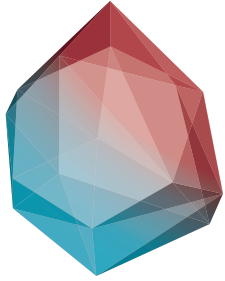


LUXX
profile

LUXXPROFILE
MANUAL
FOR CERTIFIED USERS

(Excerpt from the scientific manual of the University of Luxembourg for LUXX United GmbH
written by Prof. Samuel Greiff, Dr. Christoph Kemper, and Jan Dörendahl)
Compiled by Peter Boltersdorf, Chief Instructor at LUXX United GmbH and Head of LUXXacademy

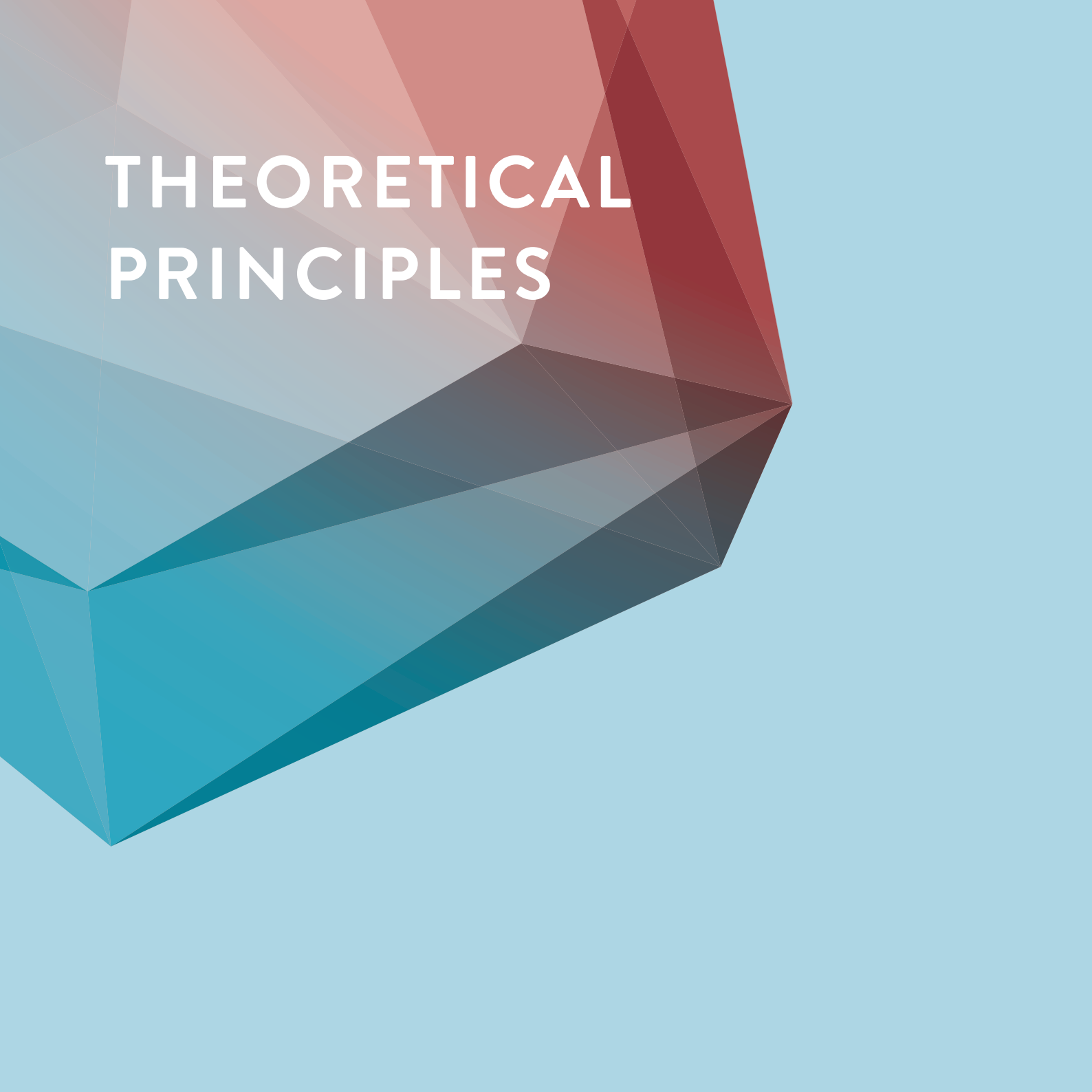


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CONTENT

1. THEORETICAL PRINCIPLES	6
2. USING THE QUESTIONNAIRE	12
2.1 DESCRIPTION	13
2.2 AREAS OF APPLICATION	13
2.3 CARRYING OUT THE SURVEY	14
2.3.1 Prerequisites for meaningful application of LUXXprofile	14
2.3.2 Instructions and explanations for the participant	14
2.4 TEST EVALUATION	17
2.5 INTERPRETATION	19
3. DEVELOPMENT OF LUXXPROFILE	21
3.1 METHOD	22
3.1.1 Design process	22
3.1.2 Design samples	26
3.1.3 Validation and calibration sample	26
3.2 RELIABILITY	33
3.3 VALIDITY	35
3.3.1 Factorial validity	35
3.3.2 Criterion validity	38
3.3.3 Convergent/discriminant validity	46
3.4 STANDARD VALUES	51
4. SOURCES	52
5. ETHICS OF PERSONALITY DIAGNOSTICS	58



THEORETICAL PRINCIPLES

1. THEORETICAL PRINCIPLES

Both in colloquial language and in the field of law, the concept of motive is used to describe the underlying reasons for a particular behavior (Brandstätter, Schüler, Puca, & Lozo, 2013). In motivational psychology, this term is also used to describe behavioral dispositions inherent to a person. More precisely, motives describe preferences for different classes of incentive classified according to thematic content. For an even more precise definition of motives, a number of distinctions will need to be drawn in the following.

In 1989, McClelland, Koestner, & Weinberger (1989) described the existence of two motivational systems which exist in parallel. These motives are distinguished as being either implicit or explicit and have no substantial correlation, which means they are essentially independent of each other. Implicit motives describe subconscious preferences, which are not manifested linguistically and can only be identified indirectly through projective measurement methods (McClelland et al., 1989). Explicit motives, on the other hand, describe a person's concept of themselves regarding their goals, values, personality attributes, and affective preferences (Schönbrodt & Gerstenberg, 2012; McClelland et al., 1989). These self-concepts, also called self-attributed motives, are manifested linguistically and, unlike implicit motives, can be assessed directly via questionnaire methods such as LUXXprofile.

A second important distinction to be made is whether the incentives described above apply to the performance of an activity itself, or to a goal which is to be achieved through the performance of the activity (Brandstätter et al., 2013). If the incentive lies in the achievement of a target state, this is defined as extrinsic motivation (Heckhausen & Heckhausen, 2010). If, on the other hand, the incentive for an activity lies in the performance of this activity itself, i.e., the performance of the activity becomes a goal unto itself, it is considered intrinsic motivation (Heckhausen & Heckhausen, 2010). The term "goal" should be used very carefully in this context, as it usually implies an end state. In this case, because the incentive lies in the performance of the activity itself, it is not possible to speak of a target state in a strict sense. Instead, when intrinsic motivation is experienced, one wants to perform the corresponding activity as long, as frequently, and as intensively as possible (Heckhausen & Heckhausen, 2010). Sansone and Smith (2000) more precisely define the incentive for the execution of an activity. According to them, actions are intrinsically motivated if they are initiated and maintained by the current, anticipated or sought-for experience of interest. The term interest is to be understood as current interest in this case, and encompasses cognitive and affective components. Current interest exists when the direction and focusing of attention on the present execution of action is experienced as being positive (Heckhausen & Heckhausen, 2010;

Sansone & Smith, 2000). This definition differs from Schiefele's definition (1996; cited in Heckhausen & Heckhausen, 2010), in which interest is seen as an incentive derived from an object.

As described at the beginning in general terms, intrinsic incentives can also be divided into incentive classes according to their thematic content. This inevitably raises the question of which and how many classes are relevant. To answer this question, it is helpful to consider framework models that include multiple intrinsic motives. With such models, classification can take place according to abstraction levels. Located at the highest level of abstraction are the two constructs agency and communion (Bakan, 1966; cited in Heckhausen & Heckhausen, 2010). Agency subsumes motives that serve one's own progress or growth ("getting ahead"), while communion comprises motives that serve to achieve positive coexistence with others ("getting along"). Each of these two concepts are extremely broad and encompass many motivational aspects.

The "Big 3" – power, connection, and achievement – can be situated one level down (Heckhausen & Heckhausen, 2010). On the one hand, the motive of power includes the need to exert control and influence over other people, and on the other, the pursuit of status and prestige (Schönbrodt & Gerstenberg, 2012). The motive of connection is about building and maintaining satisfactory interpersonal relationships. The achievement motive describes behavior that attempts to achieve a measure of quality (Brandstätter et al., 2013). Later on, intimacy was defined as another independent motive, but one that is linked to the motive of connection (McAdams, 1982). While the connection motive mostly describes interaction with strangers, the intimacy motive is about establishing attachment and affection with persons who are close to oneself. Although these three or four motives are slightly more specific than agency and communion, overall they remain quite abstract.

To enable an even more detailed identification of motivational structures, a multifaceted conceptualization of human motives was needed to form the basis for the development of LUXXprofile. Hence, we analyzed motivational models that could be situated below the Big 3 in terms of their level of abstraction. Each of these frameworks address multiple classes of motivational incentives. For example, Murray (1938) postulated 17 secondary needs, while Reiss (2004) defined 16 life motives (e.g., approval and physical activity). Based on convergences between the models, we identified 16 motives and reconceptualized them in light of current research findings.

The 16 intrinsic motives to be assessed by LUXXprofile are defined below. For each motive, research studies that have played a role in the reconceptualization of the motive dimensions are provided in parentheses:

Curiosity

describes the pursuit of knowledge, insight, and intellectual challenges
(e.g. Havercamp, 1998; Reiss, 2004, 2008; Murray, 1938; Mussel, 2013; Mussel, Spengler, Litman, & Schuler, 2012).

Social acceptance

describes the pursuit of affirmation and approval
(e.g. Havercamp, 1998; Reiss, 2004, 2008; Murray, 1938; Schlenker & Leary, 1982).

Power

describes the pursuit of control and influence over people and processes
(e.g. Havercamp, 1998; Reiss, 2004, 2008; Brandstätter et al., 2013; Murray, 1938; McClelland, 1975).

Status

is the pursuit of prestige and a prominent position in society
(e.g. Havercamp, 1998; Reiss, 2004, 2008; Neel, Kenrick, White, & Neuberg, 2015).

Retention

describes the endeavor to accumulate and maintain reserves
(Seuntjens, Zeelenberg, van de Ven, & Breugelmans, 2015).

Autonomy

describes the pursuit of independence from the expectations and power of others
(e.g. Havercamp, 1998; Reiss, 2004, 2008; Bieling, Beck, & Brown, 2000; Hmel & Pincus, 2002; Murray, 1938; Clark & Beck, 1991).

Social participation

describes the pursuit of companionship and interest in others

(e.g. Havercamp, 1998; Reiss, 2004, 2008; Brandstätter et al., 2013; Neel et al., 2015; Murray, 1938; Sokolowski & Heckhausen, 2010).

Principles

describes the pursuit of conforming to social norms that apply to specific social groups or to society as a whole (e.g. Havercamp, 1998; Reiss, 2004, 2008).

Social engagement

describes a commitment to disadvantaged and needy people and to a more just society

(e.g. Havercamp, 1998; Reiss, 2004, 2008; Murray, 1938).

Structure

describes the endeavor to structure one's environment in a simple, planned, accurate, and detailed manner (e.g. Havercamp, 1998; Reiss, 2004, 2008; Neuberg & Newsom, 1993; Murray, 1938; Meiser & Machunsky, 2008).

Safety

describes the pursuit of a quiet and safe life

(e.g. Havercamp, 1998; Reiss, 2004, 2008; Bernstein, Zvolensky, Vujanovic, & Moos, 2009; Mitchell, Riccardi, Keough, Timpano, & Schmidt, 2013; Murray, 1938; Pud, Eisenberg, Sprecher, Rogowski, & Yarnitsky, 2004)

Revenge

describes the endeavor to retaliate against wrongs one has experienced (e.g. Havercamp, 1998; Reiss, 2004, 2008; Murray, 1938).

Physical exercise

describes the pursuit of engaging in physical training and physical activity (e.g. Havercamp, 1998; Reiss, 2004, 2008).

Food enjoyment

describes the pursuit of pleasurable experiences when eating. These clearly exceed the satisfaction of basic physiological needs (e.g. Havercamp, 1998; Reiss, 2004, 2008; Bell & Marshall, 2003).

Family

describes caring for one's family (family of origin, one's own family, and partnership) (e.g. Havercamp, 1998; Reiss, 2004, 2008; Neel et al., 2015).

Sensuality

describes the pursuit of sensual and erotic experiences and an active, fulfilling sex life (e.g. Havercamp, 1998; Reiss, 2004, 2008; Neel et al., 2015; Cooper, Shapiro, & Powers, 1998).

USING THE QUESTIONNAIRE

The background of the slide is an abstract composition of overlapping geometric shapes. On the left, a solid teal color fills the upper portion. A large, dark red triangle points from the top right towards the center. Overlapping these are several translucent, multi-colored polygons in shades of grey, light red, and teal, creating a layered, crystalline effect. The text 'USING THE QUESTIONNAIRE' is positioned in the upper left, over the teal background.

2. USING THE QUESTIONNAIRE

This section provides information which is directly relevant to the practical application of LUXXprofile. Section 2.1 describes the structure of LUXXprofile, followed by the areas of application under 2.2. Section 2.3 contains important instructions for conducting the test, as well as requirements which the test administrator and the test situation must fulfill. Section 2.4 provides an overview of the evaluation method, while section 2.5 supplies important information for the subsequent interpretation of the results of the test.

2.1 Description

LUXXprofile is an online questionnaire consisting of **16 self-descriptive scales for motive dispositions**, each of which is assessed **using 9 items**. The motive dispositions are: curiosity, social acceptance, power, status, retention, autonomy, social participation, principles, social engagement, structure, safety, revenge, physical exercise, food enjoyment, family, and sensuality.

The 9 items on each scale correspond to **statements about everyday behaviors, attitudes, and habits**. Participants are asked to rate the extent to which each statement applies to them. A **graded response scale with six divisions** is provided for this purpose. On this scale, only the extreme values of (0) Does not apply to me at all and (5) Fully applies to me are expressed in words.

The statements on the individual motive dispositions may be formulated to tend towards a high degree of motivation (e.g. for social acceptance: “I attach great importance to being liked by others.”) or towards a low degree of motivation (e.g. for social acceptance: “It doesn’t bother me when someone rejects me.”).

2.2 Areas of application

LUXXprofile was developed to enable a comprehensive survey of the motive structure of older adolescents and adults in Germany. The target group of the test are German-speaking individuals aged 16 to 69. There are no restrictions with regard to other biographical criteria, such as level of education.

Potential areas of application for LUXXprofile include the use of testing services for the purpose of assessing **where a person stands or their development in their professional or private lives**, e.g. in job and career counseling or as part of training or coaching measures for all management aspects. From past experience, the topics of leadership, teams, and communication are the most common aspects touched on in its application. It is also used for consultations and coaching in the field of conflict management and also in all types of professional and private relationships.

For diagnostic questions in this context, the feedback from the core findings on particularly strongly or weakly pronounced motives are meant to initiate or intensify processes of self-reflection.

Another field of application is **basic and applied psychological research**. LUXXprofile can be used to examine various questions in the context of basic and applied research. With its 16 motive dimensions, LUXXprofile enables a comprehensive survey of the most important dispositional constructs with a dynamic perspective on personality. Hence, it maps personality aspects that are not or only partially captured by, or conceptualized differently in other personality models such as the five-factor model. LUXXprofile can be used exploratively or guided by a hypothesis to investigate the role of motives in the experiences and behavior of people and their development, e.g. the role of motive structure or individual motives in the maintenance of health, in general life satisfaction, the development of psychopathology, success at work, the shaping of social relationships, etc.

2.3 Carrying out the survey

2.3.1 Prerequisites for meaningful application of LUXXprofile

Whether the test can be implemented successfully greatly depends on the existing framework conditions. The following text aims to describe the most important aspects of a meaningful application of the test.

- Participants should be at least 16 years old and no older than 69 years. Representative standards are available for this age range.
- There should be sufficient time for the application of LUXXprofile. The time required to complete LUXXprofile is approximately $Mdn = 15$ minutes (interquartile range = 7:03 minutes). Depending on the characteristics of the person answering the survey, the time required may be considerably longer. Because the test is generally offered in an online format, the participant can take as long as they require to complete the

survey. However, if the survey is provided in a classic format, i.e. on paper, it is the responsibility of the party administering the test to be aware of the participant's needs and to ensure that they have sufficient time to complete it.

- LUXXprofile should only be used if extensive falsification of the responses (faking) on the part of the participant can be largely excluded. In this regard, a situation based primarily on trust and respect is helpful and sensible.
- LUXXprofile should always be answered voluntarily and without external pressure. Using it as an obligatory measure, e.g. as part of an internal company requirement, is not appropriate.
- For the acceptance of the test and to avoid tendencies of falsification, it is expedient to employ measures which promote transparency. For example, before the test commences, the participants should receive information about the context of the test and its objective (e.g. "measurement of core personality attributes and motives to support a team development measure"). In addition to this "briefing" prior to the test, the licensing conditions stipulate that there must be a one-on-one feedback session after the test, during which the results are communicated professionally and, where necessary, undesirable effects on the participants can be intercepted.
- According to the licensing terms, the interpretation of the results of LUXXprofile and the feedback session are only to be carried out by appropriately trained and experienced specialists. Among other things, this training should address the interpretation of the dimensions and the overall profile, the appropriate administration and evaluation of the test, the conducting of feedback sessions, the meaning and use of standard tables and values, and handling the issue of reliability (confidence intervals) of the test values.

2.3.2 Instructions and explanations for the participant

The following provides a number of important points regarding the instructions and explanations for the participant. They serve to ensure the standardization and thus the objectivity of a test. Furthermore, these measures should help to avoid negative effects on the answering of the survey, e.g. due to the participant incorrectly understanding aspects of the test.

- The participant is informed in advance about the procedure and the objective of LUXXprofile. This includes mentioning the subsequent feedback session and providing a precise description of the conclusions that can or cannot be drawn with the help of LUXXprofile.

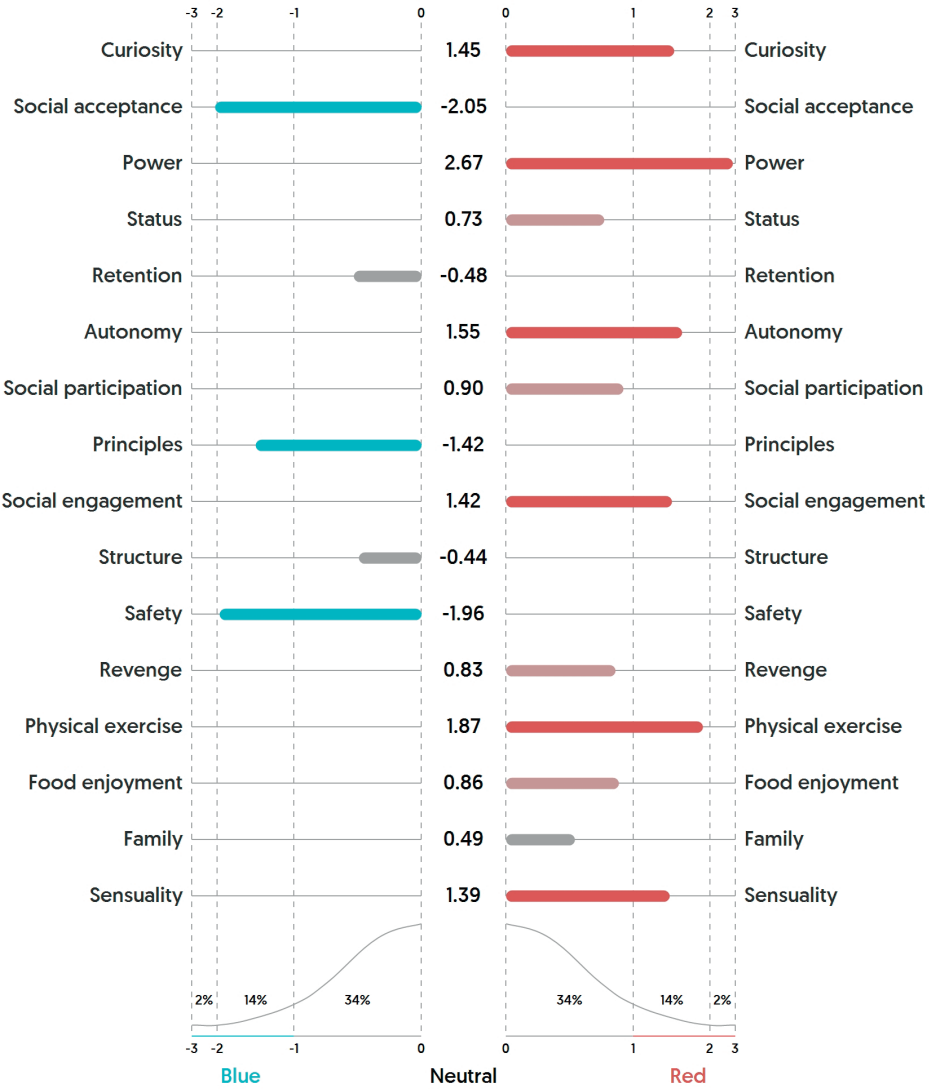
- In addition, providing a legal disclosure regarding data storage and data security (where applicable) is recommended. The participant should always be given sufficient opportunity to understand the process and objectives of LUXXprofile and to ask any questions they may have.
- Even if no questions arise, it should be pointed out that LUXXprofile represents the situational self-perception of the current personality profile, and that it does not depict good or bad results or evaluations, but merely supplies the individual personality profile. Attention is also to be paid to the fact no evaluations or assessments are made on the basis of LUXXprofile in the context of a project.
- LUXXprofile is usually conducted online. This results in particular requirements for the preparation and instruction of the participant. In addition to the aforementioned explanation of the procedure and objectives of the test, participants should be made aware of the fact that they themselves are responsible for an optimal test situation due to the fact that it takes place online. For the test, they should be in a quiet location and ensure that they are not disturbed for the period during which they expect to be doing the test. Other disruptive factors such as constant noise or unfavorable lighting, which could have a negative influence on the test, should be eliminated. Generally, the participant should work on LUXXprofile “at one go”, i.e. without any interruptions. During the session, the participant should concentrate exclusively on LUXXprofile and not have any other computer programs or websites open, nor perform any other tasks alongside the test. No devices should be used during the test that are not directly relevant for the test, such as cellphones or music players.
- When giving feedback, the test profile is always to be used as a basis for discussion. It should be pointed out once again at the beginning of the feedback session that there is no right or wrong, but merely individual personality profiles.
- After the feedback session, participants should again be given the opportunity to ask further questions as well as to describe their impression of the test and provide their own feedback. This helps ensure that the participant does not leave the test situation “unresolved”.

2.4 Test evaluation

The evaluation of LUXXprofile is computer-assisted and takes place automatically upon completion of the test. The standard scale used is the z-scale ($M = 0$, $SD = 1$).

Regardless of the standard scale used, the participant's item responses are first converted into a scale value for each motive scale using a complex algorithm during the computer-assisted and automated test evaluation. Subsequently, these scale values are compared against the representative standard sample described in section 3.1.3. The standard values calculated are then entered into a profile. Figure 1 shows an example of what the evaluation profile for z-values looks like.

Regarding the handling of missing values: We would like to point out that the participant will have to provide a response for all items in LUXXprofile. However, before the test, participants may indicate that they **do not** wish to be presented with any items on the sensuality scale. In this case, the evaluation of the sensuality scale is omitted entirely.



2.5 Interpretation

The following provides information that can be used to interpret the results after the computer-assisted and automated test evaluation. Because the test values of a person represent a relatively accurate estimate of the value of an attribute, confidence intervals are required to indicate the range around the test score in which the person's actual value lies. Tables 2 and 3 contain, for the respective standard and for each scale, the standard error of measurement (S_E) calculated on the basis of the reliability coefficient omega (McDonald, 1999; see section 3.2 Reliability). Based on this, the 80% confidence interval was calculated (80% CI) and the interval limits determined. The resulting intervals 1 to 5 can be used – taking into account the reliability of the respective scale – to make statements about e.g. when a test score is to be regarded as above average. For this purpose, it is necessary to determine the interval in which the person's standard value falls. For example, in order to be able to speak of an above-average value on the curiosity scale (taking into account the unreliability of the measurement), a person's standard value must be greater than 1.43 if z-values are used, or a 9 or a 10 if STEN values are used.

FIGURE 1.
SAMPLE OF AN EVALUATION
PROFILE USING Z-SCORES.

TABLE 2:
INTERVAL LIMITS FOR Z-VALUES

Scale	S _E	80% CI	Interval 1	Interval 2		Interval 3		Interval 4		Interval 5
CUR	.33	.43	< -1.43	-1.43	-.57	-.56	.56	.57	1.43	> 1.43
SAC	.39	.50	< -1.50	-1.50	-.50	-.49	.49	.50	1.50	> 1.50
POW	.30	.38	< -1.38	-1.38	-.62	-.61	.61	.62	1.38	> 1.38
STA	.36	.46	< -1.46	-1.46	-.54	-.53	.53	.54	1.46	> 1.46
RET	.39	.50	< -1.50	-1.50	-.50	-.49	.49	.50	1.50	> 1.50
AUT	.59	.76	< -1.76	-1.76	-.24	-.23	.23	.24	1.76	> 1.76
SOZ	.32	.41	< -1.41	-1.41	-.59	-.58	.58	.59	1.41	> 1.41
PRI	.45	.57	< -1.57	-1.57	-.43	-.42	.42	.43	1.57	> 1.57
SEN	.30	.38	< -1.38	-1.38	-.62	-.61	.61	.62	1.38	> 1.38
STR	.28	.36	< -1.36	-1.36	-.64	-.63	.63	.64	1.36	> 1.36
SAF	.39	.50	< -1.50	-1.50	-.50	-.49	.49	.50	1.50	> 1.50
REV	.30	.38	< -1.38	-1.38	-.62	-.61	.61	.62	1.38	> 1.38
PHE	.20	.26	< -1.26	-1.26	-.74	-.73	.73	.74	1.26	> 1.26
FOE	.32	.41	< -1.41	-1.41	-.59	-.58	.58	.59	1.41	> 1.41
FAM	.28	.36	< -1.36	-1.36	-.64	-.63	.63	.64	1.36	> 1.36
SUY	.22	.29	< -1.29	-1.29	-.71	-.70	.70	.71	1.29	> 1.29

Explanation: SE = standard error of measurement; CI = confidence interval; interval 1 = below -average value; interval 2 = below -average to average value; interval 3 = average value; interval 4 = average to above -average value; interval 5 = above -average value; N = 1001.

Note:
For an interpretation of the values themselves, the descriptions of the low (below -average) and high (above -average) values can be used, which are provided in the original evaluation document in the respective appendix.

DEVELOPMENT OF LUXXPFILE

The background of the slide is composed of several overlapping, semi-transparent geometric shapes, primarily triangles and quadrilaterals. On the left side, there is a solid teal-colored area. To the right, the shapes are in various shades of grey and light blue, creating a layered, crystalline effect. The overall aesthetic is modern and minimalist.

3. DEVELOPMENT OF LUXXPFILE

This section describes the design (3.1 Method) and standardization (3.4) of LUXXprofile. In the remaining two sections, findings on reliability (3.2) and validity (3.3) are presented.

3.1 Method

3.1.1 Design process

The aim of the design process was to develop a valid self-reporting procedure that would allow intrinsic motives in the general populace to be captured in as broad a fashion as possible. Homogeneous and sufficiently distinct motive scales were to be developed. Figure 2 provides a schematic representation of the design process. The four samples used in the design were obtained from a commercial online access panel provider.

The first step in the development of LUXXprofile was an extensive literature review, based on which a working definition of each motive construct was created. The content of the motive scales emerged from convergences in the classes of incentives that were subsumed under comprehensive models. We analyzed several comprehensive models for this purpose (e.g., Murray, 1938; Reiss, 2004) as well as recent findings from motivation research, and identified 16 classes of incentives. Using the information gathered from this process, we created working definitions for these 16 motives. Based on these working definitions, seven experts from the fields of personality and motivation, along with two research assistants, developed items for each motive. The resulting initial version of the item pool comprised 1,247 items.

After removing redundant items, we selected 361 items according to content and linguistic criteria for the first draft of the test. In May 2016, $N = 300$ persons took the test as part of the first design sample. This sample was quasi-representative of the German online population in terms of age, gender, and education. In a first analysis step, we used an exploratory factor analysis (EFA) with principal axis factoring using the promax rotation. To decide how many factors to extract in each case, we compared the results of the parallel analysis, comparison data

(CD), and minimum average partial (MAP) test according to the recommendations of Courtney (2013). For each motive, this method allowed us to identify which items represent the core aspect of the motives. Based on these results, we revised the item pool, removing 140 items and developing 169 new items.

From the revised item pool, we selected 390 items for use in a second design sample with $N = 299$ in August 2016. Once again, this sample was quasi-representative of the German online population in terms of age, gender, and education. Based on the resulting data, we started building an initial scale. For the selection of items for each motive, we employed the ant colony optimization algorithm (ACO; Marcoulides & Drezner, 2003) using a pheromone function to optimize model fit via the comparative fit index (CFI) and root mean square error of approximation (RMSEA) (formula 1). This pheromone function ensures that items are selected from the pool which, when combined to create scales, exhibit a good model fit in a confirmatory factor analysis (CFA). We had the algorithm select 9 items per motive.

$$(1) \quad \varphi_{\text{Fit}} = \text{CFI} - \text{RMSEA}$$

Subsequently, we expanded this initially purely data-driven method by adding a manual content analysis and swapped out items as needed in order to be able to appropriately map all aspects that constitute the construct using the scales created. The resulting scales largely showed a good model fit, whereby we assumed $\text{RMSEA} = .07$ and $\text{CFI} = .95$ as the lower limit for the model fit. The result was version FV3 of the questionnaire. However, it became apparent that the items were predominantly of medium difficulty, and hence discriminated primarily in the range of medium attribute values. In order to achieve satisfactory discriminatory ability in the ranges for low and high attribute values as well, we revised the item pool once more in order to increase the variance of the item mean values, i.e. to have more items with low difficulty and high difficulty available. To this end, 212 items were removed from the item pool and 73 newly developed items were added.

251 items from this re-revised item pool were selected and used in a questionnaire in November 2016 for a third design sample answered by $N = 333$ individuals, quasi-representative of the German online population in terms of age, gender, and education. For scale development, we once again utilized ACO and expanded the pheromone function to optimize the model fit (formula 1) by maximizing the dispersion of the item means (formula 2) and weighted both parts of the pheromone function equally (formula 3). With this modification, the algorithm selected items from the item pool in a manner such that the resulting scales exhibited a good model fit, and also selected easy and difficult items in addition to moderately difficult items. The scales selected in this fashion had a good fit and also contained easy and difficult items in addition to moderately difficult items. Again, we had the algorithm select 9 items for each scale.

$$(2) \quad \varphi_{Var(\bar{x}_i)} = \frac{1}{1 + e^{(0.5 \max Var(\bar{x}_i) - Var(\bar{x}_i))}}$$

Where $Var(\bar{x}_i)$ is equal to the variance of the mean of all selected items

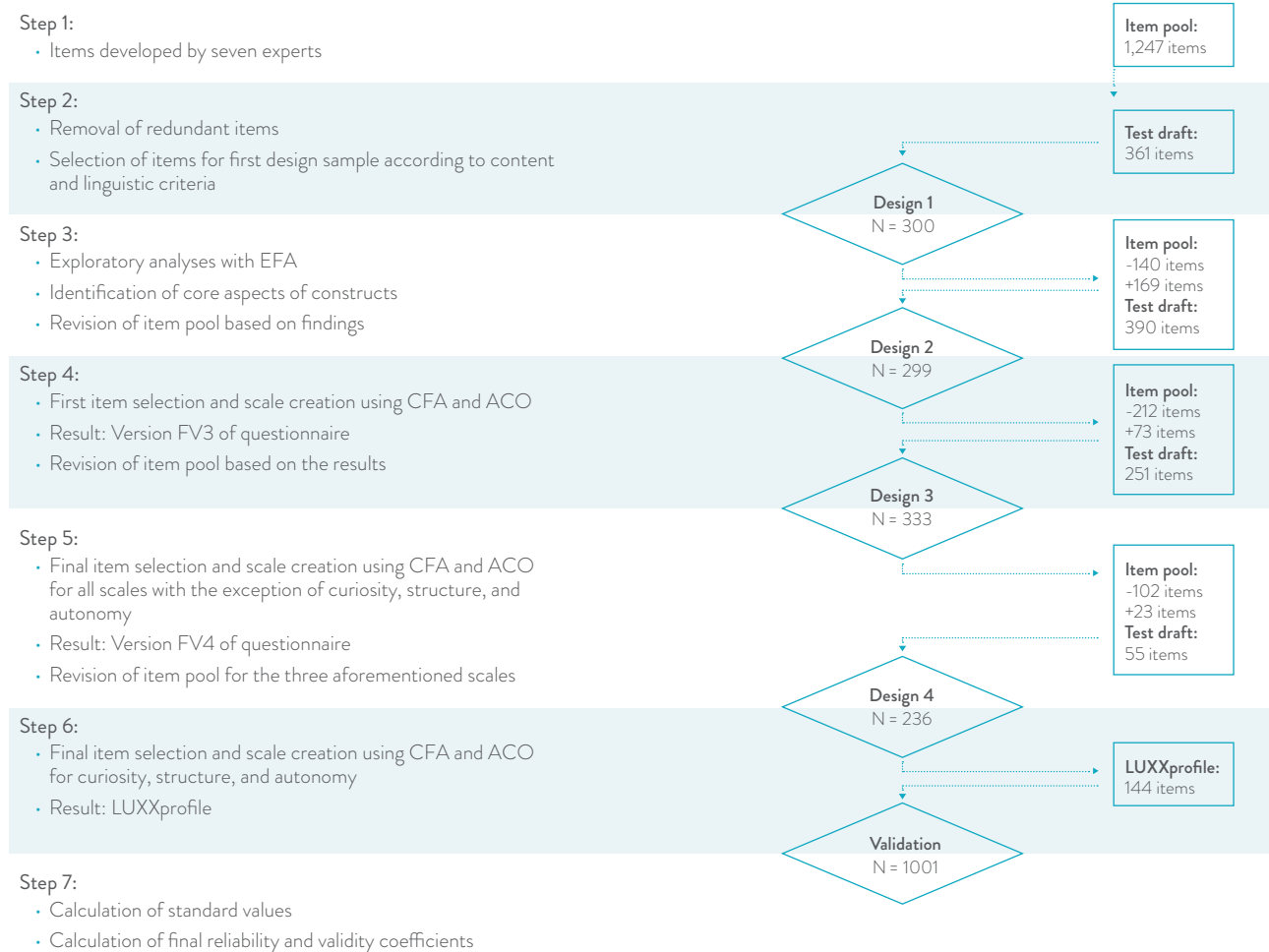
$$(3) \quad \max f(x) = 0.5 \varphi_{Fit} + 0.5 \varphi_{Var(x_i)}$$

The final step of the analysis was once again to manually check whether the scales represented all aspects of the respective constructs. Assuming our minimum model fit requirements of $RMSEA = .07$ and $CFI = .95$ we evaluated the scales created.

The result of this second selection process was version FV4 of the questionnaire. It was only for the curiosity, structure, and autonomy scales that the results were unsatisfactory. For these motives, a third revision of the item pool was performed, in which 102 items were removed and another 23 new items were developed.

To finalize the scale creation for curiosity, structure, and autonomy, a fourth design sample was drawn in February 2017 with $N = 236$. This sample was also quasi-representative of the German online population in terms of age, gender, and education, and worked on a selection of 55 items from the most recently revised version of the item pool. Following this, the scales for the three remaining motives were developed using ACO by means of the previously used pheromone function (formula 3). For this purpose, we had 9 items for each of the three scales selected via ACO. We now also had a model fit for the curiosity, structure, and autonomy scales that met our criterion of $RMSEA < .07$ and $CFI > .95$. At the end of this third selection process, we obtained LUXXprofile, which was then validated and standardized in the next step (see section 3.3 Validity as well as 3.4 Standard values).

FIGURE 2.
SCHEMATIC REPRESENTATION OF THE DESIGN PROCESS FOR LUXXPROFILE
 (THE SAMPLES USED ARE SHOWN AS DIAMONDS, WHILE THE DEVELOPMENT OF THE ITEM POOLS/QUESTIONNAIRES IS DESCRIBED IN THE RECTANGLES).



Note: the samples used are shown as diamonds, the development of the item pools/questionnaires are described in the rectangles.

3.1.2 Design samples

During the development of LUXXprofile, four design samples were drawn. Because the standard for the final test procedure was to be representative of German Internet users, quota samples that were approximately representative of German Internet users in terms of age, education and gender were also already being used in the design process. Participants answered the questionnaire from home via the Internet, and were informed in advance that the surveys were part of a design process for a survey instrument (questionnaire). Participation therefore took place without a personally relevant goal for the participants. The online access panel provider rewarded participants with bonus points which they could donate to aid organizations, exchange for shopping vouchers, or have the equivalent value deposited into their bank account. Table 4 presents the descriptive statistics for the attributes of the study participants.

The size of the samples can be considered sufficient for the analysis methods used. Regarding the confirmatory factor analysis (CFA): For the measurement models with 9 indicators, the recommended ratio of 5:1 between sample size and number of parameters to be estimated can be met (Bentler and Chou 1987), while for exploratory factor analysis (EFA), the recommended ratio of 10:1 between sample size and number of variables can be ensured for each sample (Nunnally, 1978; cited in Field, 2009, Kass and Tinsley, 1979; cited in Field, 2009).

3.1.3 Validation and calibration sample

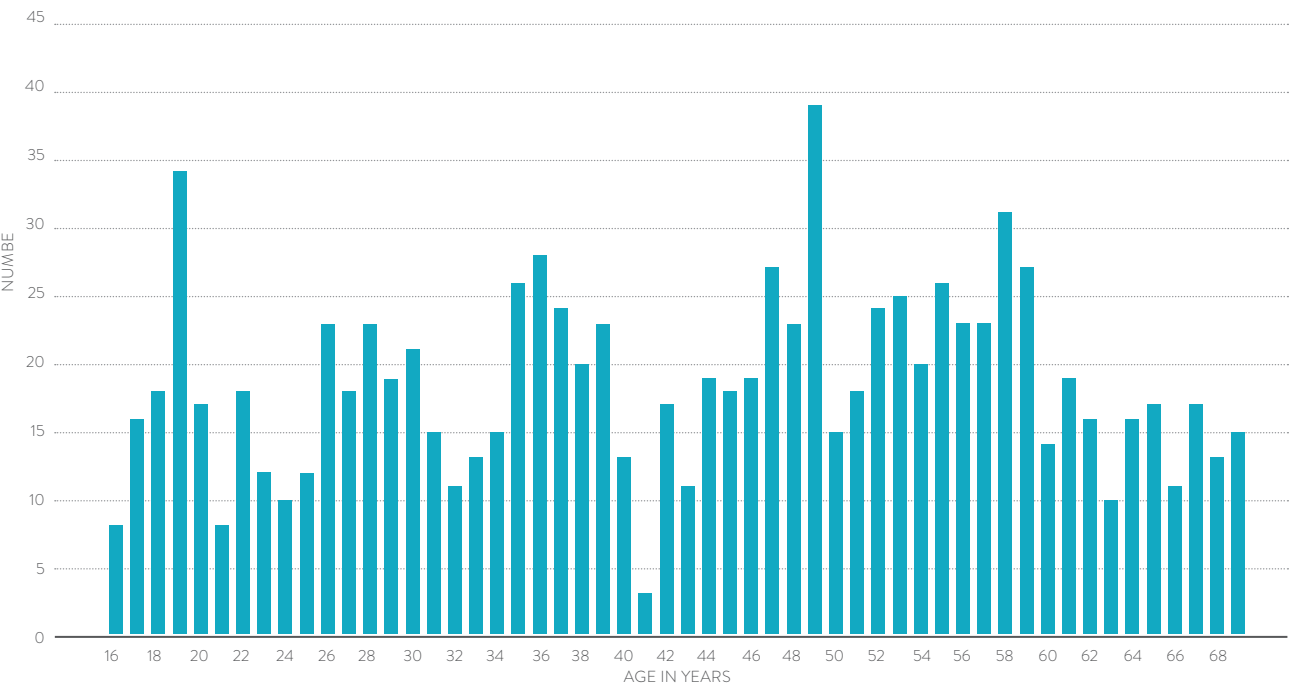
The validation and calibration sample was collected in March and April 2017. The sample was drawn by a renowned German market and opinion research institute. Recruitment was performed using one of the provider's panels, which is representative for members of the German population aged 14 years and older. In a first step, the panel was divided into strata based on age and gender, after which the sample was drawn at random from these strata in a second step.

The adjustment of the net sample was based on a quota plan for the attributes age and gender, such that these characteristics are represented without bias with regard to the online distribution. Participants completed the questionnaire via the Internet from home and without a personally relevant goal. The survey institute rewarded the participants with bonus points, which they could exchange for vouchers or a lottery ticket from "Aktion Mensch", or donate to an aid organization.

TABLE 4:
DESCRIPTIVE STATISTICS OF THE DESIGN SAMPLES

	1	2	3	4
%	N = 300	N = 299	N = 333	N = 236
GENDER				
Male	49.0	48.2	52.3	50.8
AGE				
16 – 19	5.0	3.3	5.7	5.9
20 – 29	16.3	15.7	13.5	16.9
30 – 39	15.0	15.1	12.3	16.9
40 – 49	20.3	22.4	21.6	21.2
50 – 59	24.3	25.1	28.5	22.5
60 – 69	19.0	18.4	18.3	16.5
LEVEL OF EDUCATION				
No general school leaving certificate (yet), still a student at a general school	2.3	1.7	3.3	2.5
Secondary (elementary, primary) school leaving certificate (Hauptschule, Volksschule, Grundschule); completed/did not complete apprenticeship/ vocational training	30.3	35.1	35.4	30.9
Secondary school without high school diploma (certificate from a Realschule/ Mittlere Reife/Oberschule) or equivalent	31.7	32.4	31.8	33.5
High school diploma, (technical) college entrance qualification with/without college degree	35.7	30.8	29.4	33.1

FIGURE 3.
AGE DISTRIBUTION OF THE VALIDATION AND CALIBRATION SAMPLE.



In light of the sampling method described above, the sample can be seen as being representative of Internet users in Germany within the age range covered. Furthermore, the sample size of $N > 1000$ is suitable for calculating standardized values (Lienert & Raatz, 1998). The sample comprises a total of 1001 persons and includes men ($n = 513$, 51.2%) and women ($n = 488$, 48.8%) aged 16 to 69 ($M = 43.08$, $SD = 14.89$, see Fig. 3) from different educational strata. Hence, with regard to the attributes of age and gender, the validation and calibration sample corresponds to the target group of German-speaking persons from 16 to 69 years of age as defined in 2.2 Areas of application. The main characteristics of the validation and calibration sample are presented below.

The following tables show the absolute and percentage frequencies of the current employment situation (Tab. 5), as well as the highest general school-leaving qualification (Tab. 6) and the vocational/professional qualifications acquired (Tab. 7). Multiple answers were possible when specifying the vocational/professional qualifications acquired.

TABLE 5:
CURRENT EMPLOYMENT SITUATION

	N	%
Full-time employment	498	49.8
Part-time employment	129	12.9
Part-time retirement (both working and exemption phase [Freistellungsphase])	14	1.4
Marginally employed, 450 -euro job, mini-job	49	4.9
“One euro job” (receiving Arbeitslosengeld II social security benefits)	1	0.1
Occasional or irregular employment	13	1.3
Undergoing vocational training/apprenticeship	21	2.1
In retraining	5	0.5
Federal voluntary service or voluntary social year	5	0.5
Maternity leave, parental leave, or other leave of absence	24	2.4
Not gainfully employed (including: school and college students who are not working for money, unemployed, early retirement)	242	24.2
Total	1001	100

TABLE 6:
HIGHEST GENERAL SCHOOL LEAVING CERTIFICATE

	N	%
Student, attended a full-time general education school at the time of survey	22	2.2
Left school without a school-leaving qualification	2	0.2
Secondary school leaving certificate (elementary school leaving certificate) (Hauptschule/Volksschule) or equivalent	221	22.1
Polytechnic secondary school of the GDR, with completion of 8th or 9th grade	9	0.9
Secondary school certificate (Realschule/Mittlere Reife) or equivalent	290	29.0
Polytechnic secondary school of the GDR, with completion of 10th grade	33	3.3
Technical college entrance qualification	68	6.8
High school diploma/general or course-specific college entrance qualification (Gymnasium or EOS, or EOS with apprenticeship)	351	35.1
Other school leaving certificate	5	0.5
Total	1001	100

TABELLE 7:
VOCATIONAL/PROFESSIONAL QUALIFICATION

	N	%
Still undergoing vocational training/professional qualification (preparatory year, trainee, intern, student, etc.)	100	10.0
Student attending a vocationally-oriented supplementary school vocational school, or similar at the time of the survey	11	1.1
No vocational qualification and not in vocational training	59	5.9
Vocational training (apprenticeship) completed	469	46.9
Vocational qualification from a vocational school training program (vocational school, Kolleg)	82	8.2
Preparatory training for the intermediate civil service in public administration	22	2.2
Completion of a one-year training course at a school for health care	6	0.6
Completion of two- or three- year training course at a school for health care	40	4.0
Obtained qualification as a preschool teacher	16	1.6
Technical college degree obtained in the GDR	11	1.1
Graduated from a technical school, master craftsman's school, technical school, academy for administration and business, or professional academy	99	9.9
Bachelor's degree	54	5.4
Diplom degree	108	10.8
Master's degree, Magister degree, Staatsexamen (state examination)	56	5.6
Doctorate	16	1.6
Other professional degree/qualification	25	2.5

Note: Multiple answers were possible.

3.2 Reliability

Reliability is the degree of accuracy to which a test measures a certain attribute (Lienert & Raatz, 1998). To determine the reliability, we calculated what is called construct reliability according to McDonald, the weighted omega (McDonald, 1999). This estimator of reliability is more precise than the widely used Cronbach's α coefficient (Cronbach, 1951), because it is based on more realistic assumptions (tau-congeneric measurement models of the items of a scale). Details of the calculation can be found in (Kemper, Ziegler, Krumm, Heene, & Bühner, 2015). As can be seen in Table 8, the estimated values for almost all motive scales lie within a range that is usually targeted for statements in the context of individual diagnostic questions (cf. e.g., Evers, Sijtsma, Lucassen, & Meijer, 2010; Fisseni, 2004) and in some cases significantly exceeds it: principles (.80) to sensuality (.95). This supports the conclusion that the scales in LXXXprofile measure motive dispositions with a satisfactory to high level of

reliability. The only exception is the autonomy scale where $\Omega_w = .65$. The lower accuracy of the test score for autonomy should definitely be taken into account for the interpretation (see section 2.5 Interpretation).

In addition to construct reliability, we have provided Cronbach's internal consistency coefficients because this estimator is widely used. However, because Cronbach's α only provides the lower bound of reliability in tau-congeneric models and the items assigned to the motivational scales in the measurement models sometimes load their factors differently, these estimates are, expectedly, lower than compared to Ω_w .

In accordance with DIN 33430, we recommend checking the validity of the reliability parameters before the expiry of the eight-year period (Kersting, in press).

TABLE 8:
RELIABILITY COEFFICIENTS OF THE 16 SCALES

Scale	Ω_w	α
Curiosity (CUR)	.89	.88
Social acceptance (SAC)	.85	.82
Power (POW)	.91	.87
Status (STA)	.87	.83
Retention (RET)	.85	.81
Autonomy (AUT)	.65	.62
Social participation (SOZ)	.90	.88
Principles (PRI)	.80	.74
Social engagement (SEN)	.91	.86
Structure (STR)	.92	.89
Safety (SAF)	.85	.81
Revenge (REV)	.91	.84
Physical exercise (PHE)	.96	.90
Food enjoyment (FOE)	.90	.84
Family (FAM)	.92	.89
Sensuality (SUY)	.95	.90

Note. *N* = 1001.

3.3 Validity

The validity of a test is considered to be its most important quality criterion (Bortz & Döring, 2006). It is used to determine whether a test actually measures the attribute it claims to measure. When checking validity, three aspects should be considered: content validity, criterion validity, and construct validity.

Content validity indicates that the most important aspects of a construct are covered exhaustively by all the items of the test (Bortz & Döring, 2006). However, there are two important points to consider. Firstly, content validity cannot be determined numerically, and secondly, content validity is, strictly speaking, not considered a criterion for test quality, but instead an objective used to guide the design of a test (Bortz & Döring, 2006). In line with this recommendation, we involved seven experts from the fields of personality and motivation who are familiar with the constructs to be operationalized in the development of the items for LUXXprofile, in order to best address the exhaustive mapping of the most important aspects of the constructs.

Because unlike content validity, criterion validity and construct validity can be determined numerically, we have presented these aspects in more detail in separate sub-sections to this section. We examined criterion validity with respect to the prediction of behavior (3.3.2), as well as with respect to the prediction of indicators for professional success (3.3.3). We subdivided construct validity into factorial validity (3.3.1) and convergent/discriminant validity (3.3.4), which we investigated separately. In order to answer the central question of validity, namely whether a test actually measures what it claims to measure, the results presented in this section should be viewed as an overall pattern of all aspects of validity, instead of interpreting individual results in isolation.

3.3.1 Factorial validity

The factorial validity of LUXXprofile was verified in a two-step procedure using the standardization sample. First of all, the 16 measurement models were individually fit to the data. Subsequently, all 16 scales were modeled in a common structural model to test the assumption that LUXXprofile depicts 16 sufficiently distinct motive dimensions.

For theoretically defined constructs, assumptions about the interrelationships between test items can be derived and tested. If such a correlation structure can be derived from the theoretical definition of the construct as well as tested and validated via inferential statistics, we speak of factorial validity. (Hartig, Frey, & Jude, 2012). Based

on the theoretical principles, we expected that a model with 16 sufficiently distinct factors would exhibit a good model fit in a confirmatory factor analysis (CFA).

To test this hypothesis, we proceeded in two steps. In the first step, we modeled the measurement model separately for each scale in a confirmatory factor analysis (CFA). To do so, we first randomly divided the sample into two approximately equal halves. Based on one of the halves, we then separately modeled the measurement models of the 16 scales and checked if there was any need for modification (modification indices). The retention (RET) and food enjoyment (FOE) scales both showed a particularly high error correlation. This applied to items 50 and 72 for the retention scale, as well as items 8 and 48 of the food enjoyment scale. Upon closer examination of the item content, it was revealed that the error correlations resulted from a content-related redundancy in the item formulation, which is why we decided to include the error correlations in the measurement models. We subsequently conducted cross-validation with the second half of the split sample for the modifications that had now been introduced. The results supported our approach. After implementing the modifications described, we modeled the measurement model separately for each scale based on the total sample and collected the fit statistics in Table 9. The χ^2 fit statistic was not considered for assessing model goodness of fit because it has a very high test power for a large sample, such that even minimal deviations of the model-implied covariance matrix from the population covariance matrix lead to a rejection of the model (Eid, Gollwitzer, & Schmitt, 2013, p. 881).

As Table 9 shows, all measurement models comply with the respective specified limits for the fit indices, which indicates an acceptable to good fit of the respective measurement models. It is only for the principles scale does the CFI just fall short of the lower limit of .90. Since the other fit indices for this scale are within the target limits, we assume that the principles scale still satisfies the conditions for an acceptable fit.

In the second step, we modeled the 16 motive scales jointly as part of structural equation modeling (SEM). In order to obtain a favorable ratio of sample size to the number of parameters to be estimated when modeling all motives – in this case, Bentler and Chou (1987) recommend a ratio of 5:1 as a rule of thumb – we used the parceling method. In this method, items are grouped into so-called “parcels”, which are then modeled as indicators in a CFA. When forming the parcels, we followed the balanced approach (Little, Cunningham, Shahar, & Widaman, 2002; Little, Rhemtulla, Gibson, & Schoemann, 2013), according to which the items are distributed equally among the parcels according to their loading. In this method, the item with the highest loading is inserted into the first parcel together with the item with the lowest loading. Subsequently, the item with the second-highest loading is inserted into the second parcel together with the item with the second-lowest loading. The item with the third-highest loading and the item with the third-lowest loading are then inserted together into the third

parcel. In the last step, the remaining three items are then divided up such that the item with the fourth-highest loading goes into the third parcel, the item with the fifth-highest loading is assigned to the second parcel, and the item with the sixth-highest loading is added to the first parcel.

TABLE 9:

Fit indices of the measurement models for the 16 scales.

Motive	χ^2	d.f.	p (χ^2)	RMSEA (CI 90%)	CFI	SRMR
CUR	102.58	27	< .001	.05 (.04; .06)	.97	.03
SAC	146.66	27	< .001	.07 (.06; .08)	.94	.04
POW	150.10	27	< .001	.07 (.06; .08)	.96	.03
STA	122.00	27	< .001	.06 (.05; .07)	.95	.03
RET	181.35	26	< .001	.08 (.07; .09)	.92	.05
AUT	70.66	27	< .001	.04 (.03; .05)	.92	.03
SOZ	209.61	27	< .001	.08 (.07; .09)	.94	.04
PRI	186.52	27	< .001	.08 (.07; .09)	.88	.05
SEN	169.27	27	< .001	.07 (.06; .08)	.95	.04
STR	277.14	27	< .001	.10 (.09; .11)	.93	.05
SAF	119.97	27	< .001	.06 (.05; .07)	.95	.04
REV	138.10	27	< .001	.06 (.05; .08)	.96	.04
PHE	134.09	27	< .001	.06 (.05; .07)	.98	.03
FOE	186.57	26	< .001	.08 (.07; .09)	.93	.05
FAM	96.61	27	< .001	.05 (.04; .06)	.98	.02
SUY	182.29	27	< .001	.08 (.07; .09)	.96	.04
Limit values				<.10	>.90	<.11

Note: Assessment of model goodness of fit using Root Mean Square Error of Approximation (RMSEA), limit of Browne and Cudeck (1993); Standardized Root Mean Residual (SRMR), limit of Bühner (2011); Comparative Fit Index (CFI), recommendation by Marsh, Hau, and Wen, (2004) with the more appropriate limit of .90 for personality measurements (cf. Hong, Paunonen, & Slade, 2008); N = 1001.

The objective of this method is to ensure that the resulting parcels are as similar as possible in terms of their loading, and hence represent similarly good indicators for the latent construct. Firstly, for each measurement model, we grouped the nine items into three parcels containing three items each according to the rule by Little et al. (2013) and tested the validity of the resulting model. In order to estimate a model with three indicators, we had to introduce restrictions. These involved equating the loading of the three indicators. Because of the strategy according to which the parcels were assembled, the assumption of equal loading is appropriate. However, in order for the loading of the three indicators to merely be equated and not set equal to 1, it was necessary to free the loading of the first indicator and, in this context, fix the variance of the latent variable at 1. The resulting measurement models had an adequate model fit. Finally, all 16 measurement models were integrated into an overall model and estimated. According to the previously used limits for the fit indices, the resulting overall model exhibits a good fit, $\chi^2(992) = 3452.19$, $p\chi^2 < .001$, RMSEA = .05, $p_{\text{RMSEA}} = .578$, CFI = .90, SRMR = .06.

The fit statistics for the overall model indicate that LUXxprofile captures 16 sufficiently distinct motive dimensions. This finding is also supported by the results for criterion validity (in this section) and convergent/discriminant validity (in this section).

3.3.2 Criterion validity

In the validation of a diagnostic instrument, criterion validity holds a high practical relevance. A test or questionnaire is criterion-valid if the behavior of the participant within the test situation, i.e. the answers in the questionnaire, can be used to successfully predict behavior outside of the test situation (= criterion). The closer the relationship between behavior within and behavior outside of the test situation, the greater the criterion validity (Moosbrugger & Kelava, 2012). However, in order for evidence of criterion validity to be significant at all, it is essential that criteria exist which are beyond a doubt valid measures of the attribute to be measured (Moosbrugger & Kelava, 2012, p. 145). Although Moosbrugger and Kelava (2012) state that such a case is rare, in the present case we succeeded in finding criteria that meet these requirements for 12 of the total of 16 motives. The findings on this will be presented in the following paragraphs. Exceptions to this are the scales social acceptance, structure, revenge and sensuality. For the first three scales mentioned, it ultimately proved infeasible to find criteria that could have been interpreted unambiguously and simultaneously collected as part of an online study. As criterion validity is only one of several aspects of validity (Bortz & Döring, 2006), and we present further compelling results for all scales with regard to convergent and discriminant validity, we decided not to collect any criteria for the scales mentioned which might not be clearly interpretable. Instead, we once again calculated correlations to established and well-researched constructs specifically for the scales social recognition, structure, and revenge

(see 3.3.4 Convergent/discriminant validity) and thus present different, but no less compelling evidence for the validity of these chosen scales. The sensuality scale represents another special case in that developed and valid criteria already existed for this scale. However, because the corresponding items explicitly asked about sexual behavior and habits, we decided not to present these items for moral reasons and to avoid reactive response behavior from the participants. However, we can present compelling evidence of convergent and discriminant validity in this case as well, which speaks for the validity of the scale. In the following, however, the available evidence for the criterion validity of 12 scales will first be presented. But before this, we explain the rationale for the specific criterion validation method.

The starting point for criterion validation is McClelland's definition of motives (1980, 1987; cited in Heckhausen & Heckhausen, 2010). He describes that motives are stimulated by incentives in the environment and energize, orient, and select behavior that serves to satisfy them. It therefore follows that people who have a high level of a particular motive and hence are more sensitive to situational incentives which stimulate the motive should perform actions aimed at satisfying the motive more frequently than persons who possess a lower level of the same motive. With respect to the determination of criterion validity, we can therefore infer the following general hypothesis: If the test score of a motive scale (= behavior of the person within the test situation) representing the level of the motive is able to explain inter-individual differences in behavior aimed at the satisfaction of this motive (= behavior of a person outside the test situation), this means that the test score is criterion-valid.

To test this general validation hypothesis, various behavioral indicators were elicited in the course of the validation study. These behavioral indicators ask whether and/or how often the participant exhibits certain types of behavior (e.g., using Wikipedia to learn new things) that are aimed at satisfying the respective motives (curiosity). Based on the responses to the behavioral indicators, the participants were then divided into two groups in order to compare the test scores of the respective motive scale between these groups. In this case, the response formats for the behavioral indicators surveyed differed. Naturally, some questions were dichotomized, i.e., participants could only answer "Yes" or "No". For the food enjoyment scale, for example, participants were asked whether they had ever attended a cooking class. In this case, the test score (= raw value) of the two groups "Yes" and "No" were simply compared on the relevant motive scale. Other items, however, permitted other, open-ended responses, such as an indication of frequency. For these criteria, a median split was performed before validation, i.e. participants were divided into approximately equally-sized groups based on the frequencies they specified (e.g. group 1: 0-3 times, group 2: at least 4 times), after which their test scores were also compared on the relevant motive scale.

To determine criterion validity, a covariate analysis was first performed for each criterion to calculate the influence of the covariates gender, age, or education on the mean differences in the test scores between the groups. If any covariates proved to not be significant, they were removed and the analysis was repeated, or if none of the covariates had a significant influence, a univariate analysis of variance was subsequently performed. To be able to interpret the size of the mean differences in a meaningful fashion, the effect size η^2_p was determined. An effect size of $\eta^2_p = .01$ corresponded to a small effect, $\eta^2_p = .06$ a medium-sized effect, and $\eta^2_p = .14$ constituted a strong effect (Cohen, 1988).

In the following, the criterion validation of the individual scales is described briefly:

CURIOSITY

The curiosity scale describes inter-individual differences in the pursuit of knowledge, insight, and intellectual challenges. Individuals with high test scores on this scale particularly value knowledge and insight. They prefer activities that challenge their intellect and enjoy learning new things. To determine criterion validity, participants were asked how often they use the website Wikipedia each week. Via a median split in the criterion, the participants were then divided into two groups (group 1: up to once per week, group 2: more than once per week). This revealed a medium-sized significant difference in test scores on the curiosity scale. Individuals who use the Wikipedia website less frequently have lower test scores for curiosity than persons who use the website frequently, $F(1, 172) = 12.33$, $p < .001$, $\eta^2_p = .07$. This means that test scores on the curiosity scale explain inter-individual differences in curiosity behavior and are therefore criterion-valid.

POWER

The power scale describes inter-individual differences in seeking to control and influence people and processes. Individuals with high test scores attempt to exert influence on their environment, to convince fellow human beings of their opinion, and to steer them in the interest of their own goals. In order to determine the criterion validity, the participants were asked how much leadership responsibility they have in their jobs. Via a median split in the criterion, the participants were then divided into two groups (group 1: no leadership responsibility, group 2:

at least one employee). A small significant effect was observed. Persons with leadership responsibility in their jobs achieved higher test scores than persons without leadership responsibility in their jobs, $F(1, 665) = 19.31, p < .001, \eta^2_p = .03$. This shows that test scores on the power scale are able to explain inter-individual differences in the assumption of leadership responsibility, and are therefore criterion-valid.

STATUS

The status scale describes inter-individual differences in the pursuit of prestige and a prominent position in society. Individuals with high test scores pay a lot of attention to their social position and try to stand out from other people. In order to determine the criterion validity, we asked participants about the number of academic degrees they hold. Via a median split in the criterion, participants were then divided into two groups (group 1: no academic degree, group 2: one academic degree or more). A small significant effect was observed. Persons with at least one academic degree had higher test scores on the scale than persons without an academic degree, $F(1, 997) = 5.21, p < .05, \eta^2_p = .01$. The results show that test scores on the status scale can explain inter-individual differences in the acquisition of academic degrees. Because academic degrees are associated with a certain degree of prestige, the test scores are therefore criterion-valid.

RETENTION

The retention scale describes inter-individual differences in the endeavor to accumulate and maintain reserves. For individuals with high scores on this scale, material possessions play a special role in life. It is of central importance for them to accumulate or save possessions. As a criterion for the retention scale, participants were asked if they had a call money account. There was a small significant difference in the test scores on the retention scale between the two groups of participants (Do you have a call money account? Yes/No). Persons with a call money account scored higher on the scale than persons who do not own a call money account, $F(1, 199) = 4.47, p < .05, \eta^2_p = .02$. This shows that test scores on the retention scale can explain inter-individual differences in savings behavior and that they are therefore criterion-valid.

AUTONOMY

The autonomy scale describes inter-individual differences in the pursuit of independence from the social expectations and influence of others. For individuals with high test scores, it is of particular importance to shape their lives independently and to orient themselves according to standards they themselves choose. We used relationship status as a criterion for the autonomy scale. Between the two groups of married people and persons in a civil union vs. single and divorced or separated people, there was a small but significant difference in the test scores on the autonomy scale in absolute terms. Single persons and divorced or separated persons scored higher on the scale than persons who are married or living in a domestic partnership, $F(1, 969) = 6.13$, $p < .05$, $\eta^2_p = .01$. This shows that test scores on the autonomy scale can explain inter-individual differences in relationship status and are therefore criterion-valid.

SOCIAL PARTICIPATION

The social participation scale describes inter-individual differences in the pursuit of companionship and interest in other people. Individuals who have a high test score on the scale enjoy spending time with other people and typically have a large circle of friends. They greatly appreciate being able to be part of a group. To determine criterion validity, participants were asked whether they were currently active members of a club. There was a small significant difference in mean values between the groups which answered “Yes” and “No” to club membership. Persons who reported being a member of a club had higher test scores on the social participation scale than persons who reported not having membership in a club, $F(1, 199) = 5.41$, $p < .05$, $\eta^2_p = .03$. Furthermore, participants were asked how many persons they currently counted among their circle of friends. Via a median split, the participants were then divided into two groups of approximately equal size. A significant difference in mean values was also observed here, in this case a strong effect. Persons who stated that they had a large circle of friends scored higher on the test than those who stated that they had few friends, $F(1, 199) = 41.06$, $p < .001$, $\eta^2_p = .17$. These results show that test scores on the social participation scale can explain inter-individual differences in contact behavior and are therefore criterion-valid.

PRINCIPLES

The principles scale describes inter-individual differences in striving to conform to social norms. Individuals who score high on the scale assign a high value to rules and principles. For criterion validation, participants were asked how often they had taken public transportation without a valid ticket and how often they had driven a motor vehicle with a blood alcohol level of more than 0.05%. Participants were subdivided into the groups “Never” and “At least once”. For both the criterion “Fare evasion” and the criterion “Drunk driving”, there were small differences in the mean values, however these were not significant. Descriptively, it was found that persons who stated that they had never used public transport without a valid ticket scored higher on the principles scale as compared to those who stated that they had evaded the fare at least once, $F(1, 199) = 3.83$, $p = .052$, $\eta^2_p = .02$. Similarly, persons who reported to have never driven a motor vehicle under the influence of alcohol descriptively achieved higher test scores on the principles scale than persons who reported having driven a motor vehicle under the influence of alcohol at least once, $F(1, 199) = 3.80$, $p = .053$, $\eta^2_p = .02$. In both cases, the effects fell just short of the significance limit. Descriptively, the results point in the same direction, such that higher test scores on the principles scale are associated with fewer self-reported violations of the law.

SOCIAL ENGAGEMENT

The social engagement scale describes inter-individual differences in commitment to the disadvantaged and needy and to a more just society. Individuals with high scores on the scale care about the welfare of others and often actively advocate for it. To test criterion validity, participants were asked whether they were currently doing volunteer work or had done so in the past. There was a small significant mean difference. Persons who were currently doing volunteer work or had done so in the past achieved higher test scores on the principles scale than persons who were neither doing nor had ever done volunteer work in the past, $F(1, 199) = 10.52$, $p < .001$, $\eta^2_p = .05$. In addition, participants were asked how much money they donated to charity per year, and were then divided into two approximately equal groups by median split in the criterion. A medium-sized significant effect was observed for this criterion. Individuals donating less than € 50 per year to charity had lower test scores on the social engagement scale than persons who donated more than € 50 per year to charity, $F(1, 195) = 15.03$, $p < .001$, $\eta^2_p = .07$. This means that the test scores explain inter-individual differences in pro-social behavior and are therefore criterion-valid.

SAFETY

The safety scale describes inter-individual differences in the pursuit of a peaceful and safe life. Individuals with high scores on the scale have a pronounced sensitivity to potential dangers and try to avoid risks. To test criterion validity, we asked the group of employed persons in the sample whether they had become self-employed in their profession. Participants were then divided into two groups: those who had become self-employed and those who had not. A small significant effect was observed. People who had become self-employed scored lower on the safety scale than individuals who had not become self-employed, $F(1, 700) = 7.10$, $p < .01$, $\eta^2_p = .01$. The result shows that the test scores on the safety scale can explain inter-individual differences in the tendency to take risks, which means that they are criterion-valid.

PHYSICAL EXERCISE

The physical exercise scale describes inter-individual differences in the pursuit of exercise and physical activity. Individuals with high scores on the scale love being physically active and enjoy exercising intensively and regularly. To examine criterion validity, participants were asked how many hours of exercise they engaged in each week. Via a median split in the criterion, participants were divided into two approximately equal groups. A strong significant effect was found. Individuals who reported doing more than 2 hours of exercise per week scored higher on the physical exercise scale than those who had less than 2 hours of exercise per week, $F(1, 177) = 95.51$, $p < .001$, $\eta^2_p = .35$. In addition, participants were asked whether they were currently active in a sports club. A medium-sized significant effect was observed for this criterion. Individuals who were active in a sports club achieved higher test scores on the physical exercise scale than those who were not active in a sports club, $F(1, 199) = 17.38$, $p < .001$, $\eta^2_p = .08$. This shows that the test scores of the physical exercise scale are able to explain inter-individual differences in exercise behavior and are therefore criterion-valid.

FOOD ENJOYMENT

The food enjoyment scale describes inter-individual differences in the pursuit of pleasurable food experiences. Individuals with high scores on the scale often describe themselves as gourmands. They enjoy engaging extensively in the act of eating. They may also be interested in the preparation of food and cooking. To test criterion validity, participants were asked how often they ate at a restaurant known for the good taste of its food each month. Via a median split in the criterion, participants were then divided into two approximately equal groups. A medium-sized significant effect was observed. Individuals who reported eating at a restaurant more than twice per month achieved higher test scores on the food enjoyment scale than those who visited a restaurant less than twice per month, $F(1, 198) = 17.31, p < .001, \eta^2_p = .08$. In addition, participants were asked whether they had ever taken a cooking class or could imagine doing so. Again, a medium-sized significant effect was observed. Individuals who had attended a cooking class in the past or could imagine attending one achieved higher test scores on the food enjoyment scale than persons who had never attended a cooking class and also could not imagine doing so, $F(1, 199) = 27.22, p < .001, \eta^2_p = .12$. The results show that the test scores of the food enjoyment scale are able to explain inter-individual differences in food enjoyment behavior and are thus criterion-valid.

FAMILY

The family scale describes inter-individual differences in caring for one's family. Individuals with high scores on the scale see family as an important point of reference for closeness, trust, and safety. They enjoy spending time with their family. To this end, participants were asked how many times per month they visit family members who do not live in their household. Via a median split in the criterion, participants were then divided into two approximately equal groups. A small significant effect was observed. Individuals who reported visiting family members at least four times per month scored higher on the family scale than those who visited family members less than four times per month, $F(1, 184) = 7.67, p = .006, \eta^2_p = .04$. This means that test scores on the family scale are able to explain inter-individual differences in behavior when caring for family, and are therefore criterion-valid.

3.3.3 Convergent/discriminant validity

To obtain evidence for the convergent and discriminant validity of the test scores from LUXXprofile, we considered the correlations between the motive dimensions and the personality dimensions of the five-factor model of personality (Big Five) (Table 11). For assessing the Big Five, we used the BFI-2 (Danner et al., 2016), which measures the five personality dimensions via a total of 60 items. The reliability coefficients (McDonald's omega) for the five scales ranged from .74 (agreeableness) to .81 (openness). The classification of correlations into > .10 = low correlation, > .30 = medium correlation, and > .50 = strong correlation is based on Cohen (1988).

TABLE 11:

Rank correlations of the 16 motive scales with the five scales of the BFI-2.

	Openness	Negative Emotionality	Extraversion	Conscientiousness	Agreeableness
Curiosity	.55**	-.22**	.23**	.18**	.04
Social acceptance	-.12	.34**	-.13	-.11	.11
Power	.14*	-.06	.43**	.07	-.12
Status	.03	.11	.19**	-.03	.01
Retention	-.03	-.15*	-.04	.36**	-.01
Autonomy	-.01	.02	-.01	.16*	-.13
Social participation	.20**	-.21**	.60**	.15*	.43**
Principles	.06	-.01	-.11	.24**	.17*
Social engagement	.35**	-.14*	.16*	-.02	.55**
Structure	-.04	-.08	.20**	.73**	.00
Safety	-.21**	.19**	-.38**	.17*	.02
Revenge	-.07	.34**	.02	-.11	-.43**
Physical exercise	.03	-.22**	.29**	.42**	.15*
Food enjoyment	.15*	-.01	.24**	-.03	.06
Family	.05	-.10	.27**	.31**	.31**
Sensuality	-.00	-.03	.27**	.02	.04

Note. ** p < .01; * p < .05; n = 200.

Openness describes inter-individual differences in aesthetic perception, intellectual curiosity, and creative ingenuity (Danner et al., 2016). The curiosity scale is about the enjoyment of intellectual pursuits, as well as the appreciation of knowledge and insight. Due to the conceptual overlaps, we expected a medium correlation between openness and curiosity, which turned out to be even slightly higher in the data and resulted in a medium correlation. In addition, a medium positive correlation was found with social engagement, as well as small positive correlations with social participation, food enjoyment, and power. A low negative correlation was seen with the safety scale.

Negative emotionality subsumes inter-individual differences in anxiousness, dejection, and the volatility of feelings (Danner et al., 2016). Based on these concepts, we expected positive correlations with all motives that emphasize the fear/avoidance aspects of behavior, e.g., safety (fear of the unknown) and social acceptance (fear of rejection). The mean correlation expected for social acceptance was evident from the data. However, the correlation with safety turned out to be lower than expected. Instead of a medium effect, a small effect was seen. In addition, there was a medium positive correlation with revenge, and small negative correlations with curiosity, retention, social participation, social engagement, and physical exercise.

Extraversion encompasses inter-individual differences in sociability, assertiveness, and activity (Danner et al., 2016). The social participation scale addresses the pursuit of companionship and interest in others. Due to the sociability aspect, which plays an important role in both extraversion and social participation, we expected a strong positive correlation between these scales. Because assertiveness is also a component of extraversion, we also expected a medium positive correlation with the motive of power. This motive is very much about leading and controlling other people, for which a certain assertiveness is necessary. Both effects were apparent in the expected direction and strength. In addition, several small positive correlations with curiosity, status, social engagement, structure, physical exercise, food enjoyment, family, and sensuality were also observed. There is also a medium negative correlation with the safety scale.

Conscientiousness describes inter-individual differences in orderliness, industriousness, and reliability (Danner et al., 2016). The structure scale is about keeping an individual's own environment orderly and tidy, e.g. one's own home environment. Because the aspect of orderliness is important in both scales, we expected a strong correlation between structure and conscientiousness. Due to the reliability component of the conscientiousness scale, we also expected a medium correlation with the principles scale, as the latter addresses the pursuit of compliance with rules and agreements. Both correlations were found in the expected direction and extent. Furthermore, three medium positive correlations were found with the retention, physical exercise, and family scales. Low positive correlations were found with the curiosity, autonomy, social participation, and safety scales.

Agreeableness encompasses inter-individual differences in compassion, politeness, and trust (Danner et al., 2016). The social engagement scale addresses commitment to the needy and a better society. Because compassion plays a role in both scales, we predicted a mean positive correlation between agreeableness and social engagement. Furthermore, we expected a medium negative correlation between agreeableness and revenge. For the revenge scale, the focus is on retaliating against wrongs one has experienced and getting back at others. These aspects are contradictory to the facets of the agreeableness dimension, such as politeness. Both correlations were found in the expected direction and, for revenge, also to the expected degree. For the social commitment scale, however, the analysis revealed a strong positive effect. Moreover, medium positive correlations were observed with the social participation and family scales, and low positive correlations with the principles and physical exercise scales.

In addition to the Big Five – as previously announced in 3.3.2 Criterion validity – we calculated the correlations between the 16 motive scales and the constructs Personal Need for Structure, Negative Reciprocity, and Personal Fear of Invalidity with specific hypotheses for the three motive scales social acceptance, structure, and revenge (Table 12). The hypotheses for these 3 scales, for which no findings on criterion validity are available, are derived and tested in the following sections. The correlations with the remaining 13 motive scales were investigated exploratively.

TABLE 12:

Rank correlations of the 16 motive scales with Personal Need for Structure, Negative Reciprocity, and Personal Fear of Invalidity

	Personal Need for Structure	Negative Reciprocity	Personal Fear of Invalidity
Curiosity	-.11	-.10	-.20**
Social acceptance	.32**	.12	.63**
Power	.10	.33**	-.01
Status	.26**	.33**	.25**
Retention	.43**	.27**	.06
Autonomy	.35**	.13	.02
Social participation	-.07	-.02	-.03
Principles	.27**	-.15*	.24**
Social engagement	-.19**	-.31**	-.030
Structure	.68**	.21**	.13
Safety	.54**	.03	.28**
Revenge	.29**	.75**	.24**
Physical exercise	-.01	.09	-.01
Food enjoyment	.02	.02	-.10
Family	.12	-.02	.02
Sensuality	.00	.19**	-.11

Note: ** $p < .01$; * $p < .05$; $n = 200$.

Personal Need for Structure (PNS) was assessed using the PNS-6 scale (from Collani, 2013), which evaluates the construct with a high level of reliability ($\alpha = .89$) using six items. PNS describes inter-individual differences in the need for the social environment to have a simple structure (Neuberg & Newsom, 1993; Meiser & Machunsky, 2008), thus exhibiting conceptual overlaps with the motive scale for structure, which describes the desire to structure the environment in a simple and consistent manner. Because both scales have a strong focus on structure and order, we expected a strong positive correlation between the two scales, which proved to be true. In addition, PNS showed a strong positive correlation with safety, positive medium correlations with social acceptance, retention, and autonomy, and small positive correlations with status and revenge. A low negative correlation was observed between PNS and social engagement.

For assessing negative reciprocity (NR), we presented the eponymous scale from the NPR-S (Weinhardt & Richter, 2013), which uses three items to measure the construct economically and reliably ($\alpha = .86$). Reciprocity generally describes the tendency to respond in a comparable manner to behavior directed at oneself by someone else (Fehr & Schmidt, 2006). Negative reciprocity focuses on responding to poor treatment, such as an insult or an injustice, by also giving insult or inflicting an injustice (Dohmen, Falk, Huffman, & Sunde, 2009). Concepts such as compensation and “payback” are also the subject of strong focus on the revenge motive scale, which is why we expected a strong positive relationship between the two scales. This correlation was observed clearly, in the expected direction, and to the expected degree. Furthermore, there were medium positive correlations of the NPR-S with the power and status motive scales, as well as medium negative correlations with the social engagement scale. We also found small positive correlations for the retention, structure, and sensuality scales, and a small negative correlation with principles.

Personal Fear of Invalidity (PFI) was assessed using the SANB-5 scale (Kemper, Lutz, & Neuser, 2011), which uses five items to measure the personality trait with a very high degree of reliability ($\alpha = .89$). Personal Fear of Invalidity describes the fear of negative judgment by an interaction partner in social situations (Kemper et al., 2011). Hence, the construct exhibits conceptual overlaps with the social acceptance motive scale, whereby social acceptance tends to be a hope for recognition, whereas PFI tends to focus on a fear of rejection. Therefore, we expected a strong positive correlation between the two scales, which manifested itself in the expected direction and to the expected degree. Moreover, we found medium positive correlations between the SANB-5 and the status, principles, safety, and revenge scales. A low negative correlation was found for the curiosity scale.

3.4 Standard values

The raw score obtained from the administering of a test has no informational value on its own. Hence, a frame of reference is required for meaningful interpretation. In order to be able to use LUXXprofile to draw conclusions about the extent of a participant's attributes, a standard-oriented reference system was chosen (Kemper, Ziegler, Krumm, Heene, & Bühner, 2015). In this case, the individual test scores are correlated against the scores of a relevant comparison group. To create this reference frame, standard values in the form of z-values and STEN values were calculated using the standardization and calibration sample described in section 3.1.3. The standard values can then e.g. be entered into an evaluation profile, and interpreted accordingly. In compliance with DIN 33430, we recommend checking the applicability of the standard values before the expiry of the eight-year period and updating the standardization if necessary (Kersting, in press).

SOURCES



4. SOURCES

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THE 16 MOTIVES OF LUXXPFILE

DEUTSCH	ENGLISCH	NIEDERLÄNDISCH
NEUGIER	CURIOSITY	NIEUWSGIERIGHEID
SOZIALE ANERKENNUNG	SOCIAL ACCEPTANCE	SOCIALE ERKENNING
EINFLUSS	POWER	INVLOED
STATUS	STATUS	STATUS
BESITZEN	RETENTION	BEZITTEN
AUTONOMIE	AUTONOMY	AUTONOMIE
SOZIALKONTAKTE	SOCIAL PARTICIPATION	SOCIALE CONTACTEN
PRINZIPIEN	PRINCIPLES	PRINCIPES
SOZIALES ENGAGEMENT	SOCIAL ENGAGEMENT	SOCIALE BETROKKENHEID
STRUKTUR	STRUCTURE	STRUCTUUR
SICHERHEIT	SAFETY	VEILIGHEID
REVANCHE	REVENGE	REVANCHE
BEWEGUNG	PHYSICAL EXERCISE	BEWEGING
ESSENSGENUSS	FOOD ENJOYMENT	EETGENOT
FAMILIE	FAMILY	FAMILIE
SINNlichkeit	SENSUALITY	ZINNELIJKHEID

ITALIENISCH

FRANZÖSISCH

CURIOSITÀ	CURIOSITÉ
RICONOSCIMENTO SOCIALE	RECONNAISSANCE SOCIALE
INFLUENZA	INFLUENCE
STATUS	STATUT
POSSESSO	POSSESSION
AUTONOMIA	AUTONOMIE
CONTATTI SOCIALI	RELATIONS SOCIALES
PRINCIPI	PRINCIPES
IMPEGNO SOCIALE	ENGAGEMENT SOCIAL
STRUTTURA	STRUCTURE
SICUREZZA	SÉCURITÉ
VENDETTA	ESPRIT DE REVANCHE
MOVIMENTO	ACTIVITÉ PHYSIQUE
GUSTO NEL MANGIARE	PLAISIR DE MANGER
FAMIGLIA	FAMILLE
SENSUALITÀ	SENSUALITÉ

ETHICS OF PERSONALITY DIAGNOSTICS USING LUXXPFILE

- **Neutral and free of judgment**
- **Respectful, appreciative, and tolerant**
- **Realistic and self-reflective**
- These core axioms are the starting point for performing any work involving people using LUXXprofile. We also view these values as the foundation for any form of positive service aimed at optimizing the development of a person's individual potential.
- This is an explicit component when training to become a LUXXexpert.
- Each user assumes responsibility for their professional actions within this framework, with the knowledge of possible personal and social impact.
- LUXXexpert possess the professional, social, personal, and emotional competencies to utilize LUXXprofile professionally and appropriately.
- Each LUXXexpert shall undertake to keep abreast of the latest findings and experience through regular further training and to engage in self-reflection/supervision.
- Each LUXXexpert is committed to maintaining confidentiality, data protection, and actively safeguarding the information entrusted to them.
- A LUXXexpert shall not abuse the relationship arising from the professional relationship. Abuse occurs when LUXXexperts fail to fulfill their responsibility to participants and satisfy their own personal interests, e.g. of an economic, social, sexual or spiritual nature.
- Information about the content and costs of the training and test prices must be made transparent to the participants and are not to give rise to any deception.

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