

Factorial Surveys: A Novel Empirical Method in Cognitive Linguistics

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Abstract

The Factorial Survey is a method used mainly in sociology to investigate opinions or judgements based on latent principles. To the author's knowledge, however, it has never been used in linguistics. This paper reports the methodology and results of a theory-driven investigation of cognitive knowledge structures for which a large body of empirical data was collected and analysed by the Factorial Survey method. This method was implemented in order to empirically study intertextuality from a cognitive linguistic point of view.

1 Introduction

Intertextuality can be defined as the references to previous texts (so-called *pre-texts*), incorporated in later texts (so-called *post-texts*; cf. Plett 1991; Worton & Still 1990). Pre-textual knowledge (i.e. knowledge of the text or texts being referred to) can influence the production and/or reception of a post-text. Furthermore, according to cognitive linguistic theories on the organization of knowledge in the human mind, coherent concepts, representing the same part of reality or being activated for the same purpose, are stored together in a cognitive network. This cognitive network may be called a *frame* (cf. Baddeley et al. 2009; Barnett & Ceci 2002; Minsky 1974) when the concepts represent a static part of reality (e.g. residential building and its rooms) or a *script* (cf. Schank & Abelson 1977) when the concepts represent a dynamic part of reality (e.g. eating in a restaurant). A cognitive representation of knowledge opens *slots*, which may be filled with chunks of knowledge (so-called *values*) when the network is activated or *instantiated*. In the process of instantiation, a temporary copy of the network is created and filled with concepts relating to an actual part of reality. If these concepts re-occur repeatedly in instantiations (e.g. a waiter or food when eating in a restaurant), they may be stored permanently as *default* (or *stereotypical*) or even *obligatory* values in the network (cf. Minsky 1974). While the former are interculturally and interindividually variable, only the latter have to be valid for the respective frame or script to be instantiated, i.e. for a particular object or action to be recognized as such. For example, an establishment can be categorized as a restaurant even when there is no waiter, but not when there is no food. Thus, cognitive networks not only organize concepts in human memory but also generate expectations and facilitate the processing of information.

Based on the two assumptions that intertextuality depends on knowledge of specific pre-texts and that coherent concepts are organized in mental networks, the existence of *intertextual frames* was hypothesized (cf. Pham 2014: 145). Those were defined as cognitive representations containing all knowledge that may influence the production and/or reception of specific post-texts. The Factorial Survey reported in this paper focused on the intertextual 'to be, or not to be' frame, in which all knowledge relating to the quotation "To be, or not to be" from *Hamlet* (3.1.58; Greenblatt 1997) is stored. This is certainly the most famous reference to Shakespeare, but probably also one of the best-known references to literary pre-texts, even though today its origin may be unknown to some language users. The Factorial Survey was part of a larger project whose aim it was to study these intertextual frames, their origin, structure, contents, and functioning, empirically.

2 Hypotheses

It was hypothesized that intertextual frames are influenced by other frames, such as metalinguistic frames (containing, for example, knowledge on specific syntactic structures) or pre-textual frames (containing pre-textual knowledge). Thus, the syntactic structure of the famous Shakespearean quotation, more precisely the coordination by *or* with exclusive meaning of two *to*-infinitives, one of them negated, activates metalinguistic knowledge of alternative *wh*-questions (cf. Quirk et al. 1985: 840, 932). This construction suggests that a decision needs to be taken between the alternative actions given by the conjoins. Furthermore, it was assumed that the intertextual 'to be, or not to be' frame typically contains the information that this decision is existential and irrevocable. Even when the source of the quotation is unknown, this knowledge can originally only be derived from the pre-text, where, in his famous monologue in scene 3.1, Hamlet ponders suicide. At the same time, it was hypothesized that intertextual frames may contain knowledge not derived from metalinguistic or pre-textual frames. Thus, the quotation "To be, or not to be" is often used in combination with pictorial representations of a skull and corresponding knowledge may consequently be stored in the intertextual 'to be, or not to be' frame, although Yorick's skull occurs as a prop only in the graveyard scene in scene 5.1. Based on this observation, it can be assumed that famous intertextual references like the ubiquitous Shakespearean quotation may develop independently of their source and gradually become established as independent phraseological units.

In accordance with established tenets of frame theory regarding the structure and the functioning of these configurations (cf. Chapter 1), it was furthermore assumed that the slots of an intertextual frame are filled not only with default values but also with certain obligatory values. As mentioned before, the former make an intertextual frame interculturally and interindividually variable, while only the latter have to be valid for the respective intertextual frame to be instantiated, i.e. for an intertextual reference to be used or to be perceived as appropriate for a particular context or situation. Thus, (modifications of) the quotation being inappropriate, for example, for decisions which the speaker/writer considers trivial, the value EXISTENTIAL is probably an obligatory value in the intertextual 'to be, or not to be'

frame. By contrast, it can be assumed that the value SKULL filling the prop slot is only a default slot in the intertextual frame of some individuals.¹

However, empirically testing these hypotheses relating to intertextual frames proved to be difficult. Frames, like other cognitive structures, are latent constructs and as such can be neither objectively measured nor directly observed. Furthermore, they remain mostly subconscious and can consequently not be enquired in interviews. Therefore, especially early cognitive linguists relied heavily on intuition and introspection, which, of course, are subjective, do not procure replicable data, and do not meet modern scientific standards. The Factorial Survey method, however, is a promising method to overcome these difficulties of empirical studies in cognitive linguistics.²

3 The Factorial Survey Method

The Factorial Survey method was developed in the 1950s by the sociologist Peter Rossi (cf. Rossi 1979; Rossi & Nock 1982). Today it is still nearly exclusively used in sociology to investigate opinions, judgements, expectations, or intentions, which are based on and influenced by a limited number of latent, potentially interrelated, idiosyncratic or prevalent principles.

A Factorial Survey is composed of several *vignettes*, fictitious descriptions of situations or individuals. This takes into consideration that judgements are often conditional, i.e. dependent on the respective situational context. The vignettes of a Factorial Survey are identical apart from their varying with respect to certain *factors* (or *dimensions*), which in turn assume different *levels* (cf. Fig. 1). The factors are those features of the situation or individual that the researcher presumes to have an influence on the informants' judgements. The size of the *factorial object universe*, i.e. the set of all unique vignettes constituted by all possible combinations of one level from each factor, is the Cartesian product of the numbers of levels of all factors. Thus, the inclusion of two factors with two levels each as in Fig. 1 yields ($2 \times 2 =$) four different vignettes, while the addition of a third factor with three levels would enlarge the size of the factorial object universe to ($2 \times 2 \times 3 =$) twelve vignettes.

¹ For a more detailed discussion of these hypotheses see Pham 2014 (155-192 and 230-231).

² For a discussion of intuition and introspection as well as other empirical methods used in cognitive linguistics see Gibbs (2007).

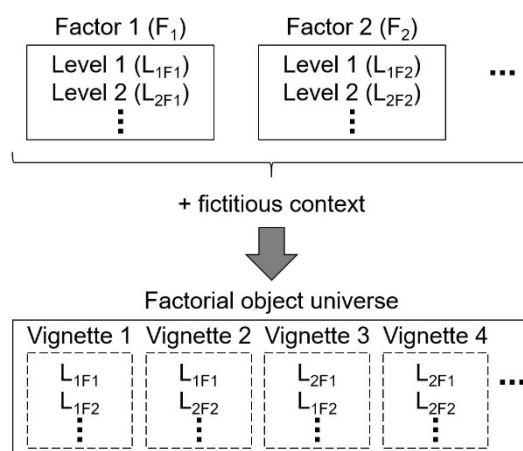


Fig. 1: Schematic representation of the structure of a Factorial Survey

Informants are asked to rate several (or all) vignettes with regard to one particular parameter, aspect, or question and to indicate this opinion or judgement on a numerical, ordinal scale. Since vignettes vary systematically with respect to the factors and since informants judge several (or all) vignettes, the relative weight attributed to each of the factors can be estimated in a subsequent regression analysis.³ In the example given in Fig. 1, a comparison of the ratings of vignettes 1 and 3 can show which importance informants attach to factor 1.

To empirically investigate the context-sensitivity of linguistic judgements (cognitive) linguists frequently use questionnaires in which informants are asked to rate target items, each embedded within a context, with regard to one or several parameters (e.g. Nayak & Gibbs 1990). Both the target items and the contexts may be manipulated. As mentioned before, Factorial Surveys equally study context-sensitive judgements, since the vignettes represent (fictitious, yet) realistic descriptions of situations or individuals. However, they differ from the questionnaire method established in linguistics by focusing on one target item or object of investigation only (in sociology, e.g. a decision, opinion, or behaviour), which is to be rated as to one parameter only (e.g. the justness of decisions or opinions, or the acceptability, appropriateness, or probability of modes of behaviour). Furthermore, due to the systematic variation of the vignettes of a Factorial Survey with regard to the factors, several aspects which presumably influence informants' ratings may be tested simultaneously. Since informants rate several (or all) vignettes, the influence of each factor can be estimated in the statistical analysis, even if it cannot be observed in isolation in reality. Finally, a Factorial Survey may be embedded within a larger questionnaire. This design permits the researcher to investigate the effect of personal and socio-demographic features on the informants' judgements. In summary, due to the question-answer structure as well as the modification of the factorial stimuli by the researcher, the Factorial Survey method shares characteristics of both the interview and the experiment (cf. Hox et al. 1991: 494) and offers considerable advantages in comparison with the established questionnaire method.

³ For a detailed discussion of the statistical analysis see Pham (2014: 252-256), Hox et al. (1991), or Frings (2010: 240-249).

O'Brien et al. (1982), for example, implemented the Factorial Survey method to study popular definitions of alcohol abuse. They hypothesized that judgements on the seriousness of an individual's drinking habits depended on this individual's social class, sex, age as well as the amount, frequency, and consequence of alcohol consumption (factors; for two sample vignettes cf. O'Brien et al. 1982: 238). Informants were asked to provide socio-demographic information as well as rate 30 vignettes describing fictitious individuals' drinking habits. On an ordinal scale they had to indicate how serious they considered these 30 individuals' drinking patterns. The regression analysis revealed that ratings were influenced neither by the fictitious individuals' social class nor by their sex. Instead (among other variables), the amount and frequency of alcohol consumption turned out to be significant predictors of the informants' judgements (cf. O'Brien et al. 1982: 242). Numerous other examples of sociological studies can be given where the Factorial Survey method was successfully implemented to investigate opinions, judgements, expectations, or intentions: Rossi (1979) studied the principles underlying the social status of individuals or households. Baker (1982) analysed adolescents' models of marital happiness. Jasso & Webster (1997) focused on the public opinion about the justness of earnings. Beck & Opp (2001) were interested in the factors which influence people's judgements about whether in certain situations and places other individuals should be allowed to smoke or not, while Steiner & Atzmüller (2006) studied under which conditions Austrians would to grant Austrian citizenship to foreigners.⁴

Studies like these proved that the Factorial Survey method can procure replicable, quantifiable data on otherwise inaccessible, complex, and conditional latent constructs like cognitive structures. Furthermore, as mentioned before, since factors vary systematically and independently of each other in the factorial object universe, the relative influence of each of them on the informants' judgements can be estimated, even if these factors are confounded in reality. On the other hand, the construction of a Factorial Survey is complex and time-consuming. The researcher should take care to neutralize certain interference effects, like *carry-over* or *learning effects*, by randomizing the order of the vignettes in the questionnaire. Yet, above all, the researcher has to make sure not to overstrain informants by too large a number of factors or levels (*number of levels-effect*) or too large a number of vignettes. The latter may lead to *fatigue effects* and consequently to simplified heuristics in vignette judgement or may cause informants to skip some vignettes (*item non-response*) or even to abandon the survey altogether. Instead of all vignettes, informants might thus be asked to rate only a selection of vignettes. However, in order to enable the subsequent statistical analysis, this selection has to maintain the symmetry and orthogonality of the factors. This means that within the selected vignettes all levels of each factor need to appear with the same frequency and that the levels of all factors need to appear just as frequently with one level of another factor as with all the other levels of the same factor. If, for example, sex and age are assumed to be influences on informants' judgements and are to be included as factors in a Factorial Survey, then the selected vignettes should describe just as many male as female individuals (symmetry) and just as many male as female individuals in each age range (orthogonality). In summary, all possible reservations

⁴ For further examples of sociological studies implementing the Factorial Survey method see Auspurg et al. (2009: 60-61).

against Factorial Surveys can be refuted, since all potentially negative secondary effects can be avoided by their meticulous construction.⁵

4 Methods

The basic assumption underlying the implementation of the Factorial Survey method for the study of intertextual frames was that the use of an intertextual reference like a quotation depends on knowledge structures relating to the typical meaning of this reference. Thus, whenever we use an intertextual reference, we do so after having compared components of its meaning to the features of the situation or context at hand. A similar matching process is also triggered during the reception process. It was therefore assumed that informants could be asked to indicate on a scale how appropriate or inappropriate they considered an intertextual reference to be for certain situations or contexts.

4.1 Design of the Factorial Survey

Due to the complexity of the construction, conduction, and analysis of Factorial Surveys, the present study had to focus on one example only of an intertextual reference. As mentioned before, the choice fell on the quotation “To be, or not to be” (*Hamlet* 3.1.58; Greenblatt 1997). It was hypothesized that, on the one hand, it is so generally current, or even pervasive, in Western culture that it may have the status of a phraseological unit for some speakers. On the other hand, *Hamlet* is such an uncontested part of the cultural heritage of many Western societies that other speakers certainly recognize it as an intertextual reference to a literary pre-text. This permitted all previous hypotheses on intertextual frames to be tested. In the rating task informants were asked to indicate how appropriate or inappropriate they considered this quotation to be for situations with varying characteristics, thereby revealing the components of the typical meaning and usage of this quotation stored in their intertextual frames. Therefore, the vignettes were presented as summaries of fictitious newspaper articles, while one and the same intertextual reference occurred as the headline of all of these articles.

As explained before, due to the syntactic structure of the Shakespearean quotation, the necessity of making a decision was taken to be a fixed component of its meaning. Thus, in all vignettes fictitious individuals had to make a decision. However, the verb *to be* was replaced by *to buy*. Since purchases can have different degrees of existentiality, the latter may refer to more everyday actions than *to be*. Furthermore, like the verb in the original, *to buy* starts with the voiced bilabial plosive /b/ and is monosyllabic. The modified intertextual reference presented as headline for the fictitious newspaper articles consequently was “To buy, or not to buy”. It was assumed that this reference can activate a more general intertextual ‘to [verb], or not to [verb]’ frame which permits modification of the original verb. The rating task for all vignettes alike was “How appropriate or inappropriate do you consider the headline

⁵ For a more detailed discussion of the complexities and advantages of the Factorial Survey method see Pham 2014 (225-229).

‘To buy, or not to buy’ to be for the following fictitious newspaper article?” and informants had to indicate their answer on a numerical, ordinal scale with six levels.

In order to avoid fatigue effects, the number of levels-effect, item non-response or even dropout (cf. Chapter 3), the descriptions of the fictitious decision-making situations varied only as to three factors. The choice of these factors and their levels respectively (cf. Fig. 2) was guided by the analysis of the syntactic structure of the quotation itself, of the Shakespearean pre-text, and of paraphrases in quotation dictionaries as well as by a comprehensive pre-test. The first factor (A) related to the alternative courses of action: the coordination of two identical infinitives, one of them negated, suggests that there is a choice between performing an action and not performing this same action (A₁). By contrast, it was hypothesized that the (modified) quotation would appear less appropriate for situations where there is a choice between two different actions, for example the purchase of two different objects (A₂). Factor B took into account whether the decision is irrevocable (B₁), as the suicide considered by Hamlet in the pre-text, or not (B₂). Finally, the third factor (C) pertained to the existentiality of the decision: in *Hamlet*, the decision whether or not to commit suicide is, of course, existential in the literal sense of the word (C₁). However, when the quotation is used in today’s English, *to be* is mostly replaced by verbs which literally relate neither to life nor to death. This suggests that the modified quotation is equally appropriate for decisions with long-term consequences for the standard of living, which were called *metaphorically existential* (C₂). By contrast, it was hypothesized that the modified quotation would be less appropriate for non-existential decisions with no or only temporary consequences for the standard of living (C₃).

A: alternative courses of action

A₁: decision between performing an action and not performing it (‘to buy X or not to buy X’)

A₂: decision between performing an action in relation to one object and performing it in relation to another object (‘to buy X or to buy Y’)

B: (ir-)revocability of the decision

B₁: irrevocable decision

B₂: revocable decision

C: existentiality of the decision

C₁: decision with long-term consequences for the existence (literal existentiality)

C₂: decision with long-term consequences for the standard of living (metaphorical existentiality)

C₃: decision with no or only temporary consequences for the standard of living (non-existentiality)

Fig. 2: Factors and levels

Consequently, for the present study, the factorial object universe was composed of (2 x 2 x 3 =) 12 vignettes. To help informants recognize the most important differences between these vignettes, information relating to these factors and levels was listed with bullet points and underlined in the survey. The descriptions of decision-making situations in the vignettes were further complemented by an introductory sentence and the mention of an object of purchase matching the degree of existentiality in factor C. This object was chosen according to its average price as well as the frequency with which an average citizen in Western Europe would

acquire it. Thus, in vignettes representing literal existentiality (C_1), the fictitious individual had to make a decision regarding the purchase of a detached family home, in vignettes illustrating metaphorical existentiality (C_2) the individual needed to acquire a computer, and non-existential decisions (C_3) involved buying a drink. Furthermore, to make the descriptions of situations more realistic, the individuals were assigned a sex (50% female, 50% male) and a family name. For the latter, the most frequent British and German family names according to Goodge (n.d.) and Stöpel (2005-2015) were used. Family names were regarded as not being indicative of age, spending capacity, or social background, while the usage of first names may be subject to changes in fashion in epochs, social strata, or regions. Fig. 3 shows one example of a vignette, more precisely the one with the levels A_1 , B_2 , and C_2 .

One newspaper article reported on the offers of large electronic retailers. It was about Mr Taylor who urgently needed to buy a new computer by closing time of the same day.

- He came across only one interesting offer and so he only had the choice to buy this computer or not to buy anything.
- He could have returned it within two weeks.
- For him, buying this computer would have been an expense, for which he would have had to save up money and lower his standard of living.

The headline “To buy, or not to buy” is...

very inappropriate	1	2	3	4	5	6	very appropriate
	○	○	○	○	○	○	

Fig. 3: Sample vignette

To further avoid fatigue effects (cf. Chapter 3) particularly with younger informants, the distribution of shorter questionnaires, containing only part of the factorial object universe, should be enabled as well. Consequently, sets of vignettes were formed following a quota sampling design. Since even with these shorter questionnaires all main effects should be kept unconfounded and estimable, the size of these sets needed to be an even multiple of the numbers of levels, i.e. of two and three. Therefore, two sets of six vignettes each were formed. In those sets only the correlations between the factors A and B and between all three factors were confounded, six being no even multiple of the product neither of the number of levels of A and B ($2 \times 2 = 4$) nor of those of A, B, and C ($2 \times 2 \times 3 = 12$). Thus, the orthogonality and symmetry of all main effects and some interactions (AC and BC) were maintained (cf. Chapter 3). Fig. 4 shows how the twelve vignettes of the factorial object universe were distributed between set one (cells shaded in grey; vignettes V1, V3, V5, V8, V10, V12) and set two (white cells; vignettes V2, V4, V6, V7, V9, V11). Whereas the shorter questionnaires contained one of those two sets, the full questionnaires contained both sets of vignettes. To avoid sequence and fatigue effects (cf. Chapter 3), the order of these sets in the full questionnaires as well as the order of the vignettes within each set in both types of questionnaires was randomized with the help of a random number generator (cf. Haahr 1998-2016).

	A ₁			A ₂	
	B ₁	B ₂		B ₁	B ₂
C ₁	A ₁ B ₁ C ₁ V1: Smith / Müller (♂)	A ₁ B ₂ C ₁ V4: Brown / Fischer (♀)	C ₁	A ₂ B ₁ C ₁ V7: Smith / Müller (♂)	A ₂ B ₂ C ₁ V10: Brown / Fischer (♀)
C ₂	A ₁ B ₁ C ₂ V2: Jones / Schmidt (♀)	A ₁ B ₂ C ₂ V5: Taylor / Weber (♂)	C ₂	A ₂ B ₁ C ₂ V8: Jones / Schmidt (♀)	A ₂ B ₂ C ₂ V11: Taylor / Weber (♂)
C ₃	A ₁ B ₁ C ₃ V3: Williams / Schneider (♂)	A ₁ B ₂ C ₃ V6: Davies / Meyer (♀)	C ₃	A ₂ B ₁ C ₃ V9: Williams / Schneider (♂)	A ₂ B ₂ C ₃ V12: Davies / Meyer (♀)

Fig. 4: Partially confounded design for reduced questionnaires

The vignettes were then combined with eleven general and socio-demographic questions relating, amongst other things, to the informants' newspaper reading habits, their sex and age, the country where they had attended school, their level of education, their general knowledge of *Hamlet*, and the fact whether they had read the Shakespearean play. The whole questionnaire was finally translated into German.

4.2 Data Collection

The data was collected between November 2011 and May 2012. The collection was substantially supported by four students of the University of Würzburg (Germany) who were studying or working in Great Britain and the Republic of Ireland at that time. They interviewed students, pupils of different grades as well as their families. While the questionnaire in its shorter version, which took informants an average of seven minutes to answer, was only distributed as printouts, the full questionnaire, which took informants twelve minutes on average, was also distributed via the online survey platform SoSci Survey (Leiner 2006-2015). Programming online surveys on this platform is particularly flexible and free of charge for scientific purposes. The link to this online survey could conveniently be advertised in circular e-mails and on platforms like Facebook (e.g. alumni platforms of universities).

4.3 Informants

As previously mentioned, one of the aims of the empirical study was to establish whether or in how far intertextual frames vary interculturally. Therefore, during data analysis, informants of different cultural provenances, more specifically belonging to cultures which attach different importance to Shakespeare, should be compared. However, to guarantee the validity of the statistical analysis, a sufficiently high number of informants for each of the cultural provenances included was needed. With reference to Frings (2010: 220), achieving a size of at least 100 informants per partial sample was set as the goal for data collection. Consequently, the choice had to be narrowed down to certain provenances. Since it is one of the fundamental aims of educational systems to ensure the continuity of a cultural community by transmitting its accumulated knowledge (cf. Department for Education 09.07.2015), the answer to the question in which country informants had attended school was

regarded as being indicative of their cultural affiliation. The importance that these cultures attach to Shakespeare was determined by an analysis of national or regional school curricula, more precisely by whether they specify that studying Shakespeare or even specific plays is mandatory or recommended in a certain intensity in certain grades and types of schools. On the basis of this analysis, several cultural provenances could be summarized under one label. Thus, one group of informants comprised individuals from Great Britain, the USA, the Republic of Ireland, and Canada, countries which regard Shakespeare as a very central part of their cultural heritage. Subsequently, these informants will be called *English native speakers* for convenience, even if some of them might have been speakers of English as a second language only. The curricula of Bavaria and Lower Saxony showed that Shakespeare is regarded as part of the German cultural heritage as well, but occupies a less central position than in some English-speaking countries. Thus, informants from Germany, subsequently referred to as *German native speakers*, formed the second partial sample. Only eleven individuals from countries which did not regard Shakespeare as central to their cultural heritage (e.g. from Australia, Belgium, China, Malaysia, and the Ukraine) had completed the questionnaire. Since analyses showed, however, that not in a single case did the inclusion of these individuals make a difference to the results, these few individuals were integrated into one of the previously mentioned partial samples depending on whether they had answered the English or the German questionnaire.

Furthermore, while most informants were between 17 and 29 years old (n=453), the procedure of data collection described above (cf. Chapter 4.2) permitted the inclusion of participants from the other age ranges as well (below 17 years: n=78; 30-49 years: n=109; 50-64 years: n=36; above 65 years: n=11). Similarly, the majority of informants had passed their A-levels or a similar qualification (n=284) or held a university degree (BA, MA, PhD; n=201). But the participants were also well distributed across the other levels of education: no qualification (yet) (n=67), GCSE or similar qualification (n=60), apprenticeship or vocational training (n=32), other level of education (n=43).⁶ The informants' age and educational background could thus be included as independent variables into the statistical analysis.

While the online survey required informants to answer all questions, a few vignettes or socio-demographic questions remained unanswered in the printouts. These were included as missing values in the statistical analysis. By contrast, 17 questionnaires in which all vignettes were given the same ranking were excluded so that the total sample comprised 689 questionnaires (English questionnaires n=215; German questionnaires n=474). [Fig. 5](#) gives further details regarding the composition of the total sample.

⁶ These age ranges and levels of education were chosen in order not to intrude on informants' privacy and to roughly mirror major stages of education in Germany and English-speaking countries.

	Full questionnaire		Shortened questionnaire (printouts)	Total
	(online survey)	(printouts)		
English native speakers	58	123	34	215
German native speakers	389	85	0	474
Total sample	447	208	34	689

Fig. 5: Composition of the total sample (provenances of informants and mode of data collection)

On this sample a multiple regression analysis was performed using the statistical software Stata 12 (StataCorp LP 2012). Since the answers of each informant were correlated, a multilevel analysis was conducted (confidence interval 90%; $\alpha < 0.1$).

5 Results

One of the major results of the data analysis was that it confirmed the existence of the intertextual ‘to [verb], or not to [verb]’ frame. On average, the three factors included in the Factorial Survey were systematically taken into consideration for the rating task. In fact, all three factors had a highly significant influence on the evaluation of the headline (factor A: Coeff.=−0.3; $p < 0.001$; 90% CI: −0.3—−0.2; factor B: Coeff.=−0.2; $p < 0.001$; 90% CI: −0.3—−0.2; factor C: Coeff.=−0.7; $p < 0.001$; 90% CI: −0.7—−0.6). This means that chunks of information relating to those factors were indeed stored in the average informant’s mind. Since coherent concepts, typically activated for the same purpose or relating to the same part of reality, form a coherent cognitive network (cf. Baddeley et al. 2009; Barnett & Ceci 2002), this result corroborated the existence of an intertextual ‘to [verb], or not to [verb]’ frame.

Furthermore, the above statistical results also showed that, as suspected, most subjects consistently rated the modified quotation as most appropriate for vignettes consistent with the Shakespearean pre-text, i.e. for situations in which fictitious individuals had to make an existential ($C_{1/2}$) and irreversible (B_1) decision between performing an action and not performing it (A_1). In accord with its original, pre-textual wording and meaning as well as with its now more frequently occurring modifications, the modified intertextual reference was considered to be appropriate for both literally and metaphorically existential situations, while it was considered to be strongly inappropriate for non-existential situations (C_3 ; average scale values: 4.1 for C_1 , 3.8 for C_2 , and 2.8 for C_3). The respective chunks of knowledge stored in an average intertextual ‘to [verb], or not to [verb]’ frame and relating to the decision-making situation are therefore DO NOT PERFORM ACT 1 as second alternative course of action (A_1), IRREVOCABILITY (B_1), and (LITERAL OR METAPHORICAL) EXISTENTIALITY ($C_{1/2}$).

While on average all three factors were highly significant predictor variables for vignette ratings, their importance, i.e. the size and direction of their effect on informants’ ratings, varied considerably interindividually. First, for each of the three

factors, a small percentage of informants (ca. 13% for factor A, 12% for factor B, and only 4% for factor C) paid no attention to the respective factor in evaluating the vignettes. The intertextual frames of these informants, consequently, contained no information (or information not easily accessible enough) as to which of the levels of the respective factor is preferable.

Second, for each of the three factors, there was also a certain percentage of informants who regarded the modified quotation as most appropriate for a level not consistent with the pre-text (ca. 30% for A₂, 31% for B₂, and 18% for C₃). Their intertextual frames consequently contained information contrary to the information in the pre-text.

Third, while informants did not automatically rate the modified quotation as entirely inappropriate for vignettes containing levels A₂ or B₂ (0%), 7% of the informants did so for level C₃. This permits the conclusion that, at least in the intertextual 'to [verb], or not to [verb]' frames of some informants, the chunks of knowledge relating to these levels have different statuses: while DO NOT PERFORM ACT 1 (A₁) and IRREVOCABILITY (B₁) are usually prototypical or default frame values, the concept (LITERAL OR METAPHORICAL) EXISTENTIALITY (C_{1/2}) is sometimes an obligatory content of the intertextual 'to [verb], or not to [verb]' frame. Thus, the former two are mere preferences which permit the intertextual reference to be used even for situations deviating from these preferences, whereas the latter is an absolute condition in the intertextual frame of some informants and would block the instantiation of the frame for non-existential situations. This suggests that the share of prototypical or default frame values is higher, whereas obligatory frames values occur less frequently than previously assumed. Furthermore, the different importance attributed to the three factors by the overall sample as well as by individual informants suggests that established tenets of frame theory should be modified to permit frame values to assume different degrees of prototypicality.

Fourth, the evaluation of the vignettes did not vary randomly, but was significantly influenced by certain personal and socio-demographic characteristics of the informants. For example, vignette judgements depended on the fact whether informants had previously read *Hamlet* or not (Coeff.=−0.1; p=0.085; 90% CI: −0.2–−0.005). By contrast, the scope of their general pre-textual knowledge of *Hamlet*, which does not necessarily imply knowledge of the exact wording of passages, had no significant influence. Thus, informants who had read *Hamlet* generally regarded the modified quotation as less appropriate for the given vignettes than those who had not read it. It can only be hypothesized whether this influence is due to the fact that these informants generally disapproved of the use of modified literary quotations in journalistic texts in quality papers. Further significant predictors of vignette judgements were the informants' stylistic evaluation of the modified quotation (Coeff.=0.07; p=0.002; 90% CI: 0.04-0.1) as well as their origin (Coeff.=0.2; p=0.004; 90% CI: 0.08-0.3). On average, German native speakers, who rated the intertextual reference as more informal than English native speakers, generally considered it also to be less appropriate for the given vignettes. These correlations could possibly be attributed to the fact that creative language play is particularly typical of the informal style of the yellow press in Germany and thus clashes with the formal content of the given vignettes. Interestingly, the statistical

analysis showed that neither age nor educational background were significant direct influences on vignette judgements.⁷

Finally, possible sources of the information stored in the intertextual 'to [verb], or not to [verb]' frame were considered. It was remarkable that, despite this influence of certain personal and socio-demographic features, even informants who had never read *Hamlet* and who considered their own knowledge of the play to be very limited showed the above-mentioned preferences for the use of the modified quotation. Moreover, a few enquiries showed that, even after having completed the questionnaire at whose end *Hamlet* was explicitly mentioned, some informants remained uncertain as to the original wording and origin of the intertextual reference. This uncertainty can be explained by a process labelled *intertextual bleaching* (cf. Pham 2014: 475), in which intertextual references gradually lose their intertextual character and become established as independent phraseological units. Information pertaining to the origin of the references as well as pointers to relevant pre-textual frames stored in intertextual frames gradually get lost. This evolution can be regarded as being typical of present-day intertextuality.

Consequently, the '*Hamlet*' pre-text was not the only source of the intertextual 'to [verb], or not to [verb]' frame. The preference for situations in which individuals have to make a decision between performing an action and not performing it (A_1) might also be explained by syntactic knowledge stored in metalinguistic frames, activated by the coordination of two infinitives, one of them negated, by the conjunction *or* with exclusive meaning, i.e. an alternative *wh*-question (cf. Quirk et al. 1985: 840, 932). In contrast, chunks of knowledge in the informants' intertextual 'to [verb], or not to [verb]' frame relating to the existentiality ($C_{1/2}$) and irreversibility (B_1) of a decision, if not acquired by reading *Hamlet*, have probably been acquired as general knowledge during the process of socialization.

The fact that intertextual frames can therefore be influenced by the general knowledge of a cultural community, acquired during socialization, makes it possible for intertextual frames to develop independently of the respective pre-textual frames. Thus, knowledge unrelated to the respective pre-texts may be stored as default or even obligatory values in intertextual frames. As previously mentioned, for example, the famous quotation "To be, or not to be" from *Hamlet* (3.1.58; Greenblatt 1997) often occurs in combination with (visual representations of) a skull. In the Shakespearean play, however, a skull only occurs in the graveyard scene in scene 5.1. Such combinations of the quotation and a prop contradicting the exact literary source can for instance be found in the advertisement for a fragrance called *To be* by *Police*, published in September 2011. It shows a young man with the famous Shakespearean quotation as a tattoo on his right upper arm, holding a flacon in the shape of a skull (cf. Petrović 2011). Because of the pervasiveness of the quotation as well as the general familiarity of the prop from the graveyard scene, the two have generally become associated and SKULL has probably been stored as a default value in many speakers' intertextual 'to [verb], or not to [verb]' frames.

⁷ However, as was to be expected, the educational background turned out to be a significant predictor of whether informants had previously read *Hamlet* or not (Coeff.=0.8; p=0.001; 90% CI: 0.4-1.2) and thus indirectly influenced vignette judgements.

6 Conclusions

In summary, the results of the Factorial Survey in connection with the informants' answers to the general and socio-demographic questions permit several conclusions: first and foremost, intertextual frames do exist. Furthermore, intertextual frames are interindividually and interculturally variable. Their contents, detailedness, and accessibility as well as their activation are influenced by the respective pre-textual frames, but they may also be influenced by other frames like metalinguistic frames. Furthermore, intertextual frames may also be constructed from repeatedly experiencing the respective intertextual references themselves and by acquiring general knowledge during the process of socialization. Similarly, the contents, detailedness, and accessibility of pre-textual frames are not only dependent on reading the respective pre-texts, but also on the acquisition of general knowledge during socialization. As a result of this, chunks of knowledge not related to the respective pre-texts may be integrated into intertextual frames as well.

The data analysis also permitted the conclusion that intertextual frames contain more default values than previously assumed. Since these values only summarize the prototypical usage of the respective intertextual references, but may be contradicted in actual usage, these default values make the activation and instantiation of intertextual frames particularly flexible and efficient. The same might also apply to other types of frames or cognitive representations of knowledge. In addition, whereas frame theory has hitherto only assumed the existence of prototypical frame values, this study could show that frame values can assume different degrees of prototypicality or stereotypicality.

Certainly, "To be, or not to be" from *Hamlet* (3.1.58; Greenblatt 1997) is the most famous Shakespearean quotation and one of the most frequently used intertextual references in the Anglo-American and even the German culture. For some language users it has probably reached the status of a phraseological unit independent of its source. It was chosen because it permitted all previous hypotheses on intertextual frames, including for example those relating to the origin of their contents, to be tested exemplarily. But the Factorial Survey method is, of course, equally applicable to less pervasive intertextual references, which are not as central a part of the cultural heritage of the informants' culture(s). Since the recognition and understanding of more rarely used references therefore depends less on the process of socialization, but more on detailed specialist knowledge acquired by reading or experiencing the respective pre-texts, the corresponding intertextual frames probably display an even greater interindividual and intercultural variability than the intertextual 'to [verb], or not to [verb]' frame. However, intertextual references can be characterized as *twofold* or *doubly referential* (cf. Pham 2014: 472; Gómez-Moriana 1993: 3), because they not only point to pre-texts, but may also be interpreted as statements on the extralinguistic world. Thus, in cases where recipients do not recognize intertextual references as such, they probably rely on metalinguistic frames for a literal interpretation more heavily than with the intertextual 'to [verb], or not to [verb]' frame.

7 Summary

After this first exemplary conduction of a Factorial Survey in linguistics it would be desirable for this method to be implemented to other intertextual references of varying degrees of pervasiveness as well as to other phenomena in (cognitive) linguistics. Subconscious principles operating in anaphora resolution could be studied by presenting informants with various short texts (vignettes) and asking them to indicate on a scale how probable it is for an anaphor in the last sentence to be coreferential with a specific preceding name or descriptive noun phrase. The co-references tested by the various vignettes could vary according to those factors to which the researcher attributes importance for anaphora resolution. Those might, for example, be the grammatical roles of antecedent and anaphor, the degree of accessibility of the antecedent due to its proximity or inferability, number and gender agreement, or lexical repetition (cf. Kamune & Agrawal 2015; Van Hoek 2007). The advantage of a Factorial Survey over other empirical methods would be that it would take into account the conditionality of anaphora resolution and that the influence of all latent factors influencing anaphora resolution (as well as their interactions) could be tested simultaneously. Similarly, the prototypicality or marginality of certain semantic components (so-called *semes*) in the meaning of specific words could be determined by asking informants to indicate how probable it is that they used these words for entities, activities, or situations with varying characteristics, represented in the vignettes.

The results of this study suggest that the Factorial Survey method, despite its complexity and the expenditure of time required for its preparation, conduction, and data analysis, is applicable and useful in cognitive linguistics for the study of cognitive representations of knowledge like frames. The particular value of the Factorial Survey is that it is an objective method of empirical observation procuring replicable and re-testable data on latent constructs. Therefore, it seems a useful and promising method for the study of other linguistic phenomena based on latent and conditional processes.

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