

ORIGINAL ARTICLE

Development and initial validation of the Daily Goal Realization Scale

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BACKGROUND

This paper presents the results of three studies allowing the design and initial validation of the Daily Goal Realization Scale (DGRS). Goal realization refers to the engagement in goal-directed behavior that leads to progress in personal goal attainment; it is considered one of the adaptive personal characteristics.

PARTICIPANTS AND PROCEDURE

Three studies, including an initial study to develop and select the items (Study 1), an intensive longitudinal study (Study 2), and a multiple goal evaluation study (Study 3), tested factorial structure, reliability and validity of the measure.

RESULTS

Multilevel confirmatory factor analysis confirmed the unidimensional structure of the DGRS (obtained in Study 1) both at the individual and goal level, captured as daily

goal realization (Study 2) and as multiple goal realization (Study 3). The validity of the DGRS was supported by meaningful associations with other goal evaluations (Study 3). As expected, the DGRS was positively related to evaluations of progress in goal achievement, engagement, likelihood of success, and goal importance. The DGRS also demonstrated measurement invariance allowing for meaningful comparisons of scores between men and women.

CONCLUSIONS

The findings indicate that the DGRS is a brief and reliable idiographic measure of daily goal realization. The scale has excellent internal consistency and good criterion validity.

KEY WORDS

goal realization; personal goals; multilevel analysis; diary study; measurement invariance

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BACKGROUND

The concept of goals has a long tradition in psychology, being used when explaining purposeful action (Pervin, 2015). It helps explain a person's readiness to take a certain action and to execute it in an energized manner (Gollwitzer & Oettingen, 2015). Understanding of human striving towards goals is considered important for understanding personality and particularly motivation (Gollwitzer & Oettingen, 2015; Hryniewicz & Borchet, 2019). A goal is a mental representation of an end point a person is trying to attain, which governs purposive behavior (Pervin, 2015). Directed by such cognitively generated motivation, people guide their actions anticipatorily (Bandura, 2015); they set goals, anticipate likely outcomes of future actions, and plan courses of actions to achieve these goals. Goal realization, understood as engagement in goal-directed behavior that leads to progress in personal goal attainment (Bagozzi et al., 2003; Little, 2006; Milyavskaya et al., 2012), is therefore considered one of the adaptive personal characteristics. Moreover, progress and attainment of meaningful goals is linked to well-being (e.g., Emmons, 2003; Sheldon et al., 2010). Consequently, research explaining the antecedents and consequences of personal goal realization provides insights into important aspects of human functioning.

An important characteristic of goals is their hierarchical organization, which adds an element of considerable complexity to the explanations of human functioning (Pervin, 2015). A person may be engaged in the realization of multiple personal goals at the same time, and the realization of a specific goal may differ from the realization of other goals (Laguna et al., 2017; Milyavskaya & Werner, 2018; Nurmi et al., 2009; Salmela-Aro et al., 2000). Thanks to this, the analysis of multiple personal goals that guide purposive behavior opens an interesting perspective for understanding the "personality architecture" which manifests itself in within-person structures and processes (Cervone, 2005). This is possible because personal goals have a natural multilevel structure (Lüdtke & Trautwein, 2007), with a goal level (within-individual level) and a person level (between-individual level). The multilevel approach allows for explaining the between-individual stability in the general tendency to undertake actions leading to the achievement of goals and the within-individual variability in the realization of different goals – a person may be strongly engaged in the process of realization of one goal and only moderately engaged in the realization of another. Moreover, the dynamic nature of the goal realization process raises the issue of within-individual variability in specific goal realization over time – a person may be more engaged in the realization of that goal one day and less engaged the next day. Considering this complexity and

dynamics of the goal system, a person has not only to select among goals, but also to develop strategies for achieving short-term and long-term, single and multiple goals (Pervin, 2015).

The time-frame of goal realization is one of the important questions raised especially in the social cognitive theory, which postulates that individuals regulate their behavior by self-imposed goals and self-produced consequences (Bandura, 1986). Goal proximity is considered important for effective goal realization, and the effectiveness of goals in regulating action depends on how far into the future they are projected (Bandura, 2015). Consequently, by dividing a distal (long-term) goal into short-term sub-goals, a person may achieve progress in goal realization. As postulated by Bandura (1986), motivation is best maintained by explicit proximal subgoals that are instrumental in achieving distal ones. These proximal goals "direct what one does in the here and now. Distal goals alone are too far removed in time to provide effective incentives and guides for present action" (Bandura, 2015, pp. 44-45). Therefore, the analysis of short-term goal realization, including daily progress in goal realization, is of vital importance for a better understanding of goal-directed behavior and, consequently, of human motivation and personality.

CHALLENGES OF GOAL EVALUATION

The measurement of short-term goal realization poses inevitable problems resulting from the complexity of goals, their personal character, and their dynamics. First, a person may be engaged in the realization of multiple personal goals at the same time (Little, 2006). A measure intended to assess goal realization should take this into account, allowing for the evaluation of multiple goals (e.g., Koestner et al., 2008). Second, each person establishes, maintains, and strives to attain a different set of personal goals (Laguna et al., 2017; Nurmi et al., 2009; Salmela-Aro et al., 2000), specific to this person only and expressing his or her personality in specific life situations (Little, 2006). As autonomous motivation is related positively to goal progress (Koestner et al., 2008), analysis of self-selected personal goals seems important when studying goal realization (Sheldon et al., 2010). Therefore, a measure of personal goal realization has to allow for the expression of person-specific goals and to evaluate progress in their realization. Third, people may change their engagement in particular goal realization over time, changing their goal priorities, which is especially prominent in the case of short-term goals. A measure should therefore assess short-term engagement in goal realization and allow researchers to evaluate it repetitively over time.

Based on all these considerations, we propose a measure of short-term goal realization: the Daily

Goal Realization Scale (DGRS). It was built with the intention to enable the idiographic evaluation of progress in the realization of goals chosen by a particular person (Little, 2006). The DGRS was intended to enable multiple goal evaluations which, additionally, could be repeated many times (i.e., daily), as needed in intensive longitudinal research (Bolger & Laurenceau, 2013). To serve these purposes, the measure should be reliable but very short, so as to reduce respondents' fatigue when enquired repetitively.

To demonstrate why a new measure is needed, it is worth analyzing the problems faced when evaluating personal goals. Usually, with some notable exceptions (e.g., Milyavskaya et al., 2012; Sheldon et al., 2010), single items were used for goal evaluations. As an illustrative example we use the Personal Projects Analysis (PPA; Little & Gee, 2007). Applying this flexible tool consisting of several modules, a researcher chooses the modules they want to apply. Usually, personal goals are assessed in a two-step procedure, applying the first two PPA modules. First, participants write down the goals they consider most relevant and personally valid for them. Second, they rate each goal on several dimensions selected for a particular study. Each of these dimensions is a single item with an 11-point scale (e.g., plan clarity: from 0 – *have no plan of project realization* to 10 – *have a clear and concrete plan*). Different sets of PPA dimensions were used in different studies (Nurmi et al., 2009; Salmela-Aro et al., 2000) and similar evaluations were applied in other research (e.g., Koestner et al., 2008). Because reliability of single item evaluations is usually unknown (test-retest correlations are rarely available), as a remedy some researchers combined several PPA dimensions into scales, for example, using the total score on five single-item dimensions (Laguna et al., 2017). A similar solution was applied in other studies (e.g., Milyavskaya et al., 2012; Sheldon et al., 2010). Thus developed, the scales were then evaluated psychometrically; their factorial structure and reliability were estimated. Such measures, however, were merely ad hoc solutions developed for a specific study, and none of them was systematically tested psychometrically. Moreover, there has been no specific measure of short-term goal realization. Therefore, a measure with known psychometric properties that enables the assessment of short-term personal goal realization is proposed.

CURRENT RESEARCH

In this paper we present the development and initial validation of the brief measure of daily goal realization, the DGRS, allowing evaluation of personally chosen idiographic goals. Three studies are reported. In Study 1 we tested the internal structure of the initial set of items, selected the final set of items for the

DGRS, and tested its internal consistency. Next, in Study 2, the DGRS was applied in a daily diary allowing the multilevel evaluation of its factorial structure and testing its reliability both on the goal and on the person level. Thus, Study 2 also demonstrates the usefulness of the DGRS in investigations concerning the daily realization of personal goals. Study 3 demonstrates its usefulness in investigations of multiple personal goals. We also tested the reliability and construct validity, established the measurement invariance, and estimated the criterion validity of the measure, thus conducting an initial validation of the DGRS.

When estimating criterion validity of the DGRS, we expected that daily goal realization would be positively correlated with other goal scales, selected from the PPA (Little & Gee, 2007) – namely, with the evaluations of progress in goal achievement, engagement, likelihood of success, and goal importance. Of all the dimensions proposed in the PPA, we selected the ones that were most likely to be related to the daily level of goal realization. According to Little and Gee (2007), the progress dimension is the current level of success in achieving the goal. This is why we assumed that there would be a positive correlation between DGRS scores and this PPA dimension. Engagement (also called absorption) is defined as the actual extent of involvement in the project (Little & Gee, 2007), which has been found in many studies to be associated with persistence in goal realization (Locke & Latham, 2019). We therefore expected that engagement would be positively correlated with daily goal realization. Likelihood of success is the belief in successful goal achievement (Little & Gee, 2007). Research shows that people are more likely to pursue the goals that they perceive as attainable compared to those in which they have little hope of succeeding (Milyavskaya & Werner, 2018). We therefore expect positive correlations between this PPA dimension and DGRS scores. The last goal dimension that we selected is goal importance – the extent to which the achievement of a goal is important to a person (Little & Gee, 2007). Goal importance is directly linked to goal realization, because assessing one goal as more important than another leads to prioritization and greater perseverance in pursuing that goal (Austin & Vancouver, 1996); it also stimulates motivation to engage in the pursuit of valued goals (e.g., Savina, 2013). Consequently, we expected positive correlations between goal importance and daily goal realization as measured by the DGRS.

STUDY 1

We performed this initial study with two samples (1A and 1B) to develop and select the items that would be included in a new measure of daily goal realization.

PARTICIPANTS AND PROCEDURE

In sample 1A the participants were 72 university students of different majors (58 women), aged 19 to 29 years ($M = 22.38$, $SD = 1.73$). We invited participants during their classes at the university and via social media. Those who agreed to take part in the study provided their email addresses and were then invited by e-mail to complete an online questionnaire. Participation in the study was voluntary and no compensation was provided.

Sample 1B consisted of 318 participants aged 25 to 55 years ($M = 40.81$, $SD = 8.49$; 172 women). They lived in cities with more than 200,000 inhabitants (28.9%), 16.0% lived in cities with 100,000-200,000 inhabitants, 23.9% in cities with 20,000-100,000 inhabitants, 11.0% in cities with up to 20,000 inhabitants, and 20.1% lived in the countryside. In terms of educational attainment, 0.9% had completed primary education, 6.9% vocational education, 34.3% secondary education, 57.6% had a postgraduate degree, and 0.3% had some other qualification. The sample was gathered on-line using the research panel of participants who were rewarded with points in a loyalty program. Participants were recruited using quota sampling to guarantee a sufficient number of individuals in each age and gender range.

MEASURE

Based on the theoretical assumptions outlined in the introduction, we developed seven items, all of them describing a single construct, i.e. daily progress in goal realization (see examples in Supplementary material). In sample 1A participants were asked to list their three personal goals that they currently pursued (i.e., on the day of the study), and in sample 1B they listed one personal goal. Then, they rated the daily engagement in the process of realization for each of these goals, responding to seven items from the initial pool on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*).

DATA ANALYSIS

Using the data from sample 1A we performed principal component analysis (PCA) with Oblimin rotation ($\delta = 0$) and Kaiser normalization on a pool of answers provided for each of the seven items.

Using the data from sample 1B we performed confirmatory factor analysis (CFA) using maximum likelihood estimation. When evaluating model fit we applied the chi square (χ^2), root mean square error of approximation (RMSEA), comparative fit index (CFI), and standardized root mean square residual (SRMR). Values below .08 for the RMSEA and .09 for the SRMR, and values higher than .90 for the CFI indicate an acceptable fit (Schweizer, 2010).

Cronbach's α coefficient was used to estimate the reliability of the measure.

PCA RESULTS

Evaluations of three personal goals by each participant from sample 1A resulted in 215 responses to each of the initial seven items (one person listed and evaluated only two personal goals). A preliminary analysis of the data showed their relevance for the intended analyses (KMO = .84, Bartlett test: $\chi^2 = 888.74$, $df = 21$, $p < .001$). The Kaiser criterion (eigenvalue greater than 1) indicated two components which together explained 74.88% of the variance in all variables. Both factors concern daily goal realization. The first factor explained 56.44% of the variance and comprised four items (see Supplementary material) with factor loadings from .75 to .97; none of them had cross loadings higher than .30. Cronbach's α of this scale was .92. The second factor comprised three items (e.g., "Today I have been motivated to accomplish my goal") with factor loadings from .77 to .83. Cronbach's α of the second factor was .73.

The aim of the study was to develop a brief, unidimensional and reliable measure of daily goal realization. These requirements were fully met by the items belonging to the first factor, as the scale had higher reliability and its items have high factor loadings. Thus, these four items were selected for the Daily Goal Realization Scale (DGRS).

Each of the DGRS items was positively correlated with the total score (calculated excluding that item); item-total correlations ranged from .77 to .88, showing high discrimination of all items.

CFA RESULTS

Using data from sample 1B, the unidimensional model built from four items – selected based on the PCA results – was fitted to the data. The CFI and SRMR model fit indices indicated acceptable fit, while RMSEA did not: $\chi^2(2) = 36.58$, $p < .001$, RMSEA = .234, CFI = .955, SRMR = .035. Therefore, as suggested by the modification indices, we added one covariance between the error terms of items 2 and 3, which resulted in acceptable model fit: $\chi^2(1) = 1.48$, $p = .224$, RMSEA = .039, CFI = .999, SRMR = .006. The factor loadings in this model ranged from .71 to .83. Cronbach's $\alpha = .89$.

CONCLUSIONS

Study 1 allowed for development of a brief four-item DGRS (see Supplementary material), which may be easily applied in studies with multiple measurements. The scale demonstrated high reliability.

STUDY 2

This daily diary study was performed to further validate the DGRS. Multiple daily evaluations allowed us to test the multilevel structure of the measure, with daily goal realization as the within-individual level and with inter-individual differences in goal realization as the between-individual level. We also tested the reliability of the scale on both levels.

PARTICIPANTS AND PROCEDURE

The sample included 180 participants (133 women) aged 19 to 41 years ($M = 21.98$, $SD = 2.50$).

We approached university students of different majors during their classes at the university and via social media and invited them to participate in a seven-day diary study. Participation was voluntary and no compensation was offered. Those who agreed to take part in the study provided their e-mail addresses. They were then invited by e-mail to an initial online questionnaire, including a consent form.

Each evening the following week, starting on Monday, participants received a link to an online survey. They were asked to write down a personal goal that they intended to pursue the next day. The following day, they were asked to assess the realization of that goal by completing the DGRS and to name a goal for the next day.

MEASURE

We used the four-item DGRS, developed in Study 1.

COMPLIANCE WITH INSTRUCTIONS

A total of 1,005 daily goal evaluations were collected during the seven consecutive days. The minimum

number of completed daily surveys was 3 ($M = 5.58$, $SD = 1.36$). The mean daily sample size was 143.60 ($SD = 20.60$).

DATA ANALYSIS

We performed a multilevel confirmatory factor analysis (MLCFA), using maximum likelihood estimation with robust standard errors (MLR), to assess how well the data fitted the single-factor structure suggested by the Study 1 results. The two-level MLCFA allowed us to decompose the total sample covariance matrix into pooled within-individual (Level 1) and between-individual (Level 2) covariance matrices and to use these two matrices in the analyses of the factorial structure at each level. When evaluating model fit we applied the Satorra-Bentler scaled chi square ($S-B\chi^2$), RMSEA, CFI, and SRMR. Data were analyzed using Mplus v.7.0 (Muthén & Muthén, 2012). We calculated composite reliability (CR), based on the MLCFA results, to estimate the internal consistency of scale scores.

RESULTS

DESCRIPTIVE STATISTICS, CORRELATIONS, AND VARIANCE DISTRIBUTION

The average DGRS scores obtained on each of the seven days ranged from 4.50 to 4.79 (Table 1), showing variability across days (standard deviation varied from 1.59 to 1.75). Daily DGRS scores were uncorrelated or demonstrated low intercorrelations (ranging from $-.18$ to $.25$). Such diverse correlations are due to the fact that each day participants listed and evaluated different personal goals and the level of realization of one of these goals may have been unrelated to the level of realization of a goal chosen for a different day. These results confirm that the measure captures goal-specific daily realization of personal goals.

Table 1

Descriptive statistics, reliability, and correlations among seven daily DGRS scores

Day	<i>M</i>	<i>SD</i>	α	1	2	3	4	5	6
1. Day 1	4.50	1.59	.92						
2. Day 2	4.74	1.62	.94	.16*					
3. Day 3	4.62	1.77	.97	.08	.06				
4. Day 4	4.79	1.75	.96	-.09	-.10	-.03			
5. Day 5	4.76	1.75	.97	-.17	-.01	.01	.16		
6. Day 6	4.75	1.63	.96	-.18*	.01	-.06	.01	.14	
7. Day 7	4.79	1.65	.96	.07	-.06	-.17*	-.17*	-.11	.25***

Note. DGRS – Daily Goal Realization Scale; $N = 215$ goal evaluations; * $p < .05$, *** $p < .001$ (two-tailed).

To check if there is both within-individual and between-individual variance in daily goal realization, we checked variance distribution (Nezlek, 2012). The MLCFA results showed that there was variance in this variable at both levels (1.55 at the within-individual level and 0.63 at the between-individual level). The intra-class correlation coefficient (ICC), being the ratio of the between-individual level variance to the total variance in the DGRS scores, was .29. This demonstrates that daily goal realization differs between individuals and, even more prominently, between days. These results support the choice of MLCFA as the data analysis strategy.

FACTORIAL STRUCTURE

The MLCFA results showed that the unidimensional factorial structure of the DGRS did not fully fit the multilevel data – CFI and SRMR model fit indices indicated acceptable model fit, while RMSEA did not, $S-B\chi^2(4) = 59.79$, $p < .001$, $RMSEA = .118$, $CFI = .969$, $SRMR_{(within)} = .023$, $SRMR_{(between)} = .019$. Likewise in sample 1B, as suggested by the modification indices, we added one covariance between the error terms of items 2 and 3 on the within-individual level. The model fit indices demonstrated acceptable fit of this model, $S-B\chi^2(3) = 20.71$, $p < .001$, $RMSEA = .077$, $CFI = .990$, $SRMR_{(within)} = .009$, $SRMR_{(between)} = .017$. The factor loadings of all items were statistically significant and ranged from .83 to .94 on the within-individual level and from .92 to 1.00 on the between-individual level.

INTERNAL CONSISTENCY

To evaluate the internal consistency of the DGRS, we used Cronbach's α and CR indicators (Table 1). The values of Cronbach's α for the seven days ranged from .92 to .97. The CR values were .94 on the within-individual level and .98 on the between-individual level. Thus, both indicators showed high internal consistency of DGRS scores on both levels.

CONCLUSIONS

The results of this daily diary study confirm that the DGRS is a reliable single-factor measure and that this factorial structure well represents the personal goal realization process both on the goal (within-individual) level and on the person (between-individual) level. This demonstrates the construct validity of the measure.

STUDY 3

As a person may be simultaneously engaged in the realization of multiple goals (Little, 2006; Little & Gee, 2007), the realization of a specific goal may differ from

the realization of other goals. This means personal goals have a natural multilevel structure, with a goal (within-individual) level and a person (between-individual) level. A measure of goal realization should therefore represent these two levels. To test whether the DGRS met this criterion, we conducted the next study using a multilevel study design.

Apart from testing reliability and construct validity, we estimated the criterion validity of the measure by analyzing its correlations with PPA scales, namely: progress in goal achievement, engagement, likelihood of success, and goal importance (Little & Gee, 2007). Based on previous research on goal realization (Austin & Vancouver, 1996; Locke & Latham, 2019; Milyavskaya & Werner, 2018; Savina, 2013), we expected that each of these dimensions would be positively correlated with the DGRS scores.

PARTICIPANTS AND PROCEDURE

The participants were 56 adults (37 women) aged 18 to 51 years ($M = 24.98$, $SD = 8.03$). In the sample, 36 participants (66.03%) had secondary education, 18 participants (33.97%) had higher education, and 2 participants (3.6%) had lower secondary education.

We invited psychology students to help us gather the data. Each student was asked to deliver paper-and-pencil questionnaires and explain the instructions (described in the *Measures* section) to at least three persons. Participation in the study was voluntary, with no compensation.

MEASURES

We performed goal evaluation by applying the Personal Projects Analysis (PPA) method (Little & Gee, 2007). At the beginning, the participants were asked to list their personal goals, referring to actions that they were currently considering. They listed as many goals as possible. Then they were asked to choose 10 goals from their list that were central to them and that they intended to actively pursue in the coming months. Next, using 11-point scales, they rated each goal on four dimensions: progress ("How successful have you been in this project so far?"; answers from 0 – *had no success at all* to 10 – *very successful*), engagement ("To what extent do you become engrossed or deeply involved in a project?"; answers from 0 – *uninvolved* to 10 – *generally absorbed*), likelihood of success ("How successful do you believe this project will be?"; answers from 0 – *total failure* to 10 – *entirely successful*), and goal importance ("How important is this project to you?"; answers from 0 – *not at all important* to 10 – *very important*).

The DGRS was used to evaluate daily goal realization of each of the personal goals elicited from the participants using the PPA.

COMPLIANCE WITH INSTRUCTIONS

Nearly all participants evaluated their 10 personal goals; only two respondents listed and evaluated 7 goals ($M = 9.84$, $SD = 0.67$). In total, we collected 554 individual goal evaluations.

DATA ANALYSIS

To verify the factor structure of the DGRS, we performed a two-level MLCFA using MLR estimation. The CR indicator was used to evaluate the internal consistency of scores. Next, we tested the criterion validity of the DGRS using multilevel modelling (Nezlek, 2012). The multilevel approach allowed us to take into account the multilevel structure of personal goals, with personal goals as Level 1 (within-individual level) and person as Level 2 (between-individual level). Controlling for the grouping effect on Level 2, we analyzed the relationships between four PPA goal evaluations (Little & Gee, 2007) as predictors and the DGRS score as the dependent variable. Finally, we tested the measurement invariance of the DGRS across sex using multigroup confirmatory factor analysis (MGCFA; Meredith, 1993; Steenkamp & Baumgartner, 1998). We examined a series of increasingly restricted models. First, we estimated the configural invariance model, a model without any cross-group constraints. Second, we tested the metric invariance model, in which factor loadings were constrained to be equal across groups. Third, we estimated the scalar invariance model, in which factor loadings and intercepts were constrained to be equal across groups. When a measure does not achieve full invariance, it is reasonable to test for partial in-

variance, allowing some parameters to vary across groups (Steenkamp & Baumgartner, 1998). MLR estimation was used. To test the differences between increasingly restricted nested models, we calculated $\Delta\chi^2$ and ΔCFI (Chen, 2007). An absolute difference in CFI smaller than .01 indicated measurement invariance. The additional criteria were differences in model fit – a change by less than .015 in RMSEA and a change by less than .030 in SRMR.

RESULTS

DESCRIPTIVE STATISTICS, CORRELATIONS, AND VARIANCE DISTRIBUTION

The mean DGRS score ranged from 2.96 to 3.52 (Table 2), and the mean score estimated for all goals was 3.30 ($SD = 1.78$). Correlations between evaluations concerning the realization of different goals ranged from $-.14$ to $.39$; only some of them were statistically significant. This demonstrates that people are engaged in the realization of their personal goals to various degrees on a specific day.

To check if there was both within-individual level and between-individual level variance in DGRS scores, we checked variance distribution (Nezlek, 2012). The MLCFA results demonstrated that there was variance at both levels (2.75 at the within-individual level and 0.45 at the between-individual level). The ICC for DGRS scores was .14. These results show that people differ in their daily realization of different personal goals and that the variance between goals is higher than the variance between people, who nevertheless do differ in their general tendency to engage in short-term goal realization.

Table 2

Descriptive statistics, reliability, and correlations among ten personal goals evaluated using the DGRS

Goal	<i>M</i>	<i>SD</i>	α	1	2	3	4	5	6	7	8	9
1. Goal 1	3.46	1.76	.90									
2. Goal 2	3.26	1.80	.93	.11								
3. Goal 3	3.10	1.69	.94	-.10	.26							
4. Goal 4	3.16	1.76	.94	.28*	.27	.33*						
5. Goal 5	3.37	1.91	.95	.17	-.01	.02	-.03					
6. Goal 6	3.52	1.90	.97	-.06	.18	.35*	.18	.39**				
7. Goal 7	3.31	1.66	.92	.27*	.07	.06	-.14	.11	.05			
8. Goal 8	2.96	1.67	.96	.15	.31*	.38**	.10	.08	.19	.25		
9. Goal 9	3.39	1.75	.96	.29	.09	.10	.38**	.24	.06	-.01	.10	
10. Goal 10	3.45	1.91	.96	.08	.15	.18	.14	.04	.22	.00	.20	.18

Note. DGRS – Daily Goal Realization Scale; $N = 1,005$ daily goal evaluations; * $p < .05$, ** $p < .01$ (two-tailed).

Table 3

Descriptive statistics and correlations between DGRS scores and the PPA dimensions

Variable	<i>M</i>	<i>SD</i>	1	2	3	4
1. DGRS	3.30	1.77				
2. Progress	5.30	2.86	.54***			
3. Engagement	5.68	2.86	.57***	.52**		
4. Likelihood of success	7.25	2.36	.26***	.40***	.30***	
5. Goal importance	8.05	2.12	.24***	.20***	.50***	.13**

Note. DGRS – Daily Goal Realization Scale; PPA – Personal Projects Analysis; *N* = 554 goal evaluations; ***p* < .01, ****p* < .001 (two-tailed).

Table 4

Results of multilevel modelling predicting DGRS scores based on the PPA dimensions

Predictor	Intercept		Predictor	
	γ	<i>SE</i>	γ	<i>SE</i>
Progress	3.30***	.12	0.31***	.03
Engagement	3.31***	.11	0.34***	.02
Likelihood of success	3.30***	.11	0.22***	.03
Goal importance	3.30***	.11	0.19***	.03

Note. DGRS – Daily Goal Realization Scale; PPA – Personal Projects Analysis; ****p* < .001.

goals, namely goal importance, likelihood of success, progress, and engagement. As expected, all correlations proved to be statistically significant and positive (Table 3).

Multilevel modelling allowed us to further verify these relationships. We applied multilevel modelling (Nezlek, 2012) to test the relationships between goal evaluations and DGRS scores (within-individual level controlled for the grouping effect). We entered predictors as group-mean centered (Nezlek, 2012). In all equations, DGRS scores were treated as the dependent variable (*y*) explained by the effects (γ) of an intercept and a predictor and by error terms at the between-individual (*u*) and within-individual levels (*r*). The multilevel model is presented in the equation:

$$y = \gamma \text{ INTERCEPT} + \gamma \text{ PREDICTOR} + u + r$$

Acknowledging that personal goals belong to a specific person, the results demonstrated that each of the PPA goal evaluations was a statistically significant predictor of DGRS scores (Table 4). This means that evaluations of progress in goal achievement, engagement, likelihood of success, and the importance of a specific personal goal are positively related to evaluation of daily realization of this specific goal. These multilevel results confirm that the evaluations of daily goal realization using the DGRS are meaningfully associated and consistent with other evaluations of personal goals.

FACTORIAL STRUCTURE

The results of MLCFA demonstrated that the two-level single-factor model had good fit indices, $S-B\chi^2(3) = 10.53, p < .001, RMSEA = .068, CFI = .989, SRMR_{(within)} = .003, SRMR_{(between)} = .068$. Factor loadings of all items were statistically significant and ranged from .86 to .90 on the within-individual level and from .84 to 1.00 on the between-individual level. This confirms the construct validity of the scale.

INTERNAL CONSISTENCY

The values of Cronbach’s α for the DGRS evaluations of ten personal goals ranged from .90 to .97 (Table 2). CR was .93 on the within-individual level and .96 on the between-individual level. These results indicated the high internal consistency of DGRS scores on both levels.

CRITERION VALIDITY

To test the criterion validity of the DGRS, we examined its relationships to other evaluations of personal

MEASUREMENT INVARIANCE

To test the measurement invariance of the DGRS across sex, we performed MGCFAs, testing the single-factor model on 355 goal evaluations (DGRS scores) obtained from women and 187 from men. The configural (unconstrained) model showed a good fit to the data ($\chi^2(2) = 5.05, p = .080, RMSEA = .075, SRMR = .004, CFI = .996$). Next, we imposed equality constraints on all factor loadings across sex. The constrained metric invariance model did not differ significantly from the configural model ($\Delta\chi^2 = 4.68, p = .197, \Delta RMSEA = .011, \Delta SRMR = .022, \Delta CFI = .003$). In the

next step, we checked for scalar invariance. The comparison of this model with the metric model showed that the difference in chi square slightly exceeded the significance level ($\Delta\chi^2 = 7.81, p = .049$), which indicates that scalar invariance was not achieved. However, it is worth stressing that for the remaining indicators the level of the difference was not significantly exceeded ($\Delta\text{RMSEA} = .004, \Delta\text{SRMR} = .003, \Delta\text{CFI} = .007$). We therefore checked for partial scalar invariance, allowing one intercept (item 4) to not be constrained as invariant. The comparison of this model with the metric model ($\Delta\chi^2 = 0.72, p = .699, \Delta\text{RMSEA} = .007, \Delta\text{SRMR} = .003, \Delta\text{CFI} = .000$) revealed partial scalar invariance of DGRS scores across sex.

These results confirm that meaningful cross-group comparisons not only of regression slopes but also of mean DGRS scores across men and women are possible (Chen, 2007). Such comparison of mean scores revealed no statistically significant differences ($F(1, 551) = 1.54, p = .215$). This shows that daily realization of different personal goals does not differ across men and women.

CONCLUSIONS

Taking into account the fact that people pursue multiple personal goals, in this study we confirmed that the DGRS allows one to meaningfully and reliably evaluate both intra-individual differences and between-person differences in goal realization. We once again confirmed the single-factor two-level model, extending the results of Study 1 and Study 2 on construct validity. Moreover, we found confirmation for the criterion validity of the measure in the form of its expected correlations with relevant goal evaluations at the goal level. The DGRS also demonstrated measurement invariance across men and women. This allows meaningful comparisons of DGRS scores; such differences were not detected, however.

DISCUSSION

The three studies reported above allowed for the development and initial validation of the idiographic, brief, four-item DGRS. The scale reliably captures daily goal realization and can be applied in studies with multiple measurement times, such as diary studies, and for the evaluation of multiple goals. To sum up the findings of our research, Study 1 allowed for the development of the DGRS, and for the initial estimation of its internal structure and internal consistency. The effect was a four-item unidimensional measure, which demonstrated high reliability. Study 2, which was a daily diary study, confirmed the unidimensional structure of the DGRS using multilevel confirmatory factor analysis, both at the

goal/day (within-individual) level and at the person (between-individual) level. The high internal consistency of the measure was further confirmed. Study 3 was based on multiple personal goal evaluations. Multilevel confirmatory factor analysis again confirmed the unidimensional structure of the DGRS at the goal level and at the person level. This study also provided initial support for the criterion validity of the scale, as DGRS scores are significantly related to other goal evaluations, namely progress in goal achievement, engagement, likelihood of success, and goal importance (Little & Gee, 2007).

All three studies consistently show that the DGRS allows for capturing both intra-individual differences and between-person differences in daily goal realization. These intra-individual differences in short-term goal realization may be considered, firstly, as differences in goal realization at a specific time (i.e., during a specific day) and, secondly, as differences in the realization of multiple personal goals. In both cases, a single factor of goal realization as captured by the DGRS was confirmed. Similarly, on the person level a single factor was confirmed that captured differences between people in a general tendency to engage in the realization of their short-term goals. Being reliable but very short, as intended, the measure can be repeated multiple times, as it is needed in intensive longitudinal studies (Bolger & Laurenceau, 2013) or in multiple goal evaluations. It does not cause respondents' fatigue when enquired several times.

The new measure is an attempt to address the problems caused by the complexity, personal character, and dynamics of goals (Little, 2006; Milyavskaya & Werner, 2018) and it supplements already existing measures. First, the DGRS can be used to evaluate multiple goals, and the variability in these evaluations of specific goal realization can be meaningfully analyzed using a multilevel approach (Nezlek, 2012). Second, the personal, idiographic character of goals is acknowledged in the instructions provided with the scale, requesting the respondent to choose one of their personal goals and evaluate its realization by rating the items. Because the goals being assessed are chosen by a person, they have high personal meaning (Little, 2006). Thus, the scale does not capture answers concerning an externally designated goal (or list of goals), chosen by the researcher (e.g., to quit smoking, to finish homework), which may have no personal meaning for the respondent (see Sheldon et al., 2010). This allows researchers, at least to some degree, to include elements of an idiographic approach in the assessment, taking into account the uniqueness of individuals' personal goals, and to combine it with a nomothetic approach (Lüdtke & Trautwein, 2007). Third, the DGRS may be used to capture the dynamics of short-term goal realization, making it possible to evaluate it repetitively, at various time points. It

can therefore be applied in diary studies investigating changes in goal-directed behavior.

We believe that scientists investigating the relationships between cognition, affect, and conation would benefit from the new instrument allowing for the psychometrically sound measurement of daily goal realization. As pointed out by Bandura (1986), most human behavior is purposive and regulated by forethoughts. For this reason, investigations of purposive behavior may be of interest in many subdomains of psychology. As the multilevel approach has recently gained considerable popularity (Nezlek, 2012), this tool may be especially useful. The development of such research provides an opportunity to better understand “personality architecture” (Cervone, 2005) by investigating the within-person structures of personal goals and the within-person processes related to effective goal realization. Such research may not only extend knowledge concerning personality and motivation (Gollwitzer & Oettingen, 2015; Koestner et al., 2008; Pervin, 2015), but also uncover motivational patterns related to goal realization, which may contribute to well-being (Sheldon et al., 2010). A new measure may stimulate research on the antecedents and consequences of short-term purposive actions, which are an important aspect of human functioning.

LIMITATIONS AND FUTURE DIRECTIONS

Our studies provide initial evidence concerning the psychometric properties of the DGRS, which can be extended in future research. First, as the majority of participants in all our samples were women, most of them relatively young, more research is needed to test the psychometric properties of the DGRS with older people and with men. As we found measurement invariance of the DGRS across men and women, it is likely that also in other samples the results of the DGRS will be invariant. This, however, requires further studies on more diverse samples. Second, we tested the measure’s structural (construct) validity and performed an initial investigation of its criterion validity. Further research is needed to fully validate the DGRS by examining whether it correlates logically with other variables related to goal realization on both the within-individual and between-individual levels. Especially studies including objective measures of goal attainment are welcome, being at the same time the most demanding ones. Third, the DGRS instructions and items require participants to evaluate the realization of a personal goal during a specific day. Future research may test other instructions, asking participants to evaluate goal realization in a different time frame (e.g., a week, a month). Such changes in the instructions, however, would require future validation.

FINAL CONCLUSIONS

The development of a new measure of daily goal realization may stimulate future research on human purposive behavior. Being a very short tool, the DGRS can be used repetitively, which is especially important in intensive longitudinal research and in research on multiple goals. The findings of our studies provide initial validation of the scale indicating its excellent internal consistency and good criterion validity. DGRS scores also demonstrate measurement invariance allowing meaningful comparisons between men and women.

ETHICAL CONSENT

The research was approved by the Institute of Psychology Ethics Committee at the John Paul II Catholic University of Lublin, 2016.

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Supplementary material is available on journal’s website.

DISCLOSURE

The authors declare no conflict of interest.

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