

Universal Basic Income meets Basic Needs: A Qualitative Analysis of Cognitive-Affective Maps

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Running head: universal basic income and needs

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Abstract

The concept of a Universal Basic Income (UBI) was explored using a content structuring qualitative analysis to identify needs and need relevant aspects and classifying whether their satisfaction was perceived as favored or endangered by UBI. The analyses was based on 62 online-collected Cognitive-Affective Maps (CAMs) on the topic “personal attitudes associated with UBI”. Maslow's classification of five basic human needs served deductively as reference theory (Maslow, 1943). By inductively differentiating the a priori categories, a comprehensive category system of main and subcategories was developed. Most frequently expressed were the Needs for Safety and Self-Actualization as well as the need-relevant aspect of Justice. Physiological and Social Needs were mentioned least often. The majority of codings were classified as benefiting from UBI; within Safety and Justice-related Needs the classification differed depending on the respective subcategories. Insights into the qualitative approach of CAMs were gained and implications for future research on UBI derived.

Keywords: cognitive-affective maps, Maslow, needs, need satisfaction, qualitative content analysis, universal basic income

1 Introduction

The consequences of digitization and climate change, increasing disparity between rich and poor, and rising old-age poverty are central issues in Germany's political debate. Technological progress is expected to redistribute occupational groups in the labor market and change working conditions in the foreseeable future (Gerdenitsch & Korunka, 2019; Weber, 2017). Initial results from the Federal Statistical Office indicate that one in five people in Germany was already at risk of poverty or social exclusion in 2022 (Statistisches Bundesamt, 2023). In 2021, women and unemployed individuals were particularly affected, with a heightened risk of poverty in old age (Statistisches Bundesamt, 2022). The search for functional long-term solutions for social security is becoming increasingly important.

One debated approach is a Universal Basic Income (UBI). To be a legitimate social security measure, it must guarantee the satisfaction of subsistence needs according to the German Social Code (Sozialgesetzbuch, SGB) (Art. 1 §27a para. 1 & para. 2 p.1 SGB XII). However, an unconditional implementation would impact not only those whose existential needs depend on it but also those, whose subsistence is already financially ensured (Hasdell, 2020). It is unclear which needs, both individual and societal, could be favored or endangered by UBI, such as noticeable financing measures like income taxes (Rinke, 2020).

While attitudes towards UBI have been researched (e.g., Adriaans et al., 2019 and Roosma & van Oorschot, 2020) and various experimental projects and meta-works conducted (e.g., Hasdell, 2020), no attempt has yet been made to identify and classify needs specifically influenced by UBI. This paper therefore explores which needs individuals associate with UBI and whether their fulfillment is anticipated to be favored or endangered by UBI. Thagard's (2010) method of Cognitive-Affective Maps

(CAMs) is used, which has not yet been applied to UBI but may add value to previous research approaches using questionnaires (Dörr, 2021; Mansell et al., 2021).

2 Theoretical background

2.1 The Universal Basic Income

UBI is commonly defined as a recurring amount of money provided condition-free to all community members, regardless of their social, financial, and occupational status (Hasdell, 2020). Additional financial income can legitimately be earned, for example through a job, but willingness to work is not a condition for receipt (Hasdell, 2020), unlike with other social benefits such as the Citizen's Income (germ. "Bürgergeld") in Germany. While there is relative agreement on the conceptual understanding of UBI, the debate about the implementation and amount is intense (Wissenschaftlicher Beirat beim Bundesministerium der Finanzen, 2021). It is generally demanded that the payment must secure the socio-cultural subsistence minimum, which according to an expert opinion of the Scientific Advisory Council at the Federal Ministry of Finance (2021) includes subsistence-related goods and personal needs of everyday life, facilitating participation in social and cultural community life. According to this definition, which corresponds to the social assistance needs under Article 1 §27a para. 1 and para. 2 p.1 of the Social Code Book XII, a UBI should ensure the fulfillment of needs in various life areas, which may have individual character beyond physical existence.

In low- and middle-income countries, studies indicate that regular cash payments positively affect schooling (Baird et al., 2013; Bastagli et al., 2019) and improve the health and health-related behaviors (Marinescu, 2018; Ranganathan & Lagarde, 2012). The largest experimental project to date, but limited to registered

unemployed in Finland, found a global improvement in subjective well-being and mental health (Simanainen & Tuulio-Henriksson, 2021). Other studies found small negative effects on work motivation (Marinescu, 2018) or no effects on employment outcomes (Banerjee et al., 2017; Gilbert et al., 2018).

In Germany, a three-year study started in 2021 provides 122 participants with a UBI of 1.200€ per month¹. In an audio report by Schmidt and Meckbach (2022) participants reported positive changes such as reduced existential worries (7:08-7:33) and reduced workload (10:10-10:28), leading to “much more time with ... family, with friends” (23:53-23:57).

However, a generalization of results from previous experimental studies is limited due to methodological and sampling limitations (Banerjee et al., 2019). Long-term effects on behavior, the labor market, or migration cannot be derived since counterfinancing measures were not implied, which is why previous conditions corresponded only to a temporary increase in income (Wissenschaftlicher Beirat beim Bundesministerium der Finanzen, 2021).

Opinion surveys represent a further research approach and provide initial indications of how attitudes toward UBI are expressed and influenced across different population groups. The idea of UBI exhibits a high degree of controversy in Germany, as illustrated by the split in opinion (Adriaans et al., 2019). Proponents of UBI tend to be younger and politically left-leaning, with higher educational qualifications and lower incomes. They prefer the need principle to the merit principle regarding the distribution of societal goods and burdens. Overall, personal justice principles appear to play a crucial role in attitudes towards UBI. Similar patterns were found across European countries (Vlandas, 2019; Roosma & van Oorschot, 2020), with support

¹ <https://www.pilotprojekt-grundeinkommen.de>

levels correlating with national levels of material deprivation (Roosma & van Oorschot, 2020). Attitudes towards UBI thus depend on individual as well as contextual factors and vary between different sociodemographic groups.

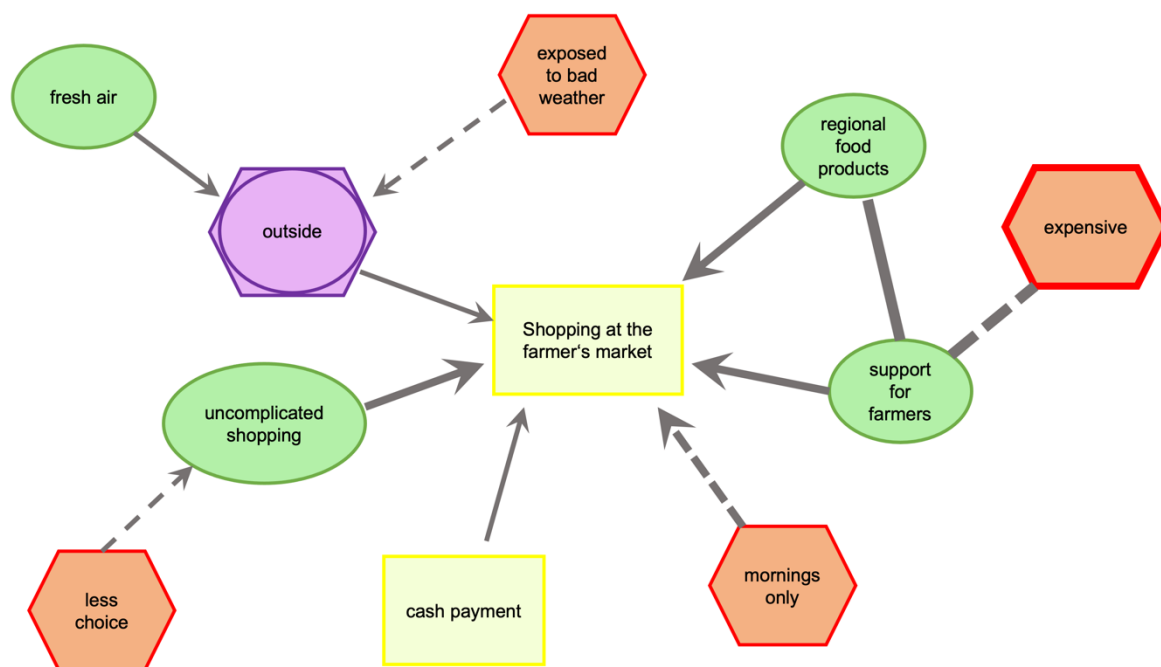
Chrisp et al. (2020) highlighted the multi-dimensionality of UBI, referring to the various conceptions regarding funding or amounts. This causes high diversity in opinion survey results, as attitudes towards UBI seem to be fragile and can change significantly when costs, especially tax-based financing, are mentioned. To address this complexity, Chrisp et al. (2022) recommend research approaches that explore the multidimensionality in opinion research.

2.2 Cognitive-Affective Maps as Data Collection Methodology

Cognitive Affective Maps (CAMs), developed by Paul Thagard (2010), were designed for understanding and resolving social conflicts. They integrate emotionally rated mental representations into traditionally value-free cognitive maps, which relate various concepts with one another (Thagard, 2012). In graphical diagrams cognitive representations about concepts, their affective evaluations, and their relationships to one another can be visually-spatially represented. Based on Thagard (2010) the conventions for creating a CAM are explained in the following and illustrated in Figure 1 using an exemplary CAM on the topic of going shopping at a farmer's market.

Figure 1

Example of a Cognitive-Affective Map (CAM)



Note. This is an exemplary CAM on the topic of “Going shopping at the farmer’s market”. It was used in the survey to illustrate the conventions for creating CAMs for the participants.

Cognitive representations are visualized by so-called concept nodes (hereafter also just "concept"), elements of different shape and coloring that can be connected by lines. Four different affective evaluations (valences) can be assigned to a concept: Neutral (yellow rectangles), positive (green ovals), negative (red hexagons), and ambivalent concepts that have both positive and negative affective ratings (purple oval framed by a hexagon). For positive and negative concepts, the valence intensity can be varied by regulating the thickness of the shape lines in three gradations. Solid lines between individual nodes represent supportive relationships between two concepts, meaning that they go along with each other, build on or promote the connected concept. Dashed lines symbolize conflicting relationships, meaning

concepts cannot co-occur, hinder, or inhibit each other. The line thickness expresses the relationship intensity. In addition, directional arrows show the nature of the relationship as unilateral, whereas lines without arrows indicate a mutual influence. Please note that in the current study (unlike in the farmers market example shown in figure 1), all connections were shown as lines without arrowhead. Consequently, we consider all connections as mutually influential.

Participants can create CAMs very freely and openly in terms of content and are not restricted or influenced by predetermined response options (Mansell et al., 2021). This enables a differentiated presentation of individual opinions on complex topics (Homer-Dixon et al., 2013) and can achieve comparable results to qualitative interviews (Meyerding, 2021) and an added value compared to classic (online) questionnaire surveys (Dörr, 2021). CAMs therefore are a promising data collection tool to address the described divergences in public opinion (Adriaans et al., 2019; Luthardt et al., 2022; Roosma & van Oorschot, 2020) and the multidimensionality of UBI (Chrisp et al., 2020).

Both quantitative and qualitative approaches can be used to evaluate CAMs, Mansell et al. (2021) and Reuter (2022) emphasize the potential of combining them when applicable. A qualitative research approach is suitable for exploring UBI due to limited prior knowledge (Gläser-Zikuda, 2011). Subjective perspectives and contexts of meaning can be analyzed (Gläser-Zikuda, 2011), which is advantageous with respect to CAMs that map associatively linked concepts and beliefs about conflicting objects (Homer-Dixon et al., 2013). With regard to the research questions, categories are formed to which available material is assigned ("coding"), followed by a data analysis (Kuckartz & Rädiker, 2020). Since qualitative research requires interpretation, subjective influences by personal characteristics of the raters are

expected (Döring, 2006), necessitating methodological measures for increased comprehensibility and intersubjectivity of the results (Kuckartz & Rädiker, 2022).

Content structuring content analysis, a basic form of the qualitative approach (Kuckartz & Rädiker, 2022), usually follows a deductive-inductive procedure, in which a rough framework of theory-based categories represents the initial state of knowledge and is expanded inductively during the analysis (Mayring & Gläser-Zikuda, 2008). This procedure is also used in the present work, with Maslow's hierarchy of needs serving as deductive basis.

2.3 Maslow's hierarchy of needs

According to a general definition, a need is "the feeling or awareness of a deficiency ... which restricts, hinders, endangers the course of life, combined with the striving to remedy the same" (Hermann, 1870, according to Toepfer, 2011).

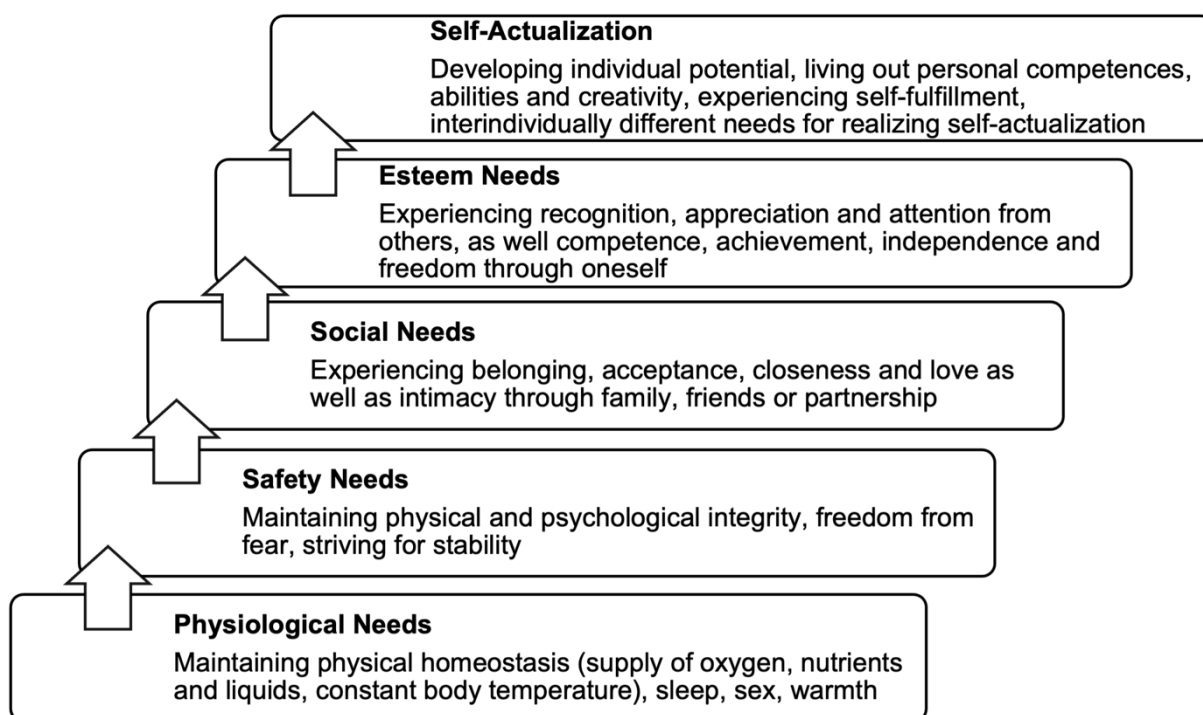
In qualitative research practice, Maslow's (1943, 1954) theory of human motivation, also known as the hierarchy of needs, is used across disciplines to study needs (e.g., Abbas, 2020; Haynes-Maslow et al., 2013; Henwood et al., 2015). Despite its age, it remains one of the most widely cited and known psychological works (Diener et al., 2014, Compton, 2018). An advantage of Maslow's theory over others, such as Deci and Ryan's (2000) three basic psychological needs, is the classification of both physiological and psychological needs. This enables a holistic exploration of needs across various life domains, relevant in terms of examining the impact of UBI.

The theory conceptually categorizes human needs into groups and postulates a fixed hierarchical sequence of their occurrence (Maslow, 1943). The needs of one level must be fully or partially satisfied before the need content of the next higher level can arise, gradually increase, and finally become the new central motivator

(Maslow, 1943). The lower levels are thus prepotent to the higher ones, since according to Maslow's theory (1943), in case of simultaneous (and massive) deprivation of the contents from two different levels, one would first strive for satisfaction of the hierarchically lower placed need. Maslow (1971) later added three more levels to his hierarchy, but this paper used the original and in research more widely used five-level version (Maslow, 1943) which is shown and explained in Figure 2.

Figure 2

The five levels of Maslow's hierarchy of needs



Note. This chart was created by the authors, based on Maslow's work from 1943 and 1954.

Maslow (1954) assumes a continuum from mental pathology to perfect health, with individuals moving towards better health the higher up the hierarchy they get. Tay

and Diener (2011) actually found correlations between Maslowian need satisfaction and subjective well-being, and Kaufman (2023) demonstrated correlations between the state of self-actualization and experiencing well-being.

Criticisms of Maslow include the postulated hierarchical sequence of needs (Tay & Diener, 2011; Wahba & Bridwell, 1976) which may vary culturally (Nevis, 1983), and the limited generalizability of Maslow's definitional approach of Self-actualization which was limited to examples of almost exclusively male, white, and highly educated individuals (Winston, 2016; Cullen & Gotell, 2002). Assumptions about hierarchical sequences of need satisfaction should thus be viewed critically, and an inclusive view of needs is required when applying Maslow's theory.

Nonetheless, Maslow's theory was found to be suitable for studying UBI by Wiencke (2017) who found needs from all levels of Maslow's hierarchy in a qualitative study of letter material, although modifications in line with the cultural zeitgeist were recommended. Due to the instruction to imagine a future fulfilled by a UBI (Wiencke, 2017), anticipated negative effects on need satisfaction were not methodologically covered. Moreover, a category system was already formed a priori, which may have led to overlooking need expressions specific to UBI in the material.

2.4 Aims of the study

In this study, we aim to identify and classify needs associated with UBI, determining whether these are anticipated to be favored or endangered in their fulfillment. The qualitative approach of content structuring content analysis with a deductive-inductive procedure is applied to CAMs on "attitudes towards UBI", using Maslow's (1943) hierarchy of needs as a deductive basis, as it can cover a variety of needs from different life areas and has previously been shown to be suitable for UBI (Wiencke, 2017). The assumption of hierarchical sequences will be abandoned, and

a special focus will be placed on the inductive search for needs specifically relevant to UBI as well as need-relevant aspects in the data material. Since CAMs are still a novel research method, this approach also aims to gain insights into the appropriate qualitative handling of the data material.

3 Methodology

A dataset collected from a joint survey by the Cluster of Excellence Living, Adaptive and Energy-autonomous Materials Systems (livMatS) and the Freiburg Institute for Basic Income Studies (FRIBIS) was used. Study materials and independent working papers are available on the platform Open Science Framework (OSF)². The folder "01_Common Information" contains shared materials, while documents specific to this work are in the folder "03_UBI and Needs".

The study included two survey time points since a separate study investigated the retest-reliability of CAMs. Only CAMs from the first time point were analyzed qualitatively, as only current opinions were of interest.

3.1 Sample

Participants were recruited via Prolific (<https://www.prolific.co>). The experiment was guided by the ethical guidelines of the Albert-Ludwigs-University of Freiburg, with participants giving informed consent and receiving 18 British pounds (~ 21 euros) for a time commitment of two hours. Participants had to be at least 18 years old, speak German natively and live in Germany at the time of the survey. The sampling aimed for a gender balance of 50% male and female participants and included two age groups: 18 to 45 years old and older than 46 years. The individual

² <https://osf.io/yjzwc/>

CAMs are available on OSF, whereby each CAM ID codes inclusion (1 or 0), age group ("y" for the younger and an "o" for the older group) and participant number. Please note however that in the current study age differences were not a study objective.

The survey began on February 24, 2023; the second survey dates took place at least one week later, from March 4, 2023 to March 17, 2023. Only individuals who completed the second survey time point were included, as sociodemographic data were collected at that time. Of the 80 persons initially recruited, only 62 completed the study, resulting in a drop-out rate of 22.5%. Exclusion criteria were the creation of a CAM with content not related to UBI or the loss of concept nodes relevant to needs, both cases did not occur. The sample contained an age range of 19 to 69 years (24 female, 37 male, 1 non-binary, $M = 36.34$ years, $SD = 12.07$).

Participants were asked about their educational background, whereby multiple answers were possible. From the 62 participants 47 participants indicated to have a high school diploma (Abitur) and six each had a university of applied sciences entrance qualification (Fachhochschulreife) or an intermediate school leaving certificate (Mittlere Reife/Realschulabschluss). Three participants did not indicate an education. 26 participants reported to have a vocational training qualification and 36 some kind of university degree. Three participants did not indicate an education. We also asked participants to indicate their current work situation (please note that multiple answers were allowed). Six participants were unemployed or job-seeking at the time of participation, 19 persons were studying, completing training or (evening) school. Three persons were retired and 44 employed (10 self-employed or freelancers). Eight persons reported doing unpaid housework or care work and five volunteered or were activists.

Further, we asked for the monthly net income. One person had a net income of less than 150€ per month, six people earned less than 1000€ per month. 13 participants had a net income between 1000€ and 2000€, 16 people between 2000€ and 3000€, and five people each were in the 3000€ to 4000€ and 4000€ to 5000€ income ranges. 14 participants earned over 5000€ per month, two people did not specify. In addition, 11 people also reported owning assets that were not included in the reported income. For reference, the average monthly net income of a childless single person in 2023 was estimated at 2,285€ by the Statista Research Department (2023). Of the participants, 24 shared most of their finances with others, while 38 did not.

Regarding the question of party preference if there were federal elections tomorrow, seven persons (11%) would have voted for CDU/CSU, five (8%) SPD, three (5%) FDP, 27 (44%) Bündnis 90/Die Grünen, six (10%) Die Linke, two (3%) AfD and 12 (19%) for another party. One person had never heard of UBI before, seven participants knew about the concept but had not yet thought about it. The remaining 41 already engaged with the concept and/or exchanged ideas with others about it.

3.2 Research procedure and study design

The survey was conducted online using UniPark (<https://www.unipark.com>), to which participants were directed by Prolific (<https://www.prolific.co>). It could be accessed via any browser, requiring only the use of a laptop or PC. Processing took place on the screen; entries were made by mouse and keyboard. Participants followed on-screen written instructions with the first survey time point taking approximately 40 minutes and the second around 80 minutes. The anonymously collected data from both sessions were matched using the Prolific ID.

At the beginning of the first session, participants were informed that the experiment thematically dealt with the creation of a "mind map" on UBI. To avoid confusion, the less familiar term CAMs was deliberately not used. After a data protection explanation and the submission of a consent form, an introductory phase followed the initial explanation of the task. The use of the software C.A.M.E.L (Fenn et al., 2023) was explained step by step using the exemplary CAM presented in Figure 1, exact instructions can be viewed on OSF (see OSF: "01_02_CAM Instruction"). UBI was shortly defined as a term under which different concepts are summarized, "which provide that citizens receive a fixed amount of money from the state every month without having to provide anything in return". Participants were redirected to the software with which they should create a CAM on the personal attitudes associated with this topic at the given moment, following the conventions of Thagard (2010) described under 2.2. Everything that came to mind in terms of "thoughts, feelings and experiences with this topic" was to be noted, with the possibility of changing the valence of the already existing concept of UBI and leaving supplementary explanations of concepts via a comment function.

When opening the drawing program, the concept "Universal Basic Income" (shown in neutral valence) was already centered on a white background. By clicking anywhere, new, initially neutral concepts could be added and positioned using drag-and-drop. Clicking on a node opened a small window in the upper right corner where concept names, valences and comments could be edited, and concepts and connections deleted again. Up to three words could be entered per concept. The comments had no character limit and were not visible in the CAMs, but only via the evaluation software. In addition to the affective classification of the concepts (positive, negative, neutral or ambivalent) an evaluation of the intensity on a scale from - 3 to +3 was possible by moving a slider with the mouse (-3 = very negative, -2

= negative, -1 = slightly negative, 0 = neutral, 1 = slightly positive, 2 = positive, 3 = very positive). Connections were created by clicking on two concept nodes in a row. Selecting a connection opened a small window in the upper right corner that allowed editing the type of relationship as inhibiting or supporting by moving a scale slider between "Inhibition" (left) and "Support" (right). Inhibitory connections ranged from -3 to -1, supportive connections from 1 to 3. Newly created connections were initially supportive at the scale position 1. Participants had in principle the option to change the connection to directional arrows, but in the software version used, all connections in the analyzed CAM images were shown without arrows, indicating mutual influence.

There was no time limit to create the CAM, but only after creating at least eight concepts and connecting each to at least one other concept, participants could save their CAM by selecting the appropriate icon in the program bar. Participants then closed the program to return to UniPark (<https://www.unipark.com>) and to assess how well the created CAM reflected their attitude towards UBI. Further, participants were asked to report on previous experience with creating similar "mind maps" and any technical problems. Reference was made to the second measurement point where participants first drew another CAM on UBI, then completed the Portrait Values Questionnaire (Schwartz et al., 2001). They answered demographic, various socio-political and UBI-related questions and reported technical difficulties. Only the demographic questions are relevant to this paper.

The subfolder "01_03_01_01_Included CAMs" on OSF contains all CAM images; those included in the analysis are identified by a "1" in the first position. Their descriptive analysis was performed using the Shiny CAM Application (Fenn et al., 2023), that of the demographic data using the IBM SPSS Statistics program (version 28.0.1.0).

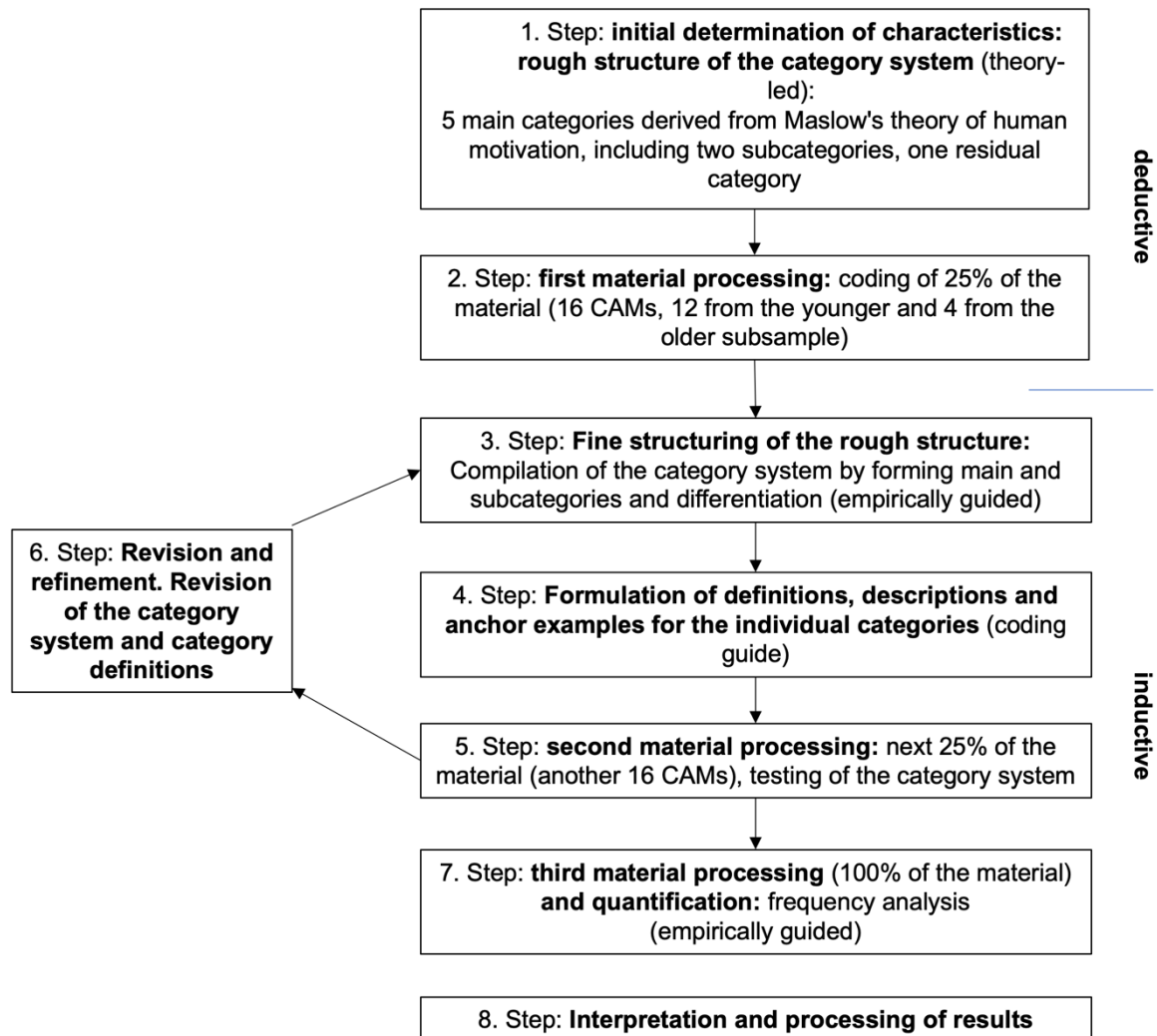
3.3 Qualitative analysis of the data

3.3.1 Procedure of the qualitative analysis

Coding was conducted according to two criteria. First, need-relevant concepts associated with UBI were identified, then these were classified as being perceived as favored or endangered by UBI. Five CAMs, from a different pilot survey on UBI, were first used to successfully test the applicability of Maslow's theory as a deductive basis to the data material and the topic (Kuckartz & Rädiker, 2022). In an iterative process in the sense of an hermeneutical circle, the sequence of the subsequent analysis illustrated in Figure 3 was carried out based on Kuckartz and Rädiker (2022).

Figure 3

Flow chart of the deductive-inductive content analysis



Note. This chart was created by the authors. The following abbreviation is used:

Cognitive-Affective Maps (CAMs).

To reduce subjective influences of the researchers, methodological measures such as the use of coding guides, multiple coding persons, and documentation of the process via memos were employed (Kuckartz & Rädiker, 2022, Chapter 9). Two individuals (raters 1 and 2), described in Section 3.3.2, independently went through all analysis phases. Applying a consensus-based coding method, discussion sessions were held after each step to resolve interpretational differences and to

achieve 100% agreement on coding (Hopf & Schmidt, 1993). A third person from the study research team was regularly included to discuss critical concepts and problems.

Deductively, an a priori category system based on Maslow's five levels of needs, with two subcategories at the Self-Esteem Level, was used. Additionally, a residual category was used for concepts that could not initially be assigned to appropriate ones (Kuckartz & Rädiker, 2022). Coding was oriented on conceptual descriptions of need levels based on Maslow (1943). Using a guideline which was based on the criteria of Kuckartz and Rädiker (2022), the category system was expanded inductively and further differentiated based on the CAMs.

Considering the high degree of individuality and, in some cases, complex content interconnectedness of the CAMs, each concept node of a CAM was considered as an individual coding element and interpreted against the background of the connected concepts and the entire CAM. Available comments were included. Due to anticipated comprehension problems with the use of dashed lines (Rothmann, 2022), the following approach was agreed upon: Connecting lines were considered to indicate related concepts, noting whether the connection type was drawn meaningfully in the context of the valence of the connected concepts. Whether need fulfillment was perceived to be threatened or benefited by UBI was primarily determined by the valence of a concept and the connected nodes. Coding as ambivalent or neutral was possible. Because a concept, including the commentary, could simultaneously affect multiple needs, multiple coding with relevant categories was possible. Concepts that were not considered relevant to needs or for which no rater agreement was possible were sorted out after consultation. This procedure was implemented for all coding phases.

After the last coding phase, it was found that some concepts were only coded as being presented positive or negative, rather than being classified as favored or endangered by UBI in terms of need fulfillment. Relevant multiple coding was also found to have been insufficiently considered. Therefore, Rater 1 revised all concepts, and critical coding was discussed in an additional meeting. Finally, individual category frequencies were quantified to identify particularly relevant need constructs across individuals in the context of UBI (Gläser-Zikuda, 2011). This, as well as the coding, was done using Excel spreadsheets.

3.3.2 Description of the coding persons

All three raters (age range of 20 to 35) grew up in Germany and are native German speakers. They have a high school diploma (Abitur) and have chosen an academic educational path.

Rater 1 (female) was in her final semester of the Bachelor of Science in Psychology and had some qualitative research experience, but no prior experience with CAMs. UBI was known in broad outlines, but no clear stance for or against UBI was given during the analysis and writing of this paper.

Rater 2 (male), graduated with a Bachelor of Arts Degree with a major in Anthropology and a minor in Psychology. At the time of analysis, he was studying Interdisciplinary Anthropology in a Master of Arts program and assisted as a FRIBIS research assistant. He had done inductive qualitative work with CAMs on UBI before, but this did not relate to needs. Rater 2 was positive about UBI in principle but had not yet fully informed himself about it.

Rater 3 was working on CAM methodology and UBI as part of her employment as a psychologist at the Albert-Ludwigs University of Freiburg. She has worked with CAMs in her dissertation as well as in other research projects. At the time of analysis,

she was training as a psychotherapist with a focus on psychoanalysis and depth psychology. She advocated UBI in the context of the impetus of socio-ecological transformations triggered by it.

4 Results

4.1 General characteristics of the CAMs

The analyzed 62 CAMs included a total of 731 concept nodes (including the concept "UBI" that was displayed when participants started to draw the CAM). Of these, 208 (29%) were rated negative, 383 (52%) positive, 82 (11%) neutral, and 58 (8%) ambivalent. The number of concept nodes per CAM varied from 8 to 24, with an average of about 12. Collectively, there were 901 linking lines in all CAMs, on average about 15 links per CAM. The minimum was seven, the maximum number 75 connections. Of the connections, 778 represented supportive, 123 inhibitory relationships. 50 (81%) participants retained the concept of UBI as neutral, in 12 CAMs the valence was changed. This included seven evaluations to positive (11%), one to negative (2%) and four to ambivalent (6%). The comment option was used by 40 (65%) people.

Excluding the node "UBI", 669 concepts were considered for the analysis. Of these, 37 (6%) were excluded from 20 CAMs. Table A.1 in the Appendix lists the reason for each exclusion. The remaining 632 concepts were coded and quantified.

4.2 Results of the qualitative analysis

Using the five a priori defined categories based on Maslow, a hierarchical category system (Kuckartz & Rädiker, 2022) was developed with ten main and 41 subcategories, one subcategory contains three further subcategories. The complete

category system, including descriptions and typical examples can be viewed in the Appendix in Table A.2.

In the following, we indicate *categories* by italics, with **main** and *subcategories* distinguished by boldface. First, categories whose formation was oriented at Maslow's theory are reported, followed by the purely inductively derived categories. Categories that represent a need and categories that represent a need-relevant aspect are distinguished.

The analysis resulted in 754 codes, including duplicate and multiple codes. This total value was used to calculate percentage shares in relation to the codings. Due to multiple coding of different categories, these do not always sum up to 100%, but provide a reasonable approximation of proportions. An overview of all codings per CAM, including excluded concepts marked with a zero, is available on OSF (see OSF: "03_02_Codebook").

The central results regarding the developed category system are reported first, followed by the research dimension of whether UBI is expected to favor or endanger need fulfillment. Last, relevant multiple coding is described. Citations are indicated by the CAM ID.

4.2.1 Categories in Derivation of Maslow's Hierarchy of Needs

Codes of all five needs of Maslow's hierarchy were found. Additionally, ***Justice*** and ***Psychological well-being and Quality of Life*** were inductively added as main categories, which were characterized by Maslow (1943) as prerequisites or consequences of need fulfillment and can thus be classified as aspects relevant to needs within the theory's framework. The conceptual portion falling under these seven main categories accounted for nearly 84% of all codings with each CAM containing at least two of them.

Safety Needs represented the most frequently coded main category (37.3%) and was present in all analyzed CAMs. **Self-Actualization** followed (13.0%), with **Justice** next (11.5%), each mentioned by more than two-thirds of the participants. **Needs for Recognition and Appreciation as well as Independence** and the need-relevant aspects of **Psychological Well-Being and Quality of Life** each took a coding share of 7.4%, each appearing in about half of the CAMs. **Physiological Needs** (2.0%) and **Social Needs** (2.1%) were least frequent.

Physiological Needs (15 codings in 8 CAMs) included not only aspects linked to the *Ensurance of Survival* (6 codings in 4 CAMs), but factors of general *Physical Health* (8 codings in 5 CAMs) and *Physical Well-Being* (1 coding in 1 CAM), which were partly subsumed under **Safety Needs** in the original theory (Maslow, 1943).

In the category **Safety Needs**, concepts referring to a "safeguarding of minimum standard of living" (1_y_74) or existence (e.g., 1_y_45 and 1_y_51) were coded. This was based on the definitions of the minimum subsistence level in human dignity by the Federal Constitutional Court (Bundesverfassungsgericht, 2019) and the sociocultural minimum subsistence level by the Scientific Advisory Council to the Federal Ministry of Finance (2021), according to which both physical, material resources and sociocultural aspects of participation in social, cultural and political life are included. Overall, **Safety Needs** included the broadest subcategory range regarding content and numbers (281 codings in 62 CAMs). Security-related aspects in the context of UBI related to *Ecological Effects* (3 codings in 3 CAMs), the *Social System* (16 codings in 13 CAMs), *Financial Security* (54 codings in 35 CAMs), and *(Freedom of) Financial Anxiety and Worry* (20 codings in 18 CAMs). Also included were *Social Impacts* (19 codings in 12 CAMs), concepts related to the *World of Work* (5 codings in 3 CAMs), and *Economic Impacts at the Individual* (38 codings in 27 CAMs) and *Federal Level* (55 codings in 36 CAMs), as well as the *Funding Issue*

associated with UBI (17 codings in 16 CAMs). For the subcategory *World of Work*, three additional subcategories were formed to properly differentiate between certain security-related aspects. These dealt with the effects of UBI on the *Labor Market* (22 codings in 16 CAMs), *Working Conditions* (11 codings in 8 CAMs) and ensuring *Job Fulfillment* (15 codings in 12 CAMs). Six concepts from six different CAMs were not specified but simply stated "security" (e.g., 1_y_62 or 1_y_72). Here we coded the main category as a whole. One person left the comment "on a wide variety of levels" (1_y_56) here, indicating a life domain overarching safety influence of UBI.

For ***Social Needs*** (16 codings in 11 CAMs), more than two-thirds of the codings referred to *Family Relationships* (11 codings in 11 CAMs). Other subcategories were *Care Work* (2 codings in 2 CAMs) and *Friendship Relationships* (3 codings in 3 CAMs). We were somewhat astonished that no partnership relations were mentioned.

Because Maslow's intended separation of ***Self-Esteem-Related Needs*** in relation to others and oneself repeatedly triggered differences, Raters 1 and 2 agreed on an alternative subdivision based on the data. A distinction was made between *Recognition* (10 codings in 9 CAMs), *Appreciation* (22 codings in 17 CAMs) and the subcategory *Independence and Autonomy* (24 codings in 21 CAMs), whereby we aimed for selectivity in coding'. The main category was renamed accordingly.

For ***Self-Actualization*** (98 codings in 47 CAMs), the subcategories occupied numerically comparable proportions. Concepts such as "gaining time" (1_o_82) were coded under the repeatedly appearing concept of *Leisure* (e.g., 1_o_86 and 1_y_40) (21 codings in 16 CAMs). This was assigned to ***Self-Actualization*** because content such as "time for travel" (concept "travel" in 1_y_46) and "time for hobbies" (1_y_47) indicated that non-work time was associated with enjoyable activities or personal interests. Thus, there is a thematic proximity to personal realization. Additionally,

Freedom (26 codings in 21 CAMs) was frequently mentioned in direct connection with concepts of **Self-Actualization** (e.g., 1_y_65 and 1_y_38) and therefore grouped as an independent subcategory. Further, we coded concepts related to “personal development” (e.g., 1_y_54) or “realization of creative ideas” (1_y_66) under the subcategory *Personal Fulfillment* (28 codings in 23 CAMs). Another subcategory, *Professional Self-Realization* (23 codings in 18 CAMs), related to the expression and realization of personal interests, skills or preferences in employment and the choice of employment.

Within **Mental Well-being and Quality of Life** (56 codings in 30 CAMs), the subcategory *Life Satisfaction and Quality* (18 codings in 16 CAMs) comprised more than one-third of this main category and appeared in 25% of all CAMs. Other subcategories were *Mental Stress Factors* (14 codings in 12 CAMs), *Mental Health* (15 codings in 11 CAMs) and *Compensation and Recovery* (9 codings in 7 CAMs).

Within the main category of **Justice** (87 codings in 44 CAMs), *Equality* (25 codings in 18 CAMs) and *Fairness and Justice* (28 codings in 24 CAMs) were predominant in the CAMs. Codings for *Implementation of a UBI* (17 codings in 8 CAMs) came proportionately from few CAMs, the 4 codings for *Work-related Justice* from only two. *Exploitation and Abuse* was coded in 15% of all CAMs (13 codings in 13 CAMs).

4.2.2 Categories that are not part of Maslow's hierarchy of needs

Supra-Individual Needs and **Work Drive and Motivation** were inductively formed as new main categories, and both represented a total share of more than 5% of all codings. The former represented aspects with need-relevance but a broader social dimension beyond individual concerns. The subcategory *Social Cohesion* was the most strongly represented in the CAMs (22 codings in 16 CAMs), 9 codings in 8

CAMs related to *Social Benefit*. The subcategory *Education (for all)* (10 codings in 8 CAMs) was also included under ***Supra-Individual Needs***, as named concepts were repeatedly related to a society-wide level. Examples are the concept "Educational opportunities for all" (1_y_39) or the comment "Society benefits from more education" (concept "Societal profit" in 1_o_77).

More than half of the CAMs mentioned concepts related to influences of UBI on *Incentives* (15 codings in 14 CAMs), *Willingness* (10 codings in 10 CAMs) or *Motivation to Work* (20 codings in 20 CAMs). Because of the cross-CAM occurrence, which underscores the high specificity and relevance to attitudes toward UBI, they were grouped under the main category of ***Work Drive and Work Motivation*** (45 codings in 32 CAMs).

Other need-relevant concepts for which no suitable integration under the main categories was possible were coded as independent subcategories under the residual category ***Other*** (37 codings in 26 CAMs), accounting for 4.91% of all codings. More than half related to *Bureaucracy and Administration* (21 codings in 19 CAMs), followed by *Continuing Problem Areas* (9 codings in 6 CAMs). Concepts coded under *Consumption* (4 codings in 3 CAMs) originated from few CAMs in relation to the sample, the 3 codings under *Demographic Change* from only one.

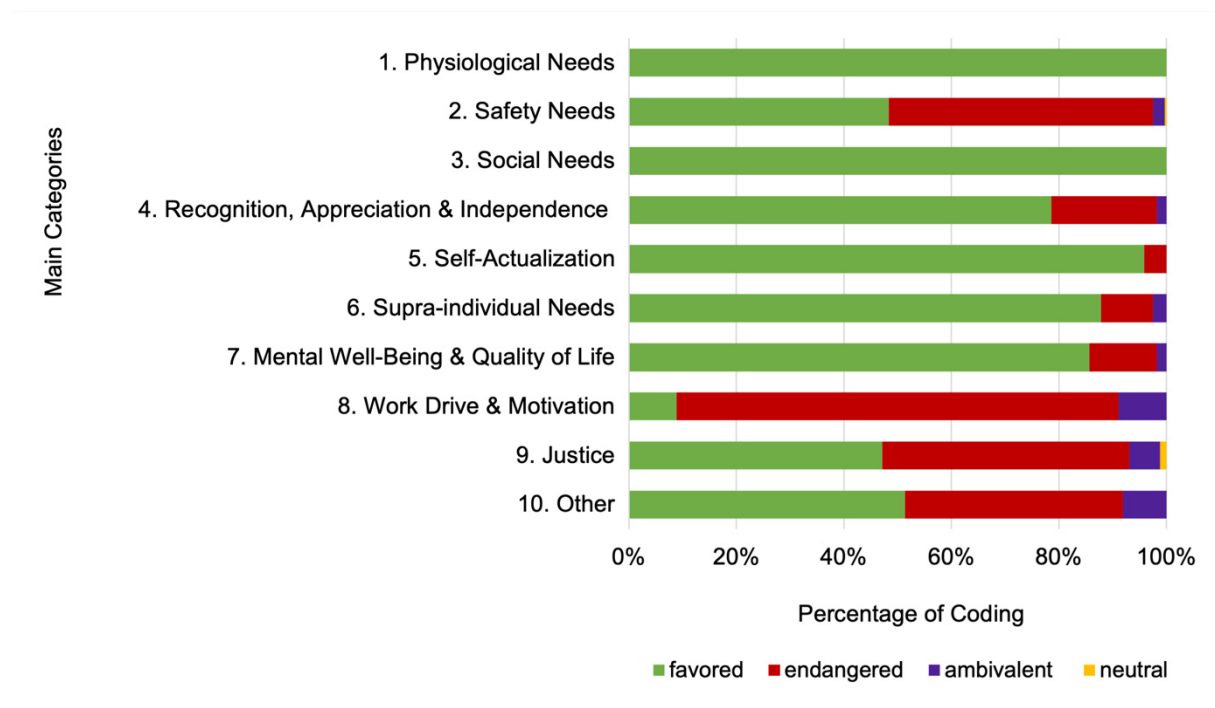
4.3 Classification of need satisfaction as favored or endangered by UBI

Overall, 384 (61%) of the coded concepts were classified as favored by UBI in terms of satisfying their overarching needs or needs-related aspects, and 228 (36%) were classified as endangered. 17 were classified as ambivalent and three as neutral, as a clear assignment by the raters was not possible. A detailed numerical overview of how many concepts were classified per category is provided in Table A.3 in the Appendix. Figure 4 shows the percentage distribution of the ten main

categories in relation to the coding dimension of the expected effect on need satisfaction. In the following, the most frequent and striking concepts regarding their classification as favored or endangered by UBI are explained.

Figure 4

Classification of needs and aspects relevant to needs as being favored or endangered in their satisfaction by an Universal Basic Income



Note. The percentage of codes per main category that were classified as favored or endangered or as ambivalent or neutral by an unconditional basic income is shown.

The **Physiological** and **Social Needs** were exclusively classified as favored. The **Needs for Recognition, Appreciation and Independence**, along with the main categories of **Self-Actualization**, **Psychological Well-Being and Quality of Life**, and **Supra-Individual needs** were also predominantly rated as favorable. **Work Drive and Motivation** were predominantly rated as at risk. Under **Other**,

Bureaucracy and Administration in the sense of a reduction in effort (e.g., 1_y_36 and 1_y_37) was predominantly classified as favored by UBI, while the codings to *Continued Problem Areas* were exclusively classified as endangered. For **Safety Needs** and **Justice**, the classifications differed by subcategory, as explained below.

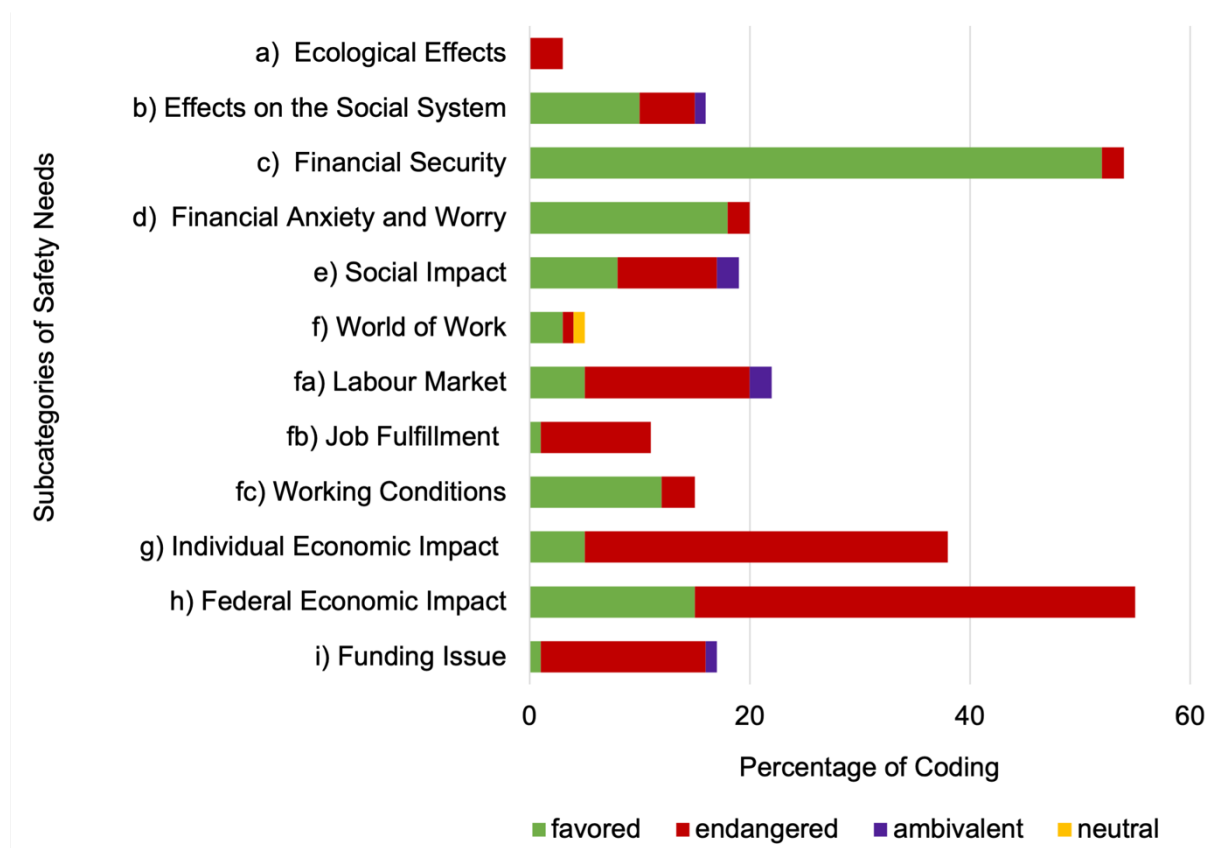
Within the main category of **Justice**, *Equality* was almost exclusively coded as favored, *Exploitation and Abuse* only contained concepts classified as endangered. *Fairness and Justice* were classified by the majority as endangered by UBI. Persons expected injustice if "rich people would also get this money" (concept "injustice" in 1_y_62) if the receipt of UBI would be guaranteed "without consideration" (1_o_88) or if the same amount would be paid to everyone "although the same is not provided" (concept "perceived injustice" in 1_y_57).

The classification proportions per subcategory of **Safety Needs** is shown in Figure 5. Only *Ecological Effects of a UBI* were classified as endangering these. In terms of *Social Impacts*, UBI was presented by several individuals as beneficial regarding *Housing* (1_o_76, 1_y_56 and 1_y_67) and predominantly as endangering regarding possible *Migration Effects* (e.g., 1_o_79 or 1_o_81). *Effects of UBI on the Social System* were predominantly rated as positive. Among other things, the fact that "other benefits, such as the support of people with handicaps" (concept "reduction of social benefits" in 1_y_28) could be reduced, was rated as endangering. The subcategories under *World of Work* were prioritized as being at risk from UBI in terms of labor shortages in the labor market (e.g., 1_y_32 and 1_y_56) and a non-doing "unattractive jobs" (1_o_83), but as predominantly favorable in terms of better working conditions. Codings of the finance-related subcategories of *Financial Security* and *(freedom of) Financial Anxiety and Worry* were almost exclusively rated as favored. In contrast, the also finance-related subcategories of *Financing Issue* and *Economic Impact at the Individual and Federal Levels* were predominantly coded as

threatening. At the *Individual Level*, nearly half of the codings raised concerns about possible price increases and/or inflation effects (e.g., 1_y_40 and 1_y_37) and negatively anticipated possible tax increases (e.g., 1_y_55 or 1_o_79). The majority of *Federal-level* codings identified as threatening related to funding-related costs to the state (e.g., 1_y_74 and 1_y_48), sometimes coupled with concerns about a lack of other state services (e.g., 1_y_57 and 1_y_49).

Figure 5

Impact of an unconditional basic income (UBI) on the satisfaction of security needs by subcategory



Note. The graph shows the number of codes per subcategory that were categorized as favored or endangered by an unconditional basic income or as ambivalent or neutral with regard to the satisfaction of security needs. Six concepts (not shown

here) were not assigned to a subcategory, but to the security needs as a whole and all of these were classified as favored.

4.4 Multiple codings

There were 87 concepts with double coding and 15 concepts with more than two codings; we refer to all as multiple codings. In total, 20% of all analyzed concepts were affected. The multiple codings originated from 37 CAMs, with ten containing only one, and the remaining 27 CAMs each containing at least two multiple codings. The maximum was eight multiple codings. Regarding the corresponding need, 69 multiple codings were classified as favored by UBI, 30 as at risk, and three as ambivalent. Some multiple codings occurred within the same main category. An overview of all multiple codings is available on OSF (see OSF: "03_03_Multiple Codings").

The main category **Safety Needs** (60 concepts) was most frequently multiple-coded, followed by **Self-Actualization** (28) and the **Needs for Recognition, Appreciation and Independence** (28). This was followed by **Psychological Well-Being and Quality of Life** (19), **Justice** (14), **Work Drive and Motivation** (12), and the subcategories under **Other** (11).

Physiological Needs showed multiple coding in only three concepts. The most overlaps were between **Safety Needs** and **Needs for Recognition, Appreciation and Independence** (10). The most frequent combination hereby involved an overlap between *Financial Security* and *Independence and Autonomy* (e.g., 1_y_46 and 1_o_83). The latter subcategory was also repeatedly multi-coded with concepts of **Self-Actualization, Psychological Well-Being and Quality of Life** was especially frequently multicoded with **Safety Needs** (9) and **Self-Actualization** (7) and overlapped with **Social Needs** in three cases.

5 Discussion

Based on 62 CAMs on the topic “attitudes towards UBI”, a content-structuring qualitative content analysis was conducted using a deductive-inductive approach to identify needs related to UBI and to classify whether these were presented as favored or endangered in their fulfillment by UBI. A hierarchical category system derived from Maslow's hierarchy of needs (1943, 1954) was developed, including needs as well as aspects relevant to needs. Concepts related to **Safety Needs**, **Self-Actualization**, and **Justice** appeared most frequently; **Physiological** and **Social Needs** were mentioned least often. Overall, the majority of the coded concepts were presented as benefiting from UBI; though the classification differed within *Safety-* and *Justice-related Needs*, depending on the respective subcategories. In the following, we discuss the results in relation to previous research findings. Quality criteria, study limitations and strengths are addressed and implications for future research derived.

5.1 Results of the analysis in the context of previous research findings

As with Wiencke (2017), needs from all five levels of Maslow's hierarchy (1943) were found in the collected CAMs and the vast majority of the codings could be assigned to them. In addition, the research team agreed that need-relevant expressions referring beyond the individual to society as a whole, were not adequately covered, leading to the creation of a new independent category: *Supra-individual needs*. While desires for more *Social Engagement*, *Innovation* and *Education* in the community may stem from underlying individual needs, needs-related effects at the collective level are quite relevant with regard to the study of UBI. Thus Maslow's (1943) individual-focused hierarchy was not sufficient to cover all aspects of UBI. The same applies to the inductively added main category of **Work drive and motivation**. Due to adding these two new categories that go beyond the

theory of Maslow (1943) we were able to code most of the concepts. Only a small proportion of concepts could not be integrated in a thematically suitable way and remained in the residual category.

Consistent with Wiencke's results (2017), especially **Safety Needs** and **Self-Actualization** represented important needs in the UBI context, whereas **Physiological** and **Social needs** were less prominent. A need-relevant aspect according to Maslow (1943) and not covered by Wiencke (2017), is **Justice**. Already classified as crucial for attitudes towards UBI in other studies (Adriaans et al., 2019; Roosma & van Oorschot, 2020; Vlandas, 2019), the proportionally high representation in the CAMs also highlighted the concepts high relevance across persons.

Need-relevant aspects that have previously been discussed to benefit from a UBI were also presented as benefitting in the CAMs, such as effects on *Education* (Baird et al., 2013; Bastagli et al., 2019), *Physiological Health* (Marinescu, 2018; Ranganathan & Lagarde, 2012), and *Psychological Well-Being* (Simanainen & Tuulio-Henriksson, 2021). Despite experimental evidence showing minimal impact on employment outcomes (Banerjee et al., 2017; Gilbert et al., 2018; Marinescu, 2018), the CAMs revealed strong expectations of negative effects on *Work Motivation* and, particularly, concerns about not completing disliked job activities. Since it was not possible to determine whether the concerns referred primarily to others or primarily to oneself, this should be explored.

The CAMs revealed mixed views on the *Reputation and Esteem* of non-employed individuals. While on the one hand, *Self-esteem-related Needs* are expected to benefit in terms of a decrease in negative self-conscious feelings and stigmatization of welfare recipients in the existing system, some of the coded concepts suggest that this stigmatization might not be dissolved by UBI, but merely

shifted. For example, receiving UBI without contributing through employment was seen as *Exploitation and Abuse*, and labeled with the negatively connoted term of scrounging (germ.: “Schmarotzen”) by some. Connections are therefore given to the need-relevant aspect *Justice*, and the *Safety Needs*, as there is a worry that UBI would lead to reduced work engagement and the incompleteness of certain job activities. Given that Adriaans et al. (2019) found that attitudes toward UBI relate to attitudes toward the needs-based or merit-based principle, this pattern of results could potentially have been influenced by underlying views of the principle of unconditionality that a UBI would hold under the instructional definition.

The multiple codings represent initial indications of how the satisfaction of different needs might be related in the context of UBI. They indicate, for example, that individuals perceive *Financial Security and Independence* from employment as prerequisites for (occupational) *Self-Actualization*. For *Psychological Well-Being and Quality of Life*, several participants mentioned the fulfillment of *Social* and *Safety needs* as well as *Self-Actualization* as crucial influencing factors.

The subcategories of the residual category highlight the highly specific and individual nature of some of the mapped cognitive representations of UBI. This illustrates the potential of CAMs to reveal individual and highly complex correlations (Homer-Dixon et al., 2013), when investigating UBI-related needs, and also for studying attitudes towards UBI in general.

5.2 Quality Criteria of Qualitative Content Analysis

In qualitative research, there are no uniform quality criteria so far. In the following, Kuckartz and Rädiker (2022, chapter 9) were used as a guide.

5.2.1 Internal study quality

The internal study quality describes the extent to which the results of a qualitative analysis can be regarded as credible and reliable, the procedure was rule-based and the results are intersubjectively comprehensible (Kuckartz & Rädiker, 2022).

Since only one CAM explicitly mentioned "basic need[s] ..." (concept "financial security" in 1_y_47), all other codings classified as need-related were derived from the material and are therefore potentially influenced by the researchers' backgrounds and personal attitudes towards UBI (Gläser-Zikuda, 2011). To minimize biases, coding guides were used in all phases, and two raters processed the material independently. Cohen's Kappa chance-adjusted intercoder agreement was substantial with $\kappa = .768$ when the category system was applied to the entire data material. For the categorization of needs as endangered or benefited by UBI, there was a near-perfect agreement of $\kappa = .800$, though this included many missing values due to initial uncertainties with the material.

Regular discussions of divergent categorical assignments and consultations with a third person with expertise on the data material were conducted to enhance analysis validity (Kuckartz & Rädiker, 2022). However, there is a possibility that the raters coordinated their coding behavior over the course of several weeks of collaboration (Hopf & Schmidt, 1993).

5.2.2 External study quality

The external study quality describes the extent to which results of a qualitative analysis are transferable and generalizable to other samples and the population (Kuckartz & Rädiker, 2022).

The high dropout rate in relation to the recruited sample is initially not unusual for online studies (Sauter et al., 2020). However, potential selective dropout may have confounded the study results (Zhou & Fishbach, 2016).

The study results are specific to German citizens and cannot be transferred to other countries with different living standards and thus potentially different needs, as contextual factors influence attitudes towards UBI (Roosma & van Oorschot, 2020). Moreover, online-study samples are limited to individuals with digital access (Thielsch & Weltzin, 2009). Since all participants had at least a intermediate school leaving certificate, a transfer to people with no or lower educational qualifications is limited. There was a sample imbalance towards younger generations and individuals identified as male. Comparing with the German Sunday poll statistics at the national level at the time of the survey (<https://dawum.de/Bundestag>), a more left-wing political orientation can be noted in the party preference of the sample. This is critical in light of Adriaans et al.'s (2019) results, which found that support for UBI was particularly common among younger and politically left-leaning Germans. Accordingly, the voluntary nature of the study participation may have led to a self-selection bias skewing the results (Bethlehem, 2010). This is likely since the majority of participants indicated that they were already at least mentally engaged with UBI. Thus, personal interest may have caused study participation and existing prior knowledge may have led to an above-average differentiated spectrum of expected needs (favorably) influenced by UBI. Despite these limitations, since certain need-groups appeared in more than half or, in the case of the safety needs, in all CAMs, these are likely also significant across other populations.

5.3 Methodological problems and limitations of the survey

The online survey format prevented control over external conditions and possible interfering factors, leaving the circumstances of the data collection unclear. Further, we could not ask and check whether participants understood the instruction on how to draw CAMs. Noticeable inconsistencies in the usage of connecting lines, especially in the case of dashed lines, likely resulted from comprehension problems with the CAM rules (Rothmann, 2022). In further studies the usage of directional arrows in CAMs could be useful in order to assign neutral and ambivalent concepts to a certain type of influence on need satisfaction by UBI reliably.

Please note that the investigated participant sample is not representative for the German population. To investigate the needs of underrepresented groups regarding UBI and to avoid (self-)selection bias, a random survey of CAM studies should be conducted using either a sufficiently large, representative sample (Bethlehem, 2010) or should consider specific groups separately. Additionally, dropout causes should be analyzed, and necessary adjustments made in further online surveys of CAMs (Zhou & Fishbach, 2016).

5.4 Strengths of the study

First, subjective influences on the qualitative analysis that arise in traditional interview surveys through contact with the research subjects were avoided through the use of CAMs, as participants created them independently and autonomously (Mansell et al., 2021).

By choosing a theoretical classification as deductive basis (that covers both physiological and psychological needs) we aimed to cover the widest possible range

of needs in the context of UBI in the analysis. Inductively, this was done by differentiating individual-level subcategories in order to prevent neglect of highly specific expressions relevant to needs and to avoid perpetuating weaknesses of Maslow's theory (Cullen & Gotell, 2002; Winston, 2016). The hermeneutic approach and strong focus on the material when differentiating the category system contributed to a targeted focus on the research object and a high representativeness with regard to the CAM content (Gläser-Zikuda, 2011).

Including the participants' comments in the qualitative analysis resolved many ambiguities regarding the categorical assignment of concepts. Although this led to an increased number of multiple codings, it enabled a more elaborate understanding of the individual cognitive representations of UBI and showed first indications of correlations between the fulfillment of different needs. This illustrates the relevance of the comment function for future research with CAMs, as its inclusion not only allows for a more appropriate interpretation of the drawn content, but also enables insights beyond the mere consideration of concept nodes and connections. Comments can also indicate the degree of representativeness a CAM has for a person's attitude towards UBI. For example, one CAM contained an argument against UBI, but the comment clarified that the participant did not actually hold this view (see Appendix, Figure A.1).

5.5 Implications for future research

In the current study, we identified a wealth of subcategories of needs and needs-relevant aspects related to UBI. To validate (and possibly quantify the results), the simultaneous use of a quantitative measurement instrument to classify the current satisfaction of Maslow's need levels (e.g., Taormina & Gao, 2013) would be

useful, as would the recording of other personal attitudes, such as those regarding the achievement or need principle.

In our study, the survey instruction provided only a general definition of UBI, without specifying its implementation. However, since mentioning payout amounts or funding measures caused attitudinal changes regarding a UBI in questionnaire surveys (Chrisp et al., 2020), this might lead to changes in the CAMs. A further exploration of the CAMs' potential to supplement information gained in questionnaire surveys (Dörr, 2021) could enhance the understanding of attitudes toward different UBI implementation designs. The methodological deficits of previous studies on UBI (Banerjee et al., 2019; Wissenschaftlicher Beirat beim Bundesministerium der Finanzen, 2021) could thus be specifically addressed, at least in the context of opinion research, which could help to develop a UBI concept that meets the needs of diverse population groups.

To evaluate the appropriateness of the category system and explore what kind of need-influence neutral and ambivalent concepts are to be classified as, empirical validation including CAM-designers in the sense of a communicative validation is recommended (Gläser-Zikuda, 2011). Furthermore useful, would be a comprehension check of the sign rules, as done in Rothmann (2022).

The suitability of Maslow's hierarchy of needs for the investigation of UBI should generally be further evaluated and the suitability of other needs conceptions (e.g., Deci & Ryan, 2000) for the qualitative treatment of CAMs should be explored. Further investigation is needed to determine if the main categories added in this study as needs-relevant aspects can be traced back to underlying needs, or whether they even have an independent need character in the context of UBI. Concepts that are thematically related and currently classified across different categories (e.g., work- or finance-related aspects) could possibly be better

represented by organizing the categories as a network structure (Kuckartz & Rädiker, 2022).

In order to investigate the relationships between individual needs and to explore hierarchical conditional relationships as postulated by Maslow (1943), further investigations should focus not only on multiple coding but also on associated concepts of a node and the directional arrows of connection. The relationship between assigned affective valences and anticipated UBI influences on need satisfaction should be explored to determine, for example, if high threat levels can be inferred from very negative evaluations. Hereby combining a qualitative approach with the evaluation of quantitative parameters, as recommended by Reuter (2022) and Mansell et al. (2021), could be beneficial.

Although Maslow's theory, with the added categories **Justice** and **Psychological Well-Being and Quality of Life**, proved to be relatively saturating, cross-category adjustments and extensions to Maslow's original divisions were necessary to achieve selectivity in coding. Based on the experience gained in this work, an application of the classification is only recommended in the sense of an initial categorical orientation. For adequate mapping of the investigated object, inductive category formation is clearly indicated.

6 Conclusion

A qualitative analysis of CAMs on UBI identified needs and need-relevant aspects, classifying whether their fulfillment was being perceived as favored or endangered by UBI. Based on Maslow's hierarchy of needs, a comprehensive category system was developed, with the needs for **Safety** and **Self-Actualization** being the most relevant, as well as the needs-relevant concept of **Justice**. Deficits of Maslow's framework as a deductive basis for the context of UBI were revealed and general

insights into the qualitative handling of CAMs could be gained. Further exploration of CAMs as a research method for investigating needs is recommended in this context, as the method represents a promising tool to investigate the relationships between needs and their perceived or anticipated satisfaction.

Appendix

1. **Appendix A:**

1. Table A.1, Overview of the concepts sorted out during coding
2. Table A.2, Subdivision of the main and subcategories as well as descriptions and anchor examples of these
3. Table A.3, Frequency of categories and expected influence of an Universal Basic Income

2. **Appendix B:**

1. Figure B.1, Example of a Cognitive-Affective Map (CAM) with a commentary discrepant to the content

Table A.1*Overview of the concepts sorted out during coding*

CAM-ID¹	Concept	Comment	Valence	Reason for sorting out
1_o_77	Political will	It currently seems impossible for politicians to decide on a UBI ²	-3	Describes attitudes in politics towards UBI and an expectation regarding its possible introduction, not needs.
1_o_77	Prejudices	There are many inaccurate prejudices against the UBI	-3	Describes general attitudes towards UBI in the population, not needs.
1_o_80	Low income earners		10	It remained unclear what the concept was intended to say and no agreement could be reached on the categorization
1_o_80	Imbalance		0	It remained unclear what the concept was intended to say and no agreement was possible on the categorization
1_o_87	Level of basic income	determines the sense of security and adaptation of the world of work	0	It is not directly a need, but a prerequisite for other needs.
1_y_21	Financing through machine tax?		10	It is not clear whether this measure would be supported as fair or not, thus no reference to needs can be established without conjecture.
1_y_27	Currency collapse?		2	It is unclear why this concept was rated as positive.

CAM-ID¹	Concept	Comment	Valence	Reason for sorting out
1_y_27	Inflation		1	It is unclear why this concept was rated as positive.
1_y_30	Citizens' income better?		0	According to the coders' understanding, different concepts of social benefits were compared in the CAM. The concept selected does not refer to UBI.
1_y_30	Redistribution		0	See top row.
1_y_30	Harz IV?		0	See top row.
1_y_30	fairer wages?		0	See top row.
1_y_30	Actual left-wing politics		0	See top row.
1_y_30	Citizens' income?		0	See top row.
1_y_30	rising prosperity at the same time?		3	See top row.
1_y_30	at whose expense?		10	See top row.
1_y_30	low wage earners?		10	See top row.
1_y_30	Environment/Ressources?		10	See top row.

CAM-ID¹	Concept	Comment	Valence	Reason for sorting out
1_y_30	climate?		10	See top row.
1_y_31	Wage labor		0	The neutral valence makes it unclear what is meant.
1_y_31	Government		0	The neutral valence makes unclear what is meant, and the concept node represents an institution, not a need.
1_y_31	Bureaucracy		-2	It was unclear whether bureaucracy is expected to in- or decrease, connections were unclear with regard to the depicted relationship and associated concepts.
1_y_40	Realistic?	Sounds too good to be true	10	No need, but non-conviction about the functionality of the UBI.
1_y_45	Policy	ultimately decides	10	No need, but description of the prerequisites (political willingness) for the introduction of a UBI.
1_y_45	Job centers/employment offices		-2	No need is shown, but naming of an institution
1_y_48	Good image		1	The meaning of the concept is not clear, coding would be guesswork.
1_y_50	Still few insights		-1	No need, but a statement about the current state of research on UBI is represented.

CAM-ID¹	Concept	Comment	Valence	Reason for sorting out
1_y_50	Personal interests	Influence the opinion	1	Does not represent a need but describes opinions on UBI.
1_y_50	works other countries		2	Does not represent a need, but an argument for the functionality of the UBI.
1_y_55	Lack of promotion		-2	Not clear in the context what is meant by promotion. As interpretation would be based on guesswork, the concept was eliminated.
1_y_57	Complexity of the concept		10	Discarded as no need can be derived.
1_y_59	Unemployment benefit already financed	Unemployment benefit is already financed, so there is apparently at least a certain amount of money that would be available	3	Does not represent a need, but an argument as to why UBI could potentially be financed.
1_y_64	Political willingness	Apart from the left, hardly any party willing to try it out	-2	It is not a need, but an assessment of political willingness to introduce a UBI.
1_Y_67	Passion / media		3	Rejected because in the context it is not clear what the person means by this.
1_y_68	Human/person in need		0	No need is depicted, but the human being/person in need.
1_y_72	Night watchman state		-3	No agreement on the meaning of the concept could be reached, classification would be based on conjecture.

CAM-ID¹	Concept	Comment	Valence	Reason for sorting out
1_y_73	Necessity per person		10	Does not represent a need.

Note. The table contains the concepts that were excluded from the analysis during coding. The criteria for exclusion were that a concept was not relevant for needs and that no agreement on a clear meaning regarding needs and Universal Basic Income (UBI)² was possible even after discussion between all three raters. The Identification Digit of the respective Cognitive Affective Map (CAM-ID)¹ is listed, as well as the content of the excluded concept node and the comment, if available. The valence of the concept node in the CAM and the reason for sorting it out are listed below.

Table A.2

Subdivision of the main and subcategories as well as descriptions and anchor examples of these

Main categories and subcategories	Category description	Anchor examples	Quantity (CAM¹-amount)
1. Physiological Needs			15 (8)
a) Ensurement of Survival	Concepts for immediate survival or to ensure basic physiological needs.	„ensures survival“ (1_y_73), „Security of supply“ (1_o_76)	6 (4)
b) Physical Health	Concepts of physical health and its maintenance, e.g., disease prevention or access to medical care.	„physical strain decreases“ (1_y_36), „fewer illnesses“ (1_y_58)	8 (5)
c) Physical Well-Being	Concepts that go beyond mere survival and physical health, such as physical enjoyment and well-being.	„buying better food“ (1_y_58)	1 (1)
2. Safety Needs			281 (62)
a) Ecological Effects	Concepts on concerns and expectations regarding the ecological impact of the introduction of an UBI ² .	„CO2 Emissions“ (1_o_76), „overexploitation“ (1_y_67)	6 (6)
b) Effects on the Social System	Concepts on possible structural effects of UBI on the social security system in Germany, such as the cancellation of Hartz IV or the reduction of social benefits. Administrative and organisational aspects belong to 10a.	„Abolition of Hartz4“ (1_y_65), „Fewer social welfare benefits“ (1_o_80), „Strengthening the welfare state“ (1_y_35)	3 (3)

Main categories and subcategories	Category description	Anchor examples	Quantity (CAM ¹ -amount)
2. Safety Needs			281 (62)
c) Financial Security	Concepts for financial security and against monetary bottlenecks, crises and poverty, including concepts such as basic security.	„Financial security“ (1_o_22), „Protection in the event of unemployment“ (1_o_83), „Combating poverty“ (1_y_57)	16 (3)
d) (Freedom of) Financial Anxiety and Worry	Concepts of anxiety and worry related to financial insecurity and existential fears.	„Fear of unemployment“ (1_o_85), „No more existential fears“ (1_y_51)	18 (2)
e) Social Impact	Concepts on the impact of an UBI on social factors in society, such as reduced crime, housing or migration. Social cohesion is coded under 6a.	„more immigration“ (1_o_81), „housing security“ (1_o_76), „Criminality?“ (1_y_44)	19 (12)
f) World of Work	Concepts on security needs in the labour context. Concepts relating to changes in the world of work can be coded under 2f).	„Change in the world of work“ & „Digitalisation“ (1_y_64)	5 (3)
f_a) Labour Market	Concepts on the labour market, its situation or changes caused by UBI, e.g., increased unemployment rates or a shortage of skilled workers.	„Reduction of unemployed people“ (1_y_59), „Shortage of skilled labour and job cuts“ (1_y_65)	22 (16)
f_b) Job Fulfillment	Concepts relating to the non-fulfilment of (certain) work caused by UBI, as its continuation is uncertain due to unpopularity or poor working conditions in view of the financial basis of UBI.	„Work remains undone“ (1_y_36), „unpopular jobs“ (comment: „may no longer be taken on“, 1_y_51)	11 (8)

Main categories and subcategories	Category description	Anchor examples	Quantity (CAM ¹ -amount)
2. Safety Needs			281 (62)
f_c) Working Conditions	Concepts relating to conditions in the workplace or at work, such as the impact of UBI on workload, working hours or pay.	„better pay“ (1_o_83), „Better working conditions needed“ (1_y_46)	15 (12)
g) Economic Impact at Individual Level	Concepts relating to economic effects of UBI that are directly perceptible at an individual level, such as rising prices and an increased tax burden. Also, inflation, as this means changed individual costs.	„Inflation and taxes“ (1_y_34), „General price increases“ (1_y_62), „Tax increases“ (1_y_39)	38 (27)
h) Economic Impact at Federal Level	Concepts on the economic effects of an UBI at state or federal level, i.e., beyond the individual, affecting all persons resident in Germany, such as increased government spending, greater purchasing power or increased prosperity.	„Economic growth“ (1_o_80), „High government expenditure“ (1_y_49), „Prosperity is being increased“ (1_y_42)	55 (36)
i) Funding Issue	Concepts that specifically address the uncertainty of the financial resources for a UBI. Those that describe concrete financing methods and their effects belong in 2g, 2h, 9c.	„Question about financing“ (1_y_32), „Where does the money come from?“ (1_y_58), „Financing?“ (1_y_43)	17 (16)

Main categories and subcategories	Category description	Anchor examples	Quantity (CAM ¹ -amount)
3. Social Needs			16 (11)
a) Care Work	Concepts that relate to unpaid activities to support, care for and look after other people at different levels, such as caring for relatives.	„Taking care for those in need of care“ (1_y_46), „Time for sick care“ (1_o_28)	2 (2)
b) Family Relationships	Concepts relating to relationships with the family or specific family members and the possible impact of an IPR on them.	„Compatibility of family“ (1_o_85), „more family time“ (1_y_74)	11 (11)
c) Friendship Relationships	Concepts relating to relationships with friends and the impact of an IPI on them.	„Time for friends“ (1_y_47)	3 (3)
4. Need for Recognition, Appreciation and Independence			56 (33)
a) Recognition	Concepts relating to a person's reputation by others or themselves, based on efforts made and attributes associated with performance.	„Detachment from meritocracy“ (1_y_44), „Social status“ (1_y_31), „Appreciation of achievement“ (1_y_56)	10 (9)
b) Appreciation	Concepts relating to a person's esteem, independent of efforts and achievements, but related to the esteem of a person per se and as an individual.	„Dignity“ (1_o_80), „No stigmatisation“ (1_o_88), „Appreciation of people“ (1_y_38)	22 (17)
c) Independence and Autonomy	Concepts relating to freedom from external restrictions and dependencies, as well as the ability to act autonomously.	„Dissolution of unfree relationships“ (1_o_76), „more independent job search“ (1_y_74), „Freedom from constraints“ (1_o_85)	24 (21)

Main categories and subcategories	Category description	Anchor examples	Quantity (CAM ¹ -amount)
5. Self-Actualization			98 (47)
a) Leisure	Concepts referring to having non-work related time and filling it with enjoyable, fun activities (e.g., hobbies).	„More free time“ (1_y_40), „Hobbies“ (1_y_46), „Reduction in working hours“ (1_y_21)	21 (16)
b) Freedom	Concepts relating to the ability to act free from external restrictions and to pursue one's own goals, interests, values and beliefs in a self-determined way and to actively shape one's own life.	„Self-determination“ (1_y_62), „Freedom“ (1_y_37), „Enables freedom“ (1_y_39)	26 (21)
c) Personal Fulfillment	Concepts that relate to living out and realising one's own person and personal skills, abilities, ideas and dreams as well as living out creativity.	„personal development“ (1_y_54), „realization of creative ideas“ (1_y_66), „fulfilment of dreams“ (1_o_22)	28 (23)
d) Professional Self-Realization	Concepts relating to the expression and realisation of personal interests, skills or preferences in employment and the choice of employment.	„More suitable job“ (1_y_38), „Freer choice of occupation“ (1_y_62), „Job is fun“ (1_y_46)	23 (18)

Main categories and subcategories	Category description	Anchor examples	Quantity (CAM ¹ -amount)
6. Supra-Individual Needs			41 (26)
a) Social Cohesion	Concepts relating to coexistence and cohesion in society, such as solidarity, participation or social commitment.	„Social participation“ (1_y_36), „Voluntary work“ (1_y_46), „Division in society“ (1_y_21)	22 (16)
b) Social Benefit	Concepts that relate to positive effects of UBI on society, i.e., advantages and benefits from which everyone in Germany would benefit, such as innovation and the promotion of culture.	„Innovation and start-ups“ (1_o_86), „Social profit“ (1_o_77), „Progress“ (1_y_33)	9 (8)
c) Education (for all)	Concepts on access to and the importance of education at an individual and societal level.	„Incentive for further education“ (1_y_48), „Education for all“ (1_o_77)	10 (8)
7. Mental Well-Being and Quality of Life			56 (30)
a) Mental Stress Factors	Concepts on factors that can impair and threaten mental well-being and mental health.	„Stress reduction“ (1_o_82), „Frustration from doing nothing“ (1_o_86)	14 (12)
b) Mental Health	Concepts relating to the presence or absence of mental health conditions.	„Less burnout“ (1_y_55), „Mental health“ (1_y_46), „Fewer therapy places needed“ (1_y_42)	15 (11)
c) Compensation and Recovery	Concepts relating to recovery and compensation for stress.	„Work-Life balance“ (1_y_52), „Time to recover“ (1_y_46)	9 (7)
d) Satisfaction and Quality of Life	Concepts relating to well-being, satisfaction and a good quality of life. Also positive feelings.	„Life worth living“ (1_y_51), „Happiness“ (1_y_47), „Joy“ (1_o_76)	18 (16)

Main categories and subcategories	Category description	Anchor examples	Quantity (CAM ¹ -amount)
8. Work Drive and Work Motivation			45 (32)
a) Incentives to Work	Concepts relating to incentives to work and work commitment, such as financial remuneration.	„Less incentive to work“ (1_y_55), „Work is worthwhile“ (1_o_77)	15 (14)
b) Willingness to Work	Concerns physical and mental willingness to work and show commitment to completing work; personal motivation does not necessarily have to be present.	„Willingness to make an effort decreases“ (1_y_36), „Willingness to perform“ (1_y_72)	10 (10)
c) Motivation to Work	Concerns the motivation to work or the lack of it; laziness is also coded here. With work motivation, the drive to work lies within the person, who wants to work in order to pursue personal goals, values or rewards.	„Lack of motivation to work“ (1_o_85), „Encouraging laziness“ (1_y_53)	20 (20)
9. Justice			87 (44)
a) Equality	Concepts of equality and equal treatment of people, such as descriptive aspects of fair distribution of resources, rights and opportunities for all members of society.	„Money for all“ (1_o_81), „Less social inequality“ (1_y_44), „Equal opportunities“ (1_y_57)	25 (18)
b) Fairness and Justice	Concepts of moral appropriateness of actions, distributions and decisions in the context of the UBI and judgements about fairness or justice.	„Social justice“ (1_o_75), „Perceived injustice“ (1_y_57)	28 (24)
c) Implementation of the UBI	Concerns aspects of fair implementation of the UBI, such as the right to fair treatment of income differences or balanced financing that does not disadvantage anyone.	„Redistribution“ (1_y_42), „Wealth tax“ (1_y_73), „Entitlement?“ (1_y_67)	17 (8)

Main categories and subcategories	Category description	Anchor examples	Quantity (CAM ¹ -amount)
9. Justice			87 (44)
d) Work-related Justice	Concepts of rights and justice in labour context, e.g., ensuring fair relationships between employers and employees with workers' rights.	„Possible weakening of labour rights“ & „Weakening of trade unions“ (1_y_66)	4 (2)
e) Exploitation & Abuse	Concepts relating to possible abuse or exploitation of the UBI (by certain groups)	„Exploitation by the unemployed“ (1_y_59), „Corruption“ (1_o_22)	13 (13)
10. Other			37 (26)
a) Bureaucracy & Administration	Concepts relating to administrative and organisational aspects of the social system such as bureaucracy and administration.	„Reduction of bureaucracy“ (1_o_78), „Simplification of administrative processes“ (1_y_50)	21 (19)
b) Consumption	Concepts relating to consumption and consumer behaviour.	„Increasing consumption“ (1_y_30), „More consumption“ (1_y_55)	4 (3)
c) Demographic Change	Concepts relating to social change and stability with regard to population development.	„Falling birth rate“ & „Healthy population pyramid“ (1_o_76)	3 (1)
d) Existing Problem Areas	Concepts relating to the persistence of existing problem areas despite the UBI.	„Does not address core problem“ (1_y_28), „Band-aid not cure“ (1_y_73)	9 (6)

Note. All main and subcategories represent needs or needs-relevant aspects that were named in 62 Cognitive Affective Maps (CAM)¹ on the Universal Basic Income (UBI)². As a residual category, main category 10 contains aspects relevant to needs for

which none of the existing categories were considered sufficiently suitable. For reasons of space, a maximum of three exemplary concepts (translations of literal quotations) are listed per category, with the CAM ID given in brackets. In the last column, we report the number of codings per category, and in brackets the number of cognitive-affective maps in which a category occurred.

Table A.3

Frequency of categories and expected influence of an Universal Basic Income

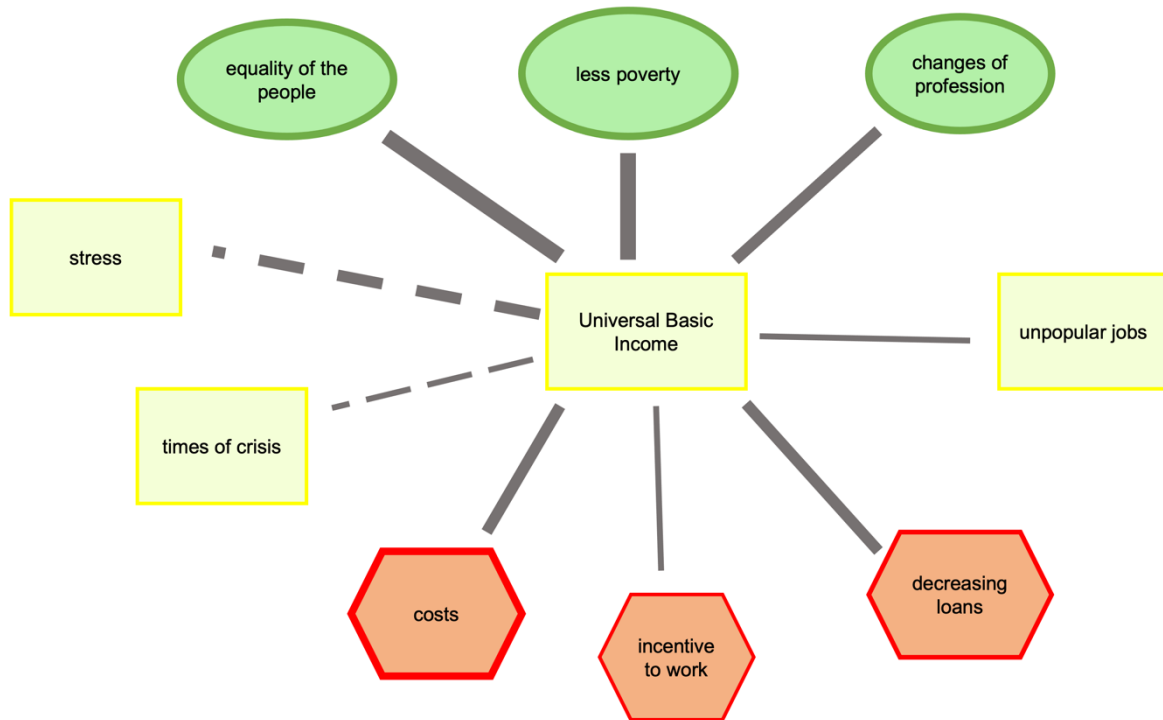
Main and subcategories	Number		Proportion	fav.¹	end.²	amb.³	neut.⁴
1. Physiological Needs	15	(8)	1.99%	100%			
a) Ensurement of Survival	6	(4)		6			
b) Physical Health	8	(5)		8			
c) Physical Well-Being	1	(1)		1			
2. Safety Needs	281	(62)	37.27%	48.4%	49.11%	2.14%	0.36%
2. Safety Needs	6	(6)		6			
a) Ecological Effects	3	(3)			3		
b) Effects on the Social System	16	(13)		10	5	1	
c) Financial Security	54	(35)		52	2		
d) (Freedom of) Financial Anxiety and Worry	20	(18)		18	2		
e) Social Impact	19	(12)		8	9	2	
f) World of Work	5	(3)		3	1		1
fa) Labour Market	22	(16)		5	15	2	
fb) Job Fulfillment	11	(8)		1	10		
fc) Working Conditions	15	(12)		12	3		
g) Economic Impact at Individual Level	38	(27)		5	33		
h) Economic Impact at Federal Level	55	(36)		15	40		
i) Funding Issue	17	(16)		1	15	1	
3. Social Needs	16	(11)	2.12%	100%			
a) Care Work	2	(2)		2			
b) Family Relationships	11	(11)		11			
c) Friendship Relationships	3	(3)		3			
4. Need for Recognition, Appreciation and Independence	56	(33)	7.43%	78.57%	19.64%	1.79%	
a) Recognition	10	(9)		5	4	1	
b) Appreciation	22	(17)		19	3		
c) Independence and Autonomy	24	(21)		20	4		

Main and subcategories	Number		Proportion	fav. ¹	end. ²	amb. ³	neut. ⁴
5. Self-Actualization	98	(47)	13%	95.92%	4.08%		
a) Leisure	21	(16)		21			
b) Freedom	26	(21)		25	1		
c) Personal Fulfillment	28	(23)		27	1		
d) Professional Realization	23	(18)		21	2		
6. Supra-individual Needs	41	(26)	5.44%	87.8%	9.76%	2.44%	
a) Social Cohesion	22	(16)		17	4	1	
b) Social Benefit	9	(8)		9			
c) Education (for all)	10	(8)		10			
7. Mental Well-Being and Quality of Life	56	(30)	7.43%	85.71%	12.5%	1.79%	
a) Mental Stress Factors	14	(12)		8	6		
b) Mental Health	15	(11)		14		1	
c) Compensation and Recovery	9	(7)		9			
d) Satisfaction and Quality of Life	18	(16)		17	1		
8. Work Drive and Motivation	45	(32)	5.97%	8.89%	82.22%	8.89%	
a) Incentives to Work	15	(14)		2	11	2	
b) Willingness to Work	10	(10)			10		
c) Motivation to Work	20	(20)		2	16	2	
9. Justice	87	(44)	11.54%	47.13%	45.98%	5.75%	1.15%
a) Equality	25	(18)		23	2		
b) Fairness and Justice	28	(24)		10	16	1	1
c) Implementation of the Universal Basic Income	17	(8)		6	7	4	
d) Work-related Justice	4	(2)		2	2		
e) Exploitation & Abuse	13	(13)			13		
10. Other	37	(26)	4.91%	51.35%	40.54%	8.11%	
a) Bureaucracy & Administration	21	(19)		15	3	3	
b) Consumption	4	(3)		1	3		
c) Demographic Change	3	(1)		3			
d) Existing Problem Areas	9	(6)			9		

Note. The frequencies of the main categories, their share of the total of 754 codings (including multiple codings) and the subcategory frequencies are reported. Due to multiple coding, some concept nodes were counted in several (main) categories, which is why the percentage calculations do not add up to 100% in some cases. The number of Cognitive Affective Maps in which a category occurred is shown in brackets. Following this is the number of cases in which a category was classified as favored (fav.)¹, endangered (end.)², ambivalent (amb.)³ or neutral (neut.)⁴ by Universal Basic Income.

Figure B.1

Example of a Cognitive-Affective Map (CAM) with a commentary discrepant to the content



Note. The test subject (1_y_69) left the following comment on the concept node "Incentive to work": "The incentive to work is missing. A recurring point that I think is totally stupid". This makes it clear that the content of the concept nodes contained in a CAM does not necessarily represent the attitude towards the Universal Basic Income the drawing person has.

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