Metaphors from perception and culture

The case of solidity

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Applying conceptual metaphor theory, this study aims to discuss how metaphors emerge from the interaction between perceptual experience and cultural environment, comparing English and Chinese. The kind of metaphors under study is rooted in the OBJECT image schema, particularly in its dimension in SOLIDITY with bipolar values as HARD and SOFT. Specifically, these are primary metaphors grounded in experiential correlations in manipulating physical objects that are hard or soft. It is argued that the similarities and differences between English and Chinese in such metaphorical mappings can be accounted for by four main meaning focuses consisting in four pairs of parametric variables: more or less effort, more or less impact, more or less strength, and more or less flexibility. These parametric variables determine metaphorical mapping pathways from HARD and SOFT as source concepts to some abstract target concepts.

Keywords: primary metaphor, OBJECT image schema, tactile experience, solidity, hard and soft, main meaning focus

1. Introduction

This article aims to discuss how metaphors emerge from the interaction between perceptual experience and cultural environment, utilizing conceptual metaphor theory (CMT) of cognitive linguistics. CMT argues that conceptual metaphors are not really arbitrary, but grounded largely in embodied experience (George Lakoff & Mark Johnson 1980, 1999). Our bodily experience, as a general category, can be divided into two subcategories: perceptual experience and motor experience, which are often combined through compounding as "sensory-motor," or "sensorimotor," experience. While motor experience refers to our ability to act, or take actions, with our body, or part of it, perceptual experience refers to our ability to perceive the physical surroundings with our five senses, namely touch, taste,

smell, hearing, and vision. Perceptions of the human senses provide the embodied grounding on which metaphors are constructed, but cultural models provide the final shapes of metaphorical constructions built on that grounding. Such inter- action between perception and culture may lead to similar or different outcomes in terms of metaphorical mappings from source concepts (expressing percep- tual experiences) to target concepts (expressing subjective experiences) across languages (see, e.g., Yu 2008, 2015).

Between two languages, therefore, the same source concepts may map onto the same target concepts, or the same source concepts may map onto different target concepts, or different source concepts may map onto the same target concepts. This paper intends to focus on a case study of a tactile concept, SOLIDITY, which is used here to refer to the degree of hardness of physical objects. This concept, therefore, denotes a scale with bipolar ends represented by two tactile concepts, HARD and SOFT, which originally represent perceptual properties of physical objects but are mapped metaphorically onto abstract properties of certain states, entities, processes, or humans.

The data for this study comes from two linguistic corpora: the Corpus of Contemporary American English at Brigham Young University (COCA) and the Corpus of Beijing Language and Culture University Corpus Center (BCC). As a preliminary study, my investigation is limited to one construction in both languages: the Adjective-Noun construction, where the adjective for "hard" or "soft" in both languages serves as a modifier of the head noun. Karen Sullivan (2013: Chapter 5) calls this type the "predicating modifier construction," which involves a source-domain adjective and a target-domain head (e.g., *blood-stained wealth*), in contrast with the "domain construction," which involves a target- domain adjective and a source-domain head (e.g., *spiritual wealth*). That is, in the Adjective-Noun constructions under study, the "hard" and "soft" adjectives are used metaphorically to modify the head nouns. I intend to examine how English and Chinese are similar and different when they use HARD and SOFT as source concepts for metaphorical mappings.

2.   Relevant preceding studies

As suggested above, the metaphors under study in this paper, along with many others, are grounded in our bodily experience with manipulating physical objects in our daily life. More specifically, these metaphors are rooted in the OBJECT image schema, which emerges from our recurring embodied experience dealing with physical objects that are hard or soft. As a fundamental form of existence in the physical world, physical objects have some basic properties that define

them as such. They are first of all solid, rather than liquid or gas, with some sort of shape of their own that can change or not depending on the degrees of their solidity. Because of that, they are visible or tangible and can be described as having some kind of color. Physical objects also have their own sizes, big or small, and they carry a weight that can be heavy or light, corresponding to their sizes and nature of physical substances they are made of. As characterized above, objects have these properties: solid, size, weight, shape, and color. Image schemas, however, function at a highly abstract and schematic level. Shape and color, which are tied with specific types of objects, are less relevant than the first three properties: solidity, size, and weight.
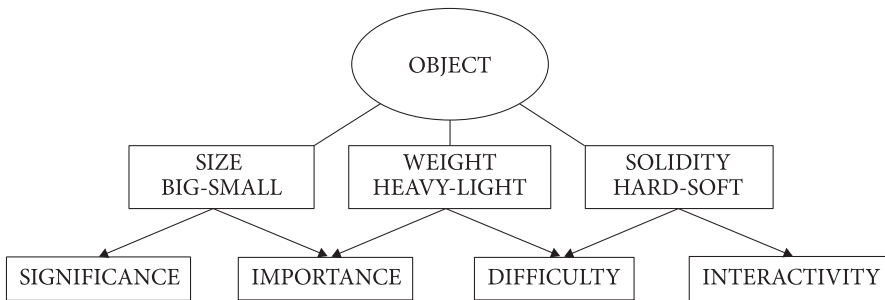
Figure 1. A hypothetical mapping scheme for some primary metaphors based on the OBJECT image schema (Yu et al. 2017: 245)

Yu et al. (2017) proposed a hypothetical conceptual mapping scheme for the metaphors rooted in the OBJECT image schema, which is at the highest, most schematic level of metaphor analysis (Zoltán Kövecses 2017, 2020). Following Joseph Edward Grady (1997a, 1997b), they refer to such metaphors as primary metaphors (see also Lakoff & Johnson 1999; Grady & Giorgio A. Ascoli 2017; Bodo Winter & Teenie Matlock 2017; Yu & Jie Huang 2019; Yu 2022). This scheme is represented in Figure 1. In that figure, the source domain OBJECT, as an image schematic frame, is mapped onto four possible examples of target concepts through one of its three interrelated, basic properties as its core elements serving as actual source concepts, namely SIZE, WEIGHT, and SOLIDITY. These three source concepts each have two possible opposing values as their parametric valences in scalar opposition to each other: BIG and SMALL for SIZE, HEAVY and LIGHT for WEIGHT, and HARD and SOFT for SOLIDITY. In that study, Yu et al. (2017) limited themselves to two source concepts, SIZE and WEIGHT, which share the same target, IMPORTANCE, namely IMPORTANCE IS SIZE (i.e., IMPORTANT IS BIG and UNIMPORTANT IS SMALL) and IMPORTANCE IS WEIGHT (i.e., IMPORTANT IS HEAVY and UNIMPORTANT IS LIGHT). The study found that both primary metaphors are manifested

in English and Chinese although there are graded metaphorical strengths with particular lexical items as language-internal specifics and characteristics.
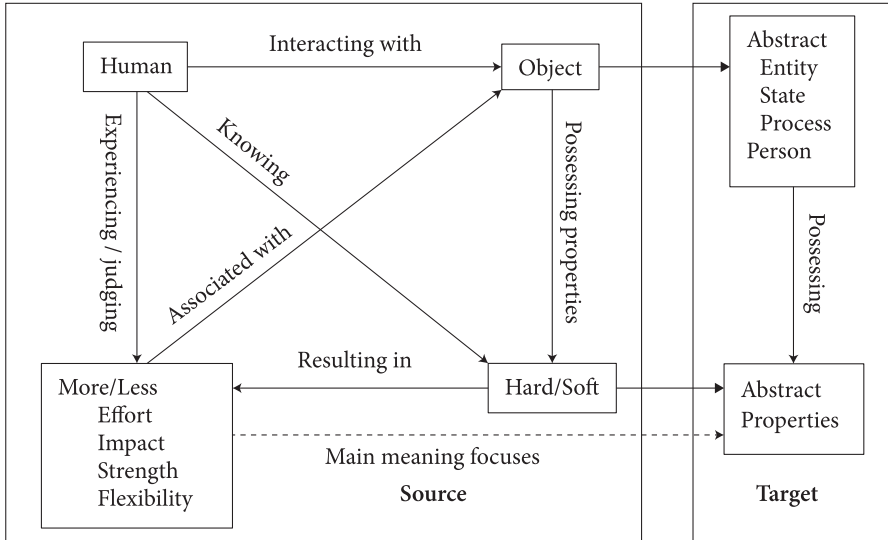
Figure 2. General human-object interaction frame as source for "hard" and "soft" metaphors (Yu & Huang 2019: 124)

Doing a follow-up study, Yu & Huang (2019) focused on another pair of primary metaphors sharing the same target as shown in Figure 1: DIFFICULTY IS WEIGHT (i.e., DIFFICULT IS HEAVY and EASY IS LIGHT) and DIFFICULTY IS SOLIDITY (i.e., DIFFICULT IS HARD and EASY IS SOFT). Both of them link two distinct dimensions of our recurring embodied experiences in specific situations. In both cases, the motivations for the primary metaphors lie in the experiential correlations between perceiving weight or solidity of physical objects and experiencing difficulty as we try to lift or manipulate them. That is, it is the source that causes the target: the heaviness or hardness of physical objects is the reason for effortful interactions with them (Kövecses 2013). Yu & Huang (2019) discussed a case in which English has a primary metaphor DIFFICULTY IS SOLIDITY manifested both at a schematic level based on the schematic OBJECT frame (e.g., *hard* questions, *hard* choices, *hard* decisions) and at a specific level based on the specific DRY FRUIT frame (e.g., *a hard nut to crack*). On the other hand, DIFFICULTY IS SOLIDITY is manifested chiefly at a specific level based on the MEAT BONE frame (e.g., 啃 这块硬骨头, [lit. gnaw on this piece of *hard bone*], meaning "take on this *difficult task*"). In Chinese, as noted, when a "task" is said to be "hard" (硬任务 [lit. hard task]), for instance, it means "non-negotiable, non-alterable task that has

definite requirements on time, amount, quality, etc.," namely an "exacting task," a "task that must be carried out to the letter," in contrast with English, where *hard task* means "difficult task." This is how linguistic manifestation of a conceptual metaphor can vary across languages.

As observed above, one area for cross-linguistic and cross-cultural variation is that a primary metaphor can have extensive manifestation in one language, but limited manifestation in another. Thus, DIFFICULTY IS SOLIDITY (i.e., DIFFICULT IS HARD and EASY IS SOFT) is manifested richly in English, but sparsely in Chinese. In Chinese, nevertheless, HARD and SOFT map onto many other target concepts than DIFFICULTY: for instance, people can be "hard" or "soft" in character, will, attitude, ability, or in social interaction, and things can be "hard" or "soft" in quality, need, or requirement (Yu & Huang 2019). Yu & Huang (2019) proposed a general human-object interaction frame, as represented in the diagram of Figure 2, to account for cross-linguistic and cross-cultural variations. In that diagram, solid arrowheads represent metaphorical mappings from the source to the target whereas stealth arrowheads denote relations among core elements or roles in the source as well as in the target.

It was suggested that the variables that the human may be experiencing when interacting with an object that is hard or soft serve as the main meaning focuses of metaphors mapped from the source to the target. According to Kövecses (2010:137–138), the "main meaning focus" is the major theme, or meaning orientation, of a given source-target pairing of a metaphor, conventionally fixed, predetermined, and agreed upon within a speech community. In this study, the main meaning focuses emphasize different, but coherent, parametric features of the object with its internal quality and external interactivity, where "interactivity" is defined as the process of two entities interacting with each other and their ability to influence each other in interaction (modified from *Oxford Lexico*). As shown in Figure 2, they are presented in a shorthand fashion as "More/Less Effort," "More/Less Impact," "More/Less Strength," and "More/Less Flexibility." These can be extended as the following:

(i)   It takes more effort to manipulate a hard object than a soft object, and vice versa.
(ii)   A hard object exerts more impact on another entity than a soft object, and vice versa.
(iii)   A hard object has more strength than a soft object and vice versa.
(iv)   A soft object has more flexibility than a hard object, and vice versa.

As suggested above, these properties of objects in general are highly coherent with one another. Thus, for instance, owing to their internal substance and quality, hard objects inherently have more strength and less flexibility, and therefore they

are able to exert more impact on another entity and to resist another entity's impact more. What specific experience or judgment is carried over to the target as the main meaning focus of the mapping depends largely on cultural contexts when the source concept is connected with the target concept.

In this study, I will elaborate on the idea of different main meaning focuses on the mappings of SOLIDITY to target concepts and show how English and Chinese may be identical with or differ from each other in such mappings. It is a preliminary comparative study based on two major corpora in English and Chinese.

3.   A comparative study between English and Chinese

To provide an overview of the two English and Chinese corpora involved in the present study, Table 1 contains the overall and relevant capacities of COCA and BCC at the time of research. As seen in this table, the total capacity of COCA is over 1 billion English words whereas that of BCC is over 7.5 billion Chinese characters. Notably, the ratio between the "hard" and "soft" tokens is approximately 6.49 to 1 in COCA, with a total of 308,054 tokens for *hard* and 47,501 for *soft*, the latter being only 15.4% of the former. In stark contrast, in BCC, the total number of "hard" tokens is 184,591 whereas that of "soft" tokens is 229,617. That is, in BCC, there are more "soft" (软 *ruǎn*) tokens than "hard" (硬 *yìng*) tokens. The ratio between 'hard' and 'soft' is approximately 1 to 1.24, the former being about 80.4% of the latter.

Table 1. The overall and relevant capacities of COCA and BCC

Corpus	COCA (Contemporary English)	BCC (Contemporary Chinese)
Total capacity	Over 1 billion words	Over 7.5 billion characters
Total number of "hard" tokens	308,054	184,591
Total number of "soft" tokens	47,501	229,617
Ratio between "hard" and "soft" tokens	6.49:1	1:1.24
% of Less/More	15.4%	80.4%

As seen above, the difference in the ratio between the total numbers of "hard" and "soft" tokens in English and Chinese is quite striking in these two corpora. On the one hand, the total number of Chinese "hard" tokens (184,591) is only 59.9% of that of the English ones (308,054); on the other hand, the total number of English "soft" tokens (47,501) is merely 20.7% of that of the Chinese "soft"

tokens (229,617). As shown in Table 1, there exists a salient asymmetry in quantity between the "hard" and "soft" tokens in English: the "hard" tokens outnumber the "soft" tokens 6.49 to 1. However, such an asymmetry does not exist in Chinese; instead, its "soft" tokens outnumber its "hard" tokens 1.24 to 1.

The next two subsections each present a data sample of the top 20 most frequent Hard+N and Soft+N constructions in English and Chinese, respectively. Although the sample is quite small, it should give us a sense of the most salient "tip of the iceberg." I would like to see the unique overall "shape" of that body of sample data in each language. In the third subsection, I attempt to take a comparative look at the similarities and differences between the two languages so as to gain insights into how relevant metaphors emerge from the interaction between human perception and cultural context. In this particular case, the perception refers to our tactile experiences in solidity as part of our sensorimotor experience in general that serves as the "breeding ground" for the emergence of metaphors, which however is conditioned by its cultural context that serves as its overall ecological environment (Yu 2004: 682; see, also, Farzad Sharifian et al. 2008; Zouheir Maalej & Yu 2011; Yu 2013).

3.1   The English data in COCA

In this subsection, I focus on the top 20 most frequent types of Hard+N and Soft+N constructions in COCA. Since this is but a preliminary study, I disregard the fact that many such English constructions have both singular and plural forms and only take into account the more frequent form, either singular or plural, among the top 20. I also disregard here and below the fact that the token frequencies of the constructions under study contain "noises," namely irrelevant tokens included by "error" for whatever reasons.

Seen below, Table 2 displays the top 20 relevant constructions in which *hard* and *soft* are clearly used in a metaphorical sense, along with their frequencies in COCA. In choosing types of construction, I excluded *hard part* (1406) and *hard thing* (986) from my top 20 list as it is possible that some of their referents may be physical objects that are "hard things" or have a "hard part" in a literal sense.

The data in Table 2 reinforces the earlier observation that there exists a general asymmetry between *hard* and *soft* in COCA. A summary of the asymmetry is provided in Table 3. As seen there, the total number of tokens for the top 20 Soft+N constructions (5,377) is just 14.3% of that of the top 20 Hard+N constructions (37,541). The ratio between the latter and the former is 6.98 to 1. Similar patterns are found with the tokens of No. 1 and No. 20 Hard+N and Soft+N constructions, as shown in Table 3. In sum, the asymmetry is consistent across the board in Table 2 and Table 3.

Table 2. Top 20 Hard+N and Soft+N constructions in COCA

No.	Hard+N	Frequency	Soft+N	Frequency
1	*hard work*	12000	*soft drinks*	1111
2	*hard time*	10914	*soft money*	793
3	*hard way*	2613	*soft voice*	546
4	*hard look*	1351	*soft power*	423
5	*hard feelings*	1125	*soft landing*	274
6	*hard evidence*	1043	*soft light*	257
7	*hard rock*	953	*soft white*	244
8	*hard day*	833	*soft skills*	219
9	*hard line*	809	*soft music*	176
10	*hard questions*	679	*soft brown*	170
11	*hard currency*	666	*soft pink*	151
12	*hard worker*	653	*soft targets*	146
13	*hard choices*	634	*soft glow*	143
14	*hard sell*	620	*soft blue*	136
15	*hard labor*	616	*soft green*	135
16	*hard life*	465	*soft breeze*	101
17	*hard facts*	455	*soft rock*	100
18	*hard decisions*	407	*soft sound*	88
19	*hard data*	382	*soft yellow*	83
20	*hard truth*	323	*soft gray*	81
Total		**37541**		**5377**

Table 3. Token data of top 20 Hard+N and Soft+N constructions in COCA

	Hard+N	Soft+N	Soft/Hard	Hard:Soft
Total tokens of top 20	37541	5377	14.3%	6.98:1
Tokens of No. 1	12000	1111	9.3%	10.8:1
Tokens of No. 20	323	81	25.1%	3.98:1

At this point, I look at the distribution of the metaphorical mappings of the Hard+N and Soft+N constructions. They can be roughly categorized into different groups according to the possible main meaning focuses of their

metaphorical mappings (see Figure 2). While HARD and SOFT as source concepts can have a wide range of target concepts, there are only a few parametric settings of main meaning focuses for their mappings based on our basic bodily experiences with hard or soft objects: more or less effort, more or less impact, more or less strength, and more or less flexibility.

Let us first look at the "hard" side of Table 2. The 20 constructions can be roughly put into the following groups as in (1), where the numbers in the parentheses indicate the number of constructions in each group:

(1) a. More effort (9)   hard work, hard labor, hard way, hard question, hard choice, hard decision; hard work, hard worker, hard look
     b. More impact (6)   hard life, hard time, hard day, hard feeling, hard rock, hard sell
     c. More strength (5) hard currency, hard evidence, hard truth, hard fact, hard data
     d. Less flexibility (1) hard line

Again, it is worth noting that the four main meaning focuses by which the constructions are grouped are not mutually exclusive. Rather, as explained above, they are highly coherent and correlated with one another. Thus, for instance, a hard object has more strength, and therefore it has less flexibility, it exerts more impact on another entity, and it takes more effort for another entity to manipulate it. After all, the four main meaning focuses are traits of a *single* object. The *main* meaning focus is chosen to characterize a particular group of constructions due to its salience in meaning making of those constructions.

Note in the above list that (1a) is divided into two subgroups, separated by a semicolon, which are characterized by "requiring more effort" and "exhibiting more effort" respectively. In the first subgroup, in dealing with *X* (denoted by the head noun) that is "hard" (i.e., difficult), it *requires* more effort from *Y* (a covert agent). In the second subgroup, *Y*, an agent that is overt (as in *hard worker*) or covert, *exhibits* more effort (i.e., being effortful) when doing *X* denoted by the head noun (as in *hard work* and *hard look*) or being covert (e.g., in *hard worker*). The construction *hard work* is placed in both subgroups because it has both senses, as illustrated by the two COCA examples in (2):

(2) a. I actually hate reading Dickens as it's *hard work*, …
     b. Thank you so, so much for your *hard work* and dedication.

In (2a) "hard" work is "difficult" work, whereas in (2b) "hard" work is "effortful" work. Nevertheless, the two distinct senses are coherent with each other. If some

work is difficult, it takes more effortful work to accomplish it. A more effortful worker can accomplish more difficult work.

In (1b), the constructions are characterized by the main meaning focus of "more impact." When hit by a physical object, we receive a lot more impact if that object is hard than soft. In this group, the first four constructions are negative and the last two neutral. In the first four *hard* can still be interpreted as meaning "difficult". The difference is that in the first subgroup of (1a), *X* is "difficult" for *Y* to do or accomplish, whereas in the first four constructions of (1b) *X* is "difficult" for *Y* to bear or endure. In *hard rock, X,* a musical form, produces more impact on the senses, especially the aural sense, but also the visual sense, of *Y*. The last one in this group, *hard sell*, refers to the "aggressive high-pressure salesmanship" that results in more impact on potential buyers, in comparison with *soft sell* that uses "suggestion or gentle persuasion in selling" (*Merriam-Webster*).

In (1c), *X* is "hard" and is therefore "strong" with "more strength." There is only one construction in (1d), characterized by "less flexibility." *Hard line* refers to "an uncompromising adherence to a firm policy" (*Oxford Lexico*). Thus, a *hard-line* person, or a *hard liner*, is a person, particularly a politician, who tends to be "unyielding" or "uncompromising" in a situation of debate or dispute. In other words, there is "less flexibility" with their position or attitude.

The list in (1) confirms Yu & Huang's (2019) observation that in English DIFFI-CULTY is a favorite target of HARDNESS as the source and the mappings instantiate the primary metaphor DIFFICULTY IS SOLIDITY (see Figure 1), or more specifically, DIFFICULT IS HARD. Of the top 20 Hard+N constructions, DIFFICULT is by far the number one target concept for HARD, at about 10 or 50%.

On the side of the top 20 Soft+N constructions in COCA, a rough classification of their metaphorical mappings, based on the possible main meaning focuses, can be presented in (3):

(3) a. Less effort (1)   soft targets
     b. Less impact (17)   soft power, soft landing, soft breeze, soft drinks, soft sound, soft voice, soft music, soft rock, soft light, soft glow, soft white, soft brown, soft pink, soft blue, soft green, soft yellow, soft gray
     c. Less strength (1)   soft money
     d. More flexibility (2) soft money, soft skills

An interesting contrast with the "hard" side is that only one out of the top 20 Soft+N constructions falls into the category of "less effort" in (3a). A *soft target* is "a target that can be attacked easily because it does not have military defenses" (*Merriam-Webster*), in contrast with a *hard target* that is heavily defended. In this

sense, a soft target is an "easy" target or *X* for *Y* to attack. The opposite is true of a hard target.

Obviously, (3b) is the biggest group with 17 constructions (85%). The first construction, *soft power*, is used in international politics to refer to a "persuasive approach" to international relations, typically involving the use of economic or cultural influence, whereas *hard power* refers to a "coercive approach" to international relations, especially one that involves the use of military action and economic sanction (*Oxford Lexico*). The difference between the two lies in the pair of keywords: *persuasion* vs. *coercion*. The former exerts "less impact" on *Y* than the latter. Also, it is more difficult to measure successes of *soft power* than those of *hard power* because it is a lot harder to quantify the former than the latter. That also means there is "more flexibility" in the measurement of the former than the latter (3d). The second construction, *soft landing*, which originally means a well-controlled landing of an aircraft, is often used metaphorically to refer to "the slowing down of economic growth at an acceptable degree relative to inflation and unemployment" (*Oxford Lexico*). In other words, a *soft landing* has less negative impact on the economy.

In the third construction of (3b), a *soft breeze* (*X*) does not produce as much "impact" on another entity *Y* as a *hard wind*. Of course, this one is also interpretable with "less strength." A "soft breeze" is not as "strong" as a "hard wind" if we ignore its impact on *Y*. Either way, the adjective *soft* is used metaphorically because it is originally a word for the property of solid objects rather than gaseous air. This one, as well as the remaining 14 constructions in (3b), can be characterized as instances of what is commonly known as "synesthetic metaphor," namely cross-sense metaphor that maps from one perceptual mode to another (see, e.g., Yu 2003; Qingqing Zhao et al. 2022). Here are the mapping types of the 15 constructions: Object Touch → Air Touch (1),[1] Touch → Taste (1), Touch → Sound (4), Touch → Sight (9). The parentheses here contain the numbers of instances of each mapping type. The commonality of these types is that they use a common tactile adjective *soft* to describe the "less impact" of *X* on the relevant senses of *Y*.

The construction *soft money* can refer to very different things because such money is called "soft" for different reasons in different contexts. It is placed in

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1. Here, we can say that the synesthetic transfer involves two distinct aspects of the sense of touch, on a par with the sense of sight divided into dimension (e.g., deep) and color (e.g., red) (see Joseph M. Williams 1976). Therefore, we have "deep red" in both English and Chinese and "big red" in Chinese when the color of red cannot literally be "deep" or "big." The sense of touch still has another dimension in temperature, with "hot" and "cold" in scalar opposition to each other.

(3c) in the context of academia when it refers to moneys coming chiefly from research grants funded for a certain period of time, in contrast to *hard money* coming from the university's regular annual budget. Positions supported solely by soft money are usually less stable and temporary in nature since there is "less strength" with their financial sources, compared to the university's "hard" annual budget. In American politics, which is a very different context, *soft money* refers to moneys donated to political parties for generic party-building purposes. Contributors are not subject to contribution limits and prohibitions of federal law. For that matter, there is "more flexibility" with this kind of money. In contrast, *hard money* refers to campaign contributions to individual candidates for their elections to offices. Contributions of this kind are federally regulated and subject to strict rules with respect to their amounts and uses. So, in American campaign politics, there is "less flexibility" with *hard money*, and "more flexibility" with *soft money*, in spending. This means *soft money* can be put in (3d) as well.

Finally, in (3d), *soft skills* are so called because they are skills that are difficult to measure and quantify, such as communication, collaboration, creativity, and adaptability. On the other hand, *hard skills* are job-specific technical skills that are more measurable and quantifiable. In this sense, there is "more flexibility" with soft skills than hard skills.

3.2   The Chinese data in BCC

Now, let us turn to the Chinese data. Table 4 presents the top 20 most frequent Hard+N and Soft+N constructions in BCC. The constructions are rendered in both Chinese characters and *pinyin*, followed by their English glosses and translations. Provided on the far-right column are the constructions' token frequencies in BCC.

Table 4. Top 20 Hard+N and Soft+N constructions in BCC

No.	Hard+N	Gloss	English translation	Freq.
1	硬骨头 *yìnggǔtou*	hard-bone	person of indomitable will; difficult task	4742
2	硬道理 *yìngdàoli*	hard-truth/reason	inescapable truth; established truth	3352
3	硬仗 *yìngzhàng*	hard-battle	tough battle; formidable task	1668
4	硬环境 *yìnghuánjìng*	hard-environment	hard environment	1108

Table 4. *(continued)*

5	硬伤 *yìngshāng*	hard-wound	obvious defects or flaws	767
6	硬指标 *yìngzhǐbiāo*	hard-quota/index	inflexible target, goal or requirement; mandatory quota or criterion	721
7	硬任务 *yìngrènwù*	hard-task	task that must be carried out to the letter; exacting task	561
8	硬气 *yìngqi*	hard-gas/*qi*	tough; unyielding; feel justified	438
9	硬着陆 *yìngzhuólù*	hard-landing	hard landing	341
10	硬实力 *yìngshílì*	hard-power	hard power	325
11	硬约束 *yìngyuēshù*	hard-restraint	hard restriction; hard restraint	322
12	硬功夫 *yìngōngfu*	hard-skill	master skills; great skills	306
13	硬汉子 *yìnghànzi*	hard-man	tough guy; dauntless unyielding man	304
14	硬通货 *yìngtōnghuò*	hard-currency	hard currency	284
15	硬措施 *yìngcuòshī*	hard-measure	hard measures	277
16	硬杠杠 *yìnggànggang*	hard-line.line	hard rules/regulations; hard standards	243
17	硬派 *yìngpài*	hard-style	hard style	196
18	硬水 *yìngshuǐ*	hard-water	hard water	160
19	硬核 *yìnghé*	hard-core	hard core	148
20	硬本领 *yìngběnlǐng*	hard-ability	great abilities, capabilities	143
Total				**16406**
No.	**Soft+N**	**Gloss**	**English translation**	**Freq.**
1	软环境 *ruǎnhuánjìng*	soft-environment	soft environment	2412
2	软实力 *ruǎnshílì*	soft-power	soft power	2081
3	软科学 *ruǎnkēxué*	soft-science	soft sciences	1044

Table 4. *(continued)*

4	软肋 *ruǎnlèi*	soft-rib	weaknesses; weak points	1033
5	软着陆 *ruǎnzhuólù*	soft-landing	soft landing	970
6	软蛋 *ruǎndàn*	soft-egg	timid and overcautious person; useless, good-for-nothing person	505
7	软饭 *ruǎnfàn*	soft-cooked.rice	(of a man) easy life financially supported by a woman (esp. one's wife)	382
8	软任务 *ruǎnrènwù*	soft-task	task with flexible goals, requirements	343
9	软刀子 *ruǎndāozi*	soft-knife	means of harming people imperceptibly	329
10	软X射线 *ruǎnXguāng*	soft-X-ray	soft X-ray	290
11	软柿子 *ruǎnshìzi*	soft-persimmon	weak person who is easily bullied	245
12	软妹子 *ruǎnmèizi*	soft-little.sister	gentle (and sweet) young woman	244
13	软约束 *ruǎnyuēshù*	soft-restraint	soft restraints; soft constraints	228
14	软饮料 *ruǎnyǐnliào*	soft-drink	soft drinks	220
15	软声 *ruǎnshēng*	soft-voice	soft voice	211
16	软指标 *ruǎnzhǐbiāo*	soft-target/goal	flexible target, goal or requirement	167
17	软水 *ruǎnshuǐ*	soft-water	soft water	165
18	软骨头 *ruǎngǔtou*	soft-bone	spineless person; coward	160
19	软钉子 *ruǎndīngzi*	soft-nail	polite refusal; snub	136
20	软贷款 *ruǎndàikuǎn*	soft-loan	soft loans	122
Total				11287

Table 5 exhibits the token data of the top 20 most frequent Hard+N and Soft+N constructions in BCC. Their total numbers of tokens for Hard+N and Soft+N are

respectively 16,406 and 11,287, the latter being 68.8% of the former and the former holding a 1.45-to-1 ratio with the latter. More or less similar patterns are found with No. 1 and No. 20 constructions between Hard+N and Soft+N.

Table 5. Token data of top 20 Hard+N and Soft+N constructions in BCC

	Hard+N	Soft+N	Soft/Hard = %	Hard:Soft
Total tokens of top 20	16406	11287	68.8%	1.45:1
Tokens of No. 1	4742	2412	50.9%	1.97:1
Tokens of No. 20	143	122	85.3%	1.17:1

In (4), I categorize the top Hard+N constructions according to the main meaning focuses of the metaphorical mappings they involve. In doing so, I just list the English glosses of the Chinese constructions.

(4) a. More effort (2)
      硬骨头 (hard-bone), 硬仗 (hard-battle)

   b. More impact (5)
      硬道理 (hard-truth), 硬伤 (hard-wound), 硬着陆 (hard-landing), 硬实力 (hard-power), 硬措施 (hard-measure)

   c. More strength (9)
      硬骨头 (hard-bone), 硬汉子 (hard-man), 硬气 (hard-gas), 硬派 (hard-style), 硬功夫 (hard-skill), 硬本领 (hard ability), 硬核 (hard core), 硬通货 (hard currency), 硬水 (hard water)

   d. Less flexibility (5)
      硬环境 (hard-environment), 硬指标 (hard-quota), 硬任务 (hard-task), 硬约束 (hard-restraint), 硬杠杠 (hard-line.line)

In (4a), compared with eating meat without bones in it, it takes "more effort" to gnaw on a hard piece of bone (see Yu & Huang 2019), even though many diners love doing it. In military terms, it takes a lot "more effort" to fight a "hard battle" than one that is not "hard" (although there is no "soft battle" as an antonymous expression). In Chinese, however, both these expressions are used regularly and commonly to mean "difficult tasks."

In (4b), the first two constructions, 硬道理 (hard-truth) and 硬伤 (hard-wound) are common expressions in the Chinese context, as suggested by their token frequencies in BCC. It is the former Chinese leader Deng Xiaoping, I believe, who made the first expression popular after he said 发展是硬道理 'Development is the absolute truth (lit. hard truth),' to start the decades of China's "Reform and Opening" period that led to the miraculous booming of Chinese economy after the disastrous decade of the "Cultural Revolution" (1966–1976). In

this saying, which served as the guiding principle of the Chinese government, "absolute (lit. hard) truth" has other variants of translation, such as "absolute principle," "absolute need," or "of overriding importance," but it means all these simultaneously. Because development is such an absolute need of primary importance, it should serve as the central and overriding principle for all. Under this principle, everything else should yield to development since it is the "hardest" of all and everything else is "softer" than it. In this sense, the "hard truth" exerts "more impact" than everything else. In the same group, "hard wound" is often used metaphorically to mean some deficiency, defect, or flaw that is so obvious and serious that, as *X*, it exerts "more impact" on *Y*, its possessor, than other wounds that are not "hard".

As seen in Table 4, 硬骨头 (hard-bone) has two distinct meanings in Chinese. That is the reason why it is placed in two separate groups in (4a) and (4c). In (4c), "hard bone" refers to a "strong" person, a person of indominable will, who will not give in to external pressure or give up in a "hard" situation. In this construction, the "bone" is used metonymically for the whole person (PART FOR WHOLE). That is, people are strong and unbending because they have "hard" bones in their bodies. The two examples in (5) from BCC illustrate the two distinct senses of "hard bone" in Chinese:

(5)   a.   所剩问题虽然不多，但均是难啃的"硬骨头"。
            Although there are not many problems that remain, they are all hard ones that are difficult to resolve (lit. they are all "hard bones" that are difficult to gnaw on).
      b.   他认为，"硬骨头"精神集中到一点，就是在任何艰难困苦面前都绝不低头。
            He believes that the "hard bone" spirit converges on one point, which is absolutely not to bow to (lit. not to hang one's head in face of) any difficulties and hardships.

In (5a), "hard bones" refers to the "difficult" problems that remain and take "more effort" to resolve. In (5b), however, "hard bones" refers to "strong" people who uphold the spirit of not submitting to any difficulties and hardships. I manually went through the first 1000 tokens of 硬骨头 (hard-bone) in BCC. The "strong person" sense accounts for 147 or 14.7% and the "difficult task" sense 853 or 85.3%. In Chinese, 软骨头 *ruǎngǔtou*, literally "soft bone," can only be the antonym of the "hard bone" in (4c), but not in (4a). That is, the "soft bone" in Chinese can only refer to a "weak" person, but not an "easy" thing to do.

In (4c), the "hard bone" is very similar in meaning to the one following it, the "hard man," although the latter refers to man only. The commonality of the two is that both exhibit the "hard gas" (硬气) and act in a "hard style" (硬派). In the

fifth and sixth constructions in (4c), skills and abilities are "hard" because they are considered "strengths" of those who possess them. The remaining constructions in (4c) all show "strengths" in some metaphorical sense.

In the last group of "hard" constructions, all five of them suggest lack of flexibility in some sense. For instance, "hard environment" is so called because it refers to the concrete infrastructures and facilities at a place that can be precisely measured and quantified. Both "hard quotas" and "hard tasks" suggest some targeted goals that must be attained, and both "hard restraints" and "hard rules" must be imposed in a strict manner. The last one, 硬杠杠 literally means the lines drawn to set up limits or demarcations. If such lines are "hard," they cannot be bent in one way or another to allow for exceptions.

Listed in (6) below are the "soft" constructions classified into four groups characterized by four main meaning focuses.

(6) a. Less effort (1)
         软饭 (soft-cooked.rice)
     b. Less impact (7)
         软实力 (soft-power), 软着陆 (soft-landing), 软刀子 (soft-knife); 软钉子 (soft-nail), 软妹子 (soft-little.sister), 软饮料 (soft-drink), 软声 (soft-voice),
     c. Less strength (6)
         软肋 (soft-rib), 软蛋 (soft-egg), 软柿子 (soft-persimmon), 软骨头 (soft-bone), 软X射线 (soft-X-ray), 软水 (soft-water)
     d. More flexibility (6)
         软环境 (soft-environment), 软科学 (soft-science), 软贷款 (soft-loan), 软任务 (soft-task), 软指标 (soft-quota), 软约束 (soft-restraint)

In the following, I only discuss those constructions that are more specific to or idiomatic in the Chinese language. The first group, with just one construction, is characterized by "less effort." When something takes less effort, it is easy to do. In China, especially in south China, people eat rice as the main food. "Soft cooked rice," which takes less effort to chew, is often used derogatorily to refer to a man financially depending on a woman, especially his wife, for an "easy" life. Such a man is often said to "eat soft cooked rice" (吃软饭 *chī ruǎnfàn*). This metaphorical expression is very culture-specific, but it instantiates the primary metaphor EASY IS SOFT (see Yu & Huang 2019), in contrast to DIFFICULT IS HARD.

In (6b), which is characterized by "less impact," a knife is a tool for cutting that is supposed to be hard. A "soft knife" refers to means of harming people imperceptibly, namely with less (perceptible) impact. Nails as metal fasteners are supposed to be hard. In Chinese, a "soft nail" refers metaphorically to a polite refusal or criticism that is not as blunt as a "hard" one with more impact on people

who receive it. In a similar vein, "soft" in "soft little sister" refers to the gentle and sweet character or personality of a young woman who is not "hard" on other people.

In (6c), characterized by "less strength," "soft rib" refers to the weaknesses or weak points of a person or any entity. A person's "soft rib" is vulnerable to injury when being hit "hard" by another person. A "soft egg" originally refers to an egg with soft shell. Such an egg, with no strength to resist external pressure, is especially easy to break under any impact. Metaphorically, it refers to a timid or useless person who is weak and good-for-nothing. Similarly, "soft persimmon" is usually used metaphorically to refer to a weak person who is easily bullied by others or, sometimes, an easy thing to do, as the Chinese saying goes: 柿子专拣软的捏 (lit. people always pick soft persimmons to pinch). That is, if you are "soft," you tend to be "squeezed" and "squashed" by others. The next construction is "soft bone," which was already discussed above as the antonym of "hard bone," which has two distinct senses in Chinese, "difficult task" and "person of indomitable will." "Soft bone," however, only carries the antonymous sense of the second one, meaning "coward" or "spineless person." With "soft bones," one cannot "stand up" to any unfavorable circumstances.

The last group of constructions in (6d) is characterized by "more flexibility." These constructions are called "soft" because they have more flexibility with them in measurement (soft environment), quantification (soft science), condition (soft loan), goal or requirement (soft task, soft quota), or constraint (soft restraint).

3.3   The English and Chinese data in comparison

Having presented the Top 20 Hard+N and Soft+N constructions in COCA and BCC, I now turn to a comparison between the two with an eye toward their similarities and differences. As shown in the preceding two subsections, the constructions in both languages can be roughly grouped into four categories according to four main meaning focuses with four pairs of parametric values: more or less effort, more or less impact, more or less strength, and more or less flexibility. The four main meaning focuses for metaphorical mappings come from our basic tactile experiences dealing with physical objects that are hard or soft. This is perhaps the biggest commonality shared between English and Chinese. This analysis supports CMT's fundamental claim that metaphors are not arbitrary, but grounded in our embodied experience in and with the physical world (e.g., Lakoff & Johnson 1980, 1999; Raymond W. Gibbs Jr. 1994, 2006, 2017; Yu 1998, 2022).

At the surface level, there are some close equivalents among just the top 20 Hard+N and Soft+N constructions between English and Chinese. On the "hard" side, we see only one pair of equivalents: *hard currency* and 硬通货 (hard-

currency), both referring to "money that comes from a country with a strong government and economy and that is not likely to lose its value" (*Merriam-Webster*). That is, the currency is "strong" because the government and economy behind it is strong. On the "soft" side, we see the following pairs of close equivalents between English and Chinese: *soft power* and 软实力 (soft-power), *soft landing* and 软着陆 (soft-landing), *soft drinks* and 软饮料 (soft-drink), *soft voice/sound* and 软声 (soft-voice/sound). Among the top 20 Chinese constructions on both "hard" and "soft" sides, there are quite a few more technical terms that mean, for instance, "hard and soft environment," "hard and soft power," "hard and soft landing," "hard currency," "soft science," "soft X-ray," and so on. These Chinese counterparts are most likely loan translations (i.e., literal translations) from a foreign language like English when the concepts they encode were first imported into Chinese. These metaphorical expressions are handily apt in Chinese because they are grounded in the same experiential basis as their English counterparts. Such an experiential basis is composed of common tactile experiences that are shared by humans and not defined by specific cultures.

Table 6. A comparison of the token data of top 20 Hard+N and Soft+N constructions in COCA and BCC

	English COCA	Chinese BCC	COCA:BCC
Top 20 Hard+N	37541	16406	2.29:1
Top 20 Soft+N	5377	11287	1:2.10
No. 1 Hard+N	12000	4742	2.53:1
No. 1 Soft+N	1111	2412	1:2.17
No. 20 Hard+N	323	143	2.26:1
No. 20 Soft+N	81	122	1:1.51

Despite the shared commonalities between English and Chinese, however, there appear to be various differences across the linguistic boundary. First, as already observed in the preceding subsections, there exists an overall asymmetry between the "hard" and "soft" constructions in English, but the same asymmetry does not exist in Chinese (cf. Tables 1, 3, and 5). Table 6 summarizes a comparison of the token data of top 20 Hard+N and Soft+N constructions between COCA and BCC from another angle, with a focus on the relevant ratios between the two. As can be seen on the far-right column of the table, COCA consistently has higher ratios with the Hard+N constructions (2.29:1, 2.53:1, and 2.26:1) but lower ratios with the Soft+N constructions (1:2.10, 1:2.17, and 1:1.51) than BCC.

There is another difference between English and Chinese among the top 20 constructions. That is, there is only one pair of antonymous expressions, *hard rock* vs. *soft rock*, in the top 20 constructions in English (5%). On the other hand, there are eight different pairs of antonymous expressions in the top 20 constructions in Chinese (40%). These are 硬实力 (hard-power) vs. 软实力 (soft-power), 硬着陆 (hard-landing) vs. 软着陆 (soft-landing), 硬环境 (hard-environment) vs. 软环境 (soft-environment), 硬水 (hard-water) vs. 软水 (soft-water), 硬骨头 (hard-bone) vs. 软骨头 (soft-bone), 硬约束 (hard-restraint) vs. 软约束 (soft-restraint), 硬指标 (hard-quota) vs. 软指标 (soft-quota), and 硬任务 (hard-task) vs. 软任务 (soft-task). This difference also suggests there is more balance between "hard" and "soft" in Chinese than in English.

As already noted above, the favorite target concept of HARD in English is DIFFICULT, i.e., DIFFICULT IS HARD, which is realized in two different main meaning focuses, "more effort" and "more impact" (10 out of 20, or 50%). The former means that something *X* takes "more effort" and is more "difficult" for *Y* to do or accomplish (6 out of 9 in (1a)). The latter means that some situation *X* exerts "more impact" on *Y* and is more "difficult" for *Y* to bear or endure (4 out of 6 in (1b)). On the "soft" side, however, there is only one construction, out of 20, in which SOFT is mapped onto EASY, i.e., EASY IS SOFT (5%, see (3a)). The salient type of metaphorical mappings on the "soft" side is known as "synesthetic metaphor" (15 out of 17 in (3b), or 15 out of 20 total and 75%). In contrast, neither DIFFICULT IS HARD nor synesthetic metaphor is a salient type of metaphor in the Chinese data. Only two constructions in (4a) instantiate DIFFICULT IS HARD (10%), plus one more in (6a) that instantiates EASY IS SOFT (5%). As for synesthetic metaphor, only the last two constructions in (6b) belong to this type (10%). It appears that the top 20 "hard" and "soft" Chinese constructions are more evenly distributed across the four different main meaning focuses than the English ones (see (1) and (3) for English and (4) and (6) for Chinese). In particular, there are more "hard" and "soft" constructions in Chinese (5+6=11) than in English (1+2=3) that are characterized by the main meaning focuses "more flexibility" and "less flexibility." For instance, as already observed, "hard task" means "difficult task" in English, but "inflexible (or exacting) task" in Chinese. Another example in Chinese is 硬汉子 (hard-man), which means "strong man" or "a dauntless unyielding man." In English, however, *hard man* is likely to mean "difficult man," typically appearing in the type of construction *a hard man to work with* or *a hard man to catch*. A closer equivalent to Chinese "hard man" would be *tough guy* (1770 in COCA) or *tough man* (110 in COCA). What appears to be close equivalents on the surface have different main meaning focuses in different languages.

Finally, another difference between the English and Chinese data was discussed in detail by Yu & Huang (2019:120–124) in a comparative analysis of

the linguistic manifestation of the primary metaphor DIFFICULTY IS SOLIDITY in English and Chinese. Although the metaphor was motivated by the OBJECT image schema in both languages, specific linguistic instantiations can be different depending on the level of mappings. Let me proceed again with the Chinese example 硬骨头 (hard-bone), one of the two examples in which "hard" means "difficult" as discussed above in Subsection 3.2 (see (4a)). The two mappings involved in this construction can be expressed as in (7) below:

(7)   a. Adjectival Modifier: hard → difficult
       b. Nominal Head: bone → task

In English, a similar construction is *hard nut* (e.g., *It's a hard nut to crack*, meaning "It's a difficult task to accomplish."), whose mappings are rendered as in (8) below:

(8)   a. Adjectival Modifier: hard → difficult
       b. Nominal Head: nut → task

In both (7) and (8), there are mappings not only from "hard" to "difficult," but also from "bone" or "nut" to "task." As discussed above, the primary metaphor DIFFI-CULT IS HARD (or DIFFICULTY IS SOLIDITY) is richly manifested in English, but its linguistic instantiation is a different type of construction from what we see in (7) and (8). This type can be formulated in (9) below:

(9)   a. Adjectival Modifier: hard   → difficult
       b. Nominal Head: (object) → task

The formulas in (9) represent the metaphorical mappings in the English construction *hard task*. That is, there is a mapping from an unspecified "object" to "task," as well as that from "hard" to "difficult." As the former mapping takes place at the highest image-schematic level, namely that of the OBJECT image schema. At this schematic level, we only know that the "object" is hard, but do not know what kind of object it is. We see in English a large number of constructions of this type, such as *hard time, hard life, hard questions, hard choices*, and *hard decisions*. Among the 40 total "hard" and "soft" constructions, one exception is perhaps *soft landing* used in its metaphorical economic sense. On the other hand, there seem to be a lot more such constructions in Chinese, such as "hard bone," "hard battle" (in its nonmilitary sense), "soft rib," "soft egg," "soft cooked rice," "soft nail," "soft persimmon," and so on.

As analyzed in this subsection, there are both commonalities and differences between English and Chinese in the top 20 Hard+N and Soft+N constructions. While the metaphorical mappings all fall into the same embodied template of

tactile experiences with physical objects, we also see various differences between English and Chinese shaped by differing cultural contexts.

4. Conclusion

In this preliminary study, I have taken a comparative look at the top 20 most frequent Hard+N and Soft+N constructions in English COCA and Chinese BCC. While this sample size is small, showing merely the "tip of the iceberg," some insights have been gained into how English and Chinese are similar and different in using "hard" and "soft" metaphors derived from the OBJECT image schema. In summary, the similarities and differences, as I see them, can be accounted for by the main meaning focuses, which serve as parametric variables that determine the paths of mapping from source to target, as illustrated in Figure 3.

In Figure 3, *N* stands for the concept in the target domain encoded by the head noun in the Hard+N or Soft+N constructions. In both English and Chinese, metaphorical mappings involved in such constructions can be distinguished by the four different main meaning focuses. The four main meaning focuses also account for why the seemingly equivalent constructions can have different meanings across languages (e.g., *hard task* in English vs. 硬任务 [hard-task] in Chinese).
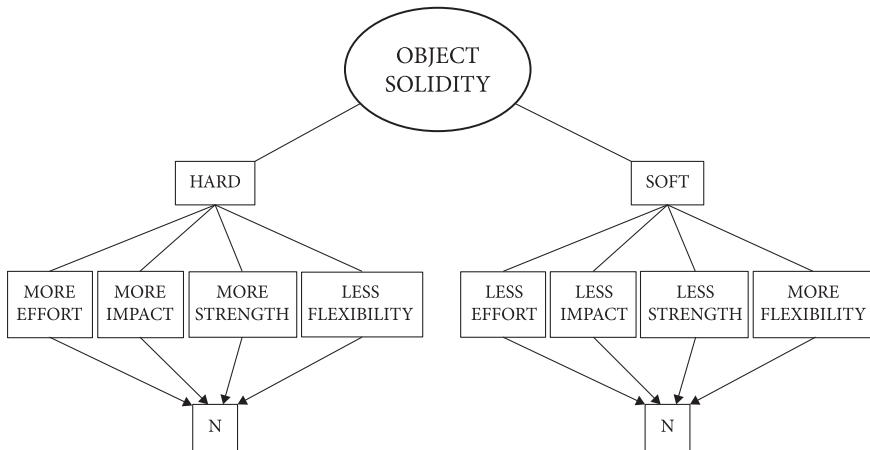
Figure 3. Main meaning focuses as parametric variables that determine metaphorical mapping pathways

As in Figure 3, the OBJECT image schema at the top and HARD and SOFT as opposite values of SOLIDITY constitute the bodily grounding upon which relevant

metaphorical mappings are based. ʜᴀʀᴅ and sᴏꜰᴛ can map through four different main meaning focuses onto *N*, but which one is chosen to map through and which *N* is a possible target are determined by cultural contexts.

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