

**Semantic Invariance and Variance in Linguistic Analyses**  
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**Abstract**

This paper was written for a symposium on invariance (*The Invariance Condition in Educational Research: Invariance Between Groups, Instruments, Language and Across Time*). The philosophical genre of hermeneutical phenomenology provided a perspective for examination of invariance in scientific research and linguistic analysis that applies the Natural Semantic Metalanguage (NSM) Approach. In both instances, a medium (theory and instruments) is constructed a priori on the assumption it will display invariance when taken out of the laboratory. The real world then inscribes the medium in accordance with qualitative differences (variance) in the phenomenon of interest. In this study, the medium is the Natural Semantic Metalanguage Approach and the phenomenon of interest are three Japanese 'hearsay' markers - *rashii*, *sooda* and *tte*.

The NSM Approach uses a set of 64 universal and culture-independent concepts. These are termed 'semantic primes' because they represent innate meanings that are fundamental to human thought. They are indefinable, their meanings so basic that they cannot be broken down any further.

The raw data for this study are the meanings of *rashii*, *sooda* and *tte* as expressed in a corpus of eight novels written in Japanese and with English translations. Using the NSM Approach's syntactic rules, a combination of primes was used to define each marker. Reductive paraphrases that are simpler than the original words were identified by a process of semantic reduction. The resulting definitions comprised discrete components that defined the respective markers.

This NSM Approach analysis illustrates how explicating the differences between similar terms in one language and across more than one language, needs a common medium with specific attributes. The medium requires that meaning be reduced to a level beyond which further simplification is not possible. This medium also limits the number of semantic primes to 64. It is the invariant nature of the NSM Approach that provides definitions that can accurately and consistently reveal qualitative differences between the terms - linguistic variance.

## Introduction

The proposition that semantic invariance between different languages can be theorised and used for semantic analyses is for some scholars, contentious. For example, from a cognitive science perspective, Evans and Levinson (2009, p. 429) stated: “A widespread assumption among cognitive scientists, growing out of the generative tradition in linguistics, is that all languages are English-like but with different sound systems and vocabularies. The true picture is very different: languages differ so fundamentally from one another at every level of description (sound, grammar, lexicon, meaning) that it is very hard to find any single structural property they share”. This view presents dismal prospects for semantic analysis when different languages are studied since there is no common framework upon which to base cross-language comparisons. The authors are of the view that proposal of common frames followed by the empirical testing of these frames is a legitimate and desirable exercise. The logic is deductive and when a frame and associated substantive theory are proven over time and in different situations, then assumptions about invariance can be productively challenged. Then, either transformed into requirements for meaningful representation, or be documented as too ambiguous to support routine interpretation as a univocal signification.

## Background: Science and Invariance

“One of the basic postulates of science is the postulate of objectivity. It reads: *Scientific knowledge should be as objective as possible*” (Vollmer, 2010, p. 1657). According to Vollmer (2010, p. 1658), “A proposition is *objective* if and only if its meaning and its truth is invariant against a change in the conditions under which it was formulated, that is, if it is independent of its author, observer, reference system, test method, and conventions”. However, absolute interpretations of the notion of objectivity such as those which characterise naïve science have been refuted over many decades by philosophers and historians of science. For example: Quine in 1951 - the under-determination of theory thesis, “... it is possible to formulate empirically equivalent but logically incompatible scientific theories” (Roth, 1986, p. 434); Kuhn in 1961 - “...new laws of nature are seldom discovered simply by inspecting the results of measurements made without advance knowledge of those laws” Kuhn, 1961, p. 197); Latour and Woolgar in 1979 - “ We do not wish to say that facts do not exist, nor that there is no such thing as reality .... our point is that ‘out-there-ness’ is the consequence of scientific work rather than its cause” (Latour & Woolgar, 1979, p. 160); and Shapere (1984 - the theory-laden nature of observations “... what counts as an observation, and the interpretation or meaning of the observational terms is at least partly [theory] dependent” (Shapere, 1984, p. 106). Thus there is a potential dilemma for those of us wishing to conduct scientific research, particularly in the human sciences. One solution is to adopt a constructivist view of science that does not necessarily deny the existence of reality but acknowledges the role of the

scientist in how this is fabricated. For example, developing an epistemology based on the philosophical genre of hermeneutical phenomenology.

Hermeneutical phenomenology can explain how both non-scientific and scientific phenomena are interpreted. In particular, it provides an understanding of reading applicable to both the reading of text and the reading of scientific instruments (e.g. a thermometer). The hermeneutical interpretation of reading sees it as being "... controlled on the one hand, by the totality of the text and its parts, and on the other, by the fore-structure of understandings that permits us to read the text as referring to specific kinds of things and objects" (Heelan, 1982, p. 79). Linguistically, we need to understand the parts to understand the whole and need to understand the whole to understand the parts. This is not a vicious circle since each iteration of part-whole interaction adds meaning. In the case of reading a thermometer, it can be 'read' irrespective of the reader's knowledge of thermodynamic theory. "A 'text' is 'written' causally on the thermometer by the environment under standard circumstances ... this 'text' is read as being 'about' a presented state of some scientific system" (Heelan 1982, p. 78). Both the fore-structure of semantic understandings that we bring to the text and thermodynamic theory were constructed over long periods and by many speakers and scientists. It is the implicit invariance in the semantic understandings and scientific theory that enables different texts to be read meaningfully and also for the thermometer to be read meaningfully.

William Fisher (personal communication, April 20, 2011) explained this as follows: "We find out what is real in the world by offering things in it media on which they can inscribe themselves in a language legible to us. Preparing those media that give us access to things that are capable of invariantly inscribing themselves is how we construct a reality shared with those things". In the following sections of this paper, the Natural Semantic Metalanguage (NSM) Approach to semantic analysis is examined and its application is illustrated. It is the contention of the authors that this form of analysis is scientific since it requires an invariant theory and associated instrumentation to perform the analysis. Utilising Fisher's interpretation, the NSM framework is the constructed medium and this medium is inscribed by the text being analysed. The process of inscription is the deliberate reduction of multiple cross-language translations of a particular word by the analyst, leading to the essence of the meaning aligning with the NSM framework. Ideally, when more than one word is analysed, as is the case in this report, variations in meaning are revealed as the different words are semantically reduced to fit the NSM framework.

## **Theoretical Framework: The Natural Semantic Metalanguage Approach**

### *Introduction*

The Natural Semantic Metalanguage (NSM) Approach is a framework used to analyse and explicate meanings (Wierzbicka, 1996 & 2006; Goddard 1998; Goddard & Wierzbicka 1994, 2002; Peeters Ed., 2006; Goddard Ed., 2008). This approach was been proposed in an attempt to overcome problems in previous research, including not defining meanings accurately. The basic idea of the framework is that the meaning of a linguistic expression can be understood intuitively on the basis of simple and ordinary language. That is to say, lexical semantic analysis can be made by means of an exact paraphrase composed of simpler words than the original. This method of semantic description is called reductive paraphrase. It solves the problem of circularity and terminological obscurity, which are often observed in conventional dictionaries and in approaches to linguistic semantics.

### *Semantic primes*

The Approach is based on the assumptions that fundamental human concepts are innate and therefore they should not differ from one language to another. Otherwise, speakers of different languages would not fully understand each other, being restricted to different and incommensurable conceptual systems. Nearly 40 years of cross-linguistic semantic research have led Wierzbicka and colleagues to propose a set of universal and culture-independent concepts such as I, YOU, KNOW, THINK, SEE, WHEN, or BECAUSE. These concepts are called ‘semantic primes’ because they represent innate meanings that are fundamental to human thought. They are indefinable, their meanings so basic that they cannot be broken down any further. A full table of semantic primes presented in their English versions is shown in Table 1 (Goddard & Wierzbicka, 2010):

Table 1

#### *Semantic Primes — English exponents*

Substantives	I, YOU, SOMEONE, PEOPLE, SOMETHING~THING, BODY
Relational substantives	KIND, PART
Determiners	THIS, THE SAME, OTHER~ELSE
Quantifiers	ONE, TWO, MUCH~MANY, SOME, ALL, LITTLE~FEW
Evaluators	GOOD, BAD
Descriptors	BIG, SMALL
Mental predicates	THINK, KNOW, WANT, FEEL, SEE, HEAR
Speech	SAY, WORDS, TRUE
Actions, events, movements, contact	DO, HAPPEN, MOVE, TOUCH
Location, existence, possession, specification	BE (SOMEWHERE), THERE IS, HAVE, BE (SOMEONE/SOMETHING)
Life and death	LIVE, DIE
Time	WHEN~TIME, NOW, BEFORE, AFTER, A LONG TIME, A SHORT TIME,

Space	FOR SOME TIME, MOMENT WHERE~PLACE, HERE, ABOVE, BELOW, NEAR, FAR, SIDE, INSIDE
Logical concepts	NOT, MAYBE, CAN, BECAUSE, IF
Intensifier, augmentor	VERY, MORE
Similarity	LIKE~AS~WAY

One of the main tenets of the NSM Approach is that the primes are lexicalised in all the languages of the world. They are sometimes referred to as ‘lexical universals’, which is fine as long as we bear in mind that the term *lexical* in this context is used in a broad sense to include not only words, but also bound morphemes and fixed phrases. In some languages, there are primitive meanings expressed by means of fixed phrases composed of several words. For example, the English expression A LONG TIME cannot be broken down into the words *a*, *long* and *time* in their ordinary senses. While in other languages such as Malay, the meaning A LONG TIME is conveyed by a single word, *lama* (Goddard, 1998, p. 59). Also, it is not a requirement for exponents of the same prime in different languages to belong to the same part of speech. For example, the exponent of WANT, a verb in English and in many other languages that is categorised as an adjective in Japanese.

Semantic primes have variant forms called ‘allolexes’. For example, the English pronoun *I* and *me* are allolexes of the same primitive concept *I*; NOT includes variants *don’t* and *no*. Also, in some combinatorial contexts the word *thing* is considered equivalent in meaning to SOMETHING. This is because it is not natural to combine SOMETHING directly with determiners or quantifiers (e.g. *this something*, *one something*), while the relevant meaning combinations can be expressed naturally if the word *thing* is used in place of SOMETHING (e.g. *this thing*, *one thing*).

One final caveat. Polysemy is widespread in natural language and it also affects the lexicalisations of the semantic primes. To establish which are the truly universal meanings allowed in NSM semantics, illustrative sentences known as *canonical contexts* are used. For example, the English word *want* has at least two meanings, as shown below (Wiezbicka, 1996, p. 25):

- (A) I want you to do something.
- (B) This house wants painting.

Of these two meanings only A is proposed as a semantic prime. Moreover, in some languages, the word for THE SAME is the same as the word for ONE, or the word for THIS is the same as the word for HERE. However, this does not mean that in those languages people do not distinguish the concept ONE from the concept THE SAME. In fact, the different meanings of such polysemous words can be distinguished on the basis of distinct grammatical frame associated with each of them.

*NSM syntax*

The NSM Approach provides syntactic rules for combining primes. NSM hypothesises that certain patterns of combination of primes are found universally. For instance, given the primes SOMEONE, SOMETHING, SAY, BAD, and YOU, it is assumed that in any language they can be combined to express 'Someone said something bad about you'. That is, the resulting sentences have the form of simple clauses which have equivalents in all other languages. But the same is not true of language-specific, complex sentences such as participial constructions, relative clauses, or nominalisations. The following are examples of basic sentences (Goddard, 1998; Peeters Ed., 2006):

Maybe something bad happened  
I want to do this  
These people lived for a long time  
I did it like this  
That place is far from here  
This thing has two parts  
If you do this, people can think something bad about you

Using simple syntactic patterns such as these, it is possible, within the framework of the NSM Approach, to define words and identify the embedded meanings.

*Benefits of the NSM Approach*

The NSM Approach aims at a descriptive accuracy so that the explication and the original expression have the same meaning. The ultimate goal for using this framework is to ensure that the resulting definition applies exclusively to one expression.

For example, in the analysis of evidential markers, a number of technical terms have been used to identify each meaning such as 'direct or indirect information', 'first-hand or second-hand information', 'personal information', 'hearsay', 'quotative', 'inferential judgment', 'speculation', or 'strong or weak degree of certainty' (Teramura, 1984; Chafe & Nichols, 1986; Hayatsu, 1988; Moriyama, 1989; Kim, 1992; Miyake, 1992 & 1995). As discussed earlier, although these labels give us a general explanation for a meaning, the problem with an analysis using these terms is that the definition describes only a part of a usage of word, or the explanation applies to a different expression as well. However, by using semantic primes, it is possible to provide more precise semantic definitions so that the explication refers to a single expression. Wierzbicka (1996) proposed various semantic formulae for evidential expressions (Chafe & Nichols, 1986). For example, Oswalt (1986, p. 37) observes that Kashaya (of the Pomo family of northern California) has an 'Auditory' suffix which "signifies that the speaker knows of what he speaks because he

heard the sound of the action, but did not see it". Wierzbicka explains the meaning of 'Auditory' suffix (which does not have aspectual distinctions) as follows (1996, p. 431):

I know this because I hear it

Similarly, according to Oswald, the 'Quotative' suffix is "the one evidential for information learned from someone else, contrasted with the many for information learned through the speaker's own experience" (1986, p. 41). The meaning of 'Quotative' can be represented as follows (Wierzbicka, 1996, p. 431):

I say this because someone else said this  
I don't say: I know it

As shown above, the meanings of 'Auditory' or 'Quotative' can be clarified in a self-explanatory way by using sequences of semantic primes. The latter allows language users who do not know the meaning of 'Auditory' or 'Quotative' to comprehend them without misunderstanding. In addition, since only universal meanings and universal syntax have been used, the sequences can be easily translated into any other language. Accordingly, semantic differences and similarities between synonyms can be clearly explained and can be compared and tested cross-linguistically. Therefore, the NSM Approach has utility for comparing related concepts across languages. It is a highly comprehensive empirically-based system of semantic analysis.

After the specification of the research objectives and examination of previous research, the subsequent section applies semantic primes to propose new definitions of the Japanese hearsay markers *rashii*, *sooda* and *tte*.

### **Research objectives**

The research sought to explore epistemological commonality between the praxes of contemporary science and linguistic analysis that applies the NSM Approach. The commonality centres on the scientific requirement for invariance which has been extensively described by philosophers and historians of science, but is contentious for many linguistic analysts and theoreticians. A detailed description of how the NSM Approach was applied to three Japanese hearsay markers will be provided. This will illustrate how the invariance property of a theoretical framework enables precise qualification of the meaning of words that might otherwise be treated as synonymous.

#### *(a)* Previous research

Different languages not only use different linguistic codes, but also focus on different kinds of evidentiality. Although both Japanese and English have a large variety of corresponding evidential devices, they are not necessarily equivalent in their meanings and functions.



For example, *rashii* is often used as a hearsay marker, and is translated as *he/she says*, or *I heard* in English. However, there are other expressions, *sooda* and *tte*, which are also often interpreted as *he/she says* or *I heard* in English (see Teramura, 1984; Aoki, 1986; Nobayashi, 1999; Kikuchi, 2000). Although these hearsay markers are semantically closely-related, they are not always interchangeable.

*The Handbook for Teaching Japanese* (Japan Foundation, 1980, p. 106) noted that *sooda* is used to convey one's own judgement after receiving information from someone and judging that the information does not contradict the present situation. In short, *sooda* specifies that the information comes from someone else. Similarly, Teramura (1984, p. 256) stated that *sooda* is an expression which implies that the speaker received information from someone 'indirectly', and the information can be from a specific person or an unspecified person. Teramura also pointed out the similarity between *sooda* and *rashii*, and says that it is very clear that information is received from someone else in the case of *sooda*, whereas it is ambiguous in the case of *rashii*.

Nobayashi (1999) and Kikuchi (2000) also attempted to clarify similarities and differences between *sooda* and *rashii*, stating that both expressions are used in conveying second-hand information, while only *sooda* can be used in the case where the speaker tells a message as it is (Kikuchi, 2000, p. 48):

(1) a. *Ima, Tanaka-san kara denwa ga ari-mashi-ta.*  
now Tanaka-HON from telephone NOM there.is-P-PAST  
*Tatta ima, Narita ni tsui-ta SOO-DESU.*  
just now Narita LOC arrive-PAST someone.says-P  
'Mr Tanaka just gave us a telephone call. He says he has just arrived at Narita.'

b. ? *Ima, Tanaka-san kara denwa ga ari-mashi-ta.*  
now Tanaka-HON from telephone NOM there.is-P-PAST  
*Tatta ima, Narita ni tsui-ta RASHII-DESU.*  
just now Narita LOC arrive-PAST I.heard-P  
'Mr Tanaka just gave us a telephone call. I heard that he has just arrived at Narita.'

In (1), the speaker receives a telephone call from Mr Tanaka and simply reports what he said. *Sooda* is a natural choice, whereas *rashii* is not appropriate.

These previous analyses fail to present a consistent explanation of the meanings of the three hearsay markers. The following NSM Approach analysis overcomes this deficiency.



(b) The NSM Approach Analysis

The NSM Approach analytic process comprises several stages. These commenced with the selection of Japanese novels containing the hearsay markers to be defined, and that have also been translated into English. For example, *Fukai kawa* (Deep river) written by Shusaku Endo in 1993 and translated into English by Van C. Gessel in 1994. Eight novels were selected for this study. The occurrences of each marker in the novels and translations are then identified. In this study, *rashii* was used 46 times, *sooda* 50 times, and *tte* 57 times. Then, the meanings of two or more markers were explicated from all the occurrences. It should be noted that while typically more than 40 occurrences per marker are analysed, only a small yet representative number are included in the analysis report. Finally, the markers were defined using a small number of components based on the same semantic primes. It is the commonalities and differences in the components that differentiated the meanings of the markers. The stages following selection of the corpus proceeded cyclically through multiple iterations of the reduction process until the resulting definitions were applicable to all the occurrences in the corpus.

Compare the meaning of *sooda* with that of *tte*. First consider:

- (2) a. *Kare wa omoi hyoojoo o shi-te Mitsuko o mitsume, 'Anata no yuujin desu ka, kega o shi-ta nihon-jin wa ...' to kare wa tsuba o nomikonde it-ta.*  
*'Kitoku da SOO-DESU. Ichi-jikan hodo mae kara jootai ga kyuuhen-shi-mashi-ta.'*  
(Shusaku Endo, 1993, p. 347)

b. He gave Mitsuko a sober look and said, 'He was your friend? That Japanese fellow who was hurt?' He swallowed and continued, 'He's in a critical condition. About an hour ago he took a sudden turn for the worse.'  
(Translated by Van C. Gessel, 1994, p. 216)

In (2), the speaker is reporting the news about a man's condition based on second-hand information (*sooda* is not translated). As pointed out by Teramura (1984) and Kikuchi (2000), *sooda* in (2) indicates that the speaker actually heard the news from someone. There is no implication that an inferential judgement was made. *Sooda* simply conveys second-hand information as it is. However, *tte* can replace *sooda* in this case, and the question is how different are they?

It has often been said that *tte* is simply more 'informal' than *sooda* (e.g. Japan Foundation, 1980; also H.Aoki, 1986; K.Aoki, 1998). It is true that *tte* is quite 'casual' and it is inappropriate in talking to someone who is older or socially higher than the speaker. The difference between *sooda* and *tte* is, however, not only stylistic. As pointed out by Horiguchi (1995) and Hui (1999), *tte* has a unique function since *tte* can convey an order or a question which someone gave, whereas *sooda* cannot. Consider next (Horiguchi, 1995, p. 19-20):

(3) a. *Kaisha*            *o*        *yame-ta*        *n*        *desu*            *ka*        **TTE.**  
 company            ACC    resign-PAST    NOML COP+P        Q        he/she say  
 ‘She asked, ‘Did you resign from the company?’.’

b. \* *Kaisha*            *o*        *yame-ta*        *n*        *desu*            *ka*        **SOODA.**  
 company            ACC    resign-PAST    NOML COP+P        Q        I.heard  
 ‘She asked if I resigned from the company.’

In short, *tte* can convey any utterance without modifying the style. What this observation suggests is that *tte* signifies that the speaker simply quotes the third person’s words, indicating ‘someone else said this’. On the other hand, what *sooda* conveys is more limited. *Sooda* represents the third person’s claim of knowledge, signifying ‘someone else said: I know this’. There is another example to support this claim, *tte* can be used as a quotation marker, whereas *sooda* cannot. For example:

(4) a. *Kyuukyusha ga ki-ta toki ni wa moo mushi no iki de. —Demo, uwagoto no yooni kurikaeshi-te-mashi-te ne. ‘Chuushajoo wa tot-te-ari-masu. Yashiro-san’ TTE....’*  
 (Jiro Akagawa, 1983p. 51)

b. By the time the ambulance arrived, he was already dying, but he kept repeating over and over, ‘I have managed to save a parking space, Miss Yashiro.’  
 (Translated by Gavin Frew, 1984, p. 43)

As shown above, *tte* is used in quoting precisely what someone said, and *sooda* does not have the same function. Judging from these observations, it is reasonable to conclude that *tte* signifies that the speaker quotes someone’s utterance as it is, indicating ‘I say this because someone else said this’; whereas *sooda* indicates that the speaker conveys the third person’s claim of knowledge. Hence utilization of semantic primes (e.g. ‘I’ and ‘say’), produced the following definitions of *sooda* (two-component definition) and *tte* (three-component definition):

*sooda*

Component [a] I say this about X because someone else said: I know this  
 Component [b] I don’t say: I know this

*tte*

Component [a] I say this because someone else said this  
 Component [b] I don’t say: I know this  
 Component [c] when I say this to you, I think about you like this: you are someone like me

Component [a] shows the difference between *sooda* and *tte*. Component [c] indicates that *tte* is an informal expression which is not generally used in talking to someone who is older or socially higher than the speaker.

Next is the meaning of *rashii*. In comparison to *sooda* and *tte*, *rashii* includes some ambiguity. For instance, observe next:

- (5) a. 'Kaisha wa kubi ni nat-ta soo yo.' Emoto wa gakuzen-to-shi-ta.  
'Itsu da?'  
'Ni, san-nichi mae RASHII wa. Asoko no ko ga yoochien ni ki-te-nai node, henda na to omot-te-ta no.'  
(Jiro Akagawa, 1983, p. 287)
- b. 'I heard that he got fired.' Emoto was astounded. 'When?'  
'Two or three days ago APPARENTLY. I thought it strange when I didn't see their daughter at the nursery school.'  
(Translated by Gavin Frew, 1984, p. 147)

In (5), a housewife is talking to her husband regarding one of their neighbours called Yamanaka. In this situation, it is not clear whether she exactly heard from someone that Mr. Yamanaka was fired two or three days ago. *Rashii* suggests that the speaker heard something such as a rumour about the man, and then reports it. Although the speaker might have heard someone saying that 'It was two or three days ago when Mr. Yamanaka was fired', *rashii* is chosen in order to indicate that the speaker did not necessarily receive the information from other people. In summary, *rashii* signifies 'someone else said something about X'. Because of the implication, as Teramura (1984) and Kikuchi (2000) state, *rashii* cannot be chosen when the speaker conveys a message as it is. Viewed in this light and by applying semantic primes, the meaning of *rashii* can be defined as follows:

*rashii*

Component [a] I say this about X because someone else said something about X

Component [b] I don't say: I know this

Component [a] shows the difference between *sooda* and *rashii*. That is, *rashii* implies that one reports information on the basis of other information which was obtained secondhand.

## Discussion

The three definitions were:

*sooda*

Component [a] I say this about X because someone else said: I know this

Component [b] I don't say: I know this

*tte*

Component [a] I say this because someone else said this

Component [b] I don't say: I know this

Component [c] when I say this to you, I think about you like this: you are someone like me

*rashii*

Component [a] I say this about X because someone else said something about X

Component [b] I don't say: I know this

When all three hearsay markers were reduced to common primes (e.g. 'I' and 'say'), the definitions all comprised one common component - 'I don't say: I know this' (Component [b]). However, the definitions differ. One difference is between the three first components in each definition. Another is that Component [c], 'when I say this to you, I think about you like this: you are someone like me', is unique to *tte*.

Importantly, these findings have been tested for all the occurrences of the markers in the corpus and thus are likely generalisable to the Japanese language; with the qualification that the fidelity of their interpretation will not be absolute. As was pointed out earlier, the NSM Approach is a medium which invites inscription by different languages to reveal external and internal linguistic characteristics. Such a medium needs to have a high degree of universality to enable semantic reduction in many languages. It also needs to be sensitive to intra-language and inter-language differences. It is a 'text' written to be readable and comprehensible for many cultures, but without denying expression of linguistic variation. Instruments that measure meaningfully in the natural and human sciences have this capacity.

### **Conclusion**

A major purpose of this paper was to bridge what might be perceived as epistemological dissonance – differing views about knowledge and how it is created. The paper was written for a symposium on 'invariance' that focused on invariance in science and in educational measurement. A constructivist epistemology based on the philosophical genre of hermeneutical phenomenology underpinned the empirical investigation and the theoretical assumptions guiding the study. Significantly, this calls for scientists to reconceptualise their instruments as mediums that are fabricated to elicit inscriptions from persons and phenomena. Also, for them to be cognisant of the interpretive nature of observations and indeed of the traditional 'scientific method'. It also encourages scholars of linguistics to position themselves within an approach to semantic analysis consistent with the scientific requirement for invariance.

Finally, the NSM Approach analysis qualified differences between words based on the information in written texts. Records of conversations could be analysed in a similar manner. Also the qualitative differences could be used to develop a survey instrument to confirm understanding of meanings. That is, to measure understanding of semantic differences.

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