resolved through discussion between the researchers.

### Data Collection and Extraction Process

A data extraction form was developed on the basis of the Centre for Reviews and Dissemination templates.<sup>15</sup> Three reviewers independently extracted the data. Disagreements in data extraction were resolved through discussion with a fourth reviewer. The quality of the studies was evaluated independently by 2 researchers with the Effective Public Health Practice Project (EPHPP) Quality Assessment Tool for Quantitative Studies.<sup>16</sup> This tool provides a standardized method to assess study quality, leading to an overall methodological rating of *strong*, *moderate*, or *weak* on the basis of selection bias, study design, confounders, blinding, data collection methods, withdrawals and dropouts, intervention integrity, and analysis. The tool has been proven to be both valid and reliable and has demonstrated the ability to adapt the most current methods of systematic literature reviews to questions related to public health.<sup>16–18</sup> Moreover, the broad adaptability of the tool to different study designs made it the most suitable for our quality assessment. Discordances in quality rating were resolved through discussion between the researchers. These evaluations were used to create, for each construct, an overall rating of the quality of the empirical evidence emerging from this review (Table 1).

### Categorization of Constructs and Instruments

A categorization of constructs and instruments detected in the review was developed on the basis of the classification proposed by Appelt et al<sup>3</sup> in their *Decision Making Individual Differences Inventory*, a resource that categorizes and describes the most common individual difference measures used in decision-making research.

The framework of Appelt et al<sup>3</sup> was revised to suit the needs of this review. First, we introduced a category for health beliefs because we contend that beliefs are a key factor to answering questions about preference formation, as was already shown in different fields.<sup>19</sup> Second, risk attitudes were taken into consideration in so far that they influence risk assessment, which is the evaluation of the chance of an undesired outcome. Because risk assessment is a cognitive activity, risk attitudes are considered as factors influencing the cognitive activities underlying the decision-making process and preference formation and thus listed under cognitive factors. Third, we believe that locus of control, which Appelt et al considered as a personality factor, does not indisputably belong to just 1 category. We accepted Appelt's suggestion to treat it as related to personality, but found it necessary to assign it to its own category, listed parallel to the “personality trait” category under the more comprehensive “individual differences” category.

Constructs and instruments identified in this review were organized into 5 categories: motivational factors, cognitive

**Table 1 – List of psychological constructs and instruments identified during the systematic literature review.**

| Category/<br>subcategory                                     | Construct                 | Description of construct                                                                                                                                                               | Overall quality<br>of studies* | Number<br>of studies | Instruments                                                                                                                                                                         |
|--------------------------------------------------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Motivational<br>factors                                      | Self-efficacy             | Self-efficacy is an individual's belief in his or her capacity to master the cognitive, motivational, and behavioral resources required to perform in a given situation. <sup>22</sup> | Moderate to strong             | 4                    | Self-Efficacy Scale<br>Decision-Making Participation<br>Self-Efficacy Scale<br>Decision Self-Efficacy Scale<br>General Perceived Self-Efficacy Scale                                |
|                                                              | Resilience                | Resilience is defined as the process of adapting well in the face of trauma, adversity, threats, tragedy, and sources of stress. <sup>109</sup>                                        | Strong                         | 1                    | Connor-Davidson Resilience Scale                                                                                                                                                    |
|                                                              | Coping style              | Coping style is defined as the habitual pattern of the way individuals react to stress either across different situations or over time. <sup>32</sup>                                  | Strong                         | 1                    | The COPE Inventory                                                                                                                                                                  |
| Cognitive<br>factors<br>Cognitive<br>abilities               | Patient activation        | Patient activation refers to the degree to which an individual possesses knowledge, motivation, skills, and confidence to make effective health-related decisions. <sup>36</sup>       | Moderate                       | 3                    | Patient Activation Measure<br>Questionnaire                                                                                                                                         |
|                                                              | Health literacy           | Health literacy is the patient's ability to read, understand, and use healthcare information appropriately. <sup>44</sup>                                                              | Moderate                       | 7                    | Rapid Estimate of Adult Literacy in<br>Medicine<br>Short test of Functional Health<br>Literacy in Adults eHealth Literacy<br>Scale<br>Chew's Set of Brief Screening<br>Questions    |
|                                                              | Numeracy                  | Numeracy refers to the ability to apply and manipulate numerical concepts. <sup>56,110</sup>                                                                                           | Strong                         | 2                    | Subjective Numeracy Scale                                                                                                                                                           |
|                                                              | Decision-making<br>styles | Decision-making style is the “habitual pattern individuals use in decision making,” or characteristic mode of perceiving and responding to decision-making tasks. <sup>40,41</sup>     | Strong                         | 1                    | General Decision-Making<br>Inventory                                                                                                                                                |
| Risk attitudes                                               | Risk propensity           | Risk propensity is described as a function of the person's perception of risk and the person's willingness to take on this risk. <sup>105</sup>                                        | Moderate<br>to weak            | 2                    | Domain-specific risk task<br>Balloon Analog Risk Task                                                                                                                               |
| Individual<br>differences<br>Personality and<br>dispositions | Personality               | Personality is “the dynamic organisation within the individual of those psychophysical systems that determine his characteristic behaviour and thought.” <sup>62</sup>                 | Moderate<br>to strong          | 6                    | NEO Five-Factor Inventory<br>Big Five Inventory<br>Millon Clinical Multiaxial<br>Inventory<br>Tridimensional Personality<br>Questionnaire<br>Temperament and Character<br>Inventory |
|                                                              | Dispositional<br>optimism | Dispositional optimism is defined as generalized expectancy for positive future events. <sup>111</sup>                                                                                 | Moderate<br>to strong          | 2                    | Life Orientation Test-Revised                                                                                                                                                       |
|                                                              | Health<br>orientation     | Health orientation is an individual-differences concept defined as an individual's motivation to engage                                                                                | Strong                         | 1                    | Health Orientation Scale                                                                                                                                                            |

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Table 1 – continued

| Category/<br>subcategory    | Construct                 | Description of construct                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Overall quality<br>of studies <sup>*</sup> | Number<br>of studies | Instruments                                                                                                                                                                                                                       |
|-----------------------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Health locus<br>of control  | Assertiveness             | in healthy attitudes, beliefs, and behaviors. <sup>112</sup> Assertiveness is a proactive response in difficult situations to contrast with passive or aggressive reactions. <sup>77,78</sup>                                                                                                                                                                                                                                                                                         | Moderate                                   | 1                    | The Assertive-Behavior Competence Inventory                                                                                                                                                                                       |
|                             | Conservatism              | Conservatism is defined as the disposition to preserve tradition and established institutions; to resist and oppose change. <sup>79,80</sup>                                                                                                                                                                                                                                                                                                                                          | Moderate                                   | 1                    | The Right-Wing Authoritarianism Scale                                                                                                                                                                                             |
|                             | Health locus of control   | Health locus of control is defined as a generalized expectation about whether one's health is controlled by one's own behavior or forces external to oneself. <sup>82</sup> An individual with an internal locus of control believes that outcomes are a direct result of his or her own behavior. An individual with an external locus of control believes that outcomes are a result of either chance or powerful other people, such as physicians.                                 | Strong                                     | 8                    | Health Locus of Control Scale<br>Form B of the Multidimensional Health Locus of Control Scale<br>Form C of the Multidimensional Health Locus of Control Scale<br>Health Internal Control subscale of the Health Orientation Scale |
| Emotion and<br>mood factors | Mood states               | In contrast to emotion, mood is defined as a transient, low-intensity, nonspecific, and subtle affective state that often has no definite cause. <sup>89</sup>                                                                                                                                                                                                                                                                                                                        | Strong                                     | 1                    | Profile of mood states                                                                                                                                                                                                            |
|                             | Anxiety                   | A distinction between state and trait anxiety has become commonplace. <sup>92</sup> State anxiety is defined as an unpleasant emotional arousal in face of threatening demands or dangers. A cognitive appraisal of threat is a prerequisite for the experience of this emotion. <sup>93</sup> Trait anxiety, on the other hand, reflects the existence of stable individual differences in the tendency to respond with state anxiety in the anticipation of threatening situations. | Strong                                     | 3                    | Hospital Anxiety and Depression Scale<br>The Spielberger State-Trait Anxiety Inventory                                                                                                                                            |
|                             | Depression                | Depression is a state of low mood and aversion to activity that can affect a person's thoughts, behavior, feelings, and sense of well-being. <sup>91</sup>                                                                                                                                                                                                                                                                                                                            | Strong                                     | 4                    | Hospital Anxiety and Depression Scale<br>The Center for Epidemiological Studies-Depression Scale                                                                                                                                  |
| Health beliefs              | Treatment-related beliefs | Treatment-related beliefs are defined as the specific patient's perception of the need to take medication and concerns about it as well as the general beliefs about pharmacotherapy. <sup>101</sup>                                                                                                                                                                                                                                                                                  | Moderate                                   | 1                    | The Beliefs about Medicines Questionnaire                                                                                                                                                                                         |

<sup>\*</sup> Each study received a score on the basis of its quality ranging from 1 to 3 (1 = weak; 2 = moderate; 3 = strong), then summed to the score of the other studies investigating the same construct; the mathematical average of the resulting value was categorized as follows: from 1 to 1.4, weak; from 1.41 to 1.8, weak to moderate; from 1.81 to 2.2, moderate; from 2.21 to 2.6, moderate to strong; from 2.61 to 3, strong.

factors, individual differences, emotion and mood factors, and health beliefs. The category of cognitive factors was organized into 2 subcategories, *cognitive ability and health literacy/numeracy* and *risk attitude*. Individual differences were organized into *personality and dispositional factors* and *health locus of control, autonomy, and control preference*. The categorization of constructs and instruments detected in the review was performed independently by 3 researchers. Discordances in categorization were resolved through discussion with a fourth reviewer until consensus was reached.

## Results

### Study Selection

The results of the systematic search are shown in Figure 1 in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses.<sup>20</sup> Of the 2460 articles detected, 33 unique studies were identified that met the inclusion/exclusion

criteria<sup>107,108</sup> (see Appendix Table 1 in Supplemental Materials found at <https://doi.org/10.1016/j.jval.2018.12.007>). These publications included 33 instruments that measured 18 psychological constructs within a PP study or health-related decision-making study (Table 1).

### Characteristics of the Included Studies

The samples included in the studies reported on adult participants. Twenty-seven studies included patients, and 8 studies included participants from the general population.

Twenty-five studies used a cross-sectional design, 3 were prospective cohorts, 2 were interventional, and 3 were experimental. Using the EPHPP Quality Assessment Tool for Quantitative Studies,<sup>16</sup> 17 studies were rated as strong, 12 as moderate, and 4 as weak. The overall evaluations for constructs derived from these quality assessments are presented in Table 1.

The 18 constructs and the 33 instruments identified were organized into 5 categories: 3 constructs and 6 instruments were

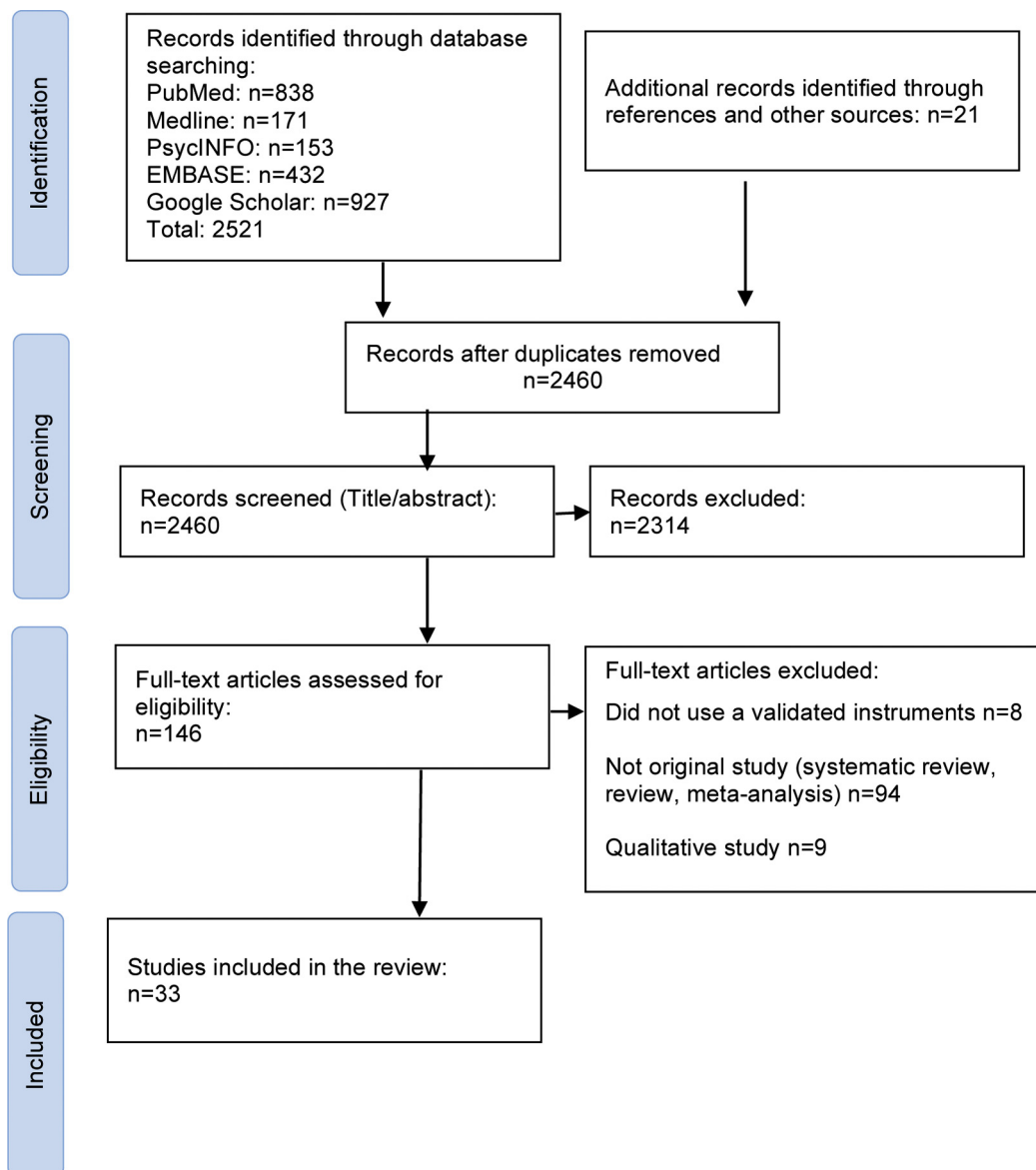


Fig. 1 – PRISMA flowchart of search, identification, and screening of studies for inclusion in the review. PRISMA indicates Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

included in motivational factors; 5 constructs and 9 measures in cognitive factors; 6 constructs and 13 measures in individual differences; 3 constructs and 4 instruments in emotion and mood factors; and 1 construct and 1 measure in health beliefs. The psychological constructs and measures identified are presented and defined in *Table 1* and *Appendix Table 2* (see Supplemental Materials found at <https://doi.org/10.1016/j.jval.2018.12.007>)<sup>112–125</sup>, respectively.

### Motivational factors

Motivation is an individual's drive to engage in a specific behavior.<sup>3</sup> It pushes individuals to fulfill their goals and influences their decisions.<sup>21</sup> Three motivational constructs were detected: self-efficacy, coping style, and resilience.

*Self-efficacy* refers to people's beliefs about their ability to effect outcomes and exert influence on their life events.<sup>22</sup> Four validated questionnaires measuring self-efficacy were identified: the Self-Efficacy Scale,<sup>23</sup> the General Self-Efficacy Scale,<sup>24,25</sup> the Decision Self-Efficacy Scale,<sup>26</sup> and the Decision-Making Participation Self-Efficacy Scale.<sup>27</sup> The latter 2 questionnaires are specific to the decision-making domain, because they examine PP for involvement in the decision-making process.<sup>27–29</sup> Braman and Gomez<sup>30</sup> found that in the general population, self-efficacy measured with the Self-Efficacy Scale did not correlate with preferences for information and involvement for decision making after demographic variables were controlled. In psychiatric outpatients it has been found that the higher the patients' self-efficacy measured with the General Self-Efficacy Scale, the greater their preference and their perception of participation in decision making in psychiatric consultations.<sup>29</sup> Miller et al<sup>31</sup> noticed that higher self-efficacy measured with the Decision Self-Efficacy Scale<sup>26</sup> reduces decisional conflict and increases active decision participation, which could result in higher participation rates in clinical trials. Using the Decision-Making Participation Self-Efficacy Scale, Chawla and Arora<sup>28</sup> found that compared with the other groups, cancer survivors preferring physician control over decision had similar self-efficacy for engaging in the decision-making process and lower self-efficacy for taking responsibility over decisions.<sup>28</sup> *Coping strategies* are defined as the habitual patterns of the way individuals react to stress either across different situations or over time,<sup>32</sup> whereas *resilience* is the ability to thrive in the face of adversity.<sup>30</sup> Two instruments measuring these constructs were detected: the Coping Orientation to Problems Experienced (COPE) inventory<sup>33</sup> and the Connor-Davidson Resilience Scale.<sup>34</sup> Colley et al<sup>35</sup> found that patients with cancer preferring active involvement in medical decision making more frequently used coping strategies such as positive reframing, planning, and humor, compared with patients who preferred a more passive role. Moreover,<sup>35</sup> patients preferring a collaborative approach were more likely to consider themselves to be resilient.

### Cognitive factors

*Cognitive abilities, health literacy, and numeracy.* Four factors and 7 instruments concerning cognitive abilities, health literacy, and numeracy were identified.

*Patient activation* refers to the degree to which an individual possesses knowledge, motivation, skills, and confidence to make effective health-related decisions.<sup>36</sup> Higher activation measured with the Patient Activation Measures Questionnaire<sup>36</sup> is associated with preferences for involvement in medical decision making,<sup>37,38</sup> and is associated with better reported healthcare experiences and with preference for sex-concordant care in women veterans.<sup>39</sup>

*Decision-making style* is the characteristic mode of perceiving and responding to decision-making tasks.<sup>40,41</sup> The General Decision-Making Inventory<sup>42</sup> categorizes individuals' decision-

making styles. It consists of 5 subscales describing a rational, avoidant, dependent, intuitive, or spontaneous decision style. Fischer et al<sup>43</sup> applied this instrument to patients who had undergone elective joint surgery to evaluate their decision style with respect to the provider choice. They found that the prevailing decision style displayed by respondents was the dependent decision style and likewise the intuitive style, followed by the rational style. In contrast, respondents hardly approached provider choice in an avoidant manner.

*Health literacy* refers to a patient's ability to read, understand, and use healthcare information appropriately.<sup>44</sup> Four health literacy questionnaires emerged from our review: the Short Test of Functional Health Literacy in Adults,<sup>45</sup> the Rapid Estimate of Adult Literacy in Medicine<sup>46</sup> and its revised version,<sup>47</sup> the Chew's Set of Brief Screening Questions,<sup>48</sup> and the eHealth Literacy Scale.<sup>49</sup> Patients with lower health literacy are more likely to rely on their physicians for health information as opposed to individuals with an adequate level of health literacy who additionally use the Internet and other sources of information.<sup>50</sup> When able to choose, parents with lower health literacy are more likely than parents with higher health literacy to vaccinate their newborn against the rotavirus.<sup>51</sup> Higher health literacy predicts preference for maximizing comfort and relieving pain as opposed to aggressive, life-prolonging care.<sup>52</sup> Also, patients with higher levels of health literacy prefer to have more involvement in decision making than do patients with lower levels.<sup>53</sup> Higher ehealth literacy suggested higher willingness to adopt a computerized personal health record and was a better predictor than socioeconomic variables.<sup>54</sup>

The assessment of numeracy is used to understand the patient's ability to apply and manipulate numerical concepts.<sup>55,56</sup> Low numeracy measured with the Subjective Numeracy Scale<sup>55</sup> was found to be associated with biased medical decisions and may negatively influence the degree of participation in medical decision making.<sup>52,53</sup>

*Risk attitude.* Risk assessment is defined as the evaluation of the chance of an undesired outcome.<sup>3,57</sup> Patients' assessment of risk is related to one's risk attitude or propensity.<sup>57</sup> Two instruments measuring risk propensity were identified in this review: Balloon Analog Risk Task<sup>58</sup> and the Domain-Specific Risk Task.<sup>59</sup> Risk-taking behavior measured with the Balloon Analog Risk Task has been found to be associated with older adults' preferences for independent living compared with residential care.<sup>60</sup> The Domain-Specific Risk Task<sup>59</sup> assesses risk taking in 5 domains: financial decisions, health/safety, recreational, ethical, and social decisions. Recreational risk-taking has been associated with PP for innovative surgical techniques rather than conventional surgery.<sup>61</sup>

### Individual differences

*Personality and dispositional factors.* We identified 10 psychological instruments used to measure 5 dispositional constructs: personality, dispositional optimism, health orientation, assertiveness, and conservatism.

*Personality* is "the dynamic organisation within the individual of those psychophysical systems that determine his characteristic behaviour and thought."<sup>62</sup> The NEO Five-Factor Inventory, the Big Five Inventory (BFI), and the BFI-54 are based on the Big Five personality traits model<sup>63</sup> and describe each respondent's personality on 5 dimensions: extroversion, agreeableness, conscientiousness, neuroticism, and openness. Patients with cancer who prefer a more passive role in health-related decisions displayed lower levels of openness to experience measured with the NEO Five-Factor Inventory than did those patients who preferred a more active role in decision making.<sup>35</sup> In a study of patients with prostatic cancer, small variations in personality traits measured

with the BFI were associated with satisfaction with treatment decision, but no significant differences in personality were observed in groups with different treatment choice.<sup>64</sup> Flynn and Smith<sup>65</sup> used 29 items of the BFI-54 in a cohort of older adults. They found that higher conscientiousness and higher openness to experience and conjointly lower agreeableness and neuroticism were associated with the most active decision-making style when deciding about health.

The Tridimensional Personality Questionnaire<sup>66</sup> is based on the Temperament and Character Model of Cloninger,<sup>66</sup> which postulates the existence of 7 personality dimensions: 4 temperamental dimensions (novelty-seeking, harm-avoidance, reward dependence, and persistence) and 3 character dimensions (self-directedness, cooperativeness, and self-transcendence). Kesari et al<sup>67</sup> found that patients' treatment preferences differed according to their score on the reward dependence dimension. Conrad et al<sup>68</sup> compared the personality profile of kidney donor candidates with that of nondonor controls using the Temperament and Character Inventory,<sup>69</sup> which is an adaptation of the Tridimensional Personality Questionnaire. They found that the reward dependence dimension has important implications for decision making, because it was associated with underestimating potential risk of donation.

Wolberg et al<sup>70</sup> assessed the influence of patients' personality attributes on preferred options in primary breast cancer treatment in women using the Millon Clinical Multiaxial Inventory.<sup>71</sup> Three subscales of this inventory, namely, psychotic thinking, avoidance, and narcissism, had a stronger association with preference for the less conservative option of the elected mastectomy.

The Health Orientation Scale<sup>72</sup> assesses 10 health-related personality features. Oliveri et al<sup>73</sup> found that people who scored high on the personal health consciousness subscale (the tendency to think about one's physical health and fitness) were more interested and willing to gather information about genetic risk and genetic testing.

Dispositional optimism is defined as a generalized tendency to expect positive experiences in life.<sup>33</sup> Steginga and Occhipinti<sup>74</sup> found that in patients with prostate cancer, greater optimism measured with the Life Orientation Test Revised<sup>75</sup> was associated with less distress related to making a treatment decision. Orom et al<sup>76</sup> found that patients with prostate cancer with low optimism were more likely to report that making treatment decisions was difficult and stressful.

Assertiveness involves a proactive response in difficult situations to contrast with passive or aggressive reactions.<sup>77</sup> In volunteers from the general population, assertiveness measured with the Assertive-Behavior Competence Inventory for Older Adults<sup>78</sup> was predictive of desire for information and for an active role in doctor-patient interaction.<sup>30</sup>

Conservatism is defined as the disposition to preserve tradition and established institutions—to resist and oppose change.<sup>79</sup> The Right-Wing Authoritarianism Scale<sup>80</sup> was designed to evaluate political conservatism. Right-wing authoritarians are people who have a high degree of willingness to submit to authorities they perceive as legitimate, who adhere to societal conventions, and who are hostile and punitive in their attitudes toward people who do not adhere to them.<sup>81</sup> No correlation was found between political conservatism and preferences for information and involvement for decision making in the general population.<sup>30</sup>

**Health locus of control, autonomy, and control preference.** *Health locus of control* is a generalized expectation about whether one's health is controlled by one's own behavior or forces external to oneself.<sup>82</sup> An individual with an internal health locus of control believes that outcomes are a direct result of his or her own behavior. An individual with an external health locus of control believes that outcomes are a result of either chance or powerful

other people, such as physicians. Three measurements investigating a patient's health locus of control have been found: the Health Locus of Control Scale,<sup>82,83</sup> the Multidimensional Health Locus of Control Scale (Form B and Form C),<sup>82,84</sup> and the Health Internal Control subscale of the Health Orientation Scale.<sup>72</sup> From our review it emerges that high internal health locus of control measured with the Health Locus of Control Scale was associated with preferences for complementary and alternative medicine in Japanese patients with low-back pain.<sup>85</sup> General practice patients with high external health locus of control are more likely to prefer limited involvement in decision-making processes than patients with lower external health locus of control.<sup>86</sup> De las Cuevas et al<sup>29</sup> used the Multidimensional Health Locus of Control Scale-Form C and found that psychiatric outpatients with “doctor” external locus of control and negative internal locus of control were more likely to prefer a paternalist style of decision making. In a study involving volunteers from the general population, health locus of control measured with the Multidimensional Health Locus of Control Scale-Form B was a better predictor of preferences for information seeking and involvement in decisions compared with demographic variables such as age, sex, and educational level.<sup>30</sup> Higher levels of powerful others were associated with higher preferences for information and involvement in decisions. Participants scoring highly on the Health Internal Control subscale of the Health Orientation Scale<sup>72</sup> were more likely to actively gather information about genetic testing.<sup>73</sup> Health locus of control seems to be related to autonomy preferences.<sup>30,86,87</sup>

### Emotion and mood factors

Emotion is defined as a complex pattern of changes, including physiological arousal, feelings, cognitive processes, and behavioral reactions, made in response to a situation perceived to be personally significant.<sup>88</sup> In contrast to emotion, *mood* is defined as a transient, low-intensity, nonspecific, and subtle affective state that often has no definite cause.<sup>89</sup>

Four psychological instruments investigating the relationship between emotions or mood states, anxiety, and depression and health-related preferences and decisions were identified.

The Profile of Mood States<sup>90</sup> measures 6 different dimensions of mood swings over a period of time. The dimensions investigated include tension or anxiety, anger or hostility, vigor or activity, fatigue or inertia, depression or dejection, and confusion or bewilderment. Higher levels in the tension and anxiety dimension have been found in women opting for mastectomy compared with women who elected for a more conservative treatment option.<sup>70</sup>

Depression is a state of low mood and aversion to activity that can affect a person's thoughts, behavior, feelings, and sense of well-being.<sup>91</sup> A distinction between state and trait anxiety has become commonplace.<sup>92</sup> *State anxiety* is defined as an unpleasant emotional arousal in face of threatening demands or dangers. *Trait anxiety*, on the other hand, reflects the existence of stable individual differences in the tendency to respond with state anxiety in the anticipation of threatening situations.<sup>93</sup>

Yuzbasioglu et al<sup>94</sup> did not find any relationship between preferences for impression techniques in dentistry and anxiety measured with the Turkish version of the State-Trait Anxiety Inventory.<sup>92</sup> Using the Hospital Anxiety and Depression Scale,<sup>95</sup> Schneider et al<sup>86</sup> discovered that the higher the depression scores the less likely patients in general practice were to want information, whereas Franssen et al<sup>96</sup> did not find any relation between anxiety and depression with preferences for communicating prognosis in patients with esophageal cancer. Patients with breast cancer with higher levels of depressive symptoms measured with the Center for Epidemiological Studies-Depression Scale<sup>97</sup> displayed a preference for a passive role in decision making.<sup>98</sup> In patients with cancer, no significant association between PPs for involvement in decision making and depression or

anxiety measured with the State-Trait Anxiety Inventory and the Center for Epidemiological Studies-Depression Scale was found.<sup>35</sup>

### Health beliefs

Health beliefs are defined as “the personal convictions that influence health behaviours.”<sup>99</sup> These convictions involve how people view health, health promotion, and healthcare practices.<sup>100</sup> The Beliefs About Medicines Questionnaire<sup>101</sup> assesses treatment-related beliefs, that is, the specific patient's perception of the need to take medication and concerns about it, as well as the general beliefs about pharmacotherapy.<sup>101</sup> In patients with schizophrenia, a negative attitude toward medications was related to preferring a higher involvement in decision making.<sup>102</sup>

## Discussion

Given the increasing recognition of the importance of PP in healthcare, it is important to understand which psychological dimensions and profiles associate with the formation and heterogeneity of preferences. Therefore, a systematic review was conducted to enhance the understanding of which psychological constructs and instruments have been investigated in the context of PPs or health-related decisions.

A total of 18 constructs and 33 instruments were identified and organized into 5 categories: motivational factors, cognitive factors, individual differences, emotion and mood factors, and health beliefs. There is no agreement or systematic categorization of the constructs involved in PP construction or decision making, even though researchers have been urged to explore this topic.<sup>3,4</sup> Given the interconnectedness and complexity of the constructs considered here, it is recognized that this classification may be arbitrary and some categories may overlap. All the constructs we reviewed are highly complex and should be considered as a part of a manifold system of psychological characteristics that influence each other. Our categorization is still a useful way to describe the psychological variables and the instruments detected and may function as an initial guide to encourage a constructive discussion and a synergy effort in the field.

Among motivational constructs, self-efficacy was promising. The concept of self-efficacy has been assessed consistently across decision-making studies in healthcare settings. Even though past literature has highlighted its important role in decision making,<sup>103</sup> to our knowledge there are no studies that directly assess the relationship between self-efficacy and PP construction. Coping strategies and resilience are only moderately established in PP and decisions literature. Although of high quality, only 1 study was captured by our search and therefore no strong conclusion can be drawn.

We found a few cognitive constructs to be related to PP and decisions. Patient activation and decision-making style are not so well investigated. Health literacy and numeracy are more established in health-related preference and decisions literature. These factors were found to predict PP and decisions in different scenarios throughout articles from strong to moderate quality. It is noticeable that ehealth literacy was a better predictor of PP compared with socioeconomic variables.<sup>54</sup> Because only 1 study, weak in quality, investigated this relationship, we advocate further investigation to confirm this evidence.

In the category of cognitive factors, we found a surprisingly small number of studies (2) exploring the relationship between PP and risk propensity. The low quality of the studies limits even further the conclusions we can draw. The limited research exploring the role of risk propensity in PP may be related to the difficulties associated with its operational definition. One view considers risk propensity as an unstable trait across domains.<sup>104</sup> According to this vision, the variation in risk-taking can be

ascribed to an individual perceived-risk attitude and tends to be more stable across different domains than economic risk.<sup>105</sup> Finally, in the healthcare setting, our search points out that the risk-taking attitudes might be more intrinsic to the patient because it has been shown by considering personality traits through instruments such as the Sensation Seeking Scale Form.<sup>106</sup>

Among individual differences, personality traits and dispositional factors have been studied more holistically in the context of PP and decisions. Overall, the personality measures are well known and validated across settings. Nevertheless, there is no consistent evidence regarding the influence of specific personality dimensions in PP and decisions. On the contrary, the number, quality, and findings of studies detected by our study highlight that health locus of control plays a relevant role in PP and decisions.

Concerning emotions and mood factors, the findings about the relationship between anxiety and depression and PP are still ambiguous. Even though the studies we considered were scientifically robust, so far there is not enough evidence to establish a specific relationship.

Health beliefs that have been considered with regard to PP are the ones concerning medications. A more consistent body of literature is needed to support the role of beliefs in PP and health-related decisions.

The present review gives an overview of the existing research on psychological constructs and instruments that have an impact on PP and decisions in healthcare. The most prominent results are related to health literacy, numeracy, and health locus of control, which have been shown to influence PP and decisions and whose measurements have shown consistent results. Self-efficacy and health beliefs are promising fields of study, but the amount or quality of existing results is not yet satisfactory. The impact of risk propensity is also difficult to assess. Evidence of the impact of personality traits and mood states was inconsistent. Further research is needed to ascertain the impact of such factors.

## Conclusions

It is important to clarify that many of the factors and measures identified might be relevant to some extent to enhance understanding of PP in healthcare settings; nevertheless, further evaluation of which instruments are most useful is needed. This being a relatively nascent area of research, it is important to develop a common framework to further facilitate sharing of information and the accumulation of evidence to demonstrate how specific psychological constructs relate to preference formation or preference heterogeneity. Moreover, there is a need to focus on the clinical feasibility of including psychological measurements in preference and decision studies.

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## Supplemental Materials

Supplementary data associated with this article can be found in the online version at <https://doi.org/10.1016/j.jval.2018.12.007>.

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