CLINICAL VALIDATION AND METHOD DEVELOPMENT OF THE DRAWING VERSION OF THE PRISM TEST

Summary of PhD Thesis

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II. **Sándor Z**, Csabai M. A PRISM-D rajzteszt alkalmazása a daganatos betegséggel összefüggő érzelmi és kognitív reprezentációk komplex vizsgálatára. Orvosi Hetilap. 2018;59(48): 2021–2030. **IF: 0,53**

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List of publications related to the subject of the thesis:

I. Látos M, **Sándor Z**, Kriston P, Havancsák R, Horváth Z, Paszt A, Simonka Zs, Lázár Gy, Csabai M. Associations Between a Sedentary Lifestyle and Negative Mood State and the Risk of Breast Cancer. In: Benkő Zs, Modi I, Tarkó K, editors. Leisure, Health and Well-Being: A Holistic Approach. Cham, Switzerland: Palgrave Macmillan; 2017. p. 99-114.

II. **Sándor Z**, Csabai M. Emlődaganatos betegek hangulati állapotának, betegséggel kapcsolatos érzelmi és kognitív reprezentációinak vizsgálata a perioperatív időszakban. In: Futó Z, editor. Tudomány és innováció a lokális és globális fejlődésért: nemzetközi tudományos konferencia előadásai. Szarvas, Magyarország: Szent István Egyetem Egyetemi Kiadó; 2015. p. 94-101.

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IV. **Sándor Z**, Csabai M. Emlődaganatos betegek betegségreprezentációinak több szempontú vizsgálata. In: Koncz I, Szova I, editors. Hiteles(ebb) tudományos prezentációk II. kötet: PEME VIII. Ph.D. – Konferencia. Budapest, Magyarország: Professzorok az Európai Magyarországért Egyesület; 2014. p. 26-37.

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VI. Havancsák R, Pócza-Véger P, Látos M, Kovács P, **Sándor Z**, Barabás K, Csabai M. PRISM-D rajzteszt térbeli formációinak elemzése a betegségreprezentációk és a megküzdési kapacitás vizsgálatára. In: Tisljár-Szabó E, editor. XIII. Magatartástudományi Napok: Magatartástudományok a betegellátásban, Debrecen, Magyarország; 2013. p. 42-43.

VII. Havancsák R, Pócza-Véger P, Látos M, Kovács P, **Sándor Z**, Barabás K, Csabai M: PRISM-D rajzteszt térbeli alakzatainak kódrendszere a kórházi betegek betegségreprezentációinak vizsgálatára. In: Vargha A, editor. Kapcsolataink világa: Magyar Pszichológiai Társaság XXII. Országos Tudományos Nagygyűlés: Kivonatkötet, Budapest, Magyarország: Magyar Pszichológiai Társaság; 2013. p. 264.

VIII. **Sándor Z**, Czinderi K, Csabai M: Betegség-reprezentációk, műtét utáni fájdalom és társas támogatás összefüggései a PRISM-D nonverbális teszten frissen operált emlődaganatos betegeknél. In: Vargha A, editor. Kapcsolataink világa: Magyar Pszichológiai Társaság XXII. Országos Tudományos Nagygyűlés: Kivonatkötet, Budapest, Magyarország: Magyar Pszichológiai Társaság; 2013. p. 265.

IX. Havancsák R, Kovács P, Látos M, **Sándor Z**, Barabás K, Csabai M. A PRISM rajzteszt alkalmazása kórházi betegek reprezentációinak és a megküzdést segítő tényezők feltárására: Első hazai tapasztalatok. In: Vargha A, editor. A tudomány emberi arca: A Magyar Pszichológiai Társaság XXI. Országos Tudományos Nagygyűlése: Kivonatkötet, Szombathely, Magyarország: Magyar Pszichológiai Társaság; 2012. p. 311.

X. Havancsák R, Kovács P, Látos M, **Sándor Z**, Barabás K, Csabai M. A PRISM nonverbális teszt első hazai alkalmazásának tapasztalatai kórházi osztályokon fekvő daganatos betegekkel. In: Barabás K, Kapocsi E, Pikó B, Hamvai Cs, Látos M, Bóta M, Vári-Kószó M, editors. XII. Magatartástudományi Napok: Programfüzet és absztraktok kivonata, Szeged, Magyarország: JATEPress Kiadó; 2012. p. 72.

ABBREVIATIONS

BDI = Beck's Depression Inventory

IPM = Illness Perception Measure

PRISM = Pictorial Representations of Illness and Self Measure

PRISM-D = Drawing version of Pictorial Representations of Illness and Self Measure

SIS = Self-Illness Separation

STAI-S = Spielberger's State-Trait Anxiety Inventory - State Anxiety Scale

STAI-T = Spielberger's State-Trait Anxiety Inventory - Trait Anxiety Scale

1. Introduction

1.1. The importance of examining illness-related representations and social support and the difficulties in measuring

Examination of illness-related emotions, representations, illess interpetations and social support is of paramount importance in clinical practice, as research has shown that these factors are related to the mental and physical recovery of severe patient. A serious illness is a traumatic experience for most patients, which can restructure the order of importance of factors present in a person's life, social relationships and test patients' mental capacity.

Research findings on the usefulness of psychosocial interventions draw attention to the short- and long-term positive benefits of correcting maladaptive emotional reactions, representations and the deficits of the social support that may occur. In order to shed light on the need for intervention, it is extremely important to detect the above factors efficiently and quickly, and to screen for any maladaptive reactions that may occur. However, because feelings and thoughts about illness and attitudes toward social relationships are highly subjective, difficult to put into words, measuring these factors is not an easy task. The available specific interviews, tests and scales, due to their time-consuming nature, are always difficult to adapt to clinical practice and can only be used in case of well-verbalized patients, which is not provided in certain treatment situations due to the nature of the illness or its treatment.

Published data prove that nonverbal techniques can be successfully applied to severe patients with serious medical conditions, because, compared to verbal techniques (questionnaire, paper-pencil tests, interview), they require less energy input from patients, yet they can be used to gather a wide range of information. A further advantage is that they are also suitable for the study of less conscious feelings and cognitions.

The most commonly used nonverbal techniques are drawing tests. Traditional drawing tests (e.g., draw their illness or damaged organ, draw their body before or after disease, or currently after treatment) can reveal individual experiences with the illness and its treatment, and subjective, idiosyncratic perception of the illness. In recent years, the method has been used successfully in several studies of illness perception in various somatic patients. However, it is important to note that drawing ability of the patients may influence the interpretation of the test results, which could be a disadvantageous trait of these tests.

1.2. PRISM tests

A novel tool for nonverbal techniques in somatic patients is the Pictorial Representation of Illness and Self Meausre (PRISM) tests. The original version of the test aims to assess the perceived burden of suffering due to their illnesses among somatic ill patients using a simple, easy-to-understand visual method. However, modifications of the test also allow the measurement of a great deal of other dimensions.

In the original test, the patients are given an A/4 white metal board with a 7 cm diameter yellow circle in the lower right corner. According to the instruction, the white metal board symbolizes the patient's current life situation and the yellow circle symbolizes the patient's self. During the test recording, the patient is given a 5 cm diameter red magnetic disk that symbolizes the person's illness and this should be placed on the metal board according to how important the illness is in the person's life at the moment. In the test, the distance between the self and the disk that symbolizes the illness (Self-Illness Separation, SIS) refers to the suffering caused by the illness burden. Small SIS indicates a great deal of suffering, and a greater SIS indicates a lower degree of it. According to the results, it is also worthwile to examine the spatial position of the illness disk relative to the self disk (whether the illness circle's relative position to the self circle is inside/overlapping or outside), as these spatial positions are significantly associated with patients's depression level and the level of quality of life.

A modified version of the test, PRISM-R1, patients can choose from 3 disk of illness symbolization. The results show that the size of the disk symbolizing the illness refers to Illness Perception Measure (IPM). Another version of the test, PRISM +, allows you to display factors other than the illness that are important to the patient, such as family, hobbies, work, friends using different discs. A self-administered version of the test was also developed, which, as a paper-pencil method, is able to measure the impact of the illness on the person and its place in their life.

The PRISM test has been successfully validated in several patient groups and has been shown to be reliable in various chronic patients. Studies have shown a consistent negative correlation between SIS and depression, anxiety / perceived stress, experienced pain, disease-specific and overall quality of life. The IPM, in turn, is significantly correlated with the patients' health status and wellbeing.

Research experience with the PRISM test shows that it is suitable as a visual method for gathering fast yet personally salient information. In attidition, the test can be used well in

individual and group psychological interventions to assess attitudes about illness and to assist in therapeutic decision-making.

2. Aims

For the research consisting of three parts, I formulated the following goals:

AIM1: to investigate the applicability and the clinical validaty of the modified test among a wide, non-disease-specific population of somatic patients under active hospital treatment. The aim was to explore whether the drawing test version provides additional information compared to previous PRISM tests, and whether test participants take advantage of the freedom of the visualization. In addition, the aim was to examine whether the modified test retains the benefits of previous versions, and whether we obtain results consistent with previous research in terms of external validity. Furthermore, the aim was to investigate whether there is a correlation between some of the features displayed on the PRISM-D test and the level of anxiety and depression, which is important due to its applicability in clinical practice. (STUDY1)

AIM2: to present how the PRISM-D test provides quantitative and qualitative information about patients' illness-related emotional and cognitive representations, detailing the possibilities of analyzing data from the PRISM-D test post-test using an example of a cancer patient population. (STUDY2)

AIM3 to examine whether the measure is suitable for exploring perceived social isolation and assessing the subjective importance of social support persons amongst somatic patients. Another aim was to examine the relationship between the characteristics of social support displayed on the test and the level of illness perception, anxiety and depression. (STUDY 3)

3. STUDY1: Clinical validation of the PRISM-D test

3.1 Methods

Participants: The study involved 500 patients diagnosed with somatic disease under active hospital treatment. Participants were selected from the following disease groups: cancer patients (35.6%), patients with lumbar degenerative disc disease (31%), patients with chronic renal insufficiency (19.2%), gastro-intestinal disease patients (7%) and other hospital inpatients (7.2%). Of the individuals included in the sample, 44.4% were male and 55.6% were female. The mean age of the participants in the sample was 51.9 years (SD = 16.06).

Data collection: Consisted of three stages. Firstly, in a pilot study, the PRISM-D test was tried on a random sample of 25 hospital in-patients to find out whether the subjects could interpret the instructions and tasks of the test (measured by structured interview). After we had found that all sample members (who belonged to various illness groups) were able to understand the instructions, we used the PRISM-D test with a larger sample in the second step of our research. Patients were randomly selected for the sample from the following illness groups: cancer, gastro-intestinal disease, chronic renal insufficiency, and lumbar degenerative disc disease.

In the third step of data collection, to examine the convergent validity, the PRISM-D test, Spielberger's State and Trait Anxiety Inventory (STAI), and Beck's Depression Inventory (BDI) were used on a sample of 197 other patients. The subjects were grouped in three disease groups: cancer, gastro-intestinal diseases, and chronic renal failure. The target sample was 300 people and the number of tests to be evaluated was 278.

As a third step in data collection, to examine the convergent validity, the PRISM-D test, Spielberger's State and Trait Anxiety Inventory (STAI), and Beck's Depression Inventory (BDI) were used. Participants were composed of the following disease groups: cancer, chronic renal insufficiency, gastro-intestinal disease. As the total number of items targeted for the total research was 500, this phase of the research was completed after the inclusion of 197 evaluable tests.

Data collection was carried out in the departments of clinical centers/hospitals, with the supportive consent of the above institution: Szent-Györgyi Albert Clinical Center, University of Szeged (Szeged); the National Institute of Oncology (Budapest); and Pándy Kálmán Member Hospital of the Békés County Central Hospital (Gyula), with the voluntary participation and informed consent of the subjects, and the guidance of specialists with BSc and MA degrees in psychology.

Recording a PRISM-D drawing test consists of several steps. The participants are first given a pre-printed A4-size sheet of paper with a yellow circle that is 7 cm in diameter in the lower right corner. According to the test recording instruction, the white sheet symbolizes the person's current living environment and the yellow circle symbolizes the person's self. On this sheet, participants should draw with a red felt-tip pen in a circle of any size and location to symbolize their illness.

As a second step in the test recording, participants have the opportunity to visualize the factors that are important to them in their current living environment using felt-tip pens of different colors (yellow, orange, pink, purple, blue, green, brown, black) of any size, color, and number of circles. During the test recording, the test leader literally records the drawing order and color

of the drawn circles on a dedicated data sheet. Then, during the post-test, the test leader asks what each circle indicates for the participant. The answers are recorded verbatim on the data sheet by the researchers. Any special reactions that may occur, e.g. crying, jamming, irritability, confusion, indicated in a separate section of the data sheet.

Data analysis: In the case of the PRISM-D test (just as in the original PRISM tests), we calculated the SIS index (Self-Illness Separation) based on the distance between the centers of the self circle and illness circle, and also calculated the IPM (Illness Perception Measure) based on the area of the illness circle. In the case of freely drawn circles, responses were categorized based on the meaning of the responses, which was performed by two independent coders. We also calculated the distance of the freely drawn circles from the self and their area. For the STAI and BDI tests, the mean and standard deviation of the total scores of the scales were calculated. During the data analysis, to examine the relations between the above indexes, the following statistical tests were used: Student's t-test, Pearson's correlation test, chi-squared test.

3.2. Results

Pilot research: Based on the responses to the structured interview, it was found that each patient was able to comprehend and execute the tasks.

Drawn illness circle: The mean **SIS** (Self-Illness Separation) was 11.19 cm, which implies a high level of suffering from the illness burden, according to the literature on the original PRISM test. Regarding the **position** of the illness circle in relation to the self circle, it can be said that 79.6% of the participants drew their illness outside of the self circle. 16.06% of participants drew their illness within the self circle, or in the case of an illness circle larger than the self circle, completely overlapping the self. 4.34% of the participants drew the illness circle partially overlapping the self circle. The mean **IPM** was 23.09 cm^2, which is smaller than the size of the displayed self (SD=43.64). Based on the relative size of the illness circles compared to the self circle, it can be said that 78.4% of them were smaller than the size of the self circle, 10.3% were almost the same size, and 11.3% were larger than the self circle.

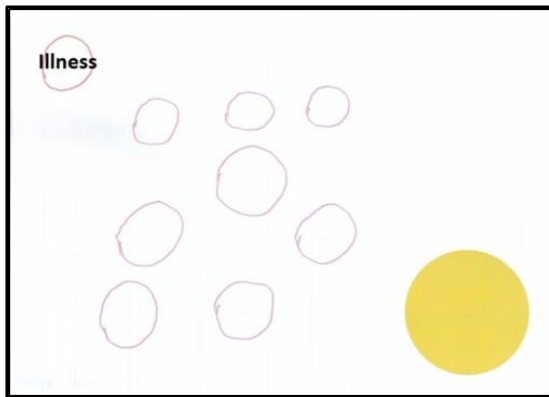The above drawing characteristics are illustrated in Figure 1.

Figure 1a: PRISM-D drawing from a 75-year-old woman with lumbar degenerative disc disease. The illness circle is separated, SIS is high, and IPM is small.

Figure 1b: PRISM-D drawing by a 31-year-old woman with breast cancer. The illness circle is within the self, SIS=0, the size of the illness is smaller than the self, but larger than the avarege size.

No gender differences were observed for SIS and IPM (Student's t-test, p> .05). Furthermore, there was no significant correlation between SIS and age and between IPM and age (Pearson's correlation coefficients p> .05).

Other drawn circles: Participants drew an average of 5.81 circles on the test, including the illness circle. Incidence of the response categories was as follows: social support 93.4% (family and friends subcategories), work 27.9%, hobby 22.5%, health 15%, recovery 9.1%, treatement-realted factors 7.5%, negative stressors 5.9%. All in all, 26.93% of all circles displayed could not be categorized due to their uniqueness and low occurrence.

Convergent validity: Based on the results of the Pearson's correlation test, the *SIS* value measured on the PRISM-D test showed a significantly negative correlation with the total BDI score (R = -.317, p <.001), which suggests that the higher the level of depression experienced by the patients, the closer they visualized their illness to the self. Furthermore, SIS showed a significant negative correlation with the *STAI-S* scale (R = -.309, p <.001) and the *STAI-T* scale (R = -.195, p = .028). The result was that the higher the level of current and general anxiety a person experienced, the closer they drew their illness to the self.

Based on the results of the Pearson's correlation test, there was a significant positive weak correlation between the total score of the *IPM* and the *BDI* scale (R = 1.83, p = .36), which suggests that the higher the level of depression the patient experienced, the greater his or her illness. Furthermore, there was a significant weak correlation between the total score on the

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IPM and *STAI-T* scales (R = .214, p = .013), which showed that the higher the degree of anxiety in a person in general, the higher their illness on the PRISM-D test.

Associations between illness circle spatial position: Individuals who drew the *illness circle within the self circle* received significantly higher *BDI* scores than those who drew the illness-circle outside the self-circle (Student's t-test, p = .004, df = 131). There was a trend-level difference between those who drew the illness inside and outside the self circle for the total score on the STAI-S scale (Student's t-test, p = .059, df = 185). Based on the result, it can be said that individuals who drew their illness within the self experienced a higher level of current anxiety.

Associations between other circle characteristics with anxiety and depression level: Participants who drew at least one circle on the PRISM-D test that could be categorized as *family* experienced significantly lower levels of state anxiety (*STAI-S*) than those who did not show any of their family members on the test (Student's t-test, p = .028, df = 170).

Participants who displayed *illness-related factors* (main category containing health, recovery, and treatment-related factor categories) experienced significantly lower state anxiety level (*STAI-S*) than those who did not draw any illness-related factor (Student's t-test, p = .004, df = 168).

Patients who displayed circles that were categorized as *negative stressors* based on their report content (e.g., relational conflicts, experiences of loss, financial problems, earlier illnesses, fears, and thoughts on passing) received significantly higher level of depression (*BDI*) compared to patients who did not draw such a meaningful circle (Chi-squared test, p = .032, df = 1).

4. STUDY 2: Applicability of the PRISM-D test to examine illness representations

4.1. Methods

The study included 150 PRISM-D tests and its post-tests amongst 150 cancer patients under active hospital treatement. Participants suffered from one of the following types of tumors: breast cancer, gastro-intestinal cancer, hematopoietic tumor, melanoma malignum, cervical cancer, testicular cancer, lung cancer. All in all, 18.7% of participants were male, 81.3% were female, and their mean age was 56 years (SD = 13.68).

The data collection conditions were as described in section 3.1.1. During the data analysis, the distance from the self (SIS) and the area (IPM) of the circle symbolizing the illness were calculated. It was also examined whether recovery and health were displayed with distinct circles by the individuals (responses were categorized based on the meaning). Post-test responses were analyzed based on several criteria, using the content analysis method.

4.2. Results

Response to illness: Based on the spatial location of the illness circle, it is typical of the sample as a whole that patients felt a high degree of illness *suffering*, as the SIS was relative small (M = 10.62; SD = 8.13). However, there was a high degree of heterogeneity in this respect, as indicated by the high standard deviation. But in 16% of the sample, extremely high (greater than 20 cm) SIS values were observed, which, considering that all the interviewees were cancer patients currently undergoing treatment, suggests a *denial* of the illness.

The content analysis of the post-test of the PRISM-D test revealed that the patients felt the following types of reactions: *negative emotional reaction* (distress, catastrophic, 27.3%), *coping* with the illness (problem-focused, solution-seeking attitude, 16%). *denial* of the illness (14) *integration* into the self of the illness (4%), and *acceptance* of the illness (2.7%).

Illness-related representations: Based on the size of the illness, it can be stated that the participants draw their illness smaller (IPM; M = 12.75 cm^2, SD = 24,57) than the self circle on average (T = 153. 86 cm^2), which indicates a positive illness perception for the whole sample. 88.7% of the respondents showed an illness smaller than the self, 6.7% were of almost the same size, and only 4.7% were larger than the self circle.

According to the content analysis of the post-tests, we found the following illness interpretation categories: illness as an *sign / change* (31.5%), *obstacle / difficulty* (25.9%), *task to be solve* (18.5%), *loss* (7.4%) *struggle*, (5.55%), *hit* (5.55%), *personal failure* (5.55%).In depicting the illness as a symbol, the illness was described as a lightning strike from a clear sky, a slap.

Of the responses from all post-tests, the following emotional representations were formulated: *generally bad feeling* (11.3%), *distress* (8.7%), *fear* (4.4%), *sadness* (2.7%), *surprise* (2.7%), *uncertainty* (2%). There were emotional contents formulated with a frequency of less than 2%: helplessness, hopelessness, remorse, mental shock.

Representations of related to outcome of illness: In 16% of the responses to a post-test related to the illness circle, response contents indicating illness outcome were formulated. According to the results of the content analysis, the majority of responses categorized in this respect (91.87%) referred to a ***positive outcome*** of the illness (belief in recovery, positive future changes). Only 8.13% of illness outcome responses and 1.3% of all responses had ***negative outcome*** responses (illness exacerbation, death, and fear of these).

Based on circles symbolizing recovery and health it can be stated that 13.4% of participants drew a distinct circle representing recovery, and 14.6% drew a distinct circle for health. Among the answers to the post-test, the following response contents appeared with reference to the recovery circle: ***recovery*** as a ***value*** (importance of recovery), recovery as a ***goal***, ***faith*** in recovery, ***desire*** for recovery, recovery as a ***miracle***. With reference to the health circles, the following response contents appeared: ***health*** as a ***value*** (emphasizing the importance of health), health as ***life***, health as ***happiness***, health as a ***goal*** to be achieved.

5. STUDY 3: Applicability of the PRISM-D test to examine perceived social support

5.1. Methods

The study involved 194 patients with severe somatic illness undergoing active hospital treatment. Participants were selected from the following disease groups: cancer patients (56.2%), patients with chronic renal insufficiency (3.8%), and gastro-intestinal patients requiring surgery (13.0%). 31% of the participants were male and 68.6% were female. Their mean age was 52.77 years (SD = 14.89).

During the data collection we used PRISM-D test, STAI and BDI scores. The further characteristics of the data collection were as described in 3.1.

During the analysis, in the case of PRISM-D test, Self-Illness Separation (SIS) and the IPM value for the illness circle were calculated. In the case of freely drawn circles, only responses that could be classified as social support based on their report content (e.g., family member, partner, friend, relative, acquaintance, neighbor, etc.) were analyzed. We calculated the distance of the self circle and the social support circle, and the area of the social support circle(s) (if it was displayed with several circles, the areas of each circle were added up). In the case of STAI and BDI, the mean of the total scores of the scales and the SDs were calculated. To analyze the relationship between social support and depression and anxiety levels, Student's t-test was used.

5.2. Results

Social support circle's characteristics: The majority of the participants, 95.7%, drew at least one circle referring to their family or a certain member(s) of it based on the response of the post-test. 72.7% of the participants drew not only their family / member but also other social support person(s) (.e.g., friend, colleague, neighbor). Only 4.3% of patients did not draw a family member or other social support person, which may suggest a perceived social isolation.

Social support circle(s) size: The average area of the social support circles drawn on the test was 36.99 cm^2 (SD = 52.93) (if the subject represented social support using multiple circles, the area values of each circle were added up), which is minimally smaller than the size of the self circle (with an area of 38.48 cm^2). However, they were larger than the size at which the illness was generally drawn (M = 16.29 cm^2, SD = 33.11). Although this result suggests that participants felt, on average, their illness was smaller and social support was perceived to be higher, the generalization of the result should be treated with caution due to large standard deviations.

Social support circle(s) distance from self circle: The mean distance of the social support circle drawn in the closest position from the self circle was 9.15 cm (SD = 5.49), which is smaller than the mean distance of the circle of the illness (SIS, M = 11.59 cm; SD = 7.77). However, the large standard deviations indicate large individual variability.

Relationship of social support circle's characteristics to illness circle, depression, and anxiety levels: Our results showed that patients who ***did not plot social support*** on the PRISM-D test scored significantly higher on the ***STAI-S*** (Student's t-test, p = .040, df = 181) and ***STAI-T*** scales (Student's t-test, p = .005, df = 153). This means that those who did not represent any social support person within their current living environment experienced a higher level of anxiety, than those who indicated member(s) of their social support area to any extent.

The ***absolute distance from social circle of self circle*** drawn closest to the self circle, symbolizing social support, was significantly associated with ***illness perception*** measure (IPM; Student's t-test, p = .047, df = 72.82). The above results may suggest that individuals, who felt closer social support, were currently experiencing a closer relationship(s), felt less significant about their illness. However, individuals who did not feel so close to social support presumably

attached more subjective importance to their illness and presumably placed a greater burden on them.

Examining the *relative distance of social support circle from self circle*, it can be said that persons who drew the illness closer to the self and social support farther away showed significantly higher *depression* values (M = 9.47; SD = 7.08) than those who drew social support closer to the self circle and illness more distantly (M = 7.60; SD = 6.80) (Student's t-test, p = .016, df = 91). The above results suggest that if there is social support between the self and the illness, the person will experience a lower level of anxiety and fewer depressive symptoms. If, on the other hand, the illness wedges between the self and important others, the person will experience an increased degree of anxiety and depressive symptoms.

6. Discussion

The purpose of the doctoral research was to present the method development process of the drawing test version of the PRISM test, a visual metaphor successfully used among somatic patients. As a first step in the doctoral research, the validation process of the PRISM-D test was performed in **STUDY 1**. Analysis of PRISM-D tests of 500 hospitalized patients revealed that the drawing test version of the PRISM test, like previous versions of the test, allows you to measure your suffering from the illness. We did not lose the reliability of the test during the modification, as the SIS showed a significant, negative correlation with the total score on the STAI-S, STAI-T and BDI, which corresponds to the results of the original PRISM test.

Based on the results of the study, in the PRISM-D test, it is worthwhile to examine the spatial position of the illness circle (1: the illness circle within the self circle / overlapping with the self; 2: the illness circle outside the self circle.), as according to our results, the two illness circle positions are associated with different levels of depression and trait anxiety. The result suggests that patients who experienced their illness inside their selves experienced a more negative mood and a higher degree of anxiety than those who experienced their illness outside their selves. A similar correlation was shown with an earlier version of the PRISM test, where the spatial position of the illness circle relative to the self circle was significantly associated with depression levels and quality of life.

The drawing test version, as well as the PRISM-R1 test, allow the measurement of illness perception (IPM; due to the size of the illness circle). However, while with PRISM-R1, patients were able to choose from three fixed-size illness discs, in the drawing test version, patients were free to determine the size of the illness circle. The results showed that patients took advantage

of the possibility of free representation, as the illness circles took very different sizes. As a result, we found a significant correlation between the values of the IPM and the total scores of the BDI and STAI-T. These results are consistent with research findings related to PRISM-R1. Thus, it can be concluded that the reliability of the test was not compromised by modifying the test, as we obtained similar results with the free choice of the patient population as in the studies using fixed-size discs.

The results related to the size of the illness drawn on the PRISM-D test are related to the research results related to traditional drawing tests, which also showed that the size of the illness drew in the drawings is related to the emotional-mood indicators. Therefore, it can be concluded that the size of the illness circle drawn on the PRISM-D test is similarly informative as the size of the illness depicted on conventional drawing tests. However, in the case of the PRISM-D test, the schematic, circular representation greatly facilitates the task of the test persons, no drawing talent is required to perform the task, and the analysis of the tests is significantly simpler than in the case of more differentiated drawings, drawing ability does not affect the analysis.

An additional benefit of the PRISM-D test is that it allows patients to freely represent the important factors present in their actual lives. We categorized the freely drawn circles, based on their meaning, into the following categories: social support (family and friends subcategories), work, hobby, health, recovery, treatement-realted factors, and negative stressors. The importance of measuring the above factors is revealed by our results, which show a correlation between each freely plotted factor and the STAI-BDI scales. For example, according our results, individuals who did not display any of their family members experienced significantly higher levels of anxiety than their fellow patients who drew at least one family member. Our further results indicate that patients who have demonstrated illness-related factors (one of the health, recovery or treatement-related factor categories), experienced significantly lower anxiety than those who did not draw such factors. Our further results showed that individuals who drew a negative stressors experienced a significantly higher rate of elevated depression levels than those who did not plot.

As the second step of the research, in **STUDY2**, as a result of the analysis of the PRISM-D tests and post-tests of 150 cancer patients under active hospital treatment, it was confirmed that the method is suitable for exploring patients' illness-related emotional responses, their emotional and cognitive illness representations, and the representations regarding healing and health.

According to our results, the cancer patients we studied experienced underwent considerable suffering due to illness (as indicated by the SIS value measured on the PRISM-D test), however, that the degree of suffering experienced by the patients studied shows great individual variability. Most patients felt negative emotions regarding their illness, eg. distress, fear, grief, uncertainty.

Participants' analysis of responses to illness also identified favorable psychological responses to illness, such as coping / problem-focused attitude (16%), integration of the illness into the self (4%), and acceptance of the illness (2.7%). However, there was a relatively high response rate to illness denial or understating the illness (14%). This type of reactions are also indicated by a great SIS on the PRISM-D test, which type of plotting was detectable among 16% of the participants.

Another important result is that the test is able to differentiate the measurement of illness perception. In addition to the IPM measure, we can find response content indicating this in most of the post-tests of the illness circle. In the content analysis of the post-test responses, we found the following illness interpretation categories: illness as an sign / change (31.5%), obstacle / difficulty (25.9%), task to be solve (18.5%), loss (7.4%) struggle, (5.55%), hit (5.55%), personal failure (5.55%). A further advantage of the test is that it allows us to get a picture of not only the representations of the illness, but also of the outcome of the illness, which is very important from the aspect of the healing process.

As a third step of the research, in **STUDY3,** the aim was to investigate whether the PRISM-D test is suitable for measuring perceived social support. We analyzed the PRISM-D, STAI, and BDI tests of 194 severe hospital patients (cancer, chronic renal insufficiency gastro-intestinal disease patients). According to our results, in the PRISM-D test, after drawing the illness circle, the majority of patients (95.7%) displayed their family or its members during free imaging, 72.7% of them also drew other social support persons (e.g., friends, colleagues, neighbors). Individuals who did not draw any social support had higher trait and anxiety scores than those who marked at least one individual, which indicates that the perceived social isolation detected with the test should be treated as a warning sign.

The spatial location of the social support factors drawn in the test provides interesting information. According to our results, the distance of the social support circle drawn closest to the self circle from the self is significantly related to the illness perception measure (IPM, which is determined based on the size of the illness). The result suggests that individuals who felt closer to social support reported their illness as smaller, i.e., presumably felt less, suggesting a more favorable perception of the illness.

Our further results suggest that the relative positions of the self, illness, and social support may also be very informative. This is because individuals who drew illness closer to the circle symbolizing the self and social support experienced a significantly higher level of anxiety and depression than those who drew social support between the circle of illness and the self circle. This result is consistent with the stress buffer theory of social support, which states that social support exerts its beneficial effects by enabling to buffer distress, which in this case may be caused by the illness.

Overall, our above findings that there is a relationship between social support and anxiety and depression levels are related to literature data.This, in turn, confirms that this novel visual measurement tool is also able to show the correlations of longer, more time-consuming paper-pencil tests, which require more energy from patients. As the test is easy and quick to apply, it can be taken over and over again, thus the changes in the social support environment (weakening or strengthening of relationships) can be detected, which means furher advantage during the clinical use.

7. Conclusions

The aim of the drawing test version developed by our research group was to combine the advantages of projective drawing tests and PRISM tests, to create a measuring tool that is understandable, easy and quick to use for everyone, while providing differentiated information. Our results suggest that the new visual procedure can be used in a wide range of somatic patients under hospital treatement, even in patients with difficult verbal communication, due to its nonverbal nature. The drawing test version does not require special tools, the test instructions are easy for patients to understand, the data collection is fast, it does not burden the patients, thus it fits well into the clinical environment. At the same time, it can be used to gather extremely rich information about the individual's experience of the illness and his or her role in a person's life.

Based on the results of our research, the PRISM-D drawing test, as well as sample previous PRISM tests, is suitable for measuring illness suffering and illness perception. The freely visualization provided by the drawing, as well as the post-test related to the test, provide an additional set of information that can be analyzed from a great deal of perspectives. According to our results, PRISM-D test differentially measures the relationship between the self and illness, illness-related cognitions, illness interpretations, emotional and cognitive representations, and resources and barriers that potentially support recovery. It is also suitable for detecting perceived social support and perceived social isolation.

Based on our research and clinical experience, the PRISM-D test and its post-test, due to its nonverbal nature, can be used well as a screening test during clinical health psychology activities to decect the maladaptive reactions, such as suffering from extremely severe illness, negative perception of illness, illness denial, lack of resources, perceived social isolation, and factors that may hinder recovery. The detection of individual spatial representation features even allows the practitioner a quick analysis, which can also be useful during the clinical work. In our clinical experience, taking the PRISM-D test alone has benefits for patients. Based on the fact that projective drawing tests examining illness perception have shown that they can help patients share emotions, experiences, and thoughts about the illness that are difficult to verbalize, and that patients can better understand themselves. In addition, the drawing of currently important factors in their living environment can help to provide patients with some visual summary of their current situation, which may have therapeutic effects in itself.

Overall, the PRISM-D drawing test, retaining the values of previous PRISM tests and further developing it, is an excellent method with a simpler tool requirement that can be used in both clinical practice and research.

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