

Measuring Language Abstraction

# *The Linguistic Category Model (LCM)*

Manual

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## Foreword

This manual consists of three parts. In the present first part explains the theoretical basis and basic elements of the Linguistic Category Model (LCM). Part 1 discusses the issues the model can address, how the model is structured, and how it can be used.

The second part offers an extension of the instructions in part 1. This section treats unusual and difficult cases, and provides more specific instructions.

Additionally, for two categories a corpus is available containing an extensive list of the words in the category. These corpora could be helpful when applying the Linguistic Category Model.

We hope you will experience the LCM as a useful tool in analyzing interpersonal communication. Please direct questions or remarks to [lcm@psy.vu.nl](mailto:lcm@psy.vu.nl).

## 1. The Linguistic Category Model (LCM)

To understand social behaviour one has to develop a handle on language as a tool that carries communication and makes social interaction possible. Such a focus constitutes a shift in terms of methodological commitment from the individual to the social. We speak of 'the social' when referring to language, because language is not an individual but a social product. One can treat and examine language in its own right in terms of the special features and properties it has. This type of focus entails a methodological commitment that privileges the theoretical and empirical analysis of language over the individual. The proposed shift in methodological emphasis simply suggests the following - however odd it may sound to some. Analyze language in terms of its psychological properties and propensities; very much in the same way one has been examining individual psychological properties and propensities. The 'linguistic category model' (Semin & Fiedler, 1988) is a conceptual framework that is the result of precisely such an approach. It is a model about the psychological properties of interpersonal language (e.g., Semin, 1998; Semin & Fiedler, 1991, 1992; Semin & Marsman, 1994). The LCM can be used to classify verbs and adjectives used in the interpersonal domain to represent actions (e.g., to help, to cheat) and states (e.g., to like, to hate) between people, as well as their more enduring characteristics or traits (e.g., helpful, aggressive).

How can an analysis of language contribute to a better understanding of social psychological processes? We regard social psychological processes as taking place in a communication context. In communication, social behavior or action entails (amongst other forms such as prosody, gestures) messages (speech acts) that are composed by means of linguistic tools. The psychological processes of the transmitter determine the shape of this type of action. The purpose of the message is to shape the cognitive representation of an addressee or recipient (e.g., 'What time is it?'), thereby influencing the recipient's psychological processes and response ('12.00 o'clock.'). In order to achieve this, the transmitter uses socially accessible resources; the most significant of which are linguistic tools. Understanding the psychological properties of these tools is therefore important for at least three reasons. First, the choice of particular linguistic tools over others in the composition of a message allows one specify why a message (a speech act) is shaped. What are the psychological processes that have shaped this particular composition over other possible compositions (e.g., Maass, Salvi, Arcuri, & Semin, 1989). Second, how a message is composed indicates how the transmitter wants to structure a recipient's representation of the communication. The message therefore gives information about the goals that the transmitter is pursuing. Finally, it is possible to specify what psychological impact the message is likely to have upon a recipient on the basis of how the message is composed (e.g., Semin & de Poot, 1997a; Wigboldus, Semin & Spears, 2000). This is akin to the concerns with text comprehension processes in psycholinguistics and cognitive psychology although the direction that has been developed with the linguistic category model is different from those commonly encountered in the text comprehension literature.

As can be seen understanding the properties of language can contribute in a systematic way towards examining social interaction as communication and yield insights about transmitter-centered and recipient-centered psychological processes. Moreover, such a model introduces a clear distinction regarding the types of psychological processes that are involved in transmission and production processes and those that entail reception and comprehension processes (Semin, 2000). This distinction is one that is not made in psychology in general and one that is useful in terms of directing attention to the complementary nature of psychological processes in general.

The considerations regarding the significant role that language plays in understanding social interaction are not intended to deny the importance of a number of other factors that contribute to meaningful communication. Common examples are non-verbal cues, the context of the communication, and the past history between the transmitter and recipient, among others. Nevertheless, they are intended to focus attention on the significance of language as a tool and how a better understanding of this social tool can inform our thinking about social psychological processes.

Thus, the linguistic category model is an instrument that furnishes the possibility of examining 'messages' and provides a quantitative handle on specific aspects of interpersonal language as they are manifested in language use.

## 2. General classification criteria

This section provides a description of the linguistic categories in the model. Table 1 provides an overview of the definitions with examples. The meaning of the different categories as outlined in this section is often sufficient to classify most terms correctly on an intuitive level. Sometimes, however, more explicit and extended linguistic criteria are needed. For cases which are not easily classifiable we refer to section 4 below (coding instructions). In some unusual cases, for example when coding a metaphor, doubt can still arise. For these exceptional cases we refer to part 2.

### 2.1. Adjectives (ADJ) versus verbs

The difference between adjectives (ADJ) and verbs is straightforward. ADJs (e.g., social, timid, aggressive, etc.) refer to qualities or properties of a person whereas verbs express either an action (e.g., to walk, to run, to talk, etc.) or a psychological state (e.g., to love, to admire, to hate, etc.).

### 2.2. State verbs (SV) versus descriptive and interpretative action verbs (DAV/IAV)

State verbs (SV) refer to mental and emotional states or changes therein. These verbs refer to either a cognitive (to think, to understand, etc.) or an affective state (to hate, to admire, etc.).

Descriptive and interpretative action verbs (DAV/IAV) refer to specific actions (e.g., to hit, to help, to gossip, etc.). Therefore action verbs refer to an event with a clearly defined beginning and end. SVs, in contrast, don't refer to single observable events but represent enduring states. These states don't have a clearly defined beginning and end.

Moreover, ADJs refer to a general feature of a person while SVs refer to a psychological state of a person in relation to a specific other person. For example, 'friendly' indicates that someone is friendly towards people in general, while 'to love' indicates that someone loves a specific other person. In the latter case, 'to love' doesn't mean that the person loves anybody or everybody.

### 2.3. Descriptive (DAV) versus interpretative (IAV) action verbs

The first criterion distinguishing DAVs and IAVs is the reference to a *physically invariant feature* of the action. All actions to which a particular DAV applies, share at least one *physically invariant feature*. For example, all actions to which the term 'to kiss' can be applied involve the mouth as a physically invariant feature. Other examples are: 'a phone' for 'to phone', 'the foot' for 'to kick', and 'legs' for 'to walk', etc.

IAVs, in contrast, refer to a multitude of different actions that have the same meaning but don't share a physically invariant feature. To lend some money to a friend and to keep an old lady company can both be described as 'to help'. These actions, however, do not share a physically invariant feature. In other words, if the verb alone does not allow you to unambiguously visualize the action, then the verb is an IAV.

A second criterion, the valence criterion, states that IAVs have a pronounced evaluative component (e.g., positive IAVs such as to help, to encourage vs. negative

IAVs such as to cheat, to bully), whereas DAVs do not (e.g., to phone, to talk). Descriptive action verbs (DAVs) are neutral in themselves (p.e. to push) but can gain an evaluative aspect dependent on the context ('to push someone in front of a bus' vs. 'to push someone away from an approaching bus').

#### 2.4. State action verbs (SAV)

State action verbs (SAV) are very similar to IAVs. Like IAVs, SAVs have a pronounced evaluative value and refer to a general group of behaviors with a clearly defined beginning and end. In contrast with IAVs, SAVs don't refer to an action in itself but to the *emotional consequence of an action* (e.g., to amaze, to surprise, to be ashamed, etc.).

Because SAVs are very similar to IAVs they are often treated as IAVs. Moreover, these types of verbs don't differ significantly in abstraction level (Semin & Fiedler, 1991). If a differentiation between both terms is necessary, depending on the goals of the research project, the corpus in which all SAVs are gathered might be useful.

Table 1: Definitions and examples criteria of interpersonal predicates defined by the Linguistic Category Model (LCM)

<b>Descriptive Action Verb (DAV)</b>	
<u>Examples:</u> Hit, yell, walk, ...	<u>Definition:</u> Verb that refers to a single specific action with a clear beginning and end, and with a physically invariant feature.
<b>Interpretative action verb (IAV)</b>	
<u>Examples:</u> Help, tease, avoid, ...	<u>Definition:</u> Verb that refers to a multitude of different actions with a clear beginning and end that have the same meaning but don't share a physically invariant feature.
<b>State action verb (SAV)</b>	
<u>Examples:</u> Surprise, amaze, anger, ...	<u>Definition:</u> Verb refers to a behavioral event but expresses the emotional consequence of an action rather than referring to an action as such.
<b>State verb (SV)</b>	
<u>Examples:</u> Admire, hate, appreciate, ...	<u>Definition:</u> Verb that refers to an enduring cognitive or emotional state with no clear definition of beginning and end.
<b>Adjectives (ADJ)</b>	
<u>Examples:</u> Honest, reliable, aggressive, ...	<u>Definition:</u> Adjective that refers to a characteristic or feature qualifying a person.

### 3. When and what should be coded and why: research objective and LCM

The LCM is an instrument to examine how specific linguistic communications are composed in terms of predicates. But when and how should one use the LCM? *This depends on the research question.* For instance, you may want to examine how a specific state (e.g., positive versus negative mood) influences the way you represent events. Let us assume, as a substantial literature on mood effects suggests, that you have a ‘global’ orientation in a positive mood and attend to the larger picture in contrast to a negative mood which induces a more local, or detailed look at an event (e.g., Gasper & Clore, 2002). Then you would be interested in examining all the predicates in descriptions generated under the respective mood conditions to see if as one might expect descriptions produced under a positive mood are more abstract (have more abstract predicates) than those generated under a negative mood. Similarly, if construal level theory is correct (Trope & Liberman, 2003) then descriptions of events in the more distant future should be linguistically represented in more general, global or inclusive categories than temporally proximate events. In either case, your interest would be on the general abstraction level of the respective descriptions in terms of the predicates used (see section 5 for calculating the abstraction score). Then you would be coding all predicates used in the description.

It may however be the case that you are interested in a specific question such as how do people describe positive and negative behaviours of ingroup- and outgroup members – the so-called Linguistic Intergroup Bias or LIB (e.g., Maass, 1999; Maass, Salvi, Arcuri, & Semin, 1989). In this case, you are interested in how an ingroup member (or an outgroup member) is represented in the description of a particular event. In such instances you would only code the predicates that have to do with the ingroup member and not any other person appearing in the event. Thus, in the following hypothetical episode:

“Jack (IG member) was *talking* to Mary (another person). Unexpectedly, Mary interrupted her and drew his attention to the soccer hooligan (OG Member) who was approaching a greengrocer aggressively. Jack (IG member), upon *seeing* the hooligan (OG member), got *angry* and *told* the hooligan (OG member) to leave immediately and *shouted* at him *threateningly*. Etc.”

Here you would code only the terms in italic for the negative IG member behaviour. Thus, you would not code any other predicates that have to do with the other persons in the description since your interest is on how the ingroup member’s behaviour is represented.

In short, what aspect of a description or narrative you score must be guided by your research question. Your specific research question then leads to the type of linguistic category coding you will use. You may wish to focus on and code:

1. The entire narrative or description because you are interested on a general effect as a function of a particular experimental manipulation (temporal distance, mood, etc.)
2. One specific person who is the target of your hypothesis (e.g., ingroup member or outgroup member).
3. Alternatively, you may wish to focus on specific persons separately instead of pooling all your categories and thus derive separate codings for each person.

Another way of going about this is to compose your dependent variable as multiple choice items with four options, one from each LCM category. You then give a stimulus (a target person or a specific social event) and ask participants to choose the alternative that best describes the person or the event. Maass et al (1989) use this option. The drawback with this method is that it requires very careful and extensive piloting for: (a) valence equivalence between the items, and (b) equiprobability of items being chosen in a control condition. This can be a very time consuming affair.

## 4. Coding instructions

On the basis of the general definitions of the categories (see section 2) terms usually can be easily classified. In some cases doubt can still arise and more detailed coding instructions are needed. These extended instructions are provided in the present section.

To clarify the instructions, coding examples are provided. Note that not all the predicates are coded, but only the terms that clarify the described category. Table 2 provides a comprehensible overview of characteristic features and classification criteria. For exceptional cases like metaphors we refer to the additional instructions in part 2 of the manual.

### 4.1. Adjectives

ADJs form the most abstract category of the LCM. ADJs are abstract inferences about the psychological features or characteristic of a person. In this way, ADJs qualify the person to whom they refer. Consequently, ADJs don't express what a person does, feels or thinks but *what a person is like*.

*For example:* 'She is very helpful' versus 'She loves her mother', 'She amazes her mother who is ill', 'She helps her mother who is ill' and 'She walks her mother's dog through the forest'

Whereas 'helpful' refers to a quality or property of a person, 'to love' refers to a psychological state, 'to amaze' refers to an emotional consequence of an action, and 'to help' and 'to walk' refer to actions. Therefore, 'helpful' is an ADJ while 'to love', 'to amaze', 'to help' and 'to walk' are verbs.

#### 4.1.1. Adjective not referring to a person

Depending on the research goal (see section 3) ADJs that do not refer to a feature of a person but to an object, an action or a situation can be classified as ADJs. When ADJs refer to an action, they qualify a verb and are grammatically called 'adverbs'. According to the LCM, adverbs don't form a separate category but are coded as ADJs.

*For example:* 'An unknown, young woman with a small baby came to sit next to me'

'Unknown' and 'young' refer to 'woman' and 'small' refers to 'baby'. Thus, each of these ADJs refer to a person.

*For example:* 'The postman always drops the letters deliberately in the wrong letterbox'

'Wrong' refers to 'letterbox'. Therefore, 'wrong' is an ADJ that refers to an object.

*For example:* 'She, friendly though firmly, asked him to go away'

'Friendly' and 'firmly' refer to a verb, namely 'to ask'. Thus, both 'friendly' and 'firmly' are adverbs that should be coded as ADJs.

*For example:* 'I heard the news when I was at a pleasant party'

'Pleasant' refers to a situation, namely a party. Therefore, 'pleasant' should be coded as ADJ.

#### 4.1.2. Nouns

Whereas ADJ that refer to a person express what a person is like (e.g. social, aggressive, timid etc.), nouns can under certain conditions also qualify a person. These can be the case when a noun refers to a mentioned person. Research (e.g., Clark & Haviland, 1974; Ferreira & Yoshita, 2003; Haviland & Clark, 1974) has shown that the

sender and receiver of a message have an implicit contract with each other to first provide the information that is already known (given) and afterwards the new information. On the basis of this given-new contract the first noun in the message is the given and should not be coded. The second noun in the message is the new information and should be coded as ADJ. The ‘new’ to-be-coded noun could refer to a person in the same sentences or to a person mentioned before.

*For example:* ‘His father is a thief’

‘Father’ and ‘thief’ both refer to the same person. Here ‘thief’ qualifies ‘father’. Namely, ‘thief’ adds something to ‘father’, not the other way around, because ‘father’ is mentioned first. According to the given-new contract ‘father’ is thus given and therefore not coded. ‘Thief’ is the second noun, but referring to the same person as ‘father’ and is therefore constitutes the new, qualifying information. It is coded as ADJ.

*For example:* ‘The thief is a father.’

Compare to the previous example. This time ‘thief’ is the first noun and thus ‘given’ information, whereas ‘father’, being the second noun, qualifies the ‘thief’. Now ‘father’ is coded as ADJ.

*For example:* ‘His father is a thief, but the sweetheart brought flowers for his mother.’

Here ‘father’ is given, being the first noun. ‘Thief’ is coded ADJ as done above. ‘Sweetheart’ is coded as ADJ because it refers to ‘father’ in the first sentence, and it qualifies the person.

*For example:* ‘The taxi driver and the customer were arguing about the bill.’

In this sentence ‘taxi driver’ nor ‘customer’ are coded because both nouns refer to two different persons that have not been mentioned. They have no qualifying function here.

Like ADJs, nouns can also refer to actions, objects and situations and qualify them. Dependent on the research goal (see section 3), these nouns can also be coded as ADJ.

*For example:* ‘They threw away all the food. What a shame!’

‘Shame’ refers to and qualifies an action, namely ‘to throw away food’. Therefore, ‘shame’ should be coded as ADJ.

*For example:* ‘She teaches them to sing and dance according to tradition’

‘According to tradition’ refers to and qualifies two verbs, namely ‘to sing’ and ‘to dance’. Therefore ‘tradition’ should be coded as ADJ.

*For example:* ‘The bike her father bought for her is a gem’

‘Gem’ refers to and qualifies an object, namely ‘the bike’. Therefore, ‘gem’ should be coded as ADJ.

*For example:* ‘Heavy rainfall made the party tent collapse. It became a mess.’

‘Mess’ qualifies the situation described in the first sentence. Therefore ‘mess’ is coded as ADJ.

## 4.2. State verbs

In the LCM, SVs constitute the most abstract verb category. SVs refer to psychological states of a person in relation to another person or changes therein. These states don’t have a clearly defined beginning or end and cannot be objectively verified. SVs can be cognitive (e.g., to admire, to think, etc.) or affective (e.g., to admire, to hate, etc.) in nature. Since there are only a fixed number of state verbs they are gathered in a corpus. For doubtful cases this corpus can be consulted.

*For example:* ‘She is helpful’ versus ‘she loves her mother’

‘Helpful’ refers to a property of a person. Therefore it is an ADJ. ‘To love’ refers to an enduring psychological state of a person (‘she’) in relation to another person (‘her mother’). This affective psychological state has no clearly defined beginning or end and cannot be objectively verified. Therefore, ‘to love’ should be coded as SV.

*For example:* ‘She helps her mother who is ill’ and ‘She walks her mother’s dog through the forest’ versus ‘She loves her mother’

‘To help’ and ‘to walk’ both refer to actions with a clearly defined beginning and end. In addition, both actions can objectively be verified. ‘To help’ and ‘to walk’ are action verbs.

‘To love’, in contrast, doesn’t refer to an action but to an enduring emotional state without a clearly defined beginning and end. On top of that, it cannot be objectively verified. Therefore, ‘to love’ is an affective SV.

#### 4.3. State action verbs

Like SVs SAVs refer to an emotional state of a person. But SAVs express an emotional consequence of a specific action and thus have a specific cause and a clearly defined beginning and end. As was already stated in the general instructions, SAVs are very similar to IAVs. SAVs also refer to a general group of behaviors with a clearly defined beginning and end, and have a positive or negative evaluative value. But, whereas SAVs refer to an emotional consequence of an action, IAVs refer to an action in itself. All SAVs are also gathered in a separate corpus.

*For example:* ‘She is helpful’ versus ‘She amazes her mother who is ill’

‘Helpful’ refers to an enduring personality trait. Therefore is an ADJ. ‘To amaze’, in contrast, refers to a psychological consequence of an action with a clearly defined beginning and end. Thus, ‘to amaze’ is a SAV.

*For example:* ‘She loves her mother’ versus ‘she amazes her mother who is ill’

‘To love’ refers to an enduring emotional state of a person (‘she’) in relation to another person (‘her mother’). ‘To love’ has no clearly defined beginning or end. In addition, no clear cause can be indicated for this emotional state. Therefore, ‘to love’ should be coded as a SV.

‘To amaze’ refers to a psychological consequence of an action. Here, a clear cause can be indicated and the action leading to the experienced state has a clearly defined beginning and end. Therefore ‘to amaze’ should be coded as SAV.

*For example:* ‘She helps her mother who is ill’ versus ‘she amazes her mother who is ill’

Both verbs, ‘to help’ and ‘to amaze’, refer to a group of behaviors with a clearly defined beginning and end. Moreover, both verbs have a positive evaluative value. But whereas ‘to help’ refers to an action in itself, ‘to amaze’ refers to a psychological consequence of an action. Therefore, ‘to help’ should be coded as IAV and ‘to amaze’ as SAV.

#### 4.4. Interpretative action verbs

IAVs refer to a multitude of behaviors or actions that have the same meaning but do not share an invariant physical aspect. Therefore they do not allow a clear visualization of the behavior or action they refer to. These verbs do refer to an event with a clearly defined beginning and end, and usually have a positive or negative evaluative value. Their meaning is not as dependent on the context of an action as in the case of DAVs.

*For example:* ‘She is helpful’ versus ‘she helps her mother who is ill’

‘Helpful’ refers to an enduring personality trait. Therefore, ‘helpful’ is an ADJ. ‘To help’, in contrast, refers to a multitude of behaviors and should be coded as IAV.

*For example:* ‘She loves her mother’ versus ‘she helps her mother who is ill’

‘To love’ refers to an enduring emotional state without a clearly defined beginning and end, and has no visible referent. Therefore, ‘to love’ should be coded as a SV. ‘To help’, in contrast, refers to a diverse of observable behaviors, each with a clearly defined beginning and end. Therefore, ‘to help’ should be coded as IAV.

*For example:* ‘She amazes her mother who is ill’ versus ‘she helps her mother who is ill’

‘To amaze’ refers to a psychological consequence of an action and should be coded as SAV. ‘To help’, in contrast, doesn’t refer to a consequence of an action but to an action in itself. Therefore, ‘to help’ should be coded as IAV.

*For example:* ‘She walks her mother’s dog through the forest’ versus ‘she helps her mother who is ill’

Whereas ‘to walk’ refers to a objectively observable behavior, ‘to help’ goes beyond description of a observable action and has a positive value. Moreover, all actions indicated by ‘to walk’ have at least one physically invariant feature, namely leg movement. Therefore, ‘to walk’ should be coded as DAV and ‘to help’ as IAV.

#### 4.5. Descriptive action verbs

DAVs constitute the most concrete category of the LCM. DAVs provide a concrete and objective description of a specific behavioral event. These verbs maintain a reference to context and situation. In addition, all actions to which a specific DAV can be applied share a common physically invariant feature. For example, all actions that can be described as ‘to talk’ involves the mouth as physically invariant feature. Thus, if the verb alone allows you to unambiguously visualize a specific action, it is a DAV.

*For example:* ‘She is helpful’ versus ‘She walks her mother’s dog through the forest’

‘Helpful’ refers to an enduring personality trait and is an ADJ. ‘To walk’, in contrast, refers to an action and is a DAV.

*For example:* ‘She loves her mother’ versus ‘She walks her mother’s dog through the forest’

‘To love’ refers to an enduring emotional state of a person (‘she’) in relation to another person (‘her mother’). Moreover, it is an enduring emotional state without a clearly defined beginning and end. Therefore, ‘to love’ should be coded as SV. ‘To walk’, in contrast, refers to an observable action with a clearly defined beginning and end. Therefore, ‘to walk’ is a DAV.

*For example:* ‘She amazes her mother who is ill’ versus ‘She walks her mother’s dog through the forest’

‘To amaze’ refers to an emotional consequence of an action. Therefore, ‘to amaze’ should be coded as SAV. ‘To walk’, in contrast, doesn’t refer to a consequence of an action but to the observable action itself. Therefore, ‘to walk’ is a DAV.

*For example:* ‘She helps her mother who is ill’ versus ‘She walks her mother’s dog through the forest’

‘To help’ refers to a general group of behaviors (e.g. to walk, to clean, etc.) with a clearly defined beginning and end. ‘To walk’ also refers to a behavior with a clearly defined beginning and end. However, whereas ‘to walk’ objectively describes the event, ‘to help’ adds an interpretation to the situation. Moreover, all actions to which ‘to walk’ can be applied share a physically invariant feature, namely legs. Therefore, ‘to walk’ should be coded as DAV and ‘to help’ as IAV.

Table 2: *Examples, characteristic features and classification criteria of interpersonal predicates defined by the Linguistic Category Model (LCM).*

**Descriptive Action Verb (DAV)**

<u>Examples:</u>	<u>Characteristic Features:</u>	<u>Classification criteria:</u>
Hit, yell, walk, ...	→ Reference to a single specific and visible behavioral event → Reference to a specific object and situation → Context is essential for sentence comprehension → Objective description of observable events	→ Reference to one particular activity and to a physically invariant feature of the action → Action has a clear beginning and end → Semantic valence dependent on context

**Interpretative action verb (IAV)**

<u>Examples:</u>	<u>Characteristic Features:</u>	<u>Classification criteria:</u>
Help, tease, avoid, ...	→ Reference to a not directly visible single behavioral event → Reference to a specific object and situation → Context is not essential for sentence comprehension → Interpretation beyond description	→ Reference to multitude of behaviors → Defined action with beginning and end → Positive and negative semantic valence

**State action verb (SAV)**

<u>Examples:</u>	<u>Characteristic Features:</u>	<u>Classification criteria:</u>
Surprise, amaze, anger, ...	→ See interpretative action verb, but no reference to concrete situation frames → Reference to states evoked in object of sentence by unspecified action	→ As interpretative action, except that the verb expresses emotional consequence of action rather than referring to action as such

**State verb (SV)**

<u>Examples:</u>	<u>Characteristic Features:</u>	<u>Classification criteria:</u>
Admire, hate, appreciate, ...	→ Enduring states, → Reference to a social object, but not to a situation → No context reference → Interpretation beyond mere description	→ Reference to mental and emotional state → No clear definition of beginning and end → Do not readily take progressive forms → Not freely used in imperatives

**Adjectives (ADJ)**

<u>Examples:</u>	<u>Characteristic Features:</u>	<u>Classification criteria:</u>
Honest, reliable, aggressive, ...	→ Highly abstract person description → No object or situation reference → No context reference → Highly interpretative, detached from specific behaviors	→ Characteristic or feature of a person → Qualification of object, situation, or act

## 5. Abstraction level: Scoring and reliability

### 5.1. Scoring

Obviously, LCM coding of a text should be undertaken by judges who are blind to the experimental conditions. Each coded category can be weighted by a numerical value (see table 3) in order to obtain an abstraction score (Semin & Fiedler, 1989)

*For example:* 'I was strolling through the city when I suddenly saw (SV) an old (ADJ) lady who wanted to cross (DAV) a busy (ADJ) street. I asked (DAV) her very friendly (ADJ) whether I could help (IAV) her.'

'I was strolling through the city' describes the situation and should not be coded.

'To cross a street' and 'to ask' are DAV's and have score 1.

'To help' is an IAV and has score 2.

'To see' is a SV and has score 3.

'Old', 'busy' and 'friendly' are ADJ's and have score 4.

Table 3: *Coding weights to abstraction score calculation*

Predicate	Score
Descriptive action verb (DAV)	1
Interpretative action verb (IAV) and state action verb (SAV) <sup>1</sup>	2
State verbs (SV)	3
Adjective (ADJ)	4

Based on the scores assigned to each category, an average language abstraction score can be calculated for every message (e.g. description of a conflict event; representation of a social event). To obtain this average abstraction score, the scores from each category should be added and divided by the total number of coded items in the description. Thus, this average degree of language abstraction varies between 1 (very concrete, only DAV's) and 4 (very abstract, only adjectives) and indicates how abstract or concrete a description is.

*For example:* 'I was strolling through the city when I suddenly saw (SV) an old (ADJ) lady who wanted to cross (DAV) a busy (ADJ) street. I asked (DAV) her in a friendly way (ADJ) whether I could help (IAV) her.'

Add all the scores: 2 DAV's + 1 IAV + 1 SV + 3 ADJ's = 2 (1) + 1 (2) + 1 (3) + 3 (4) = 16

Divide the added scores by the number of coded items: 16 : 7 = 2.29

<sup>1</sup> Interpretative action verbs and state action verbs don't differ significantly in abstraction level (Semin & Fiedler, 1991)

## 5.2. Reliability

Obviously it is important that the coding procedure is reliable. This means that two independent coders blind to the different experimental conditions should code the same text in exact the same way. Our advice is to use Cohen’s Kappa coefficient (Cohen, 1960) to measure the agreement between two coders. Cohen’s Kappa coefficient takes the percentage agreement between two coders based on chance into account. Below we give an example to show how the Kappa coefficient is calculated in three steps.

*Step 1:* Make a matrix to compare the classifications of both coders. The columns represent the classifications of the first coder and the rows represent the classifications of the second coder. The classifications on the diagonal are the terms that are classified into the same category by both coders.

	<b>DAV</b>	<b>IAV<sup>2</sup></b>	<b>SV</b>	<b>ADJ</b>	<b>NC<sup>3</sup></b>	<b>TOTAL</b>
<b>DAV</b>	15	1	0	0	0	16
<b>IAV</b>	5	24	1	0	0	30
<b>SV</b>	0	6	15	4	0	25
<b>ADJ</b>	0	0	3	20	2	25
<b>NC</b>	1	2	0	3	0	6
<b>TOTAL</b>	21	33	19	27	2	102

*Step 2:* Calculate the number of observations can be expected on the diagonal based on chance.

$$q = \sum[(n_{\text{row } i} * n_{\text{column, } i}) / N]$$

$n_{\text{row}}$  = total of category i -row  
 $n_{\text{column}}$  = total of category i-column  
 $N$  = total number of observations

Thus:  $q_{\text{DAV}}$  = 21\*16/102 = 3.2941  
 $q_{\text{IAV}}$  = 33\*30/102 = 9.7059  
 $q_{\text{SV}}$  = 19\*25/102 = 4.6569  
 $q_{\text{ADJ}}$  = 27\*25/102 = 6.6176  
 $q_{\text{NC}}$  = 2\*6/102 = 0.1176  
 $q_{\text{TOT}}$  = 24.3921

<sup>2</sup> Because SAVs occur only sporadically and do not significantly differ from IAVs in abstraction level, both SAVs and IAVs are collapsed in one category.

<sup>3</sup> ‘NC’ is used to indicate that one coder coded a specific term while the other coder didn’t code that term.

*Step 3:* Calculate the Cohen's Kappa coefficient based on the following formula:

$$\mathbf{K} = (\mathbf{d} - \mathbf{q}) / (\mathbf{N} - \mathbf{q})$$

d = sum of the cells on the diagonal

q = number of observations can be expected on the diagonal based on chance.

N = total number of observations

Thus:

$$d = 15 + 24 + 15 + 20 = 74$$

$$\mathbf{K} = (74 - 24.3921)/(102 - 24.3921) = \mathbf{.64}$$

The more the Kappa coefficient approaches one the more accurate the coding procedure. Landis and Koch (1977) refer to a Kappa coefficient between 0.41 and 0.60 as acceptable, between 0.61 and 0.80 as high and between 0.81 and 1 as almost perfect. As far as we know the kappa coefficient in LCM-research was always high.

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