

Iwona Krzewska,

Grażyna Dolińska-Zygmunt

Department of Psychology, University of Wrocław

Sense of Body Boundaries Survey – construction and psychometric values

Abstract

In fields of modern psychology and psychiatry there was a significant increase of researches on body subject. New instrument designed to measure body image and body-self are appearing. However, method for sense of body boundaries measurement have not been yet constructed. Sense of this kind is presumed to be a important body experience related to human personality and identity formation.

Authors of this article present phases of Sense of the Body Boundaries Survey construction, as well as current psychometric values. Method is designed to measure the means in which individual experience own body surface.

Questionnaire fills the gap in the list of empirical measurement methods in field of body psychology and may be a beginning for numerous interesting studies.

Key words: sense of body boundaries, body self

Streszczenie

Na gruncie współczesnej psychologii i psychiatrii wzrasta liczba badań osadzonych w problematyce ciała i cielesności. Pojawiają się nowe narzędzia badawcze przeznaczone do pomiaru obrazu ciała i ja cielesnego. Jak dotąd nie skonstruowano jednak metody przeznaczonej do pomiaru poczucia granic ciała. Poczucie to uznawane jest za ważny aspekt cielesnego doświadczenia, powiązany z rozwojem osobowości i tożsamości człowieka.

Autorki niniejszej pracy prezentują etapy konstrukcji Kwestionariusza Poczucia Granic Ciała, a także jego aktualne walory psychometryczne. Narzędzie to przeznaczone jest do pomiaru sposobu, w jaki człowiek doświadcza własnej cielesnej powierzchni.

Kwestionariusz uzupełnia lukę w wykazie metod empirycznych z zakresu psychologii ciała i może być zapowiedzią dla wielu ciekawych badań.

Słowa kluczowe: poczucie granic ciała, ja cielesne

Introduction.

Over the recent years, on the grounds of clinical psychology, psychology of health and psychiatry great interest was given to the body subject (Pruzinsky, Cash, 2002). However, sense of body boundaries problem is still being neglected. A part from extensive researches done by Fisher and associates (Fisher, Cleveland, 1956, 1958, Fisher, 1960; Cleveland, 1960; Fisher 1963; 1970; Fisher&Fisher, 1964), it seems to be impossible to find any reference in foreign literature to body boundary problem, which would go beyond the theoretic studies of identity and personality formation field (Allport, 1998; Winnicot, 1971; Mahler, 1982, per: Sakson-Obada, 2009; Krueger, 2002; Anzieu, 1978, per: Wycisk, 2004; Meloney, 1957, per: Wycisk, 2004). Polish authors also rarely refer to the body boundaries category (cf. Wycisk, 2004 and Sakson-Obada, 2003, 2009). Moreover, it is never a main interest of any study. Research attempts in this field are treated as novel undertaking (Obada 2009), and connected to certain doubts. Body boundaries have a preconscious character (Sakson-Obada, 2009). Therefore, such phenomenon is difficult to operationalise and empirically control.

Importance of empirical research on sense of body boundaries rises from its fundamental role in human personality and identity formation (Krueger 2002, Kowalik, 2003, Mirucka, 2003, Sakson-Obada, 2009), and also in health, emotion and motivation field (Fisher, Cleveland, 1956; Fisher, 1963). It is consistent with presumptions of other authors with psychodynamic approach (Anzieu, 1978; Meloney, 1957, per: Sakson-Obada, 2007; Krueger, 2002) and their continuators (Sakson-Obada, 2009). Empirical verification of these presumptions carry great cognitive and application worth. Nevertheless, absence of valid and reliable measurement instruments, results with serious difficulties with empirical verification.

Extensive and pioneering empirical studies held by American scientists on sense of body boundaries function (Fisher, Cleveland 1956, 1958, Fisher, 1960; Cleveland, 1960; Fisher, 1963; 1970; Fisher&Fisher, 1964) in fields of healthiness and illness are sceptically commented due to methodological controversies

(Wylie, 1961; Mednick, 1959 et al, per: Fisher, 1963; Shontz, 1969; Hirt, Kurtz, 1969). They leave many open research questions about sense of body boundaries measurement possibilities.

Sense of body boundaries as psychological phenomenon.

It is assumed, that sense of body boundaries is an important part of body-self (Wycisk, 2004; Sakson-Obada, 2007, 2009, Krueger, 2002) or body image (Roth, 1998, per: Schier, 2009).¹ Body psychology central terms – body image and body-self, are currently more and more understood as inclusive oneself own body experience. It can be presumed, that sense of carnal boundaries – also called body image boundaries (Fisher, Cleveland 1956), sense of body-self boundaries integration (Wycisk, 2004) or sense of body boundaries (Witkin, 1968, Sakson-Obada, 2009) – have to be regarded not only, as physical experience of one's body separation from the surroundings by objectively existing skin (Cognitive-perceptual experience), but also understood as subjective, cognitive-emotional experience of distinctiveness and oneself in the body integrity – to the degree in which one, in her/his own body, feels separated from the surrounding (Shontz, 1989). Scholars interested in the subject area refer to “sense” category (Wycisk, 2004, Sakson-Obada, 2007, 2009), because it integrates all of the psychological experience aspects: perceptual (how do I perceive, how do I respond to stimuli), cognitive (how do I think, what beliefs do I have), emotional and motivational (How do I feel) (divided per: Rohtihy, Priebe, 2001).

Rohricht and Priebe (2002) describe sense of body boundaries in terms of cognition, as an element of one's body concept. They define it as an aggregate of convictions about durability and integrity of own body surface. Moreover, in studies on cognitive aspects of this experience, they often use expressions as following: “imagination”, “fantasy”; “impression”; “sense”, “feeling as if” - which suggest, that cognitive aspect of body image might be difficult to describe apart from imaginative and emotional aspect.²

In Witkin's works (1968) sense of body boundary apprehension vary slightly. According to the scientist, people who have significant problems with usage of body signals for judgement of their position relative to other objects in the

¹ In literature those terms are understood differently depending on carnal experience, which they describe – objective (body image – experiencing oneself body as material object and related to it - thoughts, emotions and behaviours) or subjective (Body-self – inclusive mean in which oneself experience own body) (Mirucka, 2003)

² Also Cleveland (1960) aside of “perception”, used expression: “fantasy about consistency of body boundary”

space and for this mean use outer signals, have a weak sense of body boundaries. Witkin (1968) described body image as cognitive, emotional and systematic idea of individual's own body, which can be conscious or unconscious. According to the author (Witkin, ib.) global or diverse cognitive style, as a cognitive component of psychological differentiation, reflects on individual's body image. Field-independent subjects experience their body as a whole with precisely set boundaries and complex, well separated parts with specified structure, and field-dependent – oppositely.

Described cognitive styles enable to presume, that it is possible to describe body boundaries experience in cognitive aspect. Rare polish conceptualizations (Wycisk, 2004; Sakson-Obada, 2009) add an emotional aspect to phenomenon understanding, which changes its meaning.

Wycisk (2004) writes also about experience of body-self boundaries integrity. Body image by researcher is defined as entirety of individual's psychological processes related to own body. It is stated, that such experience may be considered as Allport's "sense", ergo cognitive-emotional fusion. As author states, sense of one's body integrity means "sensing security and impermeability of body-self boundaries, and also absence of concerns about outer intrusion (...)" (cit. p. 67).

Sakson-Obada (2009) describes body-self as a personality structure, which manages somatic experience. Scientist considers sense of body boundaries to be one of its dimensions. In the earlier works (Sakson-Obada, 2003), researcher describes it as a sense of separation from people and objects by the skin surface. By this mean she refers to psychodynamic skin-ego concept. Author adduce to Meloney whom writes, that experience of separateness from the surrounding results from skin being regarded as impassable barrier (Meloney, 1957, per: Sakson-Obada, 2003). Dysfunctional boundaries sense is permeable - skin stops to be secure and closed barrier which protects from the outer world (Anzieu, 1979, after: Sakson-Obada, 2003)

Most extensive empirical studies on sense of body boundaries were held on field of **body boundary concept by Fisher and Cleveland** (Fisher, Cleveland, 1956; 1958; Fisher, 1960; Cleveland, 1960; Fisher, 1963; 1970; Fisher&Fisher, 1964). Authors account body boundary psychological representation as a basic dimension of its image (Body image boundary). Scientists presume that experiencing body surface by people, can be described by two dimensions : Barrier aspect and permeability aspect. First dimension relates to relatively permanent sense of physical separateness form the surrounding. Second dimension is understood as sense of physical susceptibility to breach , connected with concern about physical safety. On the base of empirical studies Fisher and Cleveland drew a conclusion, that barrier aspect is relatively situation-independent, whereas permeability

aspect is situation-dependent.³³ Dimensions are considered to be relatively independent from one another.

Modern concepts of body boundary sense (Krueger, 1989, 1990, 2002; Kowalik, 2003, Allport 1998, James, 1890, Grotstein, 1980, per: Sakson-Obada 2009) are the continuation of earlier psychoanalytic ideas, i.a. such authors as Winnicott, Kohut, Stern, Mahler (Mirucka, 2003). Freud (1927, after: Mirucka, 2003) as well described ego mainly as body-ego, which he regarded as personality's core element. Development of body boundaries sense in earlier stages of life helps to distinct body from other elements in the space and aids to attain sense of physical boundaries – psychological boundary prototype (Mirucka, 2003). It is a capacity to distinguish the self from non-self, which Shontz (1989) considers as a basic function of body-self. Psychological boundaries concept, as a skin-ego attainment consequence, was developed by Anzieu (1989, per: Sakson-Obada 2007) and Moloney (1957, per: Sakson-Obada, 2007). Skin ego makes it possible for the individual to experience oneself as a unity with precisely set contours. It enables one to contact with environment without the fear of penetration (Moloney, 1957 per: Sakson-Obada, 2007). It also sets the mental area, that belongs to the self. Mental area is responsible for containing emotions, drives and psychological content. It protects the individual from undue perception influence and reality contact loss (Anzieu, 1989 per: Sakson-Obada, 2007)

Sense of body boundaries operationalization and measurement.

Fisher and Cleveland (1956) formulated controversial method for sense of body boundaries measurement. They designed a scoring system for subject's answers in Roschach test. Researchers acknowledge that, the means in which subjects perceive the unsorted material is equivalent with experience of body boundaries sense in barrier aspect (sense of separateness) and in permeability aspect (susceptibility to breach) (Fisher, 1971).

It is also presumed, that means by which subjects experience body boundary in cognitive-emotional aspect, can be reflected by projection method in their own drawings. Sharpness and cohesiveness of drawn figures are considered to be its coefficients (Machover, after: Fisher, 1970; Krueger, 2002).

During Witkin's (1968) researches, subjects whom stated their body position as vertical in relation to continuously position changing walls of capsule room,

³³ As some data implies, permeability aspect dimension stability in time is unambiguous. (cf. Miner, de Vos, 1960, per: Fisher, 1963). However, observed persistent negative relationship between barrier aspect and permeability aspect in psychosomatic patients, might suggest durability of this aspect.

and not as “objective” starting vertical position, were considered to be unable to separate their own body from the field, which – as suggested by researchers – refers to absence of sharp body boundaries.

Well known measurement method of body image and its degree of detailing is body image maturity scale (Witkin, 1968). It enables to assess body concept detailing degree, understood as sharpness, specificity and separation level of drawn body parts in relation to themselves. Analysed were such drawn figures properties, as congruence, proportions, body parts size and level of their precision. It was confirmed, that drawings maturity level positively correlates with field-independence.⁴⁴

It was often presupposed, that verbal message enables to adequately describe body boundary experience. Therefore, it seems possible to operationalize message of this type, as a score in specially prepared questionnaire. Polish authors attempted to develop measurement instruments of this kind (Sakson-Obada, 2003; 2009, Wycisk, 2004), by researching on body-self dimensions.

Wycisk, presumed per Lisa Cross (1993, per: Wycisk, 2004), that one of the experience of the body dimensions in sexual realm is sense of body-self boundaries integration. Researcher operationalises them as a score in authorial questionnaire subscale (example: “During the sexual intercourse I feel unpleasantly, as if fusing with my partner”)

In body-self questionnaire (Kwestionariusz ja cieleśnego) Sakson-Obada (2009) defines sense of body boundaries as dimension of body identity (TOŻ): a sense of physical separateness from the surroundings. TOŻ subscale contains 2 statements (“Sometimes, I feel that my body contours are loosing their sharpness, as if loosing outline of own boundaries”. ”Sometimes, I feel that my body contours are loosing their sharpness, as if loosing outline of own boundaries”).

Described methods were developed to define norm and pathology. However, most of contemporary verbal scales are prepared in relation to dysfunction - when subject does not present any averseness towards felt states. Available measurement methods include statements that imply productive symptoms or delusional thinking e.g. Subject’s belief, that outer object is suddenly located inside of his/her body (Fisher, 1970). Similarly as Body Distortion Questionnaire (Fisher, 1970) or developed specifically for schizophrenia examination Body image aberration scale (Chapman and Chapman, Raulin, 1978), recently published German scale for researching multifarious aspects of body experience, includes homogenise “psychoticism and body boundaries loss” scale, derived from factor analysis results (Michels-Lucht, Lucht, Spitzer, Freiburger, 2010).

⁴ 4 In Shontz’s (1969) opinion, it is impossible to verify the presumption that phenomenology of body experience expresses itself in drawings.

Unpublished Sakson-Obada's (2003) scale, which focuses on measurement of borderline subject's body boundary experience, also contains statements implying relationship dysfunctions ("Sometimes, when somebody touches me, I feel as if he/she trespasses my private world") and also perception dysfunction ("Sometimes, I feel as if some object located outer my body begins to fuse with it").

Furthermore, in the course of Rohrichta and Prieba research (2001, 2002) subjects with schizophrenia did not differ from anxious and depressive subjects in sense of body boundary, measured by Fisher's questionnaire subscale (1970). Despite the fact that, scale included statements which may imply delusional content and cognitive dysfunction ("Sometimes, I feel that some object appeared to be in my body area"). Other sources (Sakson-Obada, 2003) indicate, that people with healthy or borderline personality rarely agree with aforesaid statements. Dysfunctional and rarer healthy individuals, prefer metaphorical statements ("Sometimes I dream of fusing with one person as if, being one").

Verbal scales are difficult to acknowledge as the best measurement method neither for body boundary (cognitive-emotional variable) or for boundary concept (cognitive variable), since it is not possible to judge how exactly subjects interpret included statements (either literally or metaphorically). However, it seems that such scales still tower over projective methods due to its overt contents and lesser degree of arbitrary interpretation presumptions.

Sense of Body Boundaries Survey

Authors of this article, were aiming to develop properly valid and reliable method for sense of body boundary measurement. Iwona Krzewska⁵ have offered authorial formula for its operationalisation and measurement (Sense of body boundary survey) – in reference to body-self conceptualisations and Sakson-Obada's (2009) and Wycisk's (2004) methods. On the basis of Fisher and Cleveland's barrier concept (Fisher, Cleveland, 1956; 1958; Fisher, 1960; Cleveland, 1960; Fisher, 1963; 1970; Fisher&Fisher, 1964), author adopted variable bifactor theoretical model. Sense of body boundaries was defined as cognitive-emotional experience of own body surface in barrier and permeability aspects. First aspect relates to relatively permanent physical separateness from the surroundings. Second aspect is understood as a sense of susceptibility to breach, connected with concern about physical safety.

⁵ 5 Postgraduate student in Institute of Psychology, University of Wrocław. Mentor: prof. dr hab. G. Dolińska-Zygmunt

Body image described as psychological representation of conscious and unconscious body experiences (Mirucka, 2003) is derived from global experience of one's own body – body-self (Mirucka, 2003). Similarly: sense of body boundaries might be understood as properties psychological representation of own body surface and multifaceted psychological experience of distinctiveness and integrity of body-self, in relation to other elements in the surroundings, animate or inanimate. It is presumed, that sense of body boundaries in large degree functions on the unconscious level and is based on individual's imagination and fantasies, rather than on convictions, nonetheless it possible to evoke its awareness and verbally characterize with self-report method (Wycisk, 2004; Sakson-Obada, 2009). Means of defining sense of body boundaries relates to Wycisk's idea, whom applies "sense" category in body-self's definition (Wycisk, 2004). Scientist refers to Gliczyńska's definition (per: Wycisk, 2004), according to which "sense" is a "conviction to weak for individual to articulate it, but is strong enough to have influence on perception and human behaviour" (cit. p.67). Although, definition (per: ibidem) implies that, subject do not have an insight in the content of his/her experience, that could be verbalized, it seems possible to achieve such awareness – as a result, individual would be able to describe his/her experience as feelings, and not as convictions. Therefore, on Gliszczyńska's definition basis it is assumed, that individual is able to describe by own sense of body boundaries as conscious feelings and fantasies, towards which he/she stays critical.

Construction.

First phase of survey construction was to define model's theoretical frames, ergo determine which hypothetical subscales should questionnaire include. The barrier aspect and permeability aspect dimensions were determined. Afterwards statements, defining experience of own body on aforementioned dimensions (30 statements) were generated. First part of pilot study included testing 65 psychology students, whom task was to relate to the content of given statements. This stage was considered as necessary, since scales for researching body boundary were mainly developed in the context of mental illness - perception and thinking dysfunction. Studying subject's reaction to questionnaire material was therefore required. Through students comments , new objectives for method development were formulated.

It was sought to ascertain statements:

- on which subjects could expressly and quickly respond
- on which they respond similarly, despite the time passage

- on which subjects respond differently among themselves
- which subjects are able to interpret unambiguously
- which subjects do not have to associate with illness or abnormality indicators
- which they do not have to understand literally

Crucial for the next pilot research was to provide subjects with the information, that they are asked about their sense of body, feelings and associations related to it - "feeling, as if", and not convictions or judgements.

After language correctness check made by polish philologist, judges (5 psychologists) allocated statements in proper dimensions, with aim to match them well in terms of validity (5-point scale item adequacy estimation). Statements were selected by how they corresponded with subtests content (Selected were those statements, that were allocated with proper dimensions by at least 3 judges. Coefficient of concordance equalled 0,66). A priori answer key was developed for every item, according to which answers implying strong sense of body boundaries was ascribed to the highest score of 5 points. High values of barrier aspect's and low of permeability aspect's coefficients were considered as signs of strong sense of body boundaries, so they were scored highest (answer which is correct according to the answer key of barrier aspect scale: 5 point, answer which is incorrect according to the answer key of permeability aspect scale: 5 points). Pilot study was held on a group of people different by following factors: age, gender, field of study, occupation , state of mental and somatic health. Sample of 156 subjects included: Psychology students – 25, Cosmetology students – 15, physiotherapy students – 18, Physical education students- 16, polish philology students – 25, electrical engineering students – 10, middle aged individuals (40 – 65 years old) – 14, individuals with skin illnesses – 8, individuals whom were in course of mental illnesses treatment – 17, seniors (70-76 years old) – 8. State of health, current physical well-being, degree of concentration on particular body parts , level of physical activity, influence of alcohol or pharmaceuticals, which may have influence psychophysical condition, were controlled . Questionnaires of subjects who declared, being under influence of alcohol or pharmaceuticals, current afflictions (that do not have chronic disease status) or pain complaints were discarded. Similar procedure was applied towards questionnaires with significant data absence or filled with "hard to say" answer. Aforesaid procedure was held to minimise the probability of answers, that would refer to their current experience of body. Measured variable (sense of body boundaries) is considered to be independent from such experience.

Surveys in which subjects declared chronic disease and stated their physical activity (both conditions had to last at least for a year), were kept for further analysis. Questionnaires in which current concentration on body parts was not related with current pain, were kept for further analysis. As a procedure result analysed were 132 surveys.

Questionnaire's pilot study version included 28 statements, from which 9 represented barrier aspect ("I experience my skin as sharp boundary between me and the surroundings"), 13 permeability aspect ("I felt that my body is susceptible to outer influence"), and last 6 were buffer questions ("I like to be physically active").

Discriminating power analysis of every item, allowed to eliminate those statements that had 50% or more answers of the same kind. Subsequently, normal distribution was estimated for all variables (Kolmogorov–Smirnov test for selection of parametric or nonparametric methods). T-student and Manna-Whitney test were employed to carry further discriminating power analysis: tercile method was employed to ascertain high, medium and low test and subscales scores, then correlation of every statement with high, medium and low scores was estimated, for subscales and whole test. For further analysis selected were only statements, which correlated with high and low scores, on the significance level of $p \leq 0,05$. It was aimed to investigate a relationship strength between item and its primary subscale and it was sought to keep those statements which correlate with their subscales on the level of at least 0,4 (Kline criteria). It was not possible at all times, since eliminating statements lowers reliability of the subscales. At current test construction phase it was ascertained, that kept subscale statements, after analysis of discriminating power, correlate with their own subscale in greater degree than with subsequent one. Correlation coefficient between each item from one subscale ranges from 0.25 to 0.59 (Questionnaire structure necessitate improvements). Acquired Cronbach's α coefficients totalled:

- Body boundary awareness questionnaire: **0,87**
- Barrier aspect scale: **0,75**
- Permeability aspect scale: **0,86**
- Therefore Nenny criteria was fulfilled (Cronbach's α for test and subscales $\geq 0,7$)

Next step included employing exploratory factor analysis (*statistica*) to verify the model. Correlation matrix usefulness for factor analysis execution was ascertained ($KMO > 0,9$). Hypothesis that, the correlation matrix is an identity matrix was rejected.

Due to, observed relationship between subscales centroid method was used. Received results suggested presence of one factor. Osypisk test however, suggested presence of two factors. Since ascertained data were inconclusive, viramax rotation was employed (despite its frequent usage for uncorrelated factors). As a result, factor analysis revealed presence of two factors with eigenvalues >1 . First factor included barrier aspect subscale variables, and it was interpreted this was (factor loadings $\geq 0,5$). Second factor included permeability aspect subscale variables (factor loading $\geq 0,4$).

I factor: proportion of explained variance 20%

II factor: proportion of explained variance 15%

Questionnaire structure seems to be close to optimum.

Tab.1 Power of discrimination -Pearson's r correlation table for statements and subscales.

N = 132^{6*}

Statement no.	Bar. sume	Perm. Sume
3	0.71	0.48
7	0.72	0.38
8	0.63	0.25
12	0.61	0.20
14	0.61	0.38
15	0.73	0.43
9	0.16	0.51
10	0.40	0.57
11	0.31	0.57
17	0.11	0.51
18	0.35	0.64
20	0.33	0.60
21	0.47	0.64
22	0.38	0.71
24	0.40	0.72
27	0.40	0.66
28	0.42	0.78

⁶ * The table includes only the statements selected through confirmative factor analysis

In the next step the goodness-of-fit of the theoretical model to data with Confirmatory Factor Analysis (*Statistica*) was verified. Due to average correlations value between both subscales variables, generalized least squares method was employed. Tested model implied presence of 2 primary factors, identical to presumed subscales. Implied was also presence of secondary factor, which represents sense of body boundaries concept. Best measures of fit were received from two dependent factors model. Lower coefficients values were received from unifactor and dependent factors models. Foregoing table shows items, which were derived from factor analysis. All mentioned variables have reached factor loadings value on the level of statistical significance in two depended factor model. These variables are presumed to be relatively good prognosis on global sense of body boundary.

Through confirmatory factor analysis following goodness-of-fit of model to data coefficients were acquired (bifactor model with correlated factors):

Tab.2 goodness of fit coefficients

GSL Chi ²	p	df	GFI	RMSEA
189.362	0.000	119.000	0.830	Lower 90% endpoint of CI Estimated point Upper 90% endpoint of CI 0.049 0.067 0.085

We managed to fulfil several goodness-of-fit of model to data presumptions:
 quotient $\chi^2/df < 5$

root mean squared error RMSEA = 0,067 (expected RMSEA < 0,05 or RMSEA < 0,1). It means that, if total of subscales constitute general sense of body boundaries, then error, that we are making, is 7%. Such dependence therefore, would involve 93% of population

GFI is nearly 0,9.

Significant χ^2 index value was received. It means, that studentized residuals value differ from 0, which suggest weak goodness-of-fit of model to data. Howev-

er, this coefficient is not considered to be conclusive, since its dependent on sample's size. (Bentler, Bonett, 1980; per: Heszen-Niejodek, Gruszczynska, 2004)

All of goodness-of-fit coefficients suggest, that theoretical model does not fit perfectly to data, but survey can be acknowledged – from both psychological and statistical point of view – as moderately good and diagnostic. It can be presumed, that survey examines latent variable which is sense of body boundaries and enables to observe fields of its expression. Instrument psychometric properties can be improved by seeking to ascertain subscales more independent of one another. At the same time it lowers

In order to estimate measurement instrument construct validity (convergent validity), 45 subjects were tested with sense of body boundaries survey and one of Sakson-Obada's body-self questionnaire subscales. TOŻ subscale, which measures "experience interpretation in dysfunctional sense of body identity categories" (Sakson-Obada, 2009), was employed. Subscale include 2 statements, that refer to sense of body boundaries loss, and also statements that pertain sense of inner emptiness and unfamiliarity of carnal experience. Subjects received whole subscale, but analysed were only 2 of its statements related to body boundaries loss.

Tab.3 r-Pearson correlation coefficients value between sense of body boundaries survey (SBB) and criterion

	SBB global	SBB bar	PGC perm
Obada 32	0.37	0.60	0.22
Obada 47	0.35	0.69	0.22
Obada total	0.46	0.82	0.27

p<0,05

Since statements, related to boundaries in TOŻ scale, refer to sense of own body contour (and its durability), they - accordingly to the expectations - correlate highly with barrier aspect subscale. Lower correlation is observed with permeability aspect dimension, which is disparate sense of body boundaries facet. Therefore, SBB survey seems to have properly strong construct validity - in both convergent and discriminant aspects.

Diagnostic validity was examined by comparing subjects with relatively low and high sense of body boundaries in field of comfort in touch (Krzewska, 2012).

Finally, interior reliability of the test was estimated. The method of test-retest was used: for short time of 2 weeks and longer time of 3 months. Satisfying Pearson correlations were gained: 0,83 for the short time and 0,68 for the longer one.

Sense of body boundaries survey need improvements. However, from psychometric and statistical point of view, current version is sufficiently valid and reliable measurement method.

Description of the scale. Body Boundaries Survey consists of 17 statements, which describe the sense of physical separateness from the surroundings and sense of vulnerability of the body surface to breach. Participant has task to define the extent, in which the statement describes his or her body experience. Participants use 5-point scale, where: 1 – I definitely don't agree, 2- I don't agree, 3 – its hard to say, 4 – I agree, 5 – I strongly agree. On the first page of the survey sheet there are fields to write demographic data and some information about health condition, physical activity and attention currently paid to body parts or being under influence of psycho stimulating substances. The first page of the survey contains the list of 17 statements, in front of which it is to put the chosen number of the 5-point scale. The results of KPGC are formulated in 3 scales: global one (PGC), Barrier one (BAR) and Permeability one (PERM). PGC scale consists of 17 items, BAR – 6 items and PERM – 11.

Procedure. The way of using the survey is adequate to standards for psychological tests administration. After getting in touch with the participant, it is recommended to introduce the aim of examination and to receive participant's acceptance to take part in the research. Afterwards the survey sheet is given to the participant and He or she is asked to fill in the fields on the first page, read the instruction and work on his/her own. Time of exposition is not limited. Usually it takes about 5 minutes to participants to finish their work with the survey. While filling the survey it is recommended to provide the participants with conditions which support autoreflexion (no disturbances). The survey might be used in group research.

Obtaining results and interpretation.

Raw?? outcomes in each scale of KPGC are a score of items included in each of the 3 scales. The answers are scored from 1 do 5. Each item, with exception of 13, is scored inversely (for the answer: I definitely don't agree, participant gains 5 points). For item nr 13 participants gain the same quantity of points as the number chosen from the scale. The higher the score in PGC scale (global score), the stronger sense of body boundaries. The higher the score in BAR scale, the stronger the sense of separateness from the surrounding. What's impor-

tant, the key for PERM scale, is formulated inversely – the answer which suggest weak sense of permeability of body boundaries are scored high. The higher the result in PERM scale, the weaker the sense of permeability of body boundaries. Raw outcome in PGC scale might fluctuate from 17 to 85, BAR – from 6 to 30, PERM- from 11 to 55. Raw outcomes need to be related to sten?? norms, according to proper group of reference. Results of range from 1 to 4 might be described as low, 5-6 – average, and 7-10 high. In interpretation it is suggested to pay attention to the pattern of BAR and PERM results. The results are usually moderately positively correlated. It means that the higher sense of separateness in one’s own body, the lower sense of permeability. The pattern: strong sense of separateness and permeability as well is characteristic for people with psychosomatic skin illnesses. The pattern: weak sense of separateness and weak sense of permeability as well I for people with irritable bowel syndrome (Krzewska, 2012). These dependences might be important to personality features and aspects of body self estimation. Results which suggest weak sense of separateness and high of permeability (weak global sense of body boundaries) – might be connected to clinical problems.

Application. Sense of Body Boundaries Survey offers possibility to diagnose the strength of the sense of body boundaries and its dimensions. It might be used in medical sector (psychotherapy, rehabilitation, understanding and treatment of somatic, psychosomatic or mental and psychological problems, support for health potentials), educational one (understanding personality and health condition in context of body boundaries, psychoeducation), social one (attitude to one’s body and pension benefits, motivation for achievement and goal orientation, etc.), as well as in the area of sport practicing and aesthetic sector. Results of research on the sense of body boundaries have broad spectrum of application, because human body is fundamental aspect of human identity.

Norms.

Tab. 4 Basic statistics for women age of 20-40

variable	N	Mean	St. deviation	Median	Min	Max	Lower quartile	Upper quartile
PGC	198	65.69	11.55	66.00	33.00	85.00	58.00	75.00
BAR	198	24.08	4.47	24.00	11.00	30.00	21.00	28.00
PERM	198	41.61	8.13	42.00	19.00	57.00	36.00	48.00

Tab. 5 Sten? norms for women age of 20-40, normalization 2012-2013

Steny	PGC	BAR	PERM
1	33-37	11-13	19-21
2	38-42	14-15	22-25
3	43-46	16-17	26-29
4	47-54	18-19	30-33
5	55-59	20-21	34-37
6	60-65	22-24	38-41
7	66-71	25-26	42-45
8	72-77	27-28	46-49
9	78-83	29	50-53
10	84-85	30	54-55

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