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Self-Talk Scale: Further validation and Polish adaptation

Abstract: The aim of the article is twofold: to introduce a Polish adaptation of the Self-Talk Scale (STS) by Brinthaupt et al. (2009), including psychometric properties of the method, and to present some empirical results focusing on relationships between inner speech and other variables, like temperamental and personality traits, selected features of characteristic adaptations, and the self. In a Polish sample of 1,321 participants (770 women) aged 18–70 years ($M = 26.62$, $SD = 8.30$), the internal structure of the scale consisting of self-criticism, self-reinforcement, self-management, and social assessment was confirmed with confirmatory factor analysis (CFA), which showed an acceptable fit of the four-function model to the empirical data. However, according to EFA, two functions, self-management and social assessment, constituted one common factor. Internal consistency of the total score was high, $\alpha = .87$ and $.88$, in two samples, as well as for particular functions, from $.73$ to $.85$. Validity of the STS was confirmed with the Internal Dialogical Activity Scale – Revised (Oleś et al., 2020). Moreover, STS results corresponded with traits like endurance and neuroticism; characteristic adaptation, like love for life; characteristics of the self, like reflection and rumination; and slightly with tolerance for ambiguity.

Keywords: *Self-Talk Scale; inner speech; dialogical self; Polish adaptation; validity and reliability*

INTRODUCTION

Socrates, in a conversation with Theaetetus, reflecting on what thinking is, remarked, “The image I have of the soul as it is in thought is exactly of it as in conversation with itself, asking itself and answering questions and saying yes to this and no to that” (Plato, 2015, p. 67). This inner dialogue, which all humans experience from time to time (Kross et al., 2014), has for years been a source of inspiration for the research of philosophers and psychologists (Arendt, 2002; Gallagher, 2000; Hermans, 1996). In past publications, the phenomenon of “talking to one-self” has sometimes been linked to various types of psychopathology (Kendall et al., 1989; Schwartz & Garamoni, 1989).

In contrast, during the last at least 20 years, the adaptive functions of inner speech have been explored. For example, Puchalska-Wasył (2016) confirmed self-regulation functions of the inner dialogues. Brinthaupt et al. (2009) defined and operationalized four functions of inner

speech and constructed a self-talk scale (STS) to measure them. In this article, we present the Polish version of this tool along with the results of the research that deal with the relationship between inner speech and temperamental or personality traits and some qualities of characteristic adaptations and of the self.

The adaptive role of inner speech is well known as the key to self-control (Carver & Scheier, 2001; Kross et al., 2014; Mischel & Mischel, 1987; Morin, 1993), counterfactual thinking necessary for identity development (Arendt, 2002; Hermans & Dimaggio, 2007), change of perspective used for life review, and a great life change (Oleś, 2019), or a way to organize a personal meaning system (Oleś et al., 2020).

Inner dialogue—a phenomenon close to inner speech—can diminish anxiety and extend self-confidence and motivation; thus, it is used as an example in sport psychology and other forms of goal-directed activity (Hardy, 2006; Hatzigeorgiadis et al., 2009). Self-reflection implies inner speech and enables people to understand,



know, and improve themselves as well as to reflect on their interactions with others, for example during psychotherapy (Nutt-Williams & Hill, 1996).

WAYS TO STUDY INNER SPEECH

There are several scales devoted to measuring inner speech. For example, the Inner Speech Scale (ISS) by Siegrist (1995; see also: Uttl et al., 2011), designed to measure the frequency of inner dialogues about oneself the Self-Verbalization Questionnaire (SVQ) by Duncan & Cheyne (1999), measuring inner speech treated as a tool for thinking according to Vygotsky's (1978) theory; the Self-Talk Inventory (STI) by Calvete et al. (2005), allowing to measure positive and negative self-talk, or the Varieties of the Inner Speech Questionnaire - Revised (VISQ-R) by Alderson-Day et al. (2018), that is a tool to understand the phenomenological properties and quality of everyday inner speaking.

There are also measures of internal dialogues for example the Internal Dialogical Activity Scale-Revised (IDAS-R) by Oleś (2021), used to examine the overall level of internal dialogical activity and eight types of internal dialogues, the Integration-Confrontation Questionnaire (ICQ) by Puchalska-Wasyl (2016), that allows to determine whether an internal dialogue is more integrative or confrontational, or the Dialogic Functions Questionnaire (FUND) by Puchalska-Wasyl (2016) measuring 24 functions and seven metafunctions of internal dialogical activity, such like: support, substitution, exploration, bonding, self-improvement, insight, and self-control.

Research on self-talk and internal dialogues has been conducted in the context of developmental psychology (e.g., Berk, 1992; Diaz, 1992), personality (e.g., Brinthaup et al., 2009), or religiosity (Puchalska-Wasyl & Zarzycka, 2019). To date, research has identified some specific aspects and functions of talking to oneself, such as the frequency of negative thoughts about oneself (Kendall et al., 1989), hostile automatic thoughts (Snyder et al., 1997), or the degree to which one talks to oneself about oneself (Siegrist, 1995), but not a frequency of self-regulatory functions.

In this article we introduce in Study 1 results which confirm internal structure of the STS as well as suggest culture specific internal organization of the scale in Poland; and in Study 2 results which confirm validity of the STS on three levels of personality organization, namely traits, characteristic adaptations and the self.

STUDY 1: CONFIRMATION OF INTERNAL STRUCTURE OF THE STS AND FURTHER EXPLORATION

The aim of the first study was to confirm the structure of the STS, i.e., to check whether the 16 items can be assigned to the 4 functions of self-talk according to the original version of the scale. For this goal we used Confirmatory Factor Analysis (CFA).

Method

Participants

For the analyses that aimed to check the structure of the STS, we randomly divided a total sample of 1,321 (770 women, 58,3%) respondents aged from 14 year till 70 years ($M = 26.13$, $SD = 7.82$) into two groups. The people who participated in the study mostly have university (39.8%) and incomplete university education (32.9%). Of those surveyed, 282 people (21.3%) have secondary education. The remaining participants have vocational (2.3%), elementary (2%), and junior high education (1.7%). The participants in the study have completed a wide variety of subjects and are engaged in a wide range of professions. The respondents included both employed and unemployed people.

For confirmatory factor analysis (CFA), we used a larger sample of 696 respondents (age: $M = 26.89$, $SD = 8.66$), including 409 women. For exploratory factor analysis (EFA), we used a sample of 625 adults (361 women; age: $M = 26.33$, $SD = 7.90$).

Measures

Unlike other measures, the Self-Talk Scale focuses on both private (aloud) and inner speech. Self-talk measured with the STS is not concerned with the content of speech but with the frequency of motives for which people speak to themselves: (1) self-reinforcement, (2) self-criticism, (3) self-management, and (4) social-assessment. The STS consists of 16 items measuring the frequency of four functions of inner speech (four items each); all items begin with a stem sentence: *I talk to myself when....* (Brinthaup et al., 2009). The items are rated on a 5-point scale (1 = *never* to 5 = *very often*); each of them belongs to one of the aforementioned functions. The STS is designed for adults and can be used for both research and application purposes (Brinthaup et al., 2009). A more extensive description of the four self-talk functions is as follows:

Self-reinforcement (items numbered 2, 5, 8, 13) ($\alpha = .89$), describing self-enhancement, that is using in inner speech such sentences which bolster oneself (e.g., *I am really happy for myself*).

Self-criticism (1, 7, 10, 14) ($\alpha = .83$) describes the function of self-directed criticism; it is composed of expressions/thoughts directed at oneself and containing negative evaluation of oneself or one's actions, for example blaming oneself for something (e.g., *I am ashamed of something I've done*).

Self-management (3, 9, 12, 15) ($\alpha = .79$) includes giving oneself commands in one's mind, making a to-do list in one's head, and directing oneself using internal instructions (e.g., *I'm mentally exploring a possible course of action*).

Social assessment (4, 6, 11, 16) ($\alpha = .82$) comprises imagined simulations of social dialogues (e.g., "I'm imagining how people react to things I've said.").

Translation of the STS into Polish was in consultation with the author, Tom Brinthaup, and upon receiving his permission, so the STS is in two different

language versions (for additional information see: Oleś et al, 2020).

Procedure

Each participant completed the STS and one or more questionnaire, most commonly the IDAS-R mentioned above. This study has received approval from the University Ethics Commission (KEBN 34/2022).

Results

The results of the CFA, in which the four-factor model reflecting the original structure of the STS (see Figure 1) was tested, indicate an acceptable fit to the data: $CMIN/df = 4.716$, $CFI = .915$, $RMSEA = .073$, $90\% CI (.066; .080)$, $SRMR = .054$. This result allows us to accept the four-factor solution, although it also indicates that the model does not perfectly fit the data from the Polish sample.

Inter-correlations between the items ranged from .03 to .66, and correlations of individual items with the total score on a given scale ranged from .42 to .69. The result of the CFA, although acceptable, however inspired us to try EFA, that is to look for a natural organization of the items in Polish version of the STS. EFA, principal components

and Oblimin rotation with Kaiser normalization extracted four factors explaining 64% of variance (see Table 1). The results of EFA showed that, in accordance with the original structure of STS, one can distinguish the self-reinforcement and self-criticism, while, interestingly, some items which originally belonged to social assessment and self-management formed one common factor, and two items (#1 from self-criticism and #15 from self-management) formed a fourth factor.

Correlations between the four scales were moderate, ranging from .27 to .69. The strongest relationship was between self-management and social assessment, which was also reflected in the EFA scores (Table 2).

Reliability was checked separately in each of the two groups. The internal consistency measures indicated that the reliability of the full scale and subscales was quite satisfactory and ranged from .729 to .879 (Table 3).

We also examined possible differences in overall results in STS by gender and age, using ANOVA (2×3). Due to the fact that most of the subjects who participated in the study using the STS were between 19 and 35 years old ($M = 26.62$; $SD = 8.30$), we compared three groups: 17 to 22, 23 to 29 and over 29 years old. The differences among these groups were significant ($F(2,1009) = 3.033$, $p = .049$). The overall intensity of internal dialogical activity was significantly highest in the youngest group ($M=51.16$) and lowest in the oldest group ($M=48.87$),

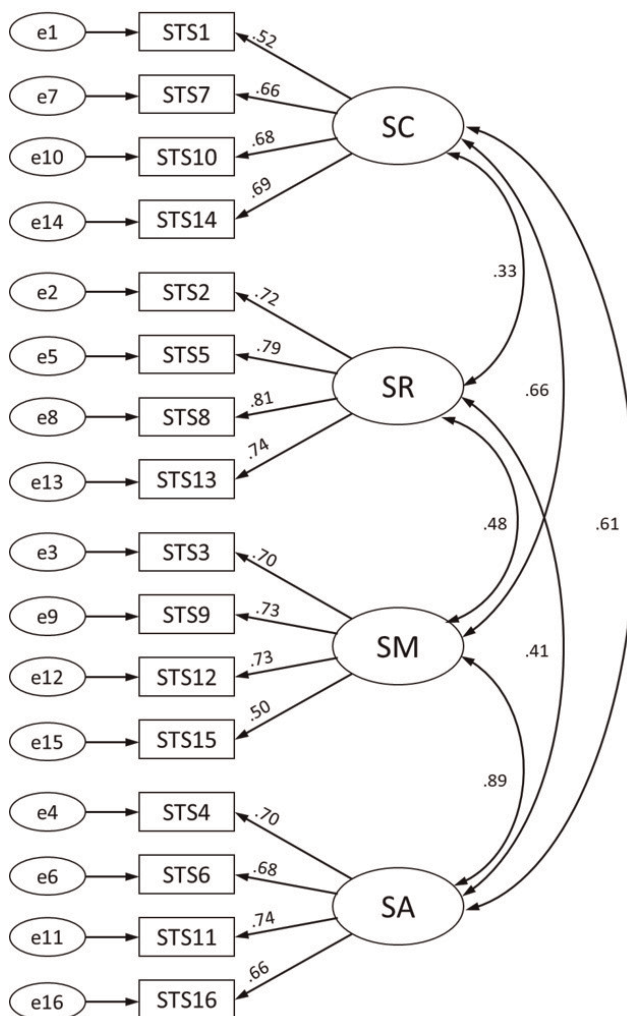


Figure 1. Structure of the Polish Version of the AIMES Scale.

Table 1 Factor loadings of the Polish version of the STS ($N=625$)

No	Scale	Factor			
		1	2	3	4
STS11	SA	.865	-.007	.038	-.232
STS4	SA	.806	-.023	.148	-.252
STS6	SA	.692	.055	.141	.002
STS9	SM	.650	.043	-.161	.330
STS12	SM	.645	.065	-.057	.299
STS3	SM	.617	.114	-.017	.240
STS16	SA	.584	.006	.086	.252
STS5	SR	-.016	.877	-.077	-.031
STS8	SR	.006	.851	-.015	.013
STS13	SR	-.053	.815	.117	.002
STS2	SR	.046	.762	.004	-.016
STS14	SC	.006	.095	.800	.032
STS10	SC	-.077	-.083	.769	.252
STS7	SC	.211	.049	.734	-.097
STS15	SM	.035	.071	.110	.728
STS1	SC	.09	-.053	.203	.661

Note. SC – self-criticism, SR – self-reinforcement, SM – self-management, SA – social assessment. Loadings over .55 are in bold.

Table 2 Correlations between STS factor scales

	STS Tot.	SC	SR	SM	SA
STS Tot.	1	.708	.617	.839	.832
SC	.731	1	.170	.506	.479
SR	.661	.266	1	.340	.306
SM	.848	.537	.389	1	.688
SA	.826	.478	.349	.686	1

Note. SC – self-criticism, SR – self-reinforcement, SM – self-management, SA – social assessment. Results from the sample of $n = 696$ are above the diagonal, and results from the sample of $n = 625$ are under the diagonal. All correlations, $p < .001$.

Table 3 Reliability of the STS: Cronbach's alpha

	Group CFA $n = 696$	Group EFA $n = 625$
SC	.729	.730
SR	.850	.844
SM	.757	.750
SA	.788	.805
STS Total	.879	.871

Note. SC – self-criticism, SR – self-reinforcement, SM – self-management, SA – social assessment.

$p = .01$. The gender effect ($F(1,1009) = 3.297, p = .07$) and interaction effect of age with gender remained insignificant ($F(2,1009) = .496, ns$).

Discussion

The Polish version of the STS by Brinthaupt et al. (2009) has good or acceptable psychometric indices. Coefficients indicating the discriminatory power of individual items, tested against the subscale to which the item belongs and against the full scale, were at a sufficient level, which resulted in a satisfactory internal consistency of the method: Cronbach's α are .87–.88 for the total score and from .73 to .85 for the functions. This means that no item required replacement or correction.

Satisfactory results of the CFA, as well as the internal consistency coefficients mentioned above, allowed us to sustain a four-factor solution identical to the original version. The four-factor model turned out to fit the data quite well, although not perfectly. It can be assumed that the scale structure is confirmed for the Polish sample. Having a choice between searching for a model that better fits the data at the expense of violating the structure of STS or accepting its original structure (and the inner speech functions), we prefer the latter solution. This is important because it provides the possibility of comparing results in international studies.

The results of the EFA are intriguing. Two functions and scales – self-reinforcement and self-criticism – were confirmed as separate factors, but the other two – social assessment and self-management proved to be less

differentiated from each other. If it is indeed the case that these two functions overlap in our study, it means that self-management by inner speech has much in common with others. This can mean, in turn, that like the self-concept in Polish people whose country is situated somewhere between individualistic and collectivistic cultures (Wojciszke, 2014) and is not as independent as, for example, in American individualistic culture (where STS was constructed), the inner speech of Poles also bears traces of both autonomous self-direction and interdependent features (social comparisons). However, this issue requires further research. Similarly, as suggested by the results, there are higher-intensity self-talk functions in people during emerging adulthood in comparison to adults.

STUDY 2: CONVERGENT VALIDITY THE STS ACROSS THREE FFM COMPONENTS OF PERSONALITY

Method

How can we predict for how and why self-talk relates to the three modes of personality? The self should be most relevant to self-talk and internal dialogues, compared to the other, characteristic adaptations and traits. Moreover, we predict, that the characteristic adaptations would have some relevance to intrapersonal communication, whereas traits should be least relevant to how and why we talk to ourselves. In fact, past research proved very weak relationships between the STS and the Big 5 (Brinthaupt, 2019).

Participants

For validity analysis we present data from 6 studies each with different participants, students or middle-age adults. The participants answered STS and one or two other scales. Participants from the first sample answered STS and IDAS-R, $n = 876$ (529 women) aged from 14 year till 69 years, $M = 25.94, SD = 7.61$).

The second sample consisted of 101 persons (56 women) aged from 18 year till 35 years, $M = 25.22, SD = 4.19$) participants who answered STS and Formal Characteristics of Behavior-Temperament Questionnaire Revised (FCZ-KT (R)).

The third sample were 211 persons (117 women) aged from 18 year till 40 years, $M = 24.27, SD = 5.31$), and they answered The Eysenck Personality Questionnaire - Revised (EPQ-R).

The fourth sample consisted of 173 participants (95 women) aged from 17 year till 70 years, $M = 29.89, SD = 9.92$), who answered STS and two other methods, the Love for Life Scale (LLS) by Abdel-Khalek (2007), and the Self-Motives Scale (SMS) by Gregg et al. (2011).

The fifth sample consisted of 111 persons participants (53 women) aged from 20 year till 40 years, $M = 25.73, SD = 6.06$), and they answered STS and the Carpe Diem-Revised (CD-R) by Sobol-Kwapińska (2007).

And the last sample were 135 participants (80 women) aged from 21 year till 69 years, $M = 39.04, SD = 9.92$) who answered STS and two other scales, namely, the Multiple

Stimulus Types Ambiguity Tolerance Scale (MSTAT-II) by McLain (2009), and the Reflection-Rumination Questionnaire (RRQ) by Trapnell and Campbell (1999).

Measures

The above-mentioned IDAS-R was used to test the validity of the STS. The IDAS-R measures internal dialogical activity, defined as “engagement in dialogues with imagined figures, the simulation of social dialogical relationships in one’s own thoughts, and the mutual confrontation of the points of views representing different *I*-positions relevant to personal and/or social identity” (Oleś & Puchalska-Wasył, 2012, p. 242). Inner speech and internal dialogical activity are similar but not the same variables (Oleś et al., 2020).

The IDAS-R consists of 40 items ($\alpha = .95$), five items per subscale, and measures overall intensity of internal dialogical activity and eight aspects of it. The subscales are the following:

Identity dialogues (IdD, $\alpha = .87$) refer to questions concerning identity and life priorities (e.g., *Thanks to dialogues with myself, I can answer the question, 'Who am I?'*).

Maladaptive dialogues (MaD, $\alpha = .72$) concern undesirable, unpleasant, or annoying issues. (e.g., *The conversations in my mind upset me*).

Social dialogues (SoD, $\alpha = .83$) reflect past or future conversations (e.g., *I continue past conversations with other people in my mind*).

Supportive dialogues (SuD, $\alpha = .84$) include inner contact with figures who have given support (e.g., *When I am alone I catch myself conversing with someone in my thoughts*).

Spontaneous dialogues (SpD, $\alpha = .85$) refer to free conversations that occur in everyday life (e.g., *I converse with myself*).

Ruminative dialogues (RuD, $\alpha = .82$) involve self-blame and recalling of failures or annoying thoughts (e.g., *After failures, I blame myself in my thoughts*).

Confronting dialogues (CoD, $\alpha = .81$) refer to confrontation between two sides of the self or with another person (e.g., *I argue with that part of myself that I do not like*).

Change of Perspective (ChP, $\alpha = .76$) refers to changes in point of view (e.g., *In my thoughts I take the perspective of someone else*).

For the level of basic disposition (traits), we have chosen the following two questionnaires to measure temperamental or personality traits:

Formal Characteristics of Behavior-Temperament Questionnaire Revised (FCZ-KT (R)) by Cyniak-Cieciura et al. (2018) describes temperament by considering temporal and energetic characteristics of behavior. The method consists of 100 items to which the respondent responds on a 4-point scale ranging from 1 *strongly disagree* to 4 = *strongly agree*. The FCZ-KT (R) has seven scales: briskness (e.g., *I am usually able to catch a falling object, e.g., a pen, or a spoon*), perseveration (e.g., *Before falling asleep, I often recall the conversations I had during*

the day), rhythmicity (e.g., *I wake up at the same time every day*), sensory sensitivity (e.g., *Shades of the same colour look the same to me*), endurance (e.g., *I get very tired after concentrating on something for several hours - reverse key*), emotional reactivity (e.g., *I lose my self-confidence when criticized*), activity (e.g., *I take every opportunity to change my surroundings, e.g., visiting friends or relatives, or going on tours*). Internal consistency coefficients' Cronbach's α range from .75 to .89, indicating satisfactory reliability of the questionnaire ($n = 101$).

The Eysenck Personality Questionnaire - Revised (EPQ-R) by Eysenck et al. (1985) contains 100 items to which the subject provides a *Yes* or *No* answer. The questionnaire examines three personality types: extraversion (e.g. *Are you a talkative person?*), neuroticism (e.g. *Are you often troubled about feeling of guilt?*), and psychoticism (e.g. *Do you enjoy hurting people you love?*). In addition, the EPQ-R has a control key: lies (e.g. *Do you always practice what you preach?*). Cronbach's α internal consistency ranged from .67 to .87 for the trait scales and is low for lies, $\alpha = .47$ ($n = 211$).

For the level of characteristic adaptations, we applied three scales focused on beliefs. Two of them concern the present measuring attitudes towards life or time which seem relevant for everyday functioning, choosing goals, fulfilling desires or enjoying the here and now. Another scale refers to coherence of beliefs, namely we used a scale to measure tolerance of ambiguity, that is one form of uncertainty. The reason to include this variable in our study was that according to the Dialogical Self Theory, uncertainty stimulates inner dialogicality and inner speech (Hermans & Hermans-Konopka, 2010). Thus, we expected negative correspondence between inner speech functions and tolerance of ambiguity; to put it simply, tolerance of ambiguity decreases the need for inner speech. Perhaps this has to do with the cognitive disruption hypothesis that a variety of distortions are associated with increases in self-talk frequency (Brinthaup, 2019). This would mean that a person with a low tolerance of ambiguity would talk to himself more often when confronted with some complex problem.

The Love for Life Scale (LLS) by Abdel-Khalek (2007) is used to measure positive attitudes towards one's life. It consists of 16 items, and each item is rated on a 5-point scale, where 1 = *not at all* and 5 = *very much*. The method contains three factor scales: positive attitude towards life (eight items, e.g. *Life is full of pleasures*), happy consequences of love for life (four items, e.g. *Love of life makes me happy*), and meaningfulness of life (four items, e.g. *Life is a treasure we should guard*). Cronbach's α coefficients ranged from .83 to .95 ($n = 173$).

Carpe Diem-Revised (CD-R) is a shortened version of the Carpe Diem scale by Sobol-Kwapińska (2007). It consists of 10 items and is used to measure temporal orientation focused on the present (e.g., *I try to live every day as fully as I can*). The respondents answer on a 5-point scale ranging from 1 = *completely disagree* to 5 = *completely agree*. A high score on the scale indicates giving

great importance to what is happening “here and now”. Internal consistency of the CD-R was $\alpha = .85$ ($n = 111$).

The Multiple Stimulus Types Ambiguity Tolerance Scale (MSTAT-II) (McLain, 2009) is devoted to measuring cognitive orientation facing new, complex, unknown, ambivalent, or strange stimuli. High ambiguity tolerance means attraction orientation toward complex, unfamiliar, or insoluble stimuli, while low tolerance means aversion to such stimuli. The scale consists of 13 items (e.g., *I prefer familiar situations to new ones.*) and uses a 5-point scale ranging from 1 = *definitely disagree* to 5 = *definitely agree*. Internal consistency is high: Cronbach's $\alpha = .85$ ($n = 135$).

For the self we used two scales concerning self-reflection and self-motives. One of these scales refers to reflection and rumination which can have self-talk expressions, and another to self-motives which organize self-concept.

The Reflection-Rumination Questionnaire (RRQ) by Trapnell and Campbell (1999) measures reflection (e.g., *I often find myself re-evaluating something I've done*) and rumination (e.g., *I never ruminate or dwell on myself for very long* – reversed key), as two kinds of self-consciousness. Each subscale consists of 12 items, and the answer format is on a 5-point scale ranging from 1 = *definitely disagree* to 5 = *definitely agree*. Internal consistency is high for both scales: Cronbach's $\alpha = .90$ for reflection and .93 for rumination ($n = 135$).

The Self-Motives Scale (SMS) by Gregg et al. (2011) consists of eight statements. The first four items form part H (*In general I LIKE to hear, e.g. that I am a GREAT person*), the next four belong to part D (*In general, I WANT to discover.... e.g., what I HONESTLY am like*). In the present study, we used an extended version of the scale containing an additional four items in part T (*I generally THINK on myself... e.g., I see myself in a certain way and I stick to it*). All items are rated on a 7-point scale ranging from 1 = *strongly disagree* to 7 = *strongly agree*. The scale consists of four subscales – self-enhancement, self-verification, self-assessment, and self-improvement – each with three items. In the present study, Cronbach's α for these scales ranged from .53 to .81 ($n = 173$).

Procedure

The data gathered for validation study originated from 6 different research projects which had one in common: each participant completed the STS. They also answered one or two other scales. These studies have received approval from the University Ethics Commission (KEBN 34/2022).

Results

While a main criterion of the STS validity was the IDAS-R we start from introducing correspondence between two measures of internal speech (self-talk) or internal dialogues. Almost all correlations between STS and IDAS-R were significant, and 40 of 45 were on a level $p < .001$ (see Table 4). Only two correlations were not significant: self-reinforcement and self-management, and maladaptive dialogues. The total scores of both scales had about 28% of common variance. Four functions of inner speech correlated with a total score for internal dialogical activity from .253 to .474 (all $p < .001$). Particular correlations supported the validity of inner speech functions, for example, self-criticism and ruminative dialogues (.466, $p < .001$); self-management and spontaneous dialogues (.517, $p < .001$), or social assessment and supportive (.399, $p < .001$) or social dialogues (.396, $p < .001$).

All significant correlations ($p < .001$) were replicated in comparison to the study by Oleś et al. (2020), however some of them were even higher.

Next we checked correspondence of the STS with other methods related to three main domains of personality according to FFM. We treat correlations of the STS with the methods described above as direct or indirect indicators of the tool's validity. The results presented in Table 5 originated from different studies involving adults.

Summary of the results and discussion

Personality correlates of the inner speech measured by STS were various and allowed for the following conclusions:

Table 4 STS convergent validity: *r*-Pearson correlations with the Internal Dialogical Activity Scale-Revised ($n = 876$)

IDAS-R/STS	SC	SR	SM	SA	STS Tot.
IdD – Identity Dialogues	.318***	.331***	.384***	.295***	.440***
MaD – Maladaptive Dialogues	.185***	-.014	.051	.086*	.099**
SoD – Social Dialogues	.312***	.099**	.376***	.396***	.390***
SuD – Supportive Dialogues	.336***	.206***	.344***	.399***	.427***
SpD – Spontaneous Dialogues	.455***	.391***	.517***	.381***	.577***
RuD – Ruminative Dialogues	.466***	.084*	.335***	.355***	.405***
CoD – Confronting Dialogues	.337***	.120***	.270***	.214***	.308***
ChP – Change of Perspective	.352***	.236***	.373***	.318***	.423***
IDAS-R Total score	.474***	.253***	.457***	.421***	.529***

Note. SC – Self-criticism, SR – Self-reinforcement, SM – Self-management, SA – Social assessment; *** – $p < .001$; ** – $p < .01$; * – $p < .05$

Table 5 Correlations of the Self-Talk Scale (STS) with Formal Characteristic of Behavior-Temperament Questionnaire (FCB-TQ (R)), Eysenck Personality Questionnaire - Revised (EPR-R), Love for Life Scale (LLS), Carpe Diem (CD), Reflection-Rumination Scale (RRS), Self-Motives Scale (SMS), and Multiple Stimulus Types Ambiguity Tolerance Scale (MSTAT-II)

Scale	SC	SR	SM	SA	STS WO
FCB-TQ (<i>n</i> = 101)					
Briskness	-.006	-.205*	-.208*	.018	-.126
Perseveration	.189	.223*	.214*	.271**	.276**
Rhythmicity	.002	.058	-.030	.020	.015
Sensory Sensitivity	.140	.027	-.002	.169	.099
Endurance	-.234*	-.354***	-.225*	-.357**	-.359***
Emotional Reactivity	.061	.230*	.118	.229*	.199*
Activity	.127	.021	.124	.109	.116
EPQ-R (<i>n</i> = 211)					
Neuroticism	.142*	-.056	.068	.049	.064
Extraversion	-.068	-.025	.069	-.081	-.035
Psychoticism	-.075	.063	-.090	.015	-.026
Lies	-.093	.068	-.160*	-.172*	-.115
LLS (<i>n</i> = 173)					
Positive Attitude	-.200**	.489***	-.010	.013	.116
Happy Consequences	-.138	.440***	.058	.042	.154*
Meaningfulness of Life	-.028	.355***	.077	.047	.167*
Love for Life	-.148	.470***	.033	.031	.149
Carpe Diem-R (<i>n</i> = 111)					
Carpe Diem	.027	.016	-.109	-.017	-.024
MSTAT-II (<i>n</i> = 135)					
Tolerance of Ambiguity	-.250**	-.037	-.064	-.114	-.149
RRQ (<i>n</i> = 135)					
Rumination	.552***	.063	.377***	.478***	.462***
Reflection	.283**	.357***	.309***	.430***	.453***
SM-R (<i>n</i> = 173)					
Self-Enhancement	.000	.344***	-.009	.149*	.182*
Self-Verification	-.004	.210**	.038	.109	.132
Self-Assessment	.020	.121	-.012	-.104	.007
Self-Improvement	-.021	.383***	.021	.006	.144

Note. SC – Self-criticism, SR – Self-reinforcement, SM – Self-management, SA – Social assessment; *** – $p < .001$; ** – $p < .01$; * – $p < .05$

1. The functions of inner speech correlated with some temperament traits measured by FCB-TQ(R). All functions of inner speech and the total score on the STS were significantly negatively related to endurance. Rhythmicity, sensory sensitivity, and activity were not related to any function of inner speech.
2. The correlations between STS and the traits measured by EPQ-R were weak and mostly insignificant; however, self-criticism correlated significantly with neuroticism ($p < .05$).
3. Two variables represented characteristic adaptations, love for life (LLS) and carpe diem. Self-reinforcement was found to be significantly related to love for life and all its components (all $p < .001$). Moreover, the results showed a weak, but significant, negative relationship between self-criticism and positive attitude toward life. Internal speech functions are not related to carpe diem temporal orientation.
4. The relationships between STS and variables representing the self were more spectacular. Self-reinforcement correlated with the motives: self-improvement, self-enhancement, and self-verification. Moreover, social assessment and the total score in the STS correlated with the self-enhancement motive.

5. All STS results correlated with reflection and rumination (all $p < .001$) except the correlation between self-reinforcement and rumination. There were mostly moderate and highly significant correlations between the STS total score and rumination and reflection (RRQ). Reflection had the highest correlation with the STS total score and the lowest with self-criticism, while in the case of the rumination, the highest correlation was with self-criticism and the lowest with self-management (self-reinforcement had no relationship with Rumination). These results were consistent with the methods' assumptions, as rumination belongs to reflective awareness and represents focusing mainly on unpleasant thoughts associated with anxiety (Trapnell & Campbell, 1999), while reflection as a form of self-awareness is associated with cognitive curiosity and the desire to learn more about oneself and self-knowledge.
6. Moreover, the results showed only one relationship between STS and tolerance of ambiguity (MSTAT-II), namely, self-criticism negatively correlated with tolerance of ambiguity in accordance with expectations. The results suggest that people who accept ambivalent information show less of a tendency to criticize themselves.

To conclude, our expectation that the association of self-talk with temperament and personality traits would be weakest was not confirmed even though the associations of reflection and ruminations with self-talk were relatively strong.

GENERAL DISCUSSION

Validity analysis revealed a number of relationships between the way one talks to oneself and other personality variables and individual differences, confirming the relevance of the STS. Particularly significant are the correlations with another method for examining internal dialogues, the IDAS-R. This analysis confirmed that inner speech and inner dialogical activity are similar, though not identical, phenomena (see also Oleś et al., 2020). Taking into account the positive correlations of inner speech with the spontaneous and supportive dialogue subscales, it can be concluded that self-talk, like inner dialogues (Hermans & Oleś, 2013), can be intensified in the face of uncertainty, the need to cope with problems, or in adapting to a new situation, and also serves to explore the unknown. This is consistent with research showing that relevant cognitive disruptions regarding various experiences (e.g., perfectionism, academic procrastination) are associated with more frequent engaging in self-talk (Brinthaup, 2019). The Dialogical Self Theory postulates that uncertainty motivates one for internal dialogues (Hermans & Hermans-Konopka, 2010), and such relationships was empirically confirmed (Oleś, 2021), but an analogues relationship for self-talk functions was not significant (except for self-criticism), what indirectly confirmed a subtle difference between inner dialogues and self-talk. Internal dialogues, worth adding, are related to emotional sensitivity, especially its components such as dissatisfaction and fear,

which decrease as a result of dialogue (Hermans, 2003; Oleś et al., 2010).

The negative correlation of the STS with endurance and the relationship between self-criticism and neuroticism are also important in this context. They indicate that, on the one hand, overcoming difficulties and task activities does not stimulate inner speech and, on the other hand, that negative emotions and difficult situations can be a good ground or climate for such an internal activity.

However another aspect of this result seems challenging that is relatively high and unexpected correspondence between traits and self-talk functions. Inner speech could have its background in temperamental or personality traits and not just or not primarily in consciousness (self) or activity (characteristic adaptations).

There were, however, moderate correlations between self-talk functions and rumination and reflection as components of awareness, and especially prominent were their correlations with self-criticism and social assessment. The interdependence of self-criticism and tolerance for ambiguity, although weak, indicates that facing ambivalent information about oneself or speaking critically about oneself requires a weaker cognitive orientation toward the complex, unfamiliar, or ambivalent. This result indicates that reduced tolerance for ambiguity, presumably including negative or ambivalent information about the self, fosters self-criticism, or in other words, constant doubts and persistent thoughts about various topics coexist with the function of self-talk that is responsible for criticizing oneself. A similar result that confirmed the relationship between intolerance uncertainty and inner dialogicality was found in another study (Oleś & Sieradzki, 2021).

Given that self-criticism is negatively correlated with self-esteem (Brinthaup et al., 2009) and positively (moderately) correlated with a tendency to ruminate, we can conclude that expressing self-criticism is possible even if it violates self-esteem but involves some cognitive limitation in terms of taking a broader perspective that includes inconsistent or even contradictory information.

In our study, unexpectedly, we found no relationship between self-criticism and self-verification (or other self-concept motives), for we expected clear relationships between self-talk functions and motives from a level of the self. The self-verification motive, in order to provide a coherent self-concept and to cope with cognitive dissonances about oneself, takes into account both positive and negative identities but at the same time protects self-esteem (Sedikides, 1993). This lack of dependence may mean that although both self-criticism and self-verification confront people with negative content about themselves, they give this information as if with a "different sensitivity" with respect to how they will deal with it, perhaps for a different purpose. Research indicate positive correlation between self-reinforcement and total emotional intelligence (Depape et al., 2006), which perhaps is an expression of this "different sensitivity". Meanwhile, another subscale, self-reinforcement, is correlated with self-enhancement, self-improvement and self-verification, and, as we know, this self-talk function positively

correlates with self-esteem (Brinthead et al., 2009), indicating its possible impact on self-esteem enhancement and protection. This inner speech function also coexists with meaning in life, and that completes the picture of its importance by sustaining and enhancing self-esteem. Moreover, self-reinforcement is associated with love for life, including happiness and satisfaction with life.

We found also that self-talk functions correlated with temperamental traits of endurance (activity or reflection), perseverance (continued activity in thoughts) and emotional reactivity (social anxiety) though most of the correlations were weak. The most visible result is the negative correlations of all self-talk functions with endurance. To understand this result we should refer to definition of endurance and to other studies. Recall that endurance is defined as the ability to respond adequately in situations requiring prolonged or highly stimulating activity and/or under conditions of intense external stimulation (Cyniak-Cieciura et al., 2018). Research on self-talk showed that in the face of various challenges, self-talk reduced thoughts that are not related to the task execution and promoted concentration on the task (Edwards et al., 2008; Hatzigeorgiadis et al., 2004). However, these studies often used motivational self-talk, induced by cognition. Perhaps the negative correlation of self-talk with temperamental endurance indicates the level of basic dispositions, while motivational self-talk refers to the level of characteristic adaptations? Moreover, Hanshaw and Sukal (2016) suggested that increased self-talk in the situation of carrying out a task requiring specific actions, including automated, can produce an effect analogous to that described within the reinvestment theory (Masters & Maxwell, 2008).

The negative correlations of all self-talk functions with endurance in our study indicate that people who are positively engaged in goal directed activity are more prone to action than self-talk (that can confuse concentration on pure activity). On the other hand people who find it more difficult to cope with strong external stimulation turn to their inner self and activate internal stimulation: perhaps inner talk is some kind of protective factor against too high stimulation? We need further research to answer this question. To conclude, we hypothesize slight negative correspondence between action and such a mode of reflection as expressed by self-talk, and in further research we intend to verify it.

Another interesting result is the positive correlations between self-talk and its functions (except for self-criticism) with perseverance, what confirms the relevance of the tool, although the lack of association with self-criticism appears to be counterintuitive. Also, the lack of correlation between self-criticism and emotional reactivity implies that this self-talk function is not a simple derivative of the temperamental tendency to experience emotional problems but has a different role, probably more strongly linked to motivational self-control (for example *this is your fault, you should improve it*).

Last but not least, self-talk functions are not very susceptible to distortion due to social approval because

only social assessment ($p = .012$) and self-management ($p = .02$) corresponded very weakly and negatively with the lies control key from the EPQ-R.

LIMITATIONS, AND FUTURE DIRECTIONS

It would still be necessary to consider what knowledge the research on the tool in question provides about self-talk and its functions. The functions proposed by Brinthead et al. (2009) seem complete – self-reinforcement, self-criticism, self-management, and social-assessment – yet different from the functions of internal dialogues proposed by Puchalska-Wasyl (2016), which are support, substitution, exploration, bonding, self-improvement, insight, and self-control. These two lists of functions are largely divergent. Self-talk refers to when and why people might talk to themselves, whereas the functions of internal dialogues as understood by Puchalska-Wasyl (2016) are more concerned with the phenomenology of how people talk to themselves and what content they communicate. Meanwhile, the functions measured by STS are concerned with the challenges of everyday life, including responding to current or recent events (Brinthead et al., 2009). People may talk to themselves to change their mood, to improve their performance, to mobilize or empower themselves but also to criticize or compare themselves to other people.

At the same time, talking to oneself may increase when faced with challenges or difficult events but also as a consequence of experiencing positive events or successes. The description of the phenomenon of self-talk (Brinthead, 2019) and the results suggest that the STS captures the dynamic aspect of communication with the self. The questionnaire is more strongly associated with cognitive and situational aspects in relation to self-regulation than affective ones, so the measured aspect of inner speech could be called “situational”. People can use self-talk to formulate strategies, to motivate themselves, to assess their performance, and more (Brinthead, Morin, 2020). It corresponds well to a core meaning of the self in frames of the FFM, as a subcategory of characteristic adaptations, while possible ‘empathic’ functions of inner speech could correspond more to self-narratives in McAdams, and Pals’ (2006) model. The functions measured by the Dialogic Functions Questionnaire (Puchalska-Wasyl, 2016), on the other hand, touch more on the needs and feelings that accompany us when we yearn, want to communicate something, deal with a difficult issue, or feel close to someone.

Certainly, a limitation of this study is the choice of variables with which the inner speech functions were correlated. Further studies should consider Big Five traits and motives, attitudes, or needs as well as - what is particularly important - self-narratives and personal meanings including identity. For knowing a core meaning of self-talk functions examining them in the context of identity formation seems to be of crucial importance.

Different aspects of self-talk measured by STS and FUND implies two questions: (1) how to integrate or order

these two approaches to self-talk or internal dialogical activity?; (2) does inner speech have other functions? Certainly, the search for a universal list of dialogue functions and the attempt to understand the complexity of the phenomenon inspires further research. This point seems especially relevant when we reflect on possible culture specificity of self-talk functions what suggested results of EFA and CFA. The question is if such differences between samples from different cultures mirrors differences on linguistic or mental (behavioral) level?

Data Accessibility Statement

De-identified data for both studies are available at:

(https://osf.io/p58gr/?view_only=b0498e89e1714d3895f0d87aed655b5b)

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SKALA ST

T. BRINTHAUPT

Badania wykazały, że wszyscy ludzie mówią do samych siebie przynajmniej w niektórych sytuacjach lub w szczególnych okolicznościach. Każde z poniższych zdań dotyczy tych chwil, kiedy można „mówić do siebie” lub prowadzić wewnętrzną rozmowę z sobą (po cichu lub na głos). Określ, jak każde zdanie odnosi się do Ciebie, zaznaczając odpowiednią liczbę obok każdego z nich. Przyjmijmy, że każde zdanie zaczyna się stwierdzeniem: „Mówię do siebie kiedy...”.

Pamiętaj, aby ocenić każde zdanie. Proszę nie śpieszyć i zastanów się nad każdym z nich. Użyj poniższej skali:

- 1 – nigdy
- 2 – rzadko
- 3 – czasem
- 4 – często
- 5 – bardzo często

MÓWIĘ DO SIEBIE KIEDY...

1. Powinienem być zrobić to inaczej	1	2	3	4	5
2. Spotkało mnie coś dobrego	1	2	3	4	5
3. Zastanawiam się co powinienem zrobić lub powiedzieć	1	2	3	4	5
4. Wyobrażam sobie jak ludzie reagują na to co mówię	1	2	3	4	5
5. Jestem z siebie naprawdę zadowolony	1	2	3	4	5
6. Chcę przeanalizować to co ktoś ostatnio do mnie powiedział	1	2	3	4	5
7. Wstydzę się czegoś co zrobiłem	1	2	3	4	5
8. Jestem dumny z czegoś co zrobiłem	1	2	3	4	5
9. Sprawdzam w myślach możliwe sposoby postępowania	1	2	3	4	5
10. Jestem na siebie naprawdę zły.	1	2	3	4	5
11. Próbuję przewidzieć co ktoś powie i jak ja na to zareaguje	1	2	3	4	5
12. Daję sobie instrukcje lub wskazówki co powinienem zrobić lub powiedzieć	1	2	3	4	5
13. Chcę pochwalić siebie za zrobienie czegoś dobrze	1	2	3	4	5
14. Spotkało mnie coś złego	1	2	3	4	5
15. Chcę przypomnieć sobie co mam zrobić	1	2	3	4	5
16. Chcę odtworzyć coś co powiedziałem innej osobie	1	2	3	4	5