

## Psycholinguistic Portrait of the Germans in Crises (Based on Computer-Processed Reactions During Free-Associative Experiment)

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### ABSTRACT

The article presents the results of computer processing of a free-associative experiment using STIMULUS based on reaction words/associations provided by German respondents to stimulus words with the semantics of resilience and to carry out their psycholinguistic interpretation. The free-associative experiment is defined as a research method that goes beyond the boundaries of traditional interpretations of logical semantics and allows for the exploration of the associative meaning of a word as an individual acquisition of a person. The psycholinguistic interpretation of the reactions provided by Germans to stimuli with the semantics of resilience helped to describe the Germans consciousness in the following way. Germans, as a whole, value stability and the rule of law, which is why a crisis can evoke concerns and a desire to restore normalcy quickly. German citizens prioritize trust in authority and expect effective responses to crises. They may anticipate that the government and governing bodies fulfill their duties adequately. They also often seek proper information and transparency in governmental actions and expect access to accurate and reliable information about the crisis, its consequences, and the measures being taken. Germans are known for their organizational skills and ability to implement necessary safety measures. In times of crisis, they are likely to adhere to instructions and recommendations provided by authorities for the safety and prevention of hazardous situations.

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## 1. Introduction.

In the contemporary epoch of scientific progress, experimental studies continue gaining popularity among researchers across various fields of knowledge. Experimental studies in *economics* allow scientists to conduct controlled experiments to study the effectiveness of various economic policies, business strategies, and other aspects of economic phenomena: the exploration of the concept of behavioural economics and decision-making based on experiments (Kahneman, 2013), the implementation of an experimental approach to tackling poverty and fostering economic development (Banerjee et al., 2011), the exploration of various facets of market phenomena through the utilization of experimental methods (Hirshleifer, 2001). Experimental studies in *political science* is centred around the examination of political processes, voter behaviour, interactions among political actors, and the efficacy of political strategies: the analysis of voting behaviour, political communication, and the effectiveness of political advertising involves conducting field experiments to ascertain the influence of various factors on voting and political attitudes (Green & Gerber, 2008), scholars focusing on political networks, social influence, and group behaviour, where experimental methods are applied to study the impact of social factors on political decision-making and the formation of political coalitions (Fowler, 2004), works that focus on political psychology, including political stereotypes, media influence, and emotional responses to political messages, utilizing experiments to study the perception of political information and the formation of political opinions (Calkins, Hartman, et al., 2013).

Experimental studies in *linguistics* is oriented toward examining linguistic phenomena, language perception and production, and the interaction between language and cognitive processes.

In linguistics, the research object is the individual who possesses language, creates text, perceives it, and serves as an informant for the researcher. Experimental methods in linguistics are employed to investigate living languages and dialects, which can exist both in oral form and be constrained within written texts. This form of research, typically conducted within the environment of informants, is known as *linguistics*.



The history of using experimental methods in domestic language study can be divided into three periods:

*The first period* is characterized by the active adoption of experimental methods in phonetics, with a particular emphasis on finding correlations between linguistics and natural sciences (Bohorodyskyy, 1887; Matusievich, 1976; Shcherba, 1974).

*The second period* was marked by the recognition that experimental methods are crucial for obtaining data on living language, including morphology, syntax, semantics, and issues related to linguistic norms, language contacts, language pathology, and more. The central driving force of the scientific agenda during this period was the ideas first formulated in the work "The threefold aspect of linguistic phenomena and experiment in linguistics" by Shcherba and Campbell-Thomson (2020).

*The third period* is characterized by implementing the mentioned scientific agenda and further refining methodological reflection on the specificity of experimental methods in linguistics compared to other sciences. Chistovich et al. (1976) and Frumkina (1981) tried elaborating on these questions. Through methodological analysis, it became evident that experimental methods are widely applied in traditional linguistic domains, such as dialectology through comparative dialectological surveys, and emerging fields like sociolinguistics and psycholinguistics. They occupy a dominant position in these areas due to the research conducted by Leontyev (1976) and Klimenko et al. (1977).

Among the works of foreign scholars, Pinker (2018, 2019) investigates language and language development by employing experimental methods. His works encompass linguistic universals, language perception, and language usage. Similar methods, with a focus on language perception and comprehension, are utilized by Boroditsky (2001) to examine how individuals perceive information conveyed through language and how it influences their thinking.

McNeil et al. (1976) are engaged in experimental research of phonetics and phonology to comprehend how speech sounds are pronounced and perceived and how they are organized within linguistic systems.



If we consider experimental studies separately within psycholinguistics, most of them investigate the relationship between language and cognitive processes, such as *comprehension*, *language production*, and *perception*. These studies help uncover how individuals process language and how linguistic structures influence perception and thinking. Plopper et al. (2022), who study psycholinguistics of language comprehension and perception; their studies encompass the following topics: syntactic information processing, the role of context in language understanding, and the psychological aspects of language competence; Spelke et al. (2001) focus on language production and linguistic planning, studying the processes through which people formulate and express their thoughts, and investigates the factors that influence the speed and accuracy of language production; Barrett (2018) analyzes the understanding of the interaction between language and cognitive processes in child development, examining how linguistic experience influences the formation of thinking, perception, and the development of cognitive skills in children.

In the "Lingvisticheskiy entsiklopedicheskiy slovar" (lit. *Linguistic Encyclopedic Dictionary*) (ed. Yartseva), it is indicated that *experimental linguistics methods* allow for the researcher to investigate language facts under controlled and organized conditions. The philosophical basis for their use is the idea of the interrelation between theoretical and empirical knowledge (LED, 1990).

In contemporary linguistics, the term "experimental methods" can be less rigid, and linguists often employ them to investigate observations, including predominantly those concerning texts (written and spoken). It is important to note that a text as an existing entity is not subject to investigation using experimental methods. For this reason, experimental methods are not utilized for studying the history of language, authorial writing style, and similar inquiries. In such cases, the term "observation" is more appropriate. The consistent use of experimental methods to investigate various levels of the linguistic system and language functioning processes within society has led to employing statistical methods in experiment design and results analysis. It has given rise to a field known as "Linguistic Statistics".



Additionally, the theory of linguistic experimentation is being developed to understand the cognitive biases and predispositions of the linguist-experimenter. It is worth noting that a linguist studying human language behaviour encounters a research subject of equal complexity to the researcher. In light of this, the researcher-subject relationship in linguistic (as well as psychological) experimentation transforms into a symmetrical relationship between two researchers. The informant can have their own "theory" about the experimenter and, based on this, modify their behaviour during the experiment. It can affect the results in an undesirable direction for the experimenter (a phenomenon well-known to dialectologists). An especially significant domain for using electronic language models is machine experiments that assess the adequacy of formalized existing language models (automatic text processing) (LED, 1990, pp. 590–591).

The free-associative experiment is a method of psychological research in which participants freely associate with words or concepts. Participants are presented with initial stimuli (such as words) to which they must respond by naming the first associations that come to their minds. This experiment enables the study of associative connections between words and concepts, as well as the identification of characteristics of cognitive processes and the structure of thought. The results of the free-associative experiment can be processed and interpreted using computer programs to gain a more detailed understanding of associative thinking processes. Computerized analysis of the results using modern software allows for swift and efficient analysis and interpretation of the collected data.

Through this process, it becomes possible to uncover connections and dependencies between words, develop classifications of associations, and obtain crucial insights into mental processes. Computer programs aid in automating data processing, conducting statistical analysis, visualizing results, and drawing comprehensible conclusions. They serve as powerful tools for researchers, enhancing the accuracy and reliability of the analysis of the free-associative experiment. The Information-Analytical System for Processing Results of Associative Experiments "STIMULUS" is a modern software product developed for investigating associative connections in the context of the free-associative experiment.



Zahorodnia and Zahorodnii developed this software (see Zahorodnia, 2018). The "STIMULUS" system incorporates a linguistic algorithm that allows for the analysis and processing of associative experiment results. It aids in automating the data processing process, conducting statistical analysis, and visualizing the obtained outcomes. Through "STIMULUS", researchers can obtain more detailed information about experiment participants' associative connections, thought structure, and cognitive processes. The Information-Analytical System "STIMULUS" is a valuable tool for researchers interested in studying associative thinking and analyzing the results of free-associative experiments (Ibid.).

## 2. Literature Review.

Among the prominent foreign researchers in psycholinguistics and the field of free-associative experiment, we most frequently encounter references to the works of: Boroditsky (2001), a professor of Cognitive Science at the University of California, San Diego, renowned for her work on the interrelation between language, cognition, and culture; Pinker (2019), a scholar and psychologist from Harvard University who has authored numerous books on language and cognition, and is known for his work in the field of evolutionary psychology of language; Loftus (1998), a scholar and psychologist at the University of California, Irvine, author of contemporary ground-breaking work in the field of human memory and its influence on recollections; Ervin-Tripp (1973), a linguist and psychologist, who undertook pioneering work in sociolinguistics and psycholinguistics, specifically in the areas of bilingualism and language development, and Jackendoff (2012), a linguist and psychologist, specializing in cognitive linguistics and theory of mind.

Therefore, the main difference between the associative experiment and the free-associative experiment lies in the fact that the associative experiment imposes restrictions on the choice of associations, requiring participants to name the first word that comes to mind. In contrast, the free-associative experiment allows participants to name any associations or ideas that emerge in their minds.

Processing and analysing experimental data from free-associative experiments are commonly performed using modern computer programs designed for this purpose. A wide



range of software available, including statistical packages and data processing tools, can be utilized for these purposes.

The main steps of processing and analysing experimental data include *data collection* (recording experimental results in a suitable format that can be imported into data processing software), *data cleaning* (removing errors, deviations, and anomalies from the data), *data analysis* (utilizing various methods to identify patterns, trends, and statistically significant relationships within the data), *data visualization* (using graphical tools to display the results of data analysis), and *interpretation of results* (analysing the interpretation of the obtained results and conclusions drawn based on data processing).

Many popular programs, such as Excel, Statistica 5.5 for Windows, and STIMULUS, provide a wide range of functional data processing and analysis capabilities. To obtain objective material and justify the reliability of research results, we choose the STIMULUS software specifically developed for processing and analysing data obtained from free-associative experiments. It offers comprehensive functions and a user-friendly data import, cleaning, and preliminary processing interface. The program includes various statistical methods and analytical tools that enable detailed data analysis from free-associative experiments.

The main features of the STIMULUS software are as follows: during *data processing*, this program allows importing data from the experiment and performing necessary operations for data cleaning, anomaly removal, and handling missing values; *the statistical analysis* provided by this program includes various statistical methods for data analysis, such as descriptive statistics, t-test, analysis of variance (ANOVA), correlation analysis, and many others. It enables the identification of statistically significant relationships and the determination of the influence of factors on experiment results; the software offers tools for *data visualization* in the form of graphs, charts, and other graphical representations (this helps visualize relationships, trends, and deviations in the data); STIMULUS enables *generating reports and analysis results* in a user-friendly format, making it easy and accessible to present research findings.

### 3. Aim and Objectives.



**The article** aims to present the results of computer processing of a free-associative experiment using STIMULUS based on reaction words/associations (from now on referred to as reactions) provided by German respondents (from now on referred to as Germans) to stimulus words (from now on referred to as stimuli) with the semantics of resilience and to carry out their psycholinguistic interpretation.

**The objectives of the article** are as follows:

- to describe the "free associative experiment" as a methodological tool used in modern psycholinguistics to obtain reactions from research participants, where they freely express their associations without any predetermined instructions or constraints;
- to outline the operational stages of working with STIMULUS according to the reactions provided by Germans;
- to present the results of computer processing of reactions provided by Germans to stimuli with the semantics of resilience;
- to provide a psycholinguistic interpretation of the reactions provided by Germans to stimuli with the semantics of resilience.

#### **4. Methods.**

*General Characteristics of the Questionnaire for Conducting the Free Associative Experiment.* An electronic questionnaire created using Google Form in German (German *der Fragebogen*) for German respondents residing in Germany consisted of two mandatory sections for completion (\*): if Section I. "General Information about the Respondent" contained information about age (17-23 / 24-30 / 31-39 / 40-49 / 50 and above) and education (secondary/basic higher (bachelor's) / higher (master's) / academic degree (PhD / candidate or doctor of sciences) / other), then Section II. "Reactions to Stimuli" included five stimuli that terminologically constitute the scientific scope of the concept "resilience": German. *Die Krise, der Zusammenbruch, der Stress, die Pandemie, das Trauma*. Section 2 is pivotal for the study, as German participants were required to provide reactions to the presented stimuli to construct associative fields further.



*Stimuli for conducting the free-associative experiment.* It is important to emphasize that for Section II, "Reactions to Stimuli", five stimuli were carefully chosen. These stimuli not only terminologically encapsulate the scientific scope of "resilience" (German *die Krise, der Zusammenbruch, der Stress, die Pandemie, das Trauma*) but also address the issues of viability, durability, and related themes. These stimuli were selected from the "Deutsches Referenzkorpus, DeReKo" (lit. *German Reference Corpus*) (URL: <https://corpora.ids-mannheim.de/ccdb/>), specifically chosen for their highest frequency of occurrence.

*The main participants in the free-associative experiment.* The free-associative experiment involved the participation of around 100 Germans aged 17-23 and 31-39, who are native and currently reside in Germany. Among these participants, there were students pursuing bachelor's or master's degrees in various higher education institutions in Germany.

*The processing stages of the reactions from Germans to stimuli with the semantics of resilience.* Among the main stages of processing the reactions of German participants to stimuli with the semantics of resilience, three operational stages were chosen: preparatory, practical, and analytical, as proposed by Zahorodnia.

## 5. Results.

*The associative experiment* is a psychological experiment in which the researcher presents participants with a list of words or stimuli and asks them to name the first words that come to mind in response to each stimulus. For example, participants might be shown the word "crisis", and they are required to name the first word that comes to their mind, such as "danger/ruin" or "opportunity/chance". The associative experiment (Salikhova, 2008; Zalevskaya, 1999) allows a scholar to explore associative connections between words and concepts in participants' minds. According to the works of some scholars (Goroshko, 2005; Terekhova, 2018; Martinek, 2011), *the free-associative experiment* also involves participants providing associations to specific stimuli. However, in this case, participants are not restricted to selecting only one word or a limited list of words. They can provide any associations or ideas that come to their mind. It gives greater freedom for expressing thoughts and associations, enabling scholars to analyse a broader spectrum of associations.



**The free-associative experiment** (FAE) is utilized in contemporary psycholinguistics (Boroditsky, 2001; Jackendoff, 2012; Pinker, 2018) to gather participants' reactions. This experiment is built upon the concept of "association," which holds significant importance in psychology. Many definitions of the term "association" emphasize its psychological aspect. For instance, in the "Philosophical Encyclopaedic Dictionary" (2002), the definition notes that association (from Latin *associatio* – "union", from *associo* – "to unite") is a form of uniting people for cooperation in order to achieve a specific common goal. In the 19<sup>th</sup> century, founders of social and political-philosophical studies, such as John Stuart Mill and Alexis de Tocqueville, emphasized the importance of addressing the question of the role of associations in the context of the science of governance (Pappe, 1964). Mill noted that "free associations" contribute to the practical aspect of political education of a free people, bringing the individual into the realm of common interests with those close to him, helping to overcome the egoism characteristic of liberal democracy. Tocqueville also observed that Americans resisted individualism, which was brought about by equality through freedom, thus overcoming it (PED, 2002, pp. 40-41).

In the "The Barnhart Concise Dictionary of Etymology" (1995), the word *associate* (adj. 1425) is presented as originating from the past participle *associat*, borrowed from Latin *assodātu*, the past participle of *assodare* (lit. *to join, combine*), where "as" means "to" or "with," and "*sociare*" means "to join with", from "*socius*" meaning "companion". In 1450, it gradually replaced the earlier form "*associen*" (1383). *Associate* is a verb derived from the Middle English participle *associat*, borrowed from Latin *associatus*, the past participle of *associare* (lit. *to join, connect*). The Middle English word *associen* was borrowed from Old French *associer*, and *associer*, from Latin *associare*. The noun *association* has existed since 1535, possibly borrowed through Middle French *association* or directly from Medieval Latin *associationem* (a nominative form of "*associatio*"), from Latin *associāre* (lit. *to join, connect*) (Barnhart Dictionary, 1995, p. 40).

In the field of German-language research on psycholinguistic associative experiments, the German terms "Verknüpfung" and "Verbindung" (lit. *connection*) are most commonly used instead of the German term "Assoziation" (lit. *association*). These words have a robust semantic



correlation with the concept of "association" and can express a connection or combination between different ideas or objects. German *Verknüpfung* means "connection" or "link" and corresponds to uniting or relating two or more elements in a particular context based on specific properties or characteristics. German *Verbindung* means "connection", "combination", or "junction". It can also indicate merging of different elements or parts into a single entity or their interconnectedness. The German words "Zusammenhang" (lit. *connection*) and "Beziehung" (lit. *relationship*) also share a semantic affinity with "association", but they are less frequently used in the context of psycholinguistic associative experiments, as they may have a broader meaning that may not precisely match the specific context of such experiments (DDW, 2002).

*The free-associative experiment* can be understood as a research method that goes beyond the boundaries of traditional interpretations of logical semantics and allows for the exploration of the associative meaning of a word as an individual acquisition of a person. According to Zakorko's (2012) perspective, the FAE needs a more complex understanding of the meaning of individual words. It focuses on the intricate interaction between linguistic and encyclopaedic knowledge. This approach allows us to view the meaning of a word as a means of expressing a personalized and individualized worldview, encompassing various relationships, connections, emotional and evaluative nuances, qualities, and more. The free-associative experiment allows researchers to comprehend how an individual perceives the world and how they endeavour to reproduce it within their associations (Zakorko, 2012, p. 105).

When participating in the free-associative experiment, a participant observes a stimulus word and tries to respond to it with the first word or phrase that spontaneously comes to mind (Leontyev, 1977). This word reaction or word association (hereafter – reaction) is connected to the stimulus word. The associative links that arise in a person's consciousness are called associations. These associations can indicate specific structural relationships between lexical units in an individual's lexicon, serving as a source of information about the organization of the lexicon's space. The obtained associative reaction from the respondent allows conclusions to be drawn about the most relevant feature of the starting word for them and how it serves as the basis for incorporating that word into a particular system of connections. It becomes evident

when comparing the starting word with the obtained reaction. Associations provide insight into the world of emotions and their associated concepts, allowing the study of how emotions are represented in human cognition and how they relate to cultural perceptions of the world. Jung et al. (1997) believed that studying associations is a pathway to delving into the human psyche.

As we can see, the free-associative experiment aims to investigate the psycholinguistic meaning of words, categorical and referential meaning, the specificity of the meaning of certain words, pivot words, comparative constructions, as well as the study of relationships between words and the organization of the lexicon in an individual. The free-associative experiment allows for exploring the structure and functioning of language in the context of individual associations and personal experiences. Research of this kind helps uncover intricate linguistic connections and study how words from the linguistic dimension intersect with an individual's emotional-cognitive processes.

The operational stages of working with STIMULUS are based on the reactions provided by the Germans. To work with the reactions provided by Germans, we will follow three operational stages proposed by Zahorodnia (2018). At each stage, we will analyse the information related to the selected stimuli and provide necessary comments. These stages will help us systematize and understand the obtained reactions and their psycholinguistic characteristics (Zahorodnia, 2018, pp. 80-81).

During the preparatory stage of working with STIMULUS, we established the necessary database for processing reactions provided by Germans. In this stage, we perform the following procedures: 1) compile lists of stimuli: German *die Krise* (lit. crises), *der Zusammenbruch* (lit. crash), *der Stress* (lit. stress), *die Pandemie* (lit. pandemic), *das Trauma* (lit. trauma); 2) create semantic fields for each stimulus (Zahorodnia, 2018, pp. 80-81). Thus, for each stimulus, the following semantic fields were identified:

– **German. *die Krise*** (lit. crises): archiseme 'change', which contains five integral semes: 'completion / ending of something', 'breakdown / intensification / disruption' (differential semes: 'emotional breakdown / intensification / disruption', 'economic breakdown / intensification / disruption', 'medical breakdown / intensification / disruption', 'political



breakdown / intensification / disruption', 'any other breakdown / intensification / disruption'), 'lack of something' (differential semes: 'ideational lack', 'fuel lack', 'governmental lack', 'any other lack'), 'turning point / pivotal moment' (differential semes: 'emotional turning point / pivotal moment', 'economic turning point / pivotal moment', 'medical turning point / pivotal moment', 'political turning point / pivotal moment', 'any other turning point / pivotal moment'), 'deterioration of something' (differential semes: 'emotional deterioration', 'economic deterioration', 'medical deterioration', 'political deterioration', 'any other deterioration') (Zahorodnia, 2018, pp. 80-81);

– **German. *der Zusammenbruch*** (lit. crash): archiseme 'bankruptcy/ruin' contains two (2) integral semes: 'financial insolvency' (differential semes: 'bankruptcy of something/poverty', 'liquidation of something'), 'loss/cessation of activity/failure' (differential semes: 'cessation of existence', 'unsuccessful/unsuccessful completion/ending of something', 'sudden disaster/event with serious, tragic consequences', 'becoming unusable') (Zahorodnia, 2018, pp. 80-81);

– **German *der Stress*** (lit. stress): archiseme 'tension / stress' contains two integral semes: 'crisis state of the organism' (differential semes: 'state of the organism in the form of tension', 'state of the organism in the form of specific adaptive reactions in response to the action of internal factors (stressors)', 'state of the organism in the form of specific adaptive reactions in response to the action of external factors (stressors)', 'state of the organism in the form of specific adaptive reactions in response to the action of internal and external factors (stressors)'), 'disorder of the organism's state' (differential semes: 'nervous / mental / psychological disorder of the organism's state', 'pathological disorder of the organism's state', 'any other state of the organism') and one (1) gradual seme 'organism's reaction to various factors (stressors)' (differential semes: 'organism's reaction to internal factors (stressors)', 'organism's reaction to external factors (stressors)', 'organism's reaction to internal and external factors (stressors)', 'organism's reaction to any other factors (stressors)') (Zahorodnia, 2018, pp. 80-81).;

– **German. *die Pandemie*** (lit. pandemic): archiseme 'disease / illness' contains five integral semes: 'type of disease / illness' (differential semes: 'infectious disease / illness (human / animal)', 'infectious disease / illness (human)', 'infectious disease / illness (animal)'), 'quality of disease / illness' (differential seme 'lethal disease / illness'), 'causative agent of disease / illness', 'area of disease / illness spread' (differential semes: 'area of disease / illness spread (human / animal)', 'area of disease / illness spread (human)', 'area of disease / illness spread (animal)'), 'time of disease / illness spread' (differential semes: 'time of disease / illness spread (human / animal)', 'time of disease / illness spread (human)') and one (1) gradual seme 'degree of disease / illness spread' (differential semes: 'degree of disease / illness spread (human / animal)', 'degree of disease / illness spread (human)', 'degree of disease / illness spread (animal)') (Zahorodnia, 2018, pp. 80-81);

– **German *das Trauma*** (lit. *trauma*): archiseme 'damage' contains three integral semes: 'traumatic damage' (differential semes: 'traumatic damage to the body or internal organs (humans/animals)', 'traumatic damage to the body or internal organs (humans)', 'traumatic damage to the body or internal organs (animals)'), 'psychological damage' (differential semes: 'nervous damage (humans/animals)', 'psychological / psycho-emotional damage (humans/animals)'), 'tension/strain' (differential semes: 'crisis state of the organism', 'disorder of the organism state', 'organism's reaction to various factors (stressors)') (Zahorodnia, 2018, pp. 80-81)).

Therefore, the results of the first and second procedures are recorded in the STIMULUS.

The practical stage of working with STIMULUS involves working with questionnaires where reactions provided by Germans are presented. All respondent reactions to the corresponding stimulus are entered into the computer system. It is important to note that the reactions provided by Germans were given in the German language.

First, we record all reactions provided by Germans:

– **German *die Krise*** (lit. *crises*): *ist bedrohlich, Momentan; geht vorbei Tiere schlafen anpacken, die Herausforderung, Energiekrise, Strom- und Gaspreise, besorgte Bürger\*innen, schwere Zeiten, Ungewissheit, steigende Preise;*



– **German. *der Zusammenbruch*** (lit. *crash*): *danach kommt etwas Neues, zu viel / zu lange gewartet, reden oft, der Wiederaufbau, die Übelkeit, der Schwindel, das System;*

– **German. *der Stress*** (lit. *stress*): *kann ein Wegweiser sein, Cortisol, Magnesium, der Sport, meditieren, die Entspannungstechniken, das Studium, die Schule, das Berufsleben, die Hektik, die Reizüberflutung, innere Unruhe;*

– **German. *die Pandemie*** (lit. *pandemic*): *wurde von den Menschen unterschätzt, zu lange Kinder Isolation, diffuse Informationen, arbeiten, die Hygiene, die Korona, die Einschränkungen, die Gesundheit, die Angst, die Ungewissheit;*

– **German. *das Trauma*** (lit. *trauma*): *PTBS, EMDR, die Therapie, reden, der Sport, der Schock, psychisches Wohlbefinden ist beeinträchtigt, langwierige Folgen, schreckliche Erlebnisse.*

The analytical stage of working with STIMULUS provides the scholar with data processing results from associative experiments using the STIMULUS system (Zagorodnya, 2018, pp. 80-81). During this stage, several possibilities are employed.

Firstly, we determine the content of the stimulus' associative field, its core and periphery, as well as indicators of the brightness index of reactions.

Now we work with the reactions provided by Germans:

– **German *die Krise*** (lit. *crises*): if the core of the stimulus = 0.1062 (German *die Herausforderung* – English *challenge*, German *die Ungewissheit* – English *uncertainty*), then the periphery = 0.0431 (German *bedrohlich* – English *threatening*, German *besorgte* – English *concerned*, German *schwere Zeiten* – English *difficult times*);

– **German *der Zusammenbruch***: if the core of the stimulus = 0.2143 (German *der Wiederaufbau* – English *reconstruction*, German *etwas Neues (kommt danach)* – English *something new (comes after)*), then the periphery = 0.1024 (German *zu viel / zu lange gewartet* – English *waited too much / too long*), = 0.0361 (German *die Übelkeit* – English *nausea*, German *der Schwindel* – English *dizziness*, German *das System* – English *system*);

– **German *der Stress*** (lit. *stress*): if the core of the stimulus = 0.1433 (German *die Reizüberflutung* – English *overload*, German *innere Unruhe* – English *the internal*

*restlessness*, German *der Wegweiser* – English *guide*), = 0.1344 (German *das Studium* – English *education*, German *die Schule* – English *school*, German *das Berufsleben* – English *professional life*, German *die Hektik* – English *hectic rush*), then the periphery = 0.0665 (German *Cortisol* – English *cortisol*, German *Magnesium* – English *magnesium*, German *der Sport* – English *sport*, German *meditieren* – English *meditation*, German *die Entspannungstechniken* – English *relaxation techniques*);

– **German. die Pandemie** (lit. *pandemic*): if the core of the stimulus = 0.1402 (German *die Hygiene* – English *hygiene*, German *die Korona* – English *corona virus*, German *die Einschränkungen* – English *restrictions*, German *die Gesundheit* – English *health*, German *die Angst* – English *fear*, German *die Ungewissheit* – English *uncertainty/insecurity*), then the periphery = 0.0315 (German *wurde von den Menschen unterschätzt* – English *was underestimated by people*, German *zu lange Kinder Isolation* – English *children's isolation for too long*, German *diffuse Informationen* – English *ambiguous information*, German *arbeiten* – English *work*);

– **German. das Trauma** (lit. *trauma*): if the core of the stimulus = 0.1053 (German *psychisches Wohlbefinden ist beeinträchtigt* – English *mental well-being is impaired*, German *schreckliche Erlebnisse* – English *terrible experiences*, German *die Therapie* – English *therapy*), then the periphery = 0.0513 (German *reden* – English *talk*, German *der Sport* – English *sport*, German *der Schock* – English *shock*, German *langwierige Folgen* – English *long-lasting consequences*, German *PTBS* (Posttraumatische Belastungsstörung) – English *post-traumatic stress disorder*, German *EMDR* (Eye Movement Desensitization and Reprocessing) – English *eye movement desensitization and reprocessing*)).

## 6. Discussion.

Using STIMULUS, associative fields (with a core-periphery organization) have been created for each German stimuli, focusing on the core units as indicators of the Germans' thought process. The core reactions for German-language stimuli are determined as follows: *die Krise* – *die Herausforderung*, *die Ungewissheit*; *der Zusammenbruch* – *der Wiederaufbau*, *etwas Neues (kommt danach)*; *der Stress* – *die Reizüberflutung*, *innere Unruhe*, *der Wegweiser*; *die*



*Pandemie – die Korona, die Gesundheit, die Einschränkungen, die Hygiene, die Angst, die Ungewissheit; das Trauma – psychisches Wohlbefinden ist beeinträchtigt, schreckliche Erlebnisse.*

The analysis of reactions demonstrates a distinct perception of crisis scenarios among the Germans. The majority perceives the concept of uncertainty (German *die Ungewissheit*) within any crisis as a true challenge (German *die Herausforderung*).

Germans, as a whole, value **stability and the rule of law**, which is why a crisis can evoke **concerns** and **a desire to restore normalcy** quickly. German citizens prioritize **trust in authority** and expect **effective responses** to crises. They may anticipate that the government and governing bodies fulfill their duties adequately. They also often seek **proper information** and **transparency** in governmental actions and expect **access to accurate and reliable information** about the crisis, its consequences, and the **measures being taken**. Germans are known for their **organizational skills** and ability to implement necessary safety measures. In times of crisis, they are likely to adhere to instructions and recommendations provided by authorities for the safety and prevention of hazardous situations.

## 7. Concluding Remarks.

The computer processing of the results of the free-associative experiment using STIMULUS based on the reactions provided by the Germans to stimulus words German *die Krise* (lit. crises), *der Zusammenbruch* (lit. crash), *der Stress* (lit. stress), *die Pandemie* (lit. pandemic), *das Trauma* (lit. trauma) with the semantics of resilience, firstly, it enabled the identification of core reactions for German stimuli (German *die Krise* (lit. crises) – German *die Herausforderung* (lit. challenge), *die Ungewissheit* (lit. uncertainty); German *der Zusammenbruch* (lit. crash) – German *der Wiederaufbau* (lit. reconstruction), *etwas Neues (kommt danach)* (lit. something new (comes next)); German *der Stress* (lit. stress) – German *die Reizüberflutung* (lit. sensory overload), *innere Unruhe* (lit. inner restlessness), *der Wegweiser* (lit. guide); German *die Pandemie* (lit. pandemic) – German *die Korona* (lit. corona virus), *die Gesundheit* (lit. health), *die Einschränkungen* (lit. restrictions/limitations), *die*



*Hygiene* (lit. *hygiene*), *die Angst* (lit. *fear*), *die Ungewissheit* (lit. *uncertainty*); German *das Trauma* (lit. *trauma*) – German *psychisches Wohlbefinden ist beeinträchtigt* (lit. *mental well-being is impaired*), *schreckliche Erlebnisse* (lit. *terrible experiences*)).

Considering the semantic characteristics of stimuli and their core units, we can outline a distinct psycholinguistic profile of a German individual, encompassing several key traits that characterize German culture and communication style: *directness* – Germans are generally open and straightforward in their communication. They often express their opinions clearly and without unnecessary embellishments; *organizational skills* – Germans are known for their organization and value precision. They tend to be detail-oriented and engage in thorough analysis. They strive for high-quality standards in their work and aim for excellent results collectively and through collaboration.

We envision **prospects for further research** in the computer processing of the results of the free-associative experiment using STIMULUS, based on reactions provided by French and Ukrainian participants to stimuli with the semantics of resilience, and in conducting their psycholinguistic interpretation.

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