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The Motivational Utility of Knowledge: Examining Fundamental Needs in the Context of Houselessness Knowledge

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Abstract: Past research on knowledge has differentiated between dimensions (e.g., amount, accuracy, specificity, coherence) of knowledge. This paper introduces a novel dimension of knowledge, the Motivational Utility of Knowledge (MUK), that is based on fundamental human needs (e.g., physical safety, affiliation, actualization, reproduction). Adults in the United States (N = 190) were recruited from an online survey platform and paid for participation. Participants read a set of four texts arguing different views of houselessness and were administered a comprehension test after each text. Participants were asked about their conceptions of houselessness before and after reading. Finally, they were given the MUK scale, a demographics questionnaire, including questions about their personal experience with houselessness, and were administered a general prior knowledge test and a vocabulary knowledge test. We examined MUK, the factor structure of the scale and the relationship between MUK and other measures of knowledge. The analyses showed that the subscales of MUK loaded onto a single factor—an overall value of houselessness knowledge. In addition, we found that MUK was correlated with conceptions of houselessness and comprehension of texts on houselessness, indicating that the scale was valid. Overall, the findings demonstrate that MUK is an important dimension of knowledge to consider in learning tasks.

Keywords: knowledge dimensions; knowledge value; fundamental motives; homelessness; houselessness; exploratory factor analysis

1. Introduction

Knowledge affects our perception, action, and cognition. Prior knowledge has strong effects on perception [1], memory [2], and social cognition [3], among many other psychological phenomena [4]. There is a long history in psychological research of differentiating between types of knowledge. For example, some researchers categorize knowledge as either explicit or implicit [5,6], while others assess the extent to which knowledge varies along dimensions such as amount, accuracy, specificity, and coherence [7]. The goal of this paper is to introduce a novel dimension of knowledge, the Motivational Utility of Knowledge.

The Motivational Utility of Knowledge (MUK) is based on the classic work by Maslow [8] and recent research by Kenrick and colleagues [9,10] that categorizes human motives as based on a hierarchy of innate predispositions (i.e., physiological needs, social needs, parenting needs, self-actualization needs). MUK is defined as the extent to which individuals value their knowledge because it either (a) provides opportunities to fulfill a fundamental motive or (b) removes threats to fulfilling a fundamental motive. For example, knowledge about the history of Japanese art may be of high value to a professor of art history, as that knowledge enhances their ability to acquire housing and food, and gain affiliation and status in their community. However, similar knowledge would be of less value to a software engineer as it may not provide a direct fulfillment of their physiological and social needs.

To our knowledge, there has been no attempt to categorize knowledge in terms of Kenrick's hierarchy. Thus, the contribution of our work is (1) the development of

the MUK scale, which is grounded in research in social psychology; (2) evaluation of the MUK scale via exploratory factor analysis; and (3) validation of the MUK scale by examining its relationship to other psychological phenomena related to knowledge and information processing.

1.1. Definition of Knowledge and Dimensions of Knowledge

Knowledge has been defined in various ways within cognitive psychology and educational research; for example, Alexander and colleagues [11] defined knowledge as, "an individual's personal stock of information, skills, experiences, beliefs, and memories". Kendeou and O'Brien [12] defined knowledge as, "the theoretical or practical understanding of information and the representation of that understanding in memory". Greene et al. [13] defined knowledge as "all that is stored and accessible in long-term memory". Most recently, McCarthy and McNamara [7] defined knowledge as, "all of the information in one's memory". This final, albeit general, definition will be the working definition for this paper.

McCarthy and McNamara [7] proposed the Multidimensional Knowledge in Comprehension (MDK-C) framework for prior knowledge, postulating that there are four primary dimensions of prior knowledge in text comprehension: amount, accuracy, specificity, and coherence. It is worth underscoring that knowledge within this framework is conceptualized in terms of its relationship to the learning task (the text being read). Thus, amount is defined as the number of concepts a reader knows that are relevant to the target text. In connectionist terms, this refers to the number of nodes in the knowledge network that are related to the learning task. In measurement, prior knowledge assessments typically measure the relative amount of knowledge on a topic (e.g., a score of 100% on a multiple-choice test is not thought to represent three times as much knowledge as a score of 33%).

Accuracy is defined as the extent to which a reader's knowledge is correct or incorrect. In connectionist terms, learners can have both inaccurate information nodes and inaccurate links between nodes. However, knowledge accuracy is more complex than a binary classification of information as correct or incorrect. For instance, Vosniadou and Brewer [14,15] documented how children have the knowledge that the world is round, but when asked to draw the world, would draw a flat circle with the sky above. This knowledge is characterized as naïve and contains both accurate and inaccurate concepts.

Specificity is defined as the degree to which the reader's knowledge is related to the text. General world knowledge is a strong predictor of reading comprehension both for children [16] and adults [17]. However, specific domain or content knowledge can facilitate readers' comprehension [18]. This aspect of differences between domains or topics is a common way to categorize knowledge, even outside of comprehension contexts [19].

Finally, coherence refers to the degree to which the readers' knowledge is well-connected. Coherence is not simply having "more" knowledge, but rather, having knowledge that is well organized and interconnected. Coherence has been measured with tasks such as keyword sorting tasks [20] and inference questions [21] that tap into the learner's understanding of the relations among concepts.

McCarthy and McNamara [7] called for more research into these dimensions of knowledge, as well as the potential to identify additional dimensions of knowledge that may be necessary to fully understand the impact of knowledge on comprehension, learning, and information processing. One potential dimension of knowledge that may influence comprehension and learning is its value or personal importance. The MDK-C defines knowledge dimensions solely with respect to relatively objective qualities of knowledge regardless of the degree to which the individual may consider the knowledge to be important or valuable. For example, one individual may have a great deal of knowledge about climate and weather patterns and consider this to be important and, in turn, intrinsically tied to their concept of self, whereas another may have the same amount of knowledge but consider it less important than knowledge, for example, about psychology. Certain concepts are more likely than others to elicit emotional arousal, identity conflict, and perceived threat

responses [22]. These concepts may be more or less important to the individual. How much one values or weights particular knowledge may also be tied to beliefs. For example, readers are more likely to recall text that conveys information that is consistent with their personal beliefs compared to texts that are inconsistent with their beliefs [23,24]. While some research has pointed to how differences in the impact of personal values and beliefs on comprehension and conceptual change, there has been little research on the impact of how individuals value knowledge on comprehension.

1.2. Fundamental Needs and Motives

Our framework is inspired by theorists in the field of social psychology who connect human behaviors (e.g., motivation, personality, relationships) to fundamental needs or motives. Human beings have innate dispositions to ensure physical safety, affiliate with other humans, reproduce, and self-actualize [8–10]. Maslow [8] proposed that humans have a hierarchy of needs that must be met in order to achieve self-actualization, or the full realization of one's potential. The needs are organized in a pyramid, with self-actualization at the top, followed by esteem, belongingness, safety and security, and physiological needs. Accordingly, humans' basic needs (i.e., physiological) must be fulfilled before they can "move up" to the next level of needs. Importantly, individuals can vary in whether a need is fulfilled based on the current situation. For instance, fasting, the practice of refraining from food for a set period of time, is a global religious practice. Individuals fulfill their physiological needs with less-than-normal food in order to fulfill their need to self-actualize. Applications of Maslow's hierarchy have been primarily studied in the context of organizational psychology and consumer purchasing decisions. For example, Sicilia and colleagues [25] studied how the need for belongingness affected brand loyalty. Stefan, Popa, and Albu have examined how Maslow's needs affect healthcare workers' motivation. Seubert, Hopfgartner, and Glaser tested how workers perceived their income level as satisfying different levels of Maslow's needs.

More recently, Kenrick et al. [9,10] posited seven fundamental motives as a recharacterization of Maslow's hierarchy of human needs. Accordingly, humans have evolved innate dispositions to (1) satisfy immediate physiological needs, (2) self-protect, (3) affiliate with other humans, (4) gain status or esteem, (5) acquire mates, (6) retain mates, and (7) successfully parent. These needs are roughly equivalent to Maslow's needs, with immediate physiological needs and self-protection at the bottom of the pyramid followed by social needs (e.g., affiliation, belongingness). However, while Maslow perceived self-actualization as the fulfillment of human potential, Kenrick and colleagues argue that successful reproduction (i.e., mating and parenting) is the fulfillment of human potential.

Within the framework of the seven fundamental motivations, human behavior is linked to attempts to either alleviate threats to fulfilling these motives or take advantage of opportunities to fulfill these motivations. For example, humans can be motivated to excel at basketball because excellence in sports fulfills several motivations. A star basketball player earns enough money to satisfy physiological needs (1), gains esteem within their social community (4), has the opportunity to acquire and retain mates (5 and 6), and enough money to successfully parent (7). Importantly, humans' attempts to alleviate threats and exploit opportunities may include humans' acquisition, retention, and use of their knowledge.

1.3. The Motivational Utility of Knowledge

In this paper, we introduce a novel dimension of knowledge: the Motivational Utility of Knowledge (MUK). MUK refers to the extent to which individuals value their knowledge or conceptions because it either (a) provides opportunities to fulfill a fundamental need or (b) removes threats to fulfilling a fundamental need. Knowledge can be conceptualized as more valuable if it provides an opportunity, or removes a threat, to fulfilling a fundamental need. For example, knowledge about cooking helps to ensure that humans remain fed and healthy, indicating a high motivational utility. However, knowledge about Mrs. O'Leary's

cow has low motivational utility, as it affords no opportunities for survival, affiliation, mating, or parenting. To our knowledge, there has been no attempt to categorize knowledge in terms of Maslow's or Kenrick's hierarchy.

The utility of knowledge has traditionally been approached from the perspective that if an individual possesses the knowledge, its impact on behaviors depends on the qualities of the knowledge [7]. Here, we propose that an additional factor to consider is from the point of view of the individual: is that knowledge important or valuable? The potential importance of MUK is supported by findings indicating that individuals' attributions of importance to knowledge impacts reading comprehension [22–24] in concert with findings indicating that fundamental needs influence human behaviors and choices [25,26].

Our question centers on how to measure or quantify personal value, or the motivational utility of knowledge. To that end, we turn toward previous measures of fundamental motivations and needs developed in the context of social psychology research [26,27]. Accordingly, the motivational utility of knowledge will be specifically tied to fundamental motivations as characterized by Maslow [8] and Kenrick and colleagues [9,10], rather than task- or trait-level motivation [28]. Table 1 lists the 10 subscales that were included within this version of the MUK.

Table 1. Items and Constructs Tested in the Scale for the Motivational Utility of Knowledge.

Construct	Number of Items	Previous Measure from Which the Items Were Adapted	Theoretical Model on Which the Items Were Based
Physical Safety	6	Neel and Colleagues [26]	Kenrick and Colleagues [9]
Affiliation	6	Neel and Colleagues [26]	Kenrick and Colleagues [9]
Status	6	Neel and Colleagues [26]	Kenrick and Colleagues [9]
Mate Seeking	6	Neel and Colleagues [26]	Kenrick and Colleagues [9]
Mate Retention	6	Neel and Colleagues [26]	Kenrick and Colleagues [9]
Parenting	6	Neel and Colleagues [26]	Kenrick and Colleagues [9]
Physiological	6	Taormina and Gao [27]	Maslow [8]
Safety-Security	4	Taormina and Gao [27]	Maslow [8]
Belongingness	6	Taormina and Gao [27]	Maslow [8]
Self-esteem	4	Taormina and Gao [27]	Maslow [8]
Self-actualization	6	Taormina and Gao [27]	Maslow [8]

Note: The full measure is provided in Appendix A.

1.4. Houselessness

This initial evaluation of the Motivational Utility of Knowledge is necessarily grounded in a topic for which individuals' knowledge varies, and the value of that knowledge can vary as a function of individual motives and needs. We chose to focus on the topic of houselessness due to the societal importance and implications of the topic in the United States (where this research is contextualized) and because how much is known about the topic varies widely among individuals.

The term "houselessness" is generally considered synonymous with "homeless". Recent work by researchers and advocates [29–31] promote the use of the term houseless (as opposed to homeless) because people who might be described by others as homeless may consider their temporary shelter or abode to be their home, but it is not a stable residence as implied by the term "house".

Houselessness was selected as the topic of interest for several reasons. First, misconceptions about poverty and houselessness are prevalent among adults in the United States, and individuals with negative attitudes towards the unhoused (e.g., fear, disgust) tend to have more misconceptions. For example, Tsai and colleagues [32] found that 64% of adults in the United States believe that unhoused people are dangerous, 73% believe that unhoused people are more likely to commit crimes, and 66% believed that unhoused people could not be trusted. Second, misconceptions about houselessness are frequently espoused in the media (i.e., film and television) and traditional news sources. A longitudinal study

by Gent and Loehwing [33] identified two dominant story types in American films about houselessness. Either the unhoused character manages to overcome adversity through individual choices and gumption, which propagates the misconception of houselessness as a primarily individual issue (e.g., "The Pursuit of Happyness"), or the unhoused character is rescued by a (white) housed savior (e.g., "The Blind Side"). A similar study by Pruitt, McKinsey, and Barile [34] found that news coverage of houselessness in Hawai'i relied on stereotypes and stigmatizing characteristics. Finally, misconceptions about unhoused people have detrimental effects. Speak and Tipple [35] found that interventions for reducing houselessness are often based on misconceptions that are related to fear of the unhoused, or the perception that the unhoused are of lower status (i.e., unhoused people are lazy and abuse substances).

After reviewing the research on houselessness, four conceptions were selected for testing in this study. The first conception was the accurate conception that houselessness is primarily due to societal or community failures—specifically, the availability of affordable housing. The National Coalition for the Homeless reported that the primary cause of houselessness is a lack of affordable housing and that approximately half of all unhoused people hold jobs but cannot afford housing [36]. The U.S. Department of Housing and Urban Development states that affordable housing is essential to fostering healthy communities and reducing houselessness [37].

The second, third, and fourth conceptions were misconceptions. The second conception was the misconception of unhoused people being more threatening or violent compared to housed people. As noted earlier, Tsai and colleagues [31] found that 64% of adults in the United States believed that unhoused people are dangerous, and 73% believe that unhoused people are more likely to commit crimes than housed people. This is a misconception because research has found that while houseless people are more likely to be the victims of violent crime, there is no link between houselessness and perpetrating violent crime [38].

The third conception was the misconception was that unhoused people are "other" or "out-group". A landmark study by Olufemi [39] found that unhoused people are often referred to using derogatory and exclusionary language which is associated with the perception that unhoused people are out-group. In addition, past research has found that unhoused people are perceived to have social stigmas such as a criminal history or poor work ethic [40–42]. This is a misconception, as unhoused people typically are involved in society and their community. For instance, 40–50% of unhoused people are employed [43] and the majority of unhoused people were living in the same city prior to becoming houseless [44].

The fourth conception was the misconception of houselessness being primarily a result of individual choices. As noted above, previous research into misconceptions around houselessness is primarily a result of societal failures (i.e., lack of affordable housing) [45]. However, the misconception that houselessness is a result of personal choices is prevalent among adults in the United States and is a repeated theme in media about the unhoused.

1.5. The Current Study: Aims and Hypotheses

The goal of this study was to introduce a novel dimension of knowledge, the Motivational Utility of Knowledge (MUK) and to create and test a novel measure of MUK to examine the factor structure, reliability and validity of the measure. Examination of the factor structure allowed us to test how different aspects (i.e., subscales of the measure) of MUK may relate to each other (e.g., whether participants' fundamental needs were aligned or differed depending on the knowledge being tested). In order to establish validity, the novel MUK scale was compared to previously established findings in cognitive and social psychology research. Thus, our guiding research question was, "How does the novel MUK scale relates to known psychological phenomena in the field of cognitive psychology—specifically phenomena within the domain of reading comprehension?" Participants' MUK was measured in the context of their knowledge of houselessness. In

addition, participants were assessed on their conceptions of houselessness, their general world knowledge, their comprehension of texts related to houselessness, and their personal experience with houselessness. The factor structure of MUK was assessed, as well as the relationships between MUK and measures of general knowledge, conceptions of houselessness, and personal experience with houselessness.

Our first set of hypotheses concerned the factor structure of the MUK scale. There were competing hypotheses about the factor structure of the MUK scale. The first possibility was that participants' MUK was unidimensional (i.e., an overall "Value of Houseless Knowledge"). The second possibility was that participants' MUK was multidimensional—either divided along theoretical backgrounds (Maslow, Kenrick) or divided by relationships of the fundamental need to houselessness (physical safety, social status, etc.). For example, the items representing Maslow's needs pyramid and the items representing Kenrick's fundamental motives were adapted from two different published scales [26,27], introducing the possibility that wording of the items would cause variance between the MUK subscales. In addition, past research has indicated that unhoused people are viewed as more physically violent than housed people [34,38,39], and that unhoused people are perceived to have social stigmas such as a criminal history or poor work ethic [40–42].

Our second hypothesis concerned the validity of the MUK scale and tested the relationships between MUK and other psychological phenomena. Past research has found that individuals' fear of the unhoused (e.g., they are likely to be violent) is related to their misconceptions about houselessness (e.g., the majority of unhoused people are substance abusers) [31]. In addition, research has demonstrated that misconceptions and text comprehension are negatively correlated: individuals with more misconceptions have worse text comprehension [7,12]. Based on these relationships, it was hypothesized that individuals with higher MUK would have more misconceptions of houselessness, and because they had more misconceptions, their reading comprehension would be impaired. That is, MUK would be positively correlated with misconceptions of houselessness and negatively correlated with text comprehension. This finding would indicate that participants' knowledge value is related to other dimensions of their knowledge (i.e., accuracy) and that their knowledge value affects performance on tasks which depend on knowledge.

In the following sections, we describe the set of materials and the procedure used to test our hypotheses. We report the descriptive statistics, and two sets of correlations analyses (an Exploratory Factor Analysis and a Pearson correlation analysis). Finally, we conclude with a discussion of our hypotheses, limitations, and future directions of this research.

2. Materials and Methods

2.1. Participants

Participants (n = 252) from the United States were recruited using the Testable Minds recruiting platform and paid $4 for participation in the study. Participants who failed to respond to more than 75% of the questions, scored below-chance on multiple choice tests, or responded with duplicate or nonsense answers (e.g., responding, "nice" to knowledge questions) were removed, leaving a final n = 190. Participants were required to be currently living in the United States. The average age of the participants was 40.2 years old, and the majority were female (n = 117). The participants were asked to self-report ethnicity: 19 reported Asian, 26 reported Black or African American, 132 reported Caucasian, 9 reported Hispanic, and 4 reported Biracial. Of the 192 participants, eight reported they did not speak English as their native language; however, all eight reported that they had spoken English for seven or more years, and thus were included in the analyses. Finally, participants were asked their highest level of education: 37 reported high school, 55 reported an associate degree or some college, 72 reported a bachelor's degree, and 26 reported a post-graduate degree. See Supplementary Material S1 for the demographic questions (DOI https://doi.org/10.17605/OSF.IO/VA753. Accessed 1 September 2023).

2.2. Measures

The texts and comprehension questions for the studies were piloted with undergraduate students to assess the validity and reliability of the questions (see Appendix B).

2.2.1. Texts

A set of four texts was used in the study. The texts were drawn from newspaper articles and edited lightly by the researcher for clarity. Each text presented a different view of unhoused people and the causes of houselessness. The texts were presented to students with no title or author information, and the order was randomized for each participant to control for the effects of text order. Table 2 shows the title, length, and Flesch–Kincaid grade level of each text. See Supplementary Material S2 for the full texts (DOI https://doi.org/10.17605/OSF.IO/VA753. Accessed 1 September 2023).

Table 2. Titles, Lengths, and Flesch–Kincaid Grade Level of Texts.

Text Title	Length in Words	FKGL
Houselessness Epidemic	356	12
Individual Responsibility of the Unhoused	300	12
Housing Shortage	353	12
Houselessness in the USA	519	12

2.2.2. Reading Comprehension Questions

Reading comprehension for each text was measured with eight multiple-choice comprehension questions (see Supplementary Material S2) Responses were scored such that a correct answer was given a 1, and an incorrect answer was given a 0. From these scores, the proportion of correct responses was derived for each text. The internal reliability of the comprehension questions ranged from $\alpha = 0.51$ to $\alpha = 0.57$; the internal reliability was poor for the questions on the "Reliability" text, with $\alpha = 0.42$. The internal reliability of the comprehension questions was lower compared to the internal reliability in the Pilot Study (α for the comprehension tests ranged from 0.61 to 0.70; see Appendix B, Table A2). In addition, the comprehension questions in the Pilot study were moderately correlated with general prior knowledge and vocabulary knowledge (see Appendix B, Table A3), indicating that comprehension test score was reflective of general reading skill.

2.2.3. Conceptions of Houselessness

Participants' conceptions of houselessness were assessed with 16 five-point (strongly disagree—strongly agree) Likert-scale items. The items assessed conceptions on four constructs: (a) unhoused people are threatening, (b) unhoused people are out-group, (c) houselessness is caused by personal choices, and (d) houselessness is caused by societal failures. Participants were administered the Conceptions assessment twice, before and after reading the texts. The items in the assessment were presented in a random order to each participant. The reliability of the subscales in the pre-test and post-test ranged from $\alpha = 0.58$ to $\alpha = 0.82$. While the reliability of some of the individual subscales was relatively low, the reliability of all of the pre-test items was $\alpha = 0.86$, and the reliability of all of the items in the post-test was $\alpha = 0.87$ (when calculating reliability for the combined pre and post-test conception measures, the subscale for societal failures was reverse coded). See Supplementary Material S3 for the full measure (DOI https://doi.org/10.17605/OSF.IO/VA753. Accessed 1 September 2023).

2.2.4. Motivational Utility of Knowledge

Participants' Motivational Utility of Knowledge (MUK) was measured using 62 five-point (strongly disagree—strongly agree) Likert-scale items (see Appendix A). The test measured 11 fundamental motives from Kenrick and colleagues [9,10] and Maslow [8]. The items were researcher-created based on two previous studies measuring fundamental

motives [26,27]. The internal reliability of the subscales was good, ranging from α = 0.72 to α = 0.92.

2.2.5. General Prior Knowledge

Students' prior science knowledge of science, literature, and history was assessed using a 30-item measure of prior knowledge. See Supplementary Material S4 for the full measure (DOI https://doi.org/10.17605/OSF.IO/VA753. Accessed 1 September 2023). The items were general domain knowledge that were not related to the misconception statements. The test has been used previously in studies on comprehension and learning [46–48]. The internal reliability in this study was acceptable (α = 0.65).

2.2.6. Vocabulary

Students' individual differences in vocabulary were assessed because vocabulary knowledge accounts for unique variance in reading comprehension skill [49]. The vocabulary test was taken from the Gates–MacGinitie Reading Test (GMVT) [50] because it is a standardized test that has been used previously in studies on reading and learning [21]. The test consists of 45 multiple-choice questions in which a word is presented in the context of a sentence and students must select the word or phrase most synonymous with the target word. The internal reliability in this study was good (α = 0.89).

2.2.7. Personal Experience

Participants were asked to report their experience with houselessness based on a four-level, seven-item scale drawn from the U.S. Department of Housing and Urban Development [51]. Appendix C, Table A4 shows the HUD levels and the number of participants who reported that they themselves, a family member, or close friend had experienced the category of houselessness. Level 0 indicated no experience, and level 4 indicated experience with extreme or long-term houselessness. In addition, participants were given the option to share any personal experiences they had with unhoused people or houselessness in an open-response text box. Each level was scored with a point value corresponding to the level (e.g., participants who responded "Yes" to the level 1 question = 1 point) to create a continuous "Personal Experience" score.

2.3. Procedure

Participants were told the study involved reading and learning from multiple texts. After consenting to participate, participants were given the houselessness conceptions pre-test. Following the pre-test, participants read the four texts in a random order. After each of the four texts, they were administered comprehension questions, the emotions-during-reading scale, and the belief-conflict question. Following the reading tasks, participants were given the houselessness conceptions post-test, followed by the MUK scale, and the general prior knowledge and vocabulary tests. Finally, participants were asked demographic questions and about their personal experience with houselessness. The average time to complete was 51 min (SD = 12.5 min).

3. Results

Our first step in analysis of the data was to examine the distributions, skew, and kurtosis of all the measures to assess the extent to which they were normally distributed (see Supplementary Material S5 (DOI https://doi.org/10.17605/OSF.IO/VA753. Accessed 1 September 2023)).Vocabulary had a significant negative skew (skew = −1.37), indicating that the participants had generally high vocabularies. Comprehension of the Epidemic text was peaked (kurtosis = 1.24), suggesting that the comprehension questions for that text were not as discriminatory compared to the other texts (i.e., participants tended to receive more similar scores). No other measures had a skew or kurtosis greater than 1.

3.1. Houselessness Conceptions

Conceptions of houselessness were measured with 16 five-point Likert-scale items (e.g., "Most unhoused people are violent") with 1 indicating strongly disagree, and 5 indicating strongly agree. The means and correlations of the houselessness conceptions pre-test and post-test were assessed to identify the pattern of conceptual change during reading. Figure 1 presents the means of the conception measures between sessions. All of the constructs were correlated across the pre-test and post-test (i.e., the pre-test score and post-test score for that construct were strongly correlated). Three of the constructs were strongly correlated with each other in the pre-test, post-test, and between the pre-test and post-test. This indicates that some participants tended to hold three conceptions of unhoused people: they are violent; they are out-group; and they are personally responsible for being unhoused. In contrast, both the pre-test and post-test measure of houselessness as a societal failure were negatively correlated with the other three constructs, indicating that participants who indicated that houselessness was a result of societal failure tended to disagree with characterizations of unhoused people as violent, out-group, or personally responsible. See Table 3 for the correlation matrix.
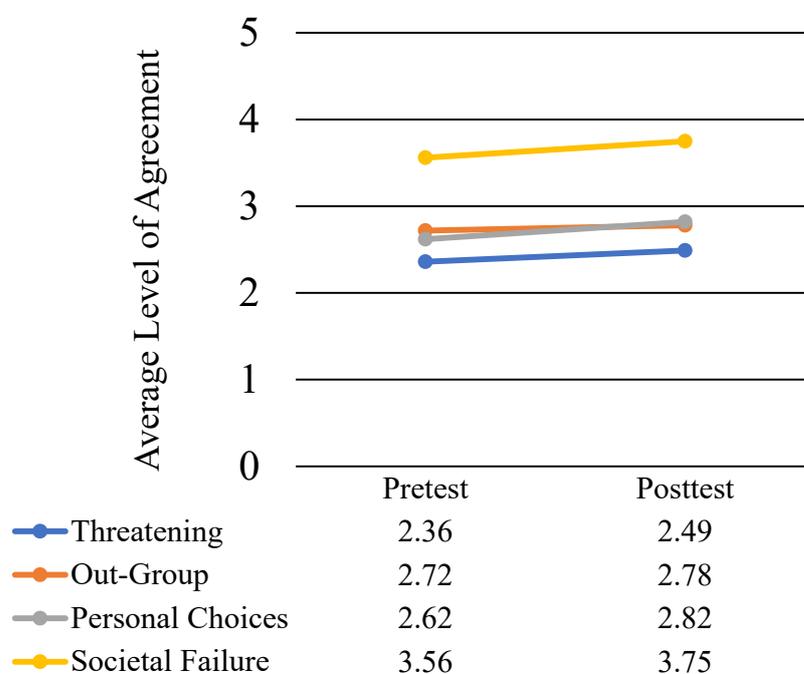

	Pretest	Posttest
Threatening	2.36	2.49
Out-Group	2.72	2.78
Personal Choices	2.62	2.82
Societal Failure	3.56	3.75

Figure 1. Graph of the Average Conceptions of Houselessness (Threatening, Outgroup, Personal Choice, Societal Failure) by Test: 5 = Strongly agree, 4 = Agree, 3 = Neither agree nor disagree, 2 = Disagree, 1 = Strongly disagree.

Table 3. Means and Correlations of the Proportion Scores for Pre-test and Post-test Conceptions of Houselessness.

Measure	1.	2.	3.	4.	5.	6.	7.	8.
1. Pre-test—Threatening								
2. Pre-test—Out-group	**0.46**							
3. Pre-test—Personal	**0.56**	**0.51**						
4. Pre-test—Society	**−0.34**	−0.16	**−0.29**					
5. Post-test—Threatening	**0.80**	**0.36**	**0.56**	**−0.25**				
6. Post-test—Out-group	**0.41**	**0.78**	**0.55**	**−0.21**	**0.45**			
7. Post-test—Personal	**0.52**	**0.42**	**0.84**	**−0.31**	**0.58**	**0.53**		
8. Post-test—Society	**−0.36**	**−0.26**	**−0.49**	**0.50**	**−0.37**	**−0.32**	**−0.54**	
9. Personal Experience	−0.10	**−0.17**	−0.08	0.04	−0.05	**−0.19**	−0.04	−0.01

Note: **Bolded** correlations are significant at $p < 0.05$.

3.2. Motivational Utility of Knowledge

Participants' MUK was measured with 11 subscales containing a total of 62 five-point Likert-scale items (e.g., "Does your knowledge about houselessness keep you safe from dangerous people?") with 1 indicating strongly disagree, and 5 indicating strongly agree. Table 4 presents the means and correlations of the MUK subscales. All of the subscales were strongly correlated with each other, suggesting that individuals tended to either view their knowledge of houselessness as fulfilling multiple fundamental motives (e.g., knowledge of houselessness keeps them safe, provides them with affiliation, improves their parenting, etc.) or that their knowledge of houselessness fulfilled no fundamental motives.

Table 4. Means and Correlations of the Proportion Scores for Motivational Utility of Knowledge.

Measure	Mean (SD)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Physical safety	2.51 (0.96)											
2. Affiliation	2.54 (0.66)	**0.56**										
3. Status	2.21 (0.87)	**0.69**	**0.77**									
4. Mate-seeking	1.87 (0.82)	**0.54**	**0.71**	**0.79**								
5. Mate retention	2.37 (0.61)	**0.59**	**0.77**	**0.83**	**0.82**							
6. Parenting	2.56 (0.73)	**0.56**	**0.76**	**0.64**	**0.62**	**0.73**						
7. Physiological needs	2.76 (0.47)	**0.48**	**0.64**	**0.66**	**0.61**	**0.62**	**0.60**					
8. Safety–security	2.55 (0.89)	**0.73**	**0.63**	**0.68**	**0.60**	**0.64**	**0.63**	**0.52**				
9. Belongingness	2.55 (0.7)	**0.59**	**0.83**	**0.77**	**0.70**	**0.79**	**0.81**	**0.66**	**0.66**			
10. Self-esteem	2.92 (0.75)	**0.53**	**0.62**	**0.61**	**0.45**	**0.60**	**0.67**	**0.58**	**0.57**	**0.69**		
11. Self-actualization	2.65 (0.96)	**0.64**	**0.79**	**0.78**	**0.66**	**0.76**	**0.78**	**0.69**	**0.71**	**0.82**	**0.77**	
12. Personal experience	3.19 (5.40)	0.06	0.07	0.02	−0.02	−0.04	0.07	0.01	0.09	0.07	0.11	0.05

Note: **Bolded** correlations were significant at *p* < 0.05.

3.3. Knowledge and Vocabulary

The vocabulary and general prior knowledge questions were examined to characterize the academic skill of the participants and the validity of the comprehension measures. Table 5 shows the means and correlations of the vocabulary, prior knowledge, and comprehension questions. Consistent with past research on comprehension, both the prior knowledge subscales and vocabulary tests were correlated with the comprehension questions.

Table 5. Means and Correlations of the Proportion Scores for Prior Knowledge, Vocabulary, and Comprehension Measures.

Measure	Mean (SD)	1.	2.	3.	4.	5.	6.	7.	8.
1. Prior Knowledge—Science	0.64 (0.14)								
2. Prior Knowledge—History	0.62 (0.18)	**0.40**							
3. Prior Knowledge—Literature	0.65 (0.19)	**0.19**	**0.42**						
4. Vocabulary	0.84 (0.15)	**0.33**	**0.47**	**0.34**					
5. Comprehension—Responsibility	0.67 (0.16)	0.15	**0.23**	0.12	**0.39**				
6. Comprehension—Shortage	0.72 (0.16)	0.14	0.15	**0.23**	**0.27**	**0.24**			
7. Comprehension—USA	0.67 (0.19)	**0.25**	**0.32**	**0.32**	**0.44**	**0.32**	**0.35**		
8. Comprehension—Epidemic	0.64 (0.17)	0.14	0.11	0.03	**0.27**	**0.26**	0.21	0.22	
9. Personal Experience	3.19 (5.40)	−0.01	0.03	0.01	0.04	−0.07	**−0.21**	**−0.03**	−0.04

Note: **Bolded** correlations were significant at *p* < 0.05.

3.4. Differences in Conceptions and MUK as a Function of Personal Experience

One potential source of variation between participants' MUK was their personal experience with houselessness. As a preliminary analysis, the correlations between personal experiences and MUK were examined (see Table 6). The correlations were nonsignificant, indicating that overall differences in MUK were not strongly related to individuals' personal experience, ruling out personal experience as a potential confound.

Table 6. Correlations between Personal Experiences and Conceptions, and Personal Experiences and MUK.

Independent Variable	Correlation with Personal Experience
MUK—Physical safety	0.06
MUK—Affiliation	0.07
MUK—Status	0.02
MUK—Mate-seeking	−0.02
MUK—Mate retention	−0.04
MUK—Parenting	0.07
MUK—Physiological	0.01
MUK—Safety–security	0.09
MUK—Belongingness	0.07
MUK—Self-esteem	0.11
MUK—Actualization	0.05

3.5. Exploratory Factor Analysis of the MUK Subscales

Our first hypotheses centered on the extent to which participants' MUK reflected more than one underlying construct (i.e., value for physical safety, value for social status) or a unidimensional construct (i.e., overall value of houselessness knowledge). An exploratory factor analysis (EFA) was conducted to assess the underlying structure of the measure. Figure 2 shows the scree plot of the eigenvalues of the EFA. Based on the eigenvalue scree plot, a 1-factor solution was deemed appropriate, indicating that participants had a single overall value for their knowledge of houselessness. Table 7 shows the factor loadings for the EFA (RMSEA = 0.14, TLI = 0.89). Based on the results of the EFA, the subscales of MUK were averaged to create an overall MUK score for the second analysis.
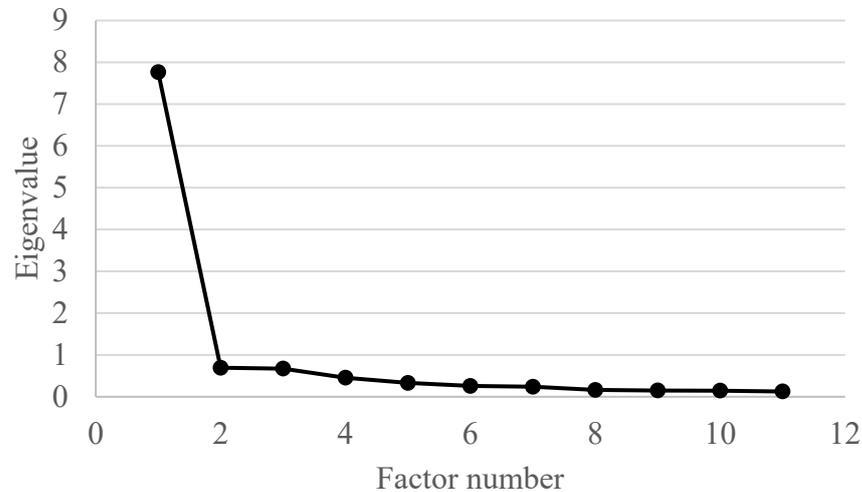
Figure 2. Scree Plot for the Exploratory Factor Analysis of the Subscales of Motivational Utility of Knowledge.

Table 7. Factor Loadings for the Exploratory Factor Analysis of the Subscales of Motivational Utility of Knowledge.

MUK Subscale	Factor Loading
Physical safety	0.71
Affiliation	0.87
Status	0.88
Mate-seeking	0.79
Mate retention	0.88
Parenting	0.83
Physiological	0.73

Table 7. *Cont.*

MUK Subscale	Factor Loading
Safety–security	0.77
Belongingness	0.90
Self-esteem	0.74
Actualization	0.91

3.6. Correlations between MUK and Measures of Knowledge and Comprehension

The second hypothesis regarded the extent to which and how participants' MUK relates to other constructs—specifically, misconceptions and reading comprehension (see Table 8). The correlations between the overall MUK score and the measures of conceptions, knowledge, and comprehension were examined to assess the extent that participants' reported MUK was related to their performance on other tasks. MUK was positively correlated with pre-test and post-test conceptions of unhoused people as threatening, out-group, and personally responsible. The three conceptions are misconceptions about houselessness (i.e., a higher score equals stronger agreement with misconception statements). Thus, this finding suggests that participants who hold misconceptions of houselessness are more likely to perceive their knowledge of houselessness as fulfilling a fundamental motive. Figures 3–5 show the scatterplots of the average MUK score and the post-test conceptions of houselessness.

In addition, MUK was negatively correlated with three of the four text comprehension measures, suggesting that participants with high MUK comprehended the texts less than did those who had lower MUK. Thus, individuals who considered their knowledge of houselessness to be more important to their needs and fundamental motives were less likely to comprehend the new information presented in the texts regarding houselessness.
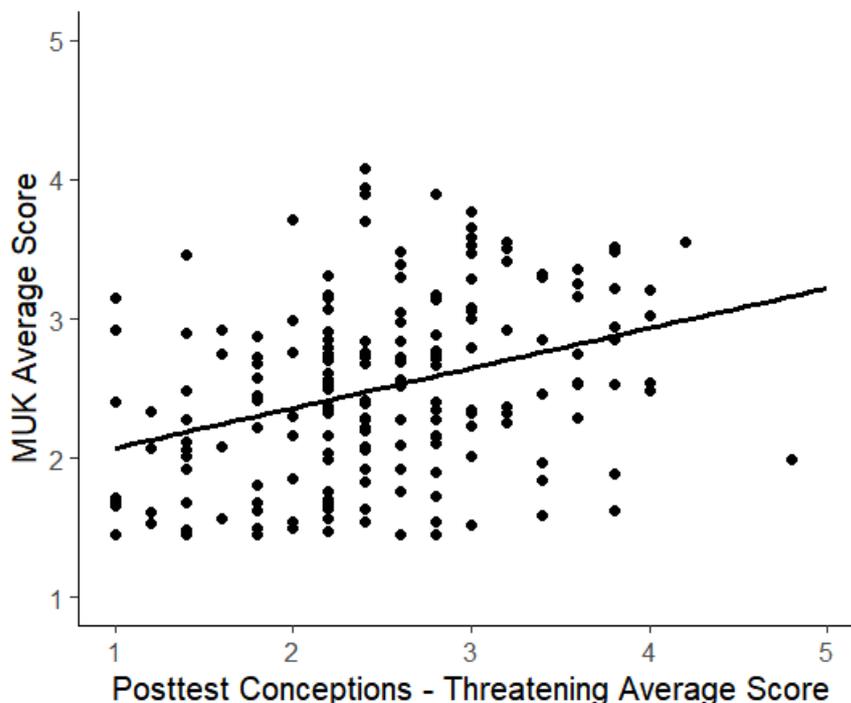

Figure 3. Scatterplot of the Overall MUK Average Score and the Post-test Average Score of the Conception of Unhoused People as Threatening.
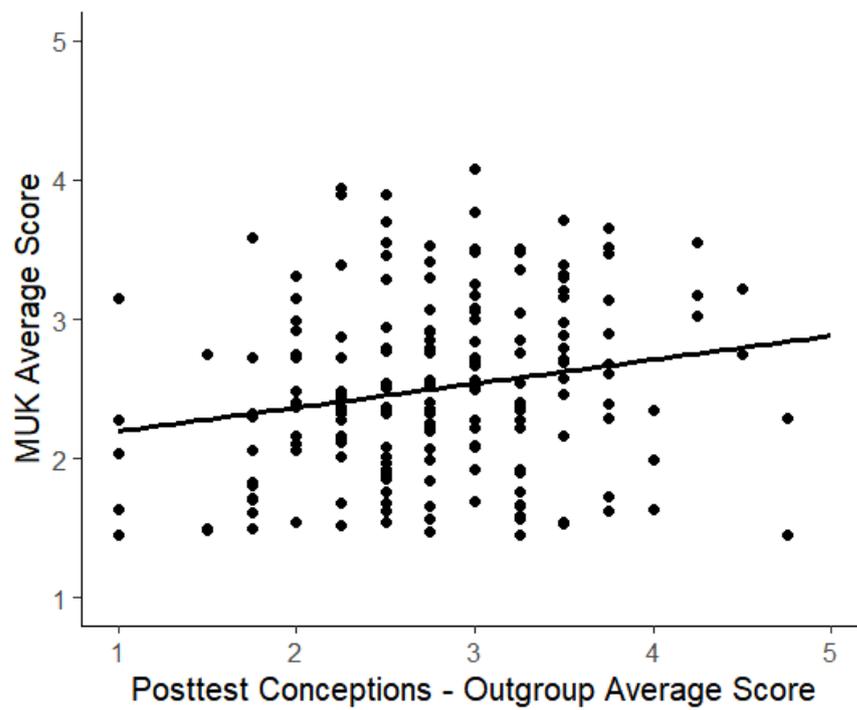
Figure 4. Scatterplot of the Overall MUK Average Score and the Post-test Average Score of the Conception of Unhoused People as Outgroup.
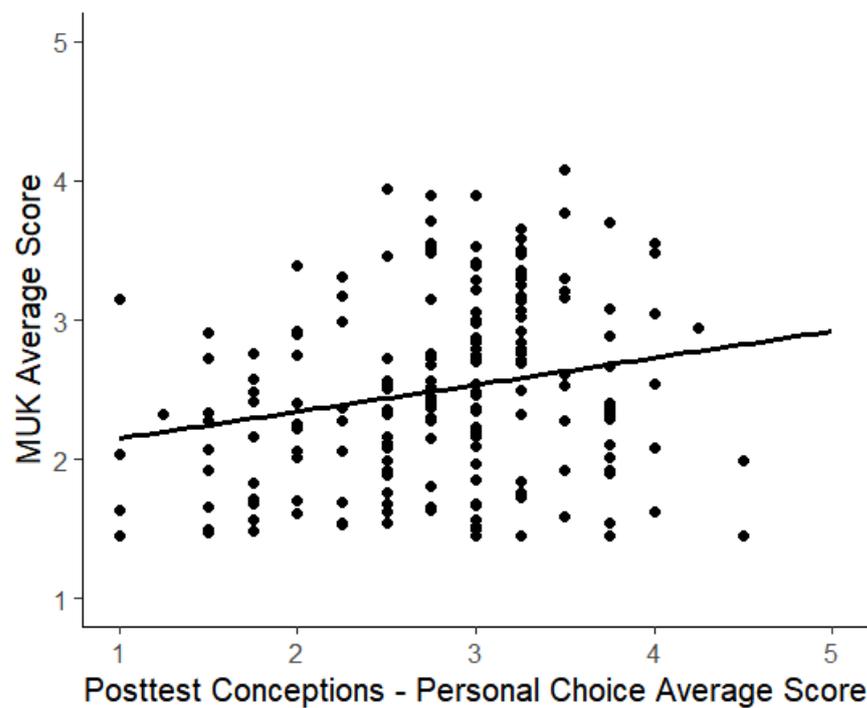

Figure 5. Scatterplot of the Overall MUK Average Score and the Post-test Average Score of the Conception of Houselessness as a Personal Choice.

Table 8. Correlations between MUK and Conception, Comprehension, and Knowledge Measures.

Independent Variable	Correlation with MUK
Pre-test Conceptions—Threatening	**0.29**
Pre-test Conceptions—Out Group	0.11
Pre-test Conceptions—Personal Choice	**0.27**
Pre-test Conceptions—Societal Failure	0.03
Post-test Conceptions—Threatening	**0.34**
Post-test Conceptions—Out Group	**0.20**
Post-test Conceptions—Personal Choice	**0.22**
Post-test Conceptions—Societal Failure	−0.10
Comprehension—Responsibility	**−0.28**
Comprehension—Shortage	−0.09
Comprehension—USA	**−0.23**
Comprehension—Epidemic	**−0.24**

Note: **Bolded** correlations were significant at $p < 0.05$.

4. Discussion

This study introduced a novel dimension of knowledge: The Motivational Utility of Knowledge. Descriptive statistics, correlations, and an exploratory factor analysis were conducted to examine MUK as a construct and test the validity of the MUK scale. Participants were adults in the United States recruited from an online survey platform. The participants were asked questions about their conceptions of houselessness, then read four texts offering alternative views of houselessness and were assessed on their comprehension, emotions while reading, and perceived belief-conflict after each text. Participants' conceptions of houselessness were reassessed, followed by administration of the MUK scale. Finally, participants were administered a demographics survey, a general prior knowledge test, and a vocabulary knowledge test.

There were competing hypotheses about the factor structure of the MUK scale. The first possibility was that participants' MUK was unidimensional (i.e., an overall "Value of Houseless Knowledge"). The second possibility was that participants' MUK was multidimensional—either divided along theoretical backgrounds (Maslow, Kenrick) or divided by relationships of the fundamental need to houselessness (physical safety, social status, etc.). The exploratory factor analysis indicated that the subscales of MUK all represented the same latent construct—an overall value of houselessness knowledge. This finding has implications for research on attitudes towards houselessness, as previous work has indicated that individuals may hold perceptions of unhoused people as either violent or out-group [34,35,40–42]. However, in this study we found that participants perceived their knowledge afforded value across multiple motivations (e.g., physical safety, affiliation, status).

Based on past research on attitudes and misconceptions of houselessness, it was hypothesized that participants with high MUK would have less accurate conceptions of houselessness, which would impair their text comprehension. That is, MUK would be negatively correlated with text comprehension and positively correlated with misconceptions of houselessness. The correlation analysis supported this hypothesis, as MUK was positively correlated with misconceptions and negatively correlated with text comprehension. This finding demonstrates that the MUK scale has construct validity and reflects a dimension of knowledge that is related to known psychological phenomena. Future studies should examine how MUK interacts with other dimensions of knowledge (e.g., high amount of knowledge, low/high MUK) in text comprehension tasks. For instance, readers' comprehension may be enhanced when trained and prompted to use reading comprehension strategies [52]. One possibility is that providing readers with strategy training may reduce the effect of MUK on text comprehension.

5. Conclusions

Overall, the findings of this study suggest that consideration of multiple dimensions of knowledge, including MUK, is essential to understanding the role of prior knowledge in text comprehension. There was a major limitation due to the lack of a comparison topic. For example, past research into fundamental needs has demonstrated that submotives (Physical Safety, Affiliation, etc.) differentially predict personality traits and other behavioral measures [25,26]. However, the findings of this study demonstrated that the MUK subscales were loaded into a single latent construct, which is inconsistent with the past research on fundamental needs. This inconsistency suggests that either the measure needs to be refined, or the topic (houselessness) did not require participants to discriminate between needs. In either case, future research utilizing the measure of MUK on different topics would provide a way to identify whether the measure requires refinement.

This study was an important step in the field of research on knowledge and comprehension. To our knowledge, this is among the first studies to investigate the root cause of individual differences in knowledge value. Thus, this study is an important contribution in measurement of a novel construct by developing a scale, examining the internal factor structure of the scale, and assessing the validity of the scale by comparing it to other measures of psychological phenomena. Expanding the research on MUK can further unravel the mechanisms behind the personal value of knowledge and its effects on conceptual change and comprehension.

Appendix A. Motivational Utility of Knowledge Measure

Participants were presented with the stem "Does your knowledge about homelessness..." followed by the statement. They were given five Likert-item response options: 1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly agree.

Table A1. Fundamental Motives Questionnaire.

Fundamental Motives (Based on the scale by Neel and colleagues [26])	
Physical Safety	Keep you safe from dangerous people Keep yourself safe from others Cause worry about dangerous people Protect you from dangerous people Help avoid people that might carry disease Help avoid people that might have a contagious illness
Affiliation Reverse	Make you part of a group Help your groups stay together Get along with other people in your group Prevent you from being rejected Cause worry about being accepted Help make friends
Status	Cause others to look up to you Improve your social standing Increase your rank or position Increase the respect you receive Prevent you from losing status Prevent you from being at the bottom of a hierarchy
Mate-seeking	Provide ways to meet possible dating partners Increase your desire to find a romantic/sexual partner Prevent you from meeting people to flirt with/date Improve your ability to attract potential dating partners Cause worry about finding romantic/sexual partners Increase the amount you think about finding a partner
Mate retention Reverse	Decrease the likelihood your partner will leave you Cause worry about your romantic/sexual partner leaving Enhance the strength of the relationship between you and your partner Increase your or your partners' sexual loyalty Increase your or your partners' emotional loyalty Cause worry that other people are interested in your romantic/sexual partner
Parenting Reverse	Help you take care of your children Increase the time you spend with your children Prevent bad things from happening to your children Cause worry about protecting your children Improve your ability to provide for your children Improve your relationship with your children
Maslow's Hierarchy (Based on the scale by Taormina and Gao [27])	
Physiological Reverse Reverse	Increase the amount of food that you eat every day Increase the amount of water that you drink every day Increase the quality of your physical health Decrease the quality of your sleep Increase the amount of your exercise to stay healthy Decrease your overall physical strength
Safety–security	Increase the security of your house/apartment Improve the safety of your neighborhood Cause worry about your financial security Increase your safety from disasters
Belongingness Reverse	Increase the intimacy you share with people Increase the affection you receive from friends Increase the affection you receive from family Enhance the love received from your spouse/partner Cause worry that you are unwelcome in your community Improve the feeling of togetherness in your family

Table A1. *Cont*.

Maslow's Hierarchy (Based on the scale by Taormina and Gao [27])	
Self-esteem	Improve the esteem you have for yourself
	Increase how much you like yourself
Reverse	Decrease your self-respect
	Improve your sense of self-worth
Self-actualization	Increase your sense of fulfillment
	Help you realize your innermost desires
	Help you act according to your values
	Improve your ability to live life to the fullest
	Increase the enjoyment you receive from your life
	Help you accept all aspects of yourself

Appendix B. Pilot Study of the Texts and Comprehension Questions

The pilot study was conducted to assess the validity and reliability of the comprehension questions. Undergraduate students ($n = 174$) read four texts on the causes and effects of houselessness and answered comprehension questions about each text. They were administered as a general prior knowledge test and a vocabulary test. The correlations showed general prior knowledge and vocabulary were highly correlated with reading comprehension, indicating that the comprehension questions had construct validity. In addition, the reliability measures indicated that the comprehension questions had good internal reliability. Thus, the texts and questions were determined to be suitable for the primary study.

Table A2. Means, Standard Deviation, Range, and Correlations of the Comprehension Questions and Individual Differences Measures in the Pilot Study.

Variable	Mean	SD	1.	2.	3.	4.	5.
1. Epidemic—Comp	0.56	0.21					
2. Responsibility—Comp	0.66	0.19	0.35				
3. USA—Comp	0.51	0.22	0.50	0.33			
4. Shortage—Comp	0.65	0.25	0.51	0.22	0.48		
5. General Prior Knowledge	0.59	0.14	0.39	0.31	0.46	0.27	
6. Vocabulary	0.70	0.16	0.45	0.24	0.40	0.45	0.58

Note: All correlations were significant at $p < 0.05$.

Table A3. Cronbach's alpha of the comprehension questions.

Title	α
Unhoused Epidemic	0.61
Individual Responsibility of the Unhoused	0.62
Housing Shortage	0.67
Houselessness in the USA	0.70

Appendix C. Levels of Houselessness Scale

Table A4. HUD Houselessness Scale and Responses.

HUD Level of Houselessness	Question(s)	Number of Participants Responding "Yes"
Level 4a	Have you, a family member, or a close friend ever lacked fixed, regular, and adequate nighttime residence? (e.g., primary nighttime residence in a place not meant for human habitation)	30
Level 4b	Have you, a family member, or a close friend ever lived in a publicly or privately operated shelter designed for temporary living conditions?	19

Table A4. *Cont.*

HUD Level of Houselessness	Question(s)	Number of Participants Responding "Yes"
Level 3a	Have you, a family member, or a close friend ever lacked the resources to obtain permanent housing?	49
Level 3b	Have you, a family member, or a close friend ever left permanent housing with no subsequent residence?	43
Level 2b	Have you, a family member, or a close friend ever spent more than 60 days without permanent housing? (e.g., a lease or occupancy agreement)	35
Level 2a	Have you, a family member, or a close friend ever moved three or more times in a 60-day period?	20
Level 2b	Have you, a family member, or a close friend ever spent more than 60 days without permanent housing? (e.g., a lease or occupancy agreement)	35
Level 1	Have you, a family member, or a close friend ever fled, or attempted to flee, domestic violence with no ability to obtain permanent housing?	25
Level 0	(Responded "No" to all of the questions.)	122

Note: The total participants exceed the sample size because some participants reported personal experience with multiple levels of houselessness.

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