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What Triggers Mental Disorders? Examining the Role of Increasing Relationships between Self-Regulatory Efficacy Expectations and Behavioral Intensity

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Abstract: Background: Extreme promotion and prevention focus (foci) of the value need can lead to mental disorders due to a reinforcement mechanism between efficacy expectations (EEs) and behavioral intensity (BI) that then sets in. A reliable measurement instrument capturing the onset of this reinforcement could facilitate disorder prevention. Additionally, the needs for truth and control may also trigger mental disorders in extremes of their foci, though these foci lack conceptualization. Thus, designing foci for each need, we developed both an item pool to assess EEs and BI of all foci across all needs and a procedure for compiling group-specific scales from it to capture EE–BI correlations for preventive purposes. We examined both the overall suitability of the pool and of the procedure to compile those scales from it that are reliable, valid, and most probably capable of capturing the EE–BI reinforcement onset in a specific group (here, our calibration sample, N = 198, 77% female). Methods: All eligible scales from the item pool were tested for cubic EE–BI correlations (high majorities of the expected cubic shape indicated item pool suitability), and those yielding the most cubic relationships were assessed in nonlinear PLS structural equation modeling with regard to their significance, reliability, and validity. Results: The item pool and procedure were largely suitable, producing reliable, valid scales where EEs significantly predicted BI cubically. Conclusions: The item pool and the method for identifying group-specific scales mark an important step toward better risk group identification. Further studies are needed to determine their actual predictive relevance for mental disorders.

Keywords: self-regulatory focus theory; strivings for value, truth and control effectiveness; self-regulation; efficacy expectations; motivation; mental disorders; mental health; basic psychological needs

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1. Introduction

A precise description of the central determinants of mental disorders is an important prerequisite for successful psychotherapy in particular and for maintaining the mental health of society in general [1]. However, theoretical models of the development of mental disorders are often criticized for leaving fundamental causal determinants of the development of mental disorders unclear [2,3]. In addition, the cross-disorder mechanisms of the transition from healthy to mentally ill are often not described [2]. Such considerations are usually either disorder-specific [4,5] and/or very complex [6]. For a comprehensive understanding of mental disorders, however, research approaches that can meaningfully link causes, as well as overarching trigger and transition mechanisms in different mental disorders, and at the same time, describe them with a few core constructs, would be more helpful [7].

Self-regulation [8,9] has often been considered a central, overarching trigger mechanism for mental disorders [10]. Several studies have shown that weak or highly imbalanced

intensities of the two self-regulatory systems of the Self-Regulatory Focus Theory (promotion vs. prevention focus, also referred to as foci [11,12]) are predictive of various mental disorders [13–16]. Evidence and theoretical considerations [17–19] suggest that, in mental disorders, extremely low or extremely high efficacy expectations (EEs) in particular influence the intensity of self-regulation stimulated in situations. Of the self-regulatory processes, behavior has the strongest long-term effect on EEs; thus, these two variables can be mutually reinforcing. For example, due to fear, people may feel that the discrepancy between their prevention goals and their higher-level (survival) reference standards is increasing [20], thus stimulating more and more self-regulation, including behavior [19]. This then has an increasing effect on the perceived discrepancy, resulting in a vicious cycle. Since the described relationship between EEs and self-regulation intensity does not seem to exist in this way in mentally healthy individuals [21], this mechanism is likely to be an important indicator of the onset of mental disorders.

In addition, evolutionary psychological considerations suggest that promotion and prevention focus also exist in the other two needs, Truth and Control, according to Higgins [22], and stimulate mental disorders in their extremes as well, for which the same mechanism should most probably be responsible. A measurement instrument for the complete mapping of all EEs and BIs in all need foci could, therefore, make the transitions into many mental disorders visible. For use in prevention, however, this measurement instrument must look different depending on the application group, as disorder-typical behaviors and descriptive properties of the EE–BI correlations can vary. In the present study, promotion and prevention foci were therefore first designed for truth and control. Then, an item pool was developed with which all foci of all needs can be recorded in their entire range. Subsequently, a procedure was developed with which those scales can be compiled from this item pool on a group-specific basis that depicts the group-specific changes in the EE–BI correlations as clearly as possible. A statistical analysis provided initial confirmation of the suitability of the item pool and the procedure.

1.1. Intense and Dysbalanced Self-Regulation of Basic Needs and Foci Predicts Mental Disorders

Self-regulation describes coordinated psychological processes that initiate and control goal-directed behavior [10,23,24]. It includes, for example, the mode of perception, the regulation of attention, the emergence of emotions, and the resulting behavior [25,26]. From the perspective of evolutionary theories, motivation and self-regulation ultimately serve to ensure the best possible survival, growth, and reproduction [27,28]. They do this by helping to satisfy basic psychological needs, i.e., various needs or domains that are critical for evolutionary propagation as a whole [29].

Higgins [22] postulates Truth, Control, and Value as three basic needs with central evolutionary relevance [30–32]. Truth defines the need for discovery, exploration, learning, and understanding [31], which serves to "determine what reality is" and "recognize the actual facts (about the self and the environment)" [22]. Truth, for example, arouses the spontaneous interest of rhesus monkeys in a puzzle until it is completely solved [31,33]. Control describes the need to exert influence over the self, the environment, and the interactions between them in order to "master what is needed to make things happen" [22]. For example, control ensures that children as young as two months of age pull the strings of a mobile over their crib of their own accord and experience pleasure from the effect [34]. Value is the need to achieve desirable outcomes and avoid undesirable ones [35]. There is a whole range of such states and stimuli that appear to have been linked through evolution by a reward system with positive/negative emotional responses that drive the need for value. Examples include reaching or approaching standards (ideals and oughts) [36] or sweet foods and drugs [22], which originally signaled favorable environmental conditions for humans [37].

Evidence suggests that a sustained success in one need can only occur if individuals are also successful in meeting the other two needs [35]. For example, for sustained positive value states, individuals need a degree of predictability and should be able to influence

their environment and themselves [38,39]. Accordingly, researchers associate mental health with self-regulation that is both *intensive* in each need in order to achieve the best current and future outcomes and *balanced across needs*, i.e., applied with approximately the same intensity and frequency for each need across situations [40,41].

In contrast, both overall weak self-regulation and an imbalance in which significantly more and more often self-regulation is applied to one of the needs than to the others are psychologically detrimental. Individuals with overall weak self-regulation do not achieve sufficiently desirable outcomes or development in any of the needs, which ultimately promotes depression [35]. Individuals who focus excessively on one of the three needs in an imbalanced manner seem to lack the flexibility to switch to self-regulation for other needs, resulting in fewer resources in the long term. Several mental disorders have already been linked to an excessive focus on one need (e.g., anxiety and narcissism [42]), although the mechanisms behind this have not been further elucidated.

In order to achieve value effectiveness, the Self-Regulatory Focus Theory [36] distinguishes between two different self-regulatory systems that serve to fulfill two different evolutionary purposes [43,44]. In the prevention focus, self-regulation is evolutionarily oriented toward survival, i.e., the fulfillment of necessities and critical minimums. In the promotion focus, self-regulation is instead directed toward growth and expansion, meaning it serves to achieve central value-related events for this purpose [45–47]. Depending on the focus, perception then constructs situations top-down either in terms of individually perceived necessities (i.e., ensuring survival and the goal of conserving resources) or in terms of individually perceived potentials (i.e., individual growth and the goal of expanding resources). Reference standards are applied to the situation that determine what is perceived as necessary in principle (ought standards) or what is perceived as the potential of the situation in principle (ideal standards) [36]. To reduce discrepancies to reference standards, different situational goals are targeted depending on the focus [48], and the self-regulatory processes for goal attainment also differ. For example, depending on whether the focus is on prevention or promotion, attention may be directed to potential obstacles or opportunities, and emotions arise on the spectrum of calmness-anxiety or joy-sadness [11,49–51].

As with the satisfaction of basic needs in general, longer-term success in the promotion and prevention focus is likely to occur only if individuals also experience success in the other focus. For example, a strong promotion focus is associated with a high error rate, which is only reduced by the prevention focus (otherwise, resources acquired only through a promotion focus are less durable). A strong prevention focus, on the other hand, is associated with lower speed, which can only be increased by the promotion focus (otherwise, resources that are only maintained and not further developed by a prevention focus are less adaptable to environmental changes) [52,53]. The best sustainable mental health, therefore, results when the stimulation of self-regulation is intense in each focus and balanced across foci [53–56].

In contrast, individuals with overall weak self-regulation do not achieve desirable outcomes in any of the foci, which ultimately promotes depression. Moreover, excessive intensity of self-regulation in the prevention focus is associated with anxiety disorders (particularly generalized anxiety disorder, GAD) [5,16], whereas in the promotion focus it is associated with mania [13,57]. In some cases, there is a direct overlap between the overactive self-regulatory mechanisms and the symptoms described in the DSM (e.g., hypervigilance), while in other cases the symptoms arise as a result of these self-regulatory mechanisms (e.g., sleep disturbances as a result of overactive vigilance in GAD) [58]. In contrast, a low frequency of activation of the prevention focus can be observed in primary psychopathy or callous/egocentric traits (comparatively low anxiety or moral sensitivity) [59,60] and a low intensity of the promotion focus in depression [13–15].

Against this background, two research questions arise.

One is whether the distinction between a self-regulatory focus on promotion vs. prevention can also be applied to truth and control. This seems obvious, as value, truth,

and control are equally central to evolutionary success and should therefore serve both survival and growth. The negative psychological outcomes of an imbalance among the three needs, at least if they are triggered by the change in self-regulation for value, are ultimately triggered by the imbalance in their two self-regulatory systems. An imbalance in needs for truth or control could arise through similar mechanisms. Since the self-regulatory processes of these foci are highly likely to become symptoms of other psychological disorders at extreme intensity, a more precise theoretical formulation of these self-regulatory processes would also contribute to a better understanding of the development of other disorders.

Second, there is the question of which mechanisms bring about changes in the intensity or balance of self-regulatory mechanisms [61]. A better understanding of these mechanisms would make the transitions into psychological disorders more easily recognizable, and a corresponding measurement tool for the relevant constructs would be useful for predicting disorders. It could be used in prevention.

1.2. Applying the Distinction between Promotion vs. Prevention Focus to Truth and Control

With reference to Higgins' description of truth as the motivation "to get answers about what happened and why it happened" [22], we define the what-part as truth-prevention focus (TPrev), the self-regulatory orientation to appropriately perceive states and processes in oneself, one's (social) environment and the relationships between the two. With regard to oneself, this can be represented in part, for example, by the awareness component of authenticity [62], or in self-concept clarity [63]. We define the why-part as the truth-promotion focus (TProm), the self-regulatory focus on deriving meaning and significance from oneself, one's (social) environment, and their relationships [42]. The TProm EEs may be represented in part by the presence of meaning [64] and other scales measuring similar constructs.

As self-regulation regarding representations of the self is probably the core of truth, and as these representations elicit the strongest motivational consequences [65], we decided to focus on representations of the self in the truth item content. Moreover, there is some evidence that representations of the self, its (social) environment, and their relationships might be separable constructs (although correlated) [65].

With reference to Higgins' [22,66] delineation of control as "exercising restraint or direction in action", we define the restraint part as control-prevention focus (CPrev), the self-regulatory focus on adapting the self to the environment through one's own influence, i.e., exerting influence and control over existing (internal) processes that affect the self and one's actions. In addition, we define the directional part as the control-promotion focus (CProm), the self-regulatory focus on independently initiating new processes from within oneself and causing effects [67]. In order to keep it parallel to the other foci in the measurement, we decided to limit it to effects on oneself and to exclude effects on the environment.

1.3. Changes in Focus Intensity Due to EEs and Behavior

Bandura [68] defines an EE as "an individual's confidence in his or her ability to organize and execute a particular course of action to solve a problem or accomplish a task" [69]. General EEs in a domain significantly influence how individuals in a single situation perceive discrepancies from their reference standards in that domain [18,70], and the perception of large or small discrepancies is, in turn, responded to with the development of behaviors or symptoms of mania, depression, anxiety, and presumably psychopathy [18,57,71–73]. A key reason for such reactions may be that the value of desired goals changes significantly with high or low EEs and thus with perceived discrepancies. This influences both the imbalance in intensity and frequency of focus activation and the overall low intensity of self-regulation in depression. With regard to focus intensity, individuals perceive the value of goals to be significantly higher in situations with large perceived discrepancies to these goals in the prevention focus or low in the promotion focus, and subsequently stimulating significantly stronger self-regulation to achieve the

goals [74]. The magnitude of the perceived discrepancy and the intensity of self-regulation then begin to correlate in these areas of discrepancy [75–77]. In terms of the frequency of focus activation, individuals with high EEs in the promotion focus and low EEs in the prevention focus appear to place greater value in novel situations on those action goals that most effectively reduce their perceived discrepancies in the respective focus [78,79], and, as a result, choose these goals, and thus the respective focus, more frequently. In turn, weak foci on both sides should arise when low EEs and thus large perceived discrepancies in the promotion focus in situations reduce the value of targeted goals and thus the effort for these goals, and also lead to a low value of all perceived goals when entering new situations. However, this can only occur if there are no other major discrepancies in the prevention focus. In such a case, goals will be selected more randomly or goals may not be selected at all [80].

With regard to measuring and visualizing changes in the transition to mental disorders, EEs also seem to be an interesting variable. On the one hand, very high or very low EEs in the area of mental disorders have a significant influence on self-regulation, and a clear increase in the intensity of self-regulation can also be observed experimentally with large or small discrepancies to a goal, depending on the development of the discrepancy [49]. On the other hand, EEs do not seem to influence the focus intensity in studies with the relatively healthy general population [11,21]. In comparison to disordered populations, however, they only reach significantly more moderate levels [18,81–83]. Experiments have also shown that when a goal is approached, a significant increase in motivation is only observed in the last stage before the goal is reached or the final goal is missed (e.g., when time is running out), but before that, motivation tends to remain constant with little change [49]. The relationship between EEs and goal value, or between EEs and self-regulation intensity and focus activation frequency, should therefore be positive or negative cubic or show thresholds at the transition to the extreme ranges of EEs [49,76,84,85]. Mental disorders should only develop beyond these thresholds. Thus, the transition of EEs into these extreme ranges could significantly initiate the development of the disorder. This opens up the possibility of making the transition to mental disorders visible by recording EEs, including their extreme ranges and the associated detection of thresholds in their connection with the intensity of self-regulation.

To date, there are no theoretical considerations as to which processes cause an individual's EEs to become more extreme over time and thereby stimulate mental disorders. However, various findings suggest that if a more extreme discrepancy to goals is perceived in many situations occurring in quick succession (or in a drastic, traumatic situation), a gradual intensification and change in behavior take place, which then has a significant effect on the EEs. More specifically, it can be assumed that such repeated situations lead to greater self-regulatory stimulation and thus also behavioral stimulation due to the higher value of the goals. On the other hand, the self-regulation processes in these situations apparently also have an additional influence on the perceived change in the discrepancy in such a way that it is perceived as increasingly extreme (e.g., an individual perceives dangerous stimuli as more threatening when fear is triggered in the prevention focus, i.e., the perceived discrepancy increases [20], or it decreases in the case of the promotion focus when euphoria and manic states are triggered). In response to this, individuals may also change their behavior to a certain extent, especially if such situations occur frequently, in order to better counter the perceived developments. However, this behavior, which is, in fact, often less well adapted and also extreme in its intensity, should have the greatest effect of all self-regulatory processes on the formation of future efficacy expectations [17]. Behavior influences not only whether an individual achieves his or her goal or not, which should then be more often not the case, and thus has a decisive effect on mastery experiences as the most important predictor of efficacy expectations [86,87]. It also has a longer-term influence on environmental changes, which, in the worst case, may make it more difficult for the individual to achieve his or her goals in the future [88,89]. Accordingly, maladaptive coping behaviors have a significant impact on psychopathology [90], which is doubled in

the area of mental disorders [91]. The change in the relationship between EEs and BI in situations should therefore be the strongest indicator of the onset of mental disorders from a self-regulation perspective, as it has the strongest and most far-reaching consequences for the further development of EEs and thus the disorder.

1.4. The Present Study

Evidence indicates that Higgins' [22] promotion and prevention foci are associated with different mental disorders. The onset of the disorder should be characterized by a change in the interaction between EEs with regard to upcoming challenges in one focus and the BI then applied in this focus. While EEs have little influence on BI in the moderate range, at more extreme levels the two variables presumably begin to reinforce each other, triggering an increase in self-regulatory intensity and related psychological symptoms.

Given that various considerations suggest that this mutual reinforcement between EE and BI could play a crucial role in the onset of mental disorders [18,21,49,70], a measurement instrument that reliably maps both constructs, including their extremes and thus the tipping points in their correlation, could possibly be used for prevention purposes. Such a measurement instrument could be suitable for identifying at-risk groups of people close to the tipping point. However, there is currently no such measurement instrument, as existing self-report questionnaires only measure the moderate ranges of the two variables and omit the tipping points [21,92]. Furthermore, only the value need according to Higgins [22] was differentiated into prevention and promotion foci. However, research suggests comparable foci in each of the three needs: value, truth, and control. Their extreme manifestations could be associated with the development of further mental disorders, so that a measurement instrument that captures the foci of all three needs in their entire range of manifestations could facilitate the early detection of the development of a whole range of disorders.

Such a measurement instrument would have to contain different items (or combinations of items) for different groups of people, as it is likely that the critical sections of change in the EE–BI contexts are at different locations for different people. Findings suggest that people may differ, for example, in terms of their usual level of self-regulation intensity (and thus behavior intensity) when they are mentally healthy (e.g., [93]), so that a healthy level of behavior intensity in person A may already be a sign of a disorder in person B. In addition, the increase in behavioral intensity, once initiated, should also be able to occur at different rates (cf. [94,95]). Additionally, the point at which this increase begins may vary among individuals, depending on their levels of efficacy expectations, for example, because people can also train themselves to behave contrary to their own expectations for a certain period of time [96]. More generally, people can also differ in terms of disorder-specific behaviors themselves (e.g., [97]). All these differences should be determined by current and past social environments, learning experiences, genetic predispositions, and dispositions [98,99], and require different, group-specific adapted scales. These scales should therefore be formed in a group-specific manner from a comprehensive item pool.

The aims of the present study were therefore:

- To develop a comprehensive item pool from which group-specific scales can be formed that capture the foci in their entire range.
- To develop a procedure with which group-specific scales can be compiled from this item pool that represent the transitions into mental disorders with the highest possible probability for each specific group, and, at the same time, are reliable, content-valid, and construct-valid.

The method should especially work with small sample sizes, as the individual samples of different groups may be very small depending on the context of the study and the disorders involved [98]. Therefore, on the one hand, a calculation method specifically developed for small samples was used (partial least squares structural equation models [100]), and on the other hand, a deliberately small, random population sample (N = 198) was selected to test the method.

The hypotheses of the study were accordingly:

H1. *The overarching item pool is suitable for extracting group-specific scales from it, as indicated by a clear majority of positive/negative cubic estimators in nonlinear regressions, which are conducted among all those EEs and BI scales of the promotion/prevention foci whose item composition is permitted based on measurement-theoretical considerations.*

H2a. *Within the scales identified as the most suitable for detecting transitions into mental disorders using the developed procedure, there are significant cubic effects of EEs on BI.*

H2b. *The scales that were identified as the most suitable for detecting transitions into mental disorders, using the developed method, prove to be reliable and construct-valid when tested in nonlinear partial least squares structural equation models and when examining their correlations with similar constructs (e.g., the correlation of TProm EE with Presence of Meaning, indicating convergent validity).*

2. Materials and Methods

2.1. Sample and Procedure

The newly developed questionnaire was tested on a German sample recruited via Facebook between December 2020 and March 2021. To this end, advertisements for participation in the questionnaire were posted in various Facebook groups, and the subjects were directed to the SoSciSurvey online platform via a link. Facebook groups with a high number of members and different content were selected (university, professional, and leisure groups). The group administrators were informed before the advert was posted, or they posted the link themselves after prior contact. To obtain informed consent, all participants were informed at the beginning of the survey about the objectives and procedure of the study, the planned handling and storage of their anonymized data, and the possibility of terminating their participation in the survey at any time. A positive vote from an ethics committee was obtained (reference number 2020-71k).

To optimize the detection of nonlinear relationships, all items were answered using a slider. This approach measures constructs precisely even at the edges of their distributions [101,102], which should make the cubic properties of correlations easier to uncover. Participants with clear indications of imprecise information were excluded from the analysis. This included subjects who did not name any personal upcoming challenges at the beginning of the questionnaire to which all items on EEs and BI related, participants for whom a significantly shortened processing time indicated a lack of engagement with the item content (SoSciSurvey variable DEG_TIME > 100), as well as subjects who answered the questionnaire on a smartphone instead of a PC or tablet, as this can lead to significant imprecision with sliders [103,104], as well as those who explicitly mentioned other technical problems with the slider.

Of the remaining N = 198 participants, 76.8% were female. Their average age was M = 35.07 years (SD = 13.59; Min = 18, Max = 78). 46.5% of the participants were students (the largest groups were students of teaching subjects with 19.6%, medicine with 16.3%, psychology with 14.1% and STEM subjects with 13% of the students) and 39.4% of the participants were employed (the largest groups were employees from the social, teaching, and education sectors with 33.3%, and from health and nursing professions with 17% of all employees). The remaining test subjects were retired (7.6%), in training (1.5%), or had no fixed occupation (3.5%). Finally, 1.5% of the test subjects did not state their occupation.

2.2. Measurement Instruments

The participants provided information on newly developed scales on EEs and BI in both foci in each of the three needs. For each scale, items with at least 3 clearly different statements were developed in order to capture the construct with sufficient breadth of content. In addition, items with at least three levels of difficulty (low, medium, high difficulty) were developed for each of these 3 content areas in order to map the entire scope of the construct sufficiently well for each content area (e.g., the following items

existed for the EEs of TProm: "When faced with upcoming challenges. . .", "I will feel that my life follows a special purpose" (low difficulty), "I will be aware of my goals for my life" (medium difficulty), and "I will have the feeling of wandering through life without a plan or goal (inverted)" (high difficulty)). The items were developed partly inspired by existing measurement instruments for similar constructs. Details on this and the wording of all items can be found in the Supplementary Materials. In the course of the survey, all participants also provided information on various other measurement instruments for the convergent validity of the scales, to which there should be a theoretical proximity in terms of content to EEs and behavior with regard to the six constructs. The scale selected for the TProm EEs was the Presence of Meaning subscale of the Meaning in Life Questionnaire [64], and for the TProm BI, the Spontaneous Self Affirmation Measure [105]. For TPrev EEs, the Self Concept Clarity Scale [63] was selected, and for TPrev BI, the Introspectiveness Scale [106]. For the CProm EEs and CPrev EEs, the selected scales were the Sense of Positive Agency Scale and the Sense of Negative Agency Scale [107]; for CProm BI, the Desirability of Control Scale [108]; and for CPrev BI, the third scenario (high threat, low responsibility) of the Obsessive Compulsive Vignette Inventory [109], where 4 items on Desire for Control were used. For VProm EEs and VPrev EEs, the Selves Questionnaire [110] was selected, and for VProm BI and VPrev BI, items on promotion and prevention strategies for dealing with friendships were used [111].

2.3. Item Analysis and Scale Construction

First, those items were removed from the overarching item pool whose mean was too close to the mean of the next more difficult or easier item group (e.g., moderately difficult items that were actually designed as easy items). Subsequently, several analysis steps were performed to test for the existence of cubic correlations between EEs and BI in the entire item pool and thus its suitability for the extraction of group-specific scales (H1). Based on this, a newly developed selection procedure was then used to identify those scales that are likely to map the transitions to mental disorders with the highest possible probability specifically for the present sample. These scales were then checked for their cubic effects between EE and BI (H2a) and for their psychometric properties (H2b).

In the first analysis step, EEs and BI scales were constructed from the total item pool and tested for cubic correlations. All combinations of at least three items were allowed as scales in which (1) the entire spectrum of characteristics was covered sufficiently evenly and precisely, which was ensured by the inclusion of at least one item from the high and one from the low difficulty group (and, if the scale contained only one item from the high difficulty group, no more than two items from the low difficulty group and vice versa). In addition, scales (2) should include a sufficient breadth of content, which was ensured by including items from at least two content areas if the items in one content area were too similar, which also had to be included in the scale with a similar weighting (a weighting of different content areas of 2:1 was permitted; scales with a weighting of 3:1 or more were excluded). From the scales formed in this way, those scales were again excluded whose distributions did not correspond to the expected normal distributions or, in the case of the efficacy expectancy scales, slightly right-skewed distributions and, in the case of the behavior intensity scales, slightly left-skewed distributions (due to the high proportion of women in the sample, a slightly higher proportion of anxiety disorders, depression and anorexia, and a slightly lower proportion of narcissism and psychopathy than in the normal population could be assumed [112–116]). The difference between the median and the mean (negative for right skewness and positive for left skewness) was used as a criterion, as it is less susceptible to outliers than, for example, the skewness measure (due to the third power in its calculation) [117]. A value > 0 was used as the criterion for the difference in the EEs scales (in two exceptional cases, values ≥ -1 were allowed), as was a value ≥ -1 for the Prom scales of BI (here in one exceptional case), and a value < 0 was used as the criterion for the Prev scales of BI. The resulting scale variants formed the basis for the subsequent analyses.

2.4. Statistical Analysis

All statistical analyses were conducted by the first author of the study. To determine the presence of positive/negative cubic relationships in the overarching item pool (H1), cubic regressions were calculated separately for each need focus, with each scale of the focus-EEs as a predictor in combination with each scale of the focus-BI as a criterion (e.g., for TProm, regressions with each TProm EE scale as a predictor in combination with each TProm-BI scale as a criterion). The sign of their cubic regression weights was then checked to see whether it was positive or negative, i.e., whether the influence of EEs on BI was positive or negative to varying degrees depending on the strength of the EEs. Due to the small sample size, it was not expected that the cubic regression weights would generally reach significance for each scale formed from the item pool. However, the suitability of the item pool for the formation of group-specific scales from it should also be recognizable from a clear majority of the assumed positive/negative signs of the cubic estimators. In contrast, in an item pool whose items are not suitable for forming the scales, the signs of the cubic estimators should be distributed randomly, such that a positive sign should result in about half of all calculated regressions and a negative sign in the other half.

The R program (versions 4.0.2 and 4.3.2 [118]) was used to run the regressions. Subsequently, partial least squares nonlinear structural equation models were calculated with the EEs–BI-scale combinations which had the lowest *p*-values (the lowest significance level) of the cubic estimators and thus depicted the transitions into mental disorders in the form of the EE–BI correlation change with the highest possible probability. Partial least squares methods allow nonlinear structural equation models to be tested even with smaller sample sizes [119,120]. They are therefore suitable for testing the cubic effects of efficacy expectations on behavioral intensity (H2a), as well as for providing initial information on the reliability and validity of the developed scales (H2b).

In the next step, separate cubic structural equation models were calculated for each need (truth, control, value), in which their promotion and prevention Focus-EEs scales were included as exogenous variables and Promotion and Prevention Focus-BI scales as endogenous variables. Starting with the two scales of their promotion and prevention focus, which had the lowest *p*-values in the cubic regressions, new models were formed and calculated in ascending order of the *p*-values of the prevention focus and promotion focus regressions with the respective scales until three models had been found whose values on the indices of reliability and construct validity were within the range of the usual statistical conventions (e.g., reliability should not be less than 0.6; for a precise description of the indices and the static conventions of their assessment, see below). In this way, it was possible to ensure that scales were ultimately selected that did not, for example, measure something other than the designed foci, or that they did not measure the designed foci with sufficient consistency. Problematic values on model indices of reliability and construct validity of one or more scales (e.g., too low factor loadings, unacceptably high cross-loadings) therefore led to the replacement of the respective scale and the associated BI or EEs scale of the same focus with the two scales with the next highest *p*-value (e.g., if the cross-loadings were higher than the loadings of an item from TProm EEs to TPrev EEs, the corresponding TProm EEs and TPrev-BI scales were exchanged for the two scales with the next highest *p*-value). The three models obtained in this way were compared in terms of the explained variance of the latent endogenous variables of BI (adjusted R^2). In models with the highest R^2 values, the largest proportion of BI is explained by EEs. The scales contained in these models were selected as the most suitable for detecting the transitions to mental disorders [121,122].

The analyses were performed with the program WARP-PLS 7.0 [100]. The PLS regression algorithm was used to compute the (reflective) measurement models (outer models), and the Warp3 algorithm, which tests for cubic relationships between the exogenous and endogenous variables, was used to compute the structural models (inner models). To evaluate the measurement models and thus the scales, composite reliabilities were calculated [121,122] (composite reliabilities of >0.6 are considered acceptable; >0.7–>0.9 as

satisfactory to good [123]). Additionally, convergent validity was assessed based on the level and significance of factor loadings. Hair et al. [122] suggest a threshold of >0.4 as a criterion for acceptable factor loadings for newly developed questionnaires. It was decided to lower this to >0.3 because the correlations between high and low difficulty items and the factor are likely to be nonlinear, which should attenuate the level of the respective loadings (for the same reason, the criterion of an Average Variance Extracted of >0.5 per factor was not used here to assess the quality of the model). More recent studies recommend heterotrait–monotrait (HTMT) ratios to test discriminant validity. These describe the ratio of the correlations of indicators measuring different constructs to the correlations of indicators each measuring its own construct, and should be <0.9 for conceptually similar variables, as well as significantly different from 1 [123]. In addition, the Fornell–Larcker criterion (i.e., correlations between indicators of different constructs should be lower than the square root of the average variance extracted of a construct) was tested. Finally, the loading pattern was examined for cross-loadings. Significantly higher cross-loadings than loadings in a model led to the replacement of the corresponding scale and the associated EEs scale or BI scale by the scales with the next higher *p*-value.

In addition, various indices for assessing the quality of the inner models were examined, which can provide information about the reliability of the standardized cubic path coefficients for testing H2a. The Full Collinearity Variance Inflation Factors (FVIF) of the factors were considered to hedge against multicollinearity (in this case, multicollinearity between the latent predictor and the latent criterion, cf. [124]). A VIF > 3 indicates multicollinearity [120]. Cubic path coefficients should also be able to be distorted by multicollinearity, in the present case when exogenous and endogenous variables measure the same in their upper or lower extreme range and thus the range in which linear correlations are expected. Furthermore, the Stone–Geisser criterion Q^2 was tested to ensure the predictive relevance of the exogenous variable EEs (in the case of predictive relevance, the Q^2 values are >0; [122]). The coefficient of determination R^2 was used to test whether the overall model explained sufficient variance (R^2 should be greater than 0.02, [100]).

Subsequently, the height and significance of the standardized cubic path coefficients were inspected to test H2a. In addition, the adjusted R^2 values of the individual endogenous variables were inspected (an adjusted R^2 of an endogenous variable of 0.19 is considered weak, of 0.33 as moderate, and of 0.66 as substantial [125]).

After calculating the models, bivariate correlations between the selected scales and various scales measuring similar constructs (one scale per focus-EE/BI, see tables in the results section for the full list) were determined in a final step (here, Spearman's Rho, as the correlations should again not be linear). This served to further examine the construct validity of the selected scales (and thus test H2b), which had already been partially examined by the selection procedure described above.

3. Results

When testing the suitability of the total item pool (H1) for the Truth Promotion Focus, 96.7% of the calculated cubic regressions with all scales that had been formed according to the procedure described under "item analysis and scale construction" in the method section had a positive cubic estimator. Of the calculated cubic regressions for TProm, 96.7% had a positive cubic estimator. In 10.1% of all calculated regressions, there was a cubic estimator with a significance level of $p < 0.05$, and in 22.0% of all regressions, a significance level of $p < 0.1$. Of the calculated cubic regressions for TPrev, 80.13% had a negative estimator. Of all calculated regressions, 0.7% had a significance level of $p < 0.05$, and 4.2% had a significance level of $p < 0.1$.

Of the calculated cubic regressions with all scales that were formed for the CProm according to the described procedure, 65.5% had a positive cubic estimator, whereby no cubic estimator with a significance level of $p < 0.1$ was found (the lowest significance level was $p = 0.38$). Of the cubic regressions calculated for the CPrev, 97.5% of the cubic estimators were negative, 2.3% of all calculated regressions were significantly negative,

and 7.7% of all calculated regressions had a significance level of $p < 0.1$. Of the calculated cubic regressions with all scales that were formed for VProm according to the described procedure, 85.9% had a positive cubic estimator. This had a significance level of $p < 0.05$ in 2.6% of all calculated regressions and a significance level of $p < 0.1$ in 6.9%. Of the cubic regressions calculated for the VPrev, 78.4% had a negative estimator; 1.75% of all calculated regressions had a significance level of $p < 0.05$; and 5.9% of all calculated regressions had a significance level of $p < 0.1$.

For the scales ultimately selected according to the procedure described, the measurement models were then tested for various indices of their reliability and construct validity when they were included in nonlinear structural equation models (H2b). With the exception of CPrev EEs, the selected scales all had satisfactory to good composite reliabilities (ρc = 0.74–0.86); for CPrev EEs, the composite reliability was acceptable (ρc = 0.66, see Table 1). Regarding structural validity, the factor loadings of the selected items ranged from 0.44 to 0.89 for Truth, from 0.33 to 0.87 for Control, and from 0.43 to 0.85 for value (see Appendix A). With regard to discriminant validity, the HTMT ratios of each of the nonlinear structural equation models were <0.9 and significantly different from 1 (HTMT ratios for Truth = 0.44–0.72, HTMT ratios for Control = 0.35–0.85, HTMT ratios for Value = 0.28–0.73). All scales met the Fornell–Larcker criterion. A test of the cross-loadings revealed that two items of low difficulty of TProm BI had equally high or slightly higher negative cross-loadings on TPrev BI (differences ≤ 0.1). These were considered permissible based on methodological considerations (see section "Adjustment of the criterion for low cross-loadings").

Table 1. Scale means, standard deviations, reliabilities, and intercorrelations of the Truth, Control and Value promotion and prevention focus scales.

Scale	M (SD)	*ρc*	1	2	3	4	5	6	7	8	9	10	11	12
1. TProm EEs	55.3 (19.9)	0.82	1											
2. TProm BI	61.7 (16.5)	0.74	0.48 **	1										
3. TPrev EEs	64.2 (18.6)	0.80	0.41 **	0.32 **	1									
4. TPrev BI	72.1 (21.7)	0.76	0.30 **	0.39 **	0.42 **	1								
5. CProm EEs	58.3 (18.3)	0.78	0.42 **	0.29 **	0.58 **	0.28 **	1							
6. CProm BI	71.2 (15.7)	0.75	0.32 **	0.45 **	0.48 **	0.44 **	0.43 **	1						
7. CPrev EEs	48.6 (23.9)	0.86	0.34 **	0.23 **	0.50 **	0.21 **	0.51 **	0.40 **	1					
8. CPrev BI	58.3 (18.1)	0.66	−0.06	0.14 $^{+}$	0.05	0.03	−0.05	0.14 $^{+}$	0.01	1				
9. VProm EEs	67.3 (17.6)	0.79	0.60 **	0.34 **	0.52 **	0.34 **	0.48 **	0.45 **	0.47 **	−0.05	1			
10. VProm BI	63.1 (17.6)	0.79	0.19 *	0.38 **	0.18 *	0.34 **	0.20 **	0.40 **	0.22 **	−0.11	0.34 **	1		
11. VPrev EEs	36.0 (20.6)	0.86	0.39 **	0.07	0.36 **	0.02	0.38 **	0.12	0.44 **	−0.17 *	0.34 **	0.16 *	1	
12. VPrev BI	64.1 (18.9)	0.89	−0.06	0.13 $^{+}$	0.03	0.09	0.02	0.21 **	−0.07	0.33 **	−0.15 *	−0.03	−0.41 **	1

Notes: *ρc* = Composite Reliability. TProm = Truth Promotion Focus. TPrev = Truth Prevention Focus. CProm = Control Promotion Focus. CPrev = Control Prevention Focus. VProm = Value Promotion Focus. VPrev = Value Prevention Focus. EEs = Efficacy Expectations. BI = Behavioral Intensity. ** $p < 0.01$, * $p < 0.05$, $^{+}$ $p < 0.10$.

When inspecting the cubic effects of EE on BI in the nonlinear structural equation models (H2a), the magnitudes of the latent cubic path coefficients of EEs on BI were between 0.41 and 0.47 in all three models, with the exception of a significantly lower magnitude of the path coefficient for CPrev (0.19, see Figure 1). All latent cubic path coefficients were significant. A quality assessment of the corresponding structural models and the associated examination of the cubic path coefficients revealed no evidence of multicollinearity (all FVIVs < 3) and also confirmed their predictive relevance (all $Q^2 > 0$). In addition, there was sufficient variance explained by the EEs in the overall models (adjusted R^2: Truth = 0.19, Control = 0.21, Value = 0.21). The corrected R^2 values of the endogenous variables were between 0.03 (CPrev) and 0.21 (TProm BI, VProm BI, and VPrev BI) (see Figure 1).

The rank correlation coefficients of the selected scales with other scales for convergent validation (H2b) ranged from small to moderate (ρ = 0.09–0.51) and were significant, with one exception (the correlation of VPrev BI with the Prevention Strategies for Dealing with Friendships scale) (see Table 2a–c). For example, there was a significant moderate correlation between the TProm EE scale and the "Presence of Meaning" scale of the Meaning in Life Questionnaire (ρ = 0.51), as well as a significant moderate correlation between the TPrev BI scale and the Introspectiveness scale (ρ = 0.45). This suggests that the scales

measure something similar to the constructs selected for their validation, thus supporting their construct validity.

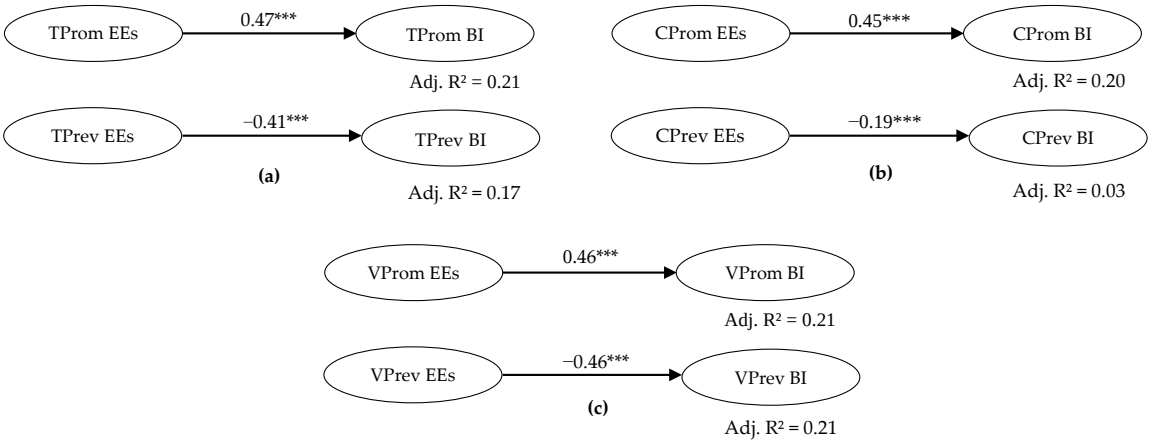

Figure 1. Results from the partial least squares nonlinear structural equation analyses with regard to (**a**) Truth, (**b**) Control, and (**c**) Value. Standardized cubic path coefficients are reported. Adj. R^2 = adjusted R^2. TProm = Truth Promotion Focus. TPrev = Truth Prevention Focus. CProm = Control Promotion Focus. CPrev = Control Prevention Focus. VProm = Value Promotion Focus. VPrev = Value Prevention Focus. EE = Efficacy Expectation. BI = Behavioral Intensity. *** $p < 0.001$.

Table 2. (a) Convergent relations of the Truth scales to other constructs (rank correlation coefficients). (b) Convergent relations of the Control scales to other constructs (rank correlation coefficients). (c) Convergent relations of the Value scales to other constructs (rank correlation coefficients).

(a)				
Validation Scale	**TProm EEs**	**TProm BI**	**TPrev EEs**	**TPrev BI**
MiL	0.51 **	0.27 **	0.52 **	0.26 **
SSA	0.30 **	0.26 **	0.34 **	0.24 **
SCC	0.30 **	0.01	0.34 **	−0.04
Intro	0.01	0.17 *	0.03	0.45 **
(b)				
Validation Scale	**CProm EEs**	**CProm BI**	**CPrev EEs**	**CPrev BI**
SoPA	0.47 **	0.38 **	0.46 **	−0.03
DCon	0.17 *	0.24 **	0.23 **	0.01
SoNA	0.35 **	0.16 *	0.30 **	−0.04
OCVI (Desire)	−0.04	0.26 **	0.01	0.23 **
(c)				
Validation Scale	**VProm EEs**	**VProm BI**	**VPrev EEs**	**VPrev BI**
Selves–Prom	0.35 **	−0.01	0.15 *	0.04
Friend strategy–Prom	0.13 $^+$	0.25 **	−0.08	0.14 $^+$
Selves–Prev	0.26 **	−0.04	0.29 **	0.10
Friend strategy–Prev	0.06	0.15 $^+$	−0.08	0.09

Notes. (a) MiL = Scale "Presence of Meaning" of the Meaning in Life Questionnaire. SSA = Spontaneous Self-Affirmation Measure. SCC = Self Concept Clarity Scale. Intro = Introspectiveness Scale. TProm = Truth Promotion Focus. TPrev = Truth Prevention Focus. EEs = Efficacy Expectations. BI = Behavioral Intensity. The diagonals contain the correlations between a scale and the construct used for its convergent validation. * $p < 0.05$; ** $p < 0.01$. (b) SoPA = Sense of Positive Agency. DCon = Desire for Control Scale (DCon). SoNA = Sense of Negative Agency. OCVI (Desire) = Appraisal of desire for control in the third scenario (high threat, low, responsibility) of the Obsessive Compulsive Vignette Inventory. CProm = Control Promotion Focus. CPrev = Control Prevention Focus. EEs = Efficacy Expectations. BI = Behavioral Intensity. The diagonals contain the correlations between a scale and the construct used for its convergent validation. ** $p < 0.01$; * $p < 0.05$. (c) Selves–Prom = Selves Questionnaire–Promotion Focus. Friend strategy–Prom = Strategies for being a good friend–Promotion Focus. Selves-Prev = Selves Questionnaire–Prevention Focus. Friend strategy–Prev = Strategies for being a good friend–Prevention Focus. VProm = Value Promotion Focus. VPrev = Value Prevention Focus. EEs = Efficacy Expectations. BI = Behavioral Intensity. The diagonals contain the correlations between a scale and the construct used for its convergent validation. ** $p < 0.01$, * $p < 0.05$, $^+$ $p < 0.10$.

Adjustment of the Criterion for Low Cross-Loadings

When testing the measurement models, cross-loadings were found in several cases to be similar in magnitude to the loadings for items from the high and low item difficulty groups. Closer inspection of these items revealed that, in many cases, the cross-loadings were either on the associated BI or EEs construct of the same focus or were negative cross-loadings of the BI factor of one focus on the BI factor of the other focus. In both cases, cross-loadings up to a certain level are theoretically plausible and, to some extent, confirm the content validity of the items. In the first case, because of their ever-increasing correlations with increasing or decreasing values in extreme areas, EEs and BI are likely to become two constructs that actually become more difficult to distinguish from each other the more pronounced the disorder. With regard to the second case, qualitative changes in the area of motivation at the onset of mental disorders have already been described on various occasions [126] and should, according to the assumptions presented here, lead to a situation where, beyond a certain level of focus intensity, the mutual reinforcement between EEs and BI and, consequently, the further reinforcement of one focus, suppresses the other focus (for similar considerations and findings, see [61–69]). In terms of content, the two foci could also become the opposite of each other in certain respects, so that the items had already been designed in advance to a certain extent to reflect a negative correlation of the two foci in this area (see Introduction section). This negative correlation cannot be represented in the positive correlation of the overall constructs. Therefore, models with such a loading pattern were included in the selection of exemplary scales as long as the corresponding cross-loadings did not exceed the loadings by more than 0.1. On the other hand, models with even higher cross-loadings were not included. Items for which such cross-loadings exceeded the loadings by >0.1 in the majority of the calculated models are also marked in the Supplementary Materials. These were three items each from the Value and Truth scales. Separately from this, items are also marked in the Supplementary Materials that, in the majority of the calculated models, showed higher cross-loadings than loadings on factors other than those just mentioned, meaning that for their loading patterns there is no theoretical justification. This was the case for one item each from the Truth and Value scales and three items from the Control scales. In the present study, all items were checked for cross-loadings, regardless of whether they appeared in the already computed models in the scale selection procedure or not. For this purpose, items that did not initially appear in any of the calculated models were subsequently included in a PLS-SEM with their scale combination that had the lowest *p*-value, combined with the scale combination of the other focus selected for an exemplary model.

4. Discussion

In the present study, EEs and BI were captured for the first time across their entire range of manifestations within the promotion and prevention focus, according to Higgins [22], using a newly developed measurement instrument. This made it possible to reveal changes in their relationships, from zero correlations to positive/negative correlations, in the extreme ranges. These changes could represent a central characteristic feature of the onset of mental disorders, suggesting that a good measurement instrument for mapping them could become important for disorder prevention. The Promotion and Prevention focus according to Higgins [36] were formulated for the measurement instrument not only for the Value need but also for the other two needs postulated by Higgins [22], Truth and Control, as evolutionary psychological considerations suggest that self-regulatory foci exist in all three needs. The foci of Truth and Control can also be assumed to be related to mental disorders in their extreme ranges, which, in turn, are triggered by a change in the EE–BI interaction. Items on EE and BI were therefore developed in both foci in all three needs.

Since it must be assumed that both specific behaviors at the onset of mental disorders and the exact descriptive properties of the cubic relationships or threshold relationships can vary significantly across different groups of people depending on their disposition and learning experiences in (socio-)cultural environments [98,99], it was decided to develop

an item pool rather than a questionnaire, from which group-specific, customized scales could then be created. In addition, a procedure was developed with which group-specific scales can be compiled from this item pool, even on the basis of small samples. These scales should fulfill the requirement of mapping the changes in the EE–BI relationships and thus transitions to mental disorders with the highest possible probability, as well as being reliable, content-valid and construct-valid. With an initial, deliberately rather small population sample, both the item pool was tested for its suitability for the formation of such scales (H1), and the scales identified by the procedure were tested for their psychometric properties (H2b) and for the cubic prediction of BI by EEs (H2a) (in this way, the procedure was simultaneously tested for its suitability).

In order to examine the suitability of the item pool (H1), cubic regressions for the prediction of BI by EEs in each of the foci were calculated with all scales whose item compositions out of this pool were possible based on measurement-theoretical considerations, and that covered the full range of manifestations (and a sufficient breadth of content) of the constructs. Due to the small sample size, it could not be expected that the cubic regression weights would generally reach significance for each scale extracted from the item pool. However, the suitability of the item pool for the formation of group-specific scales from it should also be recognizable from a clear majority of the assumed positive/negative signs of the cubic estimators. As expected, the vast majority of the regressions showed the assumed positive or negative signs of the cubic estimators in each of the need foci. With over 95% of cubic estimators in all regressions being almost exclusively positive (or negative), the clearest evidence for the hypothesis was found in TProm (CPrev); the lowest proportion, with just under two-thirds of positive estimators, was found in CProm. The item pool can therefore be considered suitable for extracting group-specific scales from its items, even with other equally small samples.

To answer H2a and H2b, the cubic estimates were used in the next step to identify those scales that map the changes in the EEs–BI relationships with the highest possible probability (those with the lowest significance level of these estimators). These scales were further tested for their psychometric properties in nonlinear PLS structural equation models separated according to need, whereby a violation of the psychometric quality criteria (recognizable by violations of statistical conventions on relevant indices) led to the rejection of the corresponding scales and the testing of the scales with the next highest significance level of these estimators. In this way, it was ensured that scales were ultimately selected that did not, for example, measure something other than the designed foci or did not measure the designed foci with sufficient consistency. Among various suitable models in this regard, the one with the highest variance resolution in the BI scales was selected for further testing in each need.

In the examination of H2b, the scales of each of the need models showed satisfactory to good reliabilities (with the exception of only acceptable reliability of CPrev BI), and various indices also confirmed their construct validity in the form of good discriminant validity (satisfactory HTMT ratios, fulfillment of the Fornell–Larcker criterion) and largely satisfactory structural validity (sufficiently high loadings on the constructs, sufficiently low cross-loadings), although the content-related conception of the constructs did justify minor adjustments to otherwise usual assessment standards (see section "Adjustment of the criterion of low cross-loadings"). The content validity of the items had been achieved by focusing on existing constructs when formulating the items (see Supplementary Materials). For further validation, correlations with constructs with (conceptually) similar content were also calculated (rank correlation coefficients). These were in the small to moderate range and thus largely indicated good convergent validity of the constructs. The only exception was the correlation of VPrev BI with the Prevention Strategies for Dealing with Friendships scale, which was not significant. Thus, the convergent validity of the scale could not be confirmed. At the same time, however, the Prevention Strategies in Dealing with Friendships scale also showed a rather low reliability ($\alpha = 0.62$). In contrast, expected small significant correlations of VPrev behavior intensity with introspectiveness ($\rho = 0.19$,

$p = 0.01$) and self-concept clarity ($\rho = -0.19$, $p = 0.01$) were also found. Therefore, the results of further research on correlations with more reliable constructs should be awaited before revising the scale, if necessary. Overall, it can therefore be concluded that the results support the reliability and construct validity of the constructs.

In the examination of H2a, the assumed significant latent cubic path coefficients from EEs to BI were found in all PLS-SEMs. These results thus indicated that the scales selected by the procedure adequately reflect the changes in the relationships from zero correlation to positive/negative correlations. Regarding the magnitude of the latent cubic path coefficients in the calculated PLS-SEMs with the selected scales, and thus regarding the strength of the cubic change or the differences in the effects of EEs on BI depending on the strength of EEs, all path coefficients showed medium two-digit values, with the exception of only small cubic path coefficients from CPrev EEs to CPrev BI (−0.19).

4.1. Indications of a Need to Revise Items of the CPrev and CProm Scales

Although the item pool can generally be considered suitable based on the results in order to extract the necessary group-specific scales for the detection of mental disorders, the summary of various single findings suggests the conclusion that minor revisions of the CProm and CPrev scales may be necessary. This applies in particular if these results are replicated in further studies. Regarding CPrev, only a very small amount of explained variance of the CPrev BI by the CPrev EEs is noticeable (adjusted $R^2 = 0.03$). Thus, in the case of CPrev, the EEs could apparently hardly explain any variance in the BI. In contrast, the values of the adjusted R^2 of the BI of the other foci were all in the low two-digit range. Moulding et al. [127] also found only a very small amount of variance explained by control beliefs in obsessive-compulsive coping strategies, suggesting an overall rather small influence of EEs in OCD. However, a reinvestigation of the CPrev BI items in conjunction with the rather low reliability of the construct ($\rho c = 0.66$) also raised alternative doubts about the conceptualization of its high-difficulty inverted items. Primary psychopathy is characterized by low intensity of one's own feelings and impulses (e.g., [72]) and correspondingly high EEs of one's own self-control even in emotionally demanding situations [128], which should lead to low self-regulation in order to deepen one's sense of control. Accordingly, recent studies also tend to show the opposite tendency, namely that people deliberately seek out frightening situations in which the high experience of control is reduced (but with a previously calculated risk) because the resulting intoxication is perceived as pleasant [128]. The current inverted high-difficulty items ("When faced with challenges. . ." CO32: ". . .I will sometimes seek out situations that trigger aggressive or angry impulses or ideas in me", CO33: ". . .I will deliberately do dangerous or immoral things to act out my impulses", CO34: ". . .I will take my feelings out on others without holding back in the least"), on the other hand, tend to describe a tendency toward aggression and immoral behavior with a high degree of impulsivity without a calculated assessment of long-term negative consequences. This would rather be classified as secondary psychopathy [129] and should not be stimulated by high EEs regarding one's own impulse control. Therefore, we suggest that in future studies, additional items may be formulated that represent the construct more accurately, and that an increase in reliability and explained variance by EEs in this respect be examined.

With regard to CPrev and CProm, it was also noticeable that three of the CPrev BI items that were of low difficulty ("With regard to upcoming challenges, I expend energy on. . ." CO26: ". . .severely rebuking or punishing me internally at the first sign of inappropriate, intrusive thoughts", CO27: ". . .controlling strong or confusing feelings by keeping them completely to myself", CO30: ". . .distracting myself when I have unpleasant or inappropriate thoughts—e.g., by thinking about something else or doing something else") had significantly higher and positive cross-loadings on CProm BI (see Supplementary Materials). CProm describes the self-regulatory focus on stimulating new processes and achieving effects from within [67], whereby these effects are limited to the self according to the conceptualization made, meaning, i.e., stimulating new thoughts and feelings. The CPrev items

mentioned seem to measure CProm in this conceptualization. For example, "distracting myself (. . .) by thinking about something else or doing something else" could be interpreted as stimulating new internal processes rather than exercising control. This would initially suggest a revision and greater differentiation of the CPrev items from the CProm construct. However, the repeated cross-loadings of three CPrev items on CProm could also provide reason to critically re-examine the conceptualization of CProm. The restriction of CProm to the stimulation of processes in the self, rather than conceptualizing it as a superordinate efficacy or competence motivation, seems relatively narrow and may also make it unnecessarily difficult to distinguish from the exercise of self-control in terms of content. Recent theoretical assumptions and findings on psychopaths also point to an overly strong focus on stimulating processes and effects on the (social) environment (e.g., a high social dominance orientation in psychopaths as well as high social potency [128,130]). If similar findings emerge in subsequent studies, CProm may need to be revised in this regard and examined for its effects on the cross-loadings of CPrev identified here. The relatively high proportion of CProm scale constructs with negative instead of positive cubic estimators (34.5%) also suggests a certain structural proximity to CPrev in its current conception.

4.2. Suggestions for Dealing with Items with Substantial Cross-Loadings

In addition, when examining the item pool for cross-loadings, several more cross-loadings were identified that did not meet the adjusted criterion of a difference ≤ 0.1 in the case of cross-loadings on specific, content-wise plausible scales (cross-loadings of items with high/low difficulty on either the corresponding EE/BI scale of the same focus or negative cross-loadings of a BI scale on the BI scale of the other focus at a corresponding level, see the Results section; for the exact items, see the Supplementary Materials). If future studies that test scales with the group-specific most significant cubic estimators for their construct validity reveal similar cross-loadings of some of their items, the respective scales should not be used and, instead, the scale with the cubic estimator of the next highest significance level should be selected (for the full procedure on item selection, see the Methods section). Furthermore, if corresponding cross-loadings repeatedly occur in these items across different groups and studies, we would suggest eliminating these items from the item pool. To gain initial insights into which items these might be, the entire item pool was checked for cross-loadings. However, these results should be consolidated with the findings of as many other studies as possible before any items are eliminated.

4.3. Implications for the Understanding of and Future Research on Mental Health

In the present study, the evolutionarily anchored self-regulatory orientations towards survival and growth of the value need, the prevention and promotion focus [11], were found across all three needs: value, truth, and control [22]. In addition, cubic correlations between EEs and BI were found in each of these foci. This indicates that, as assumed, there is a mutual influence between EEs and self-regulation intensity (and thus behavioral intensity) in the case of extreme EEs [75–77]. Various research findings indicate that individuals with extremely high EEs in the promotion focus or low EEs in the prevention focus assign goals in the associated focus excessive value and, as a result, activate the focus more frequently and more intensively [74,78,79]. This increase in the frequency and intensity of focus activation and its effects, especially the effects of the intensity of behavioral activation and behavior change, should, in turn, have an impact on perception and thus subsequent EEs, making them even more extreme and creating a mutual reinforcement mechanism. The concomitant lower activation of the other prevention or promotion foci leads to a long-term loss of resources, and the self-regulation mechanisms of the over- or under-activated foci become symptoms of mental disorders and stimulate further ones. It is also found that individuals with extremely low EEs in the promotion foci or high EEs in the prevention foci assign corresponding goals low value. A decrease in the frequency and intensity of focus activation that results from this also causes a mutual reinforcement mechanism between

BI and EEs. This can both occur as a side effect of parallel overly strong prevention or promotion foci or in isolation.

On the other hand, in the middle part of the cubic correlations, there is a whole range of moderately low to high EEs, within which individuals do not enter the area of excessively high or low self-regulation intensity. Here, there are only small, if any, correlations between EEs and BI. In this area, individuals should regulate themselves in a fundamentally different way than in the extremes of mental illness in order to continuously maintain their mentally healthy state, and, at the same time, stably advance their own development in a changing environment. It is likely that, in this area, they will face themselves with challenges of varying value and, independent of this, varying levels of EEs. This strategy has several advantages. Firstly, the accumulation of situations with extreme EEs or self-regulation intensity that trigger the reinforcement mechanism between the two rarely occurs. Secondly, varying degrees of effort for goals, which in turn vary in terms of demand, always provide precise information about current circumstances and one's own resources in the changing environment ("calibration" [131,132]). This facilitates positive developments. Thirdly, weaker self-regulation processes often lead to a regeneration of resources, which is needed in order to be able to develop intensive and resource-demanding self-regulation processes. Fourthly, the often only moderate incentive to maintain a focus in this interplay of self-regulation intensity also facilitates switching between foci and needs in order to be able to optimally meet different situational requirements [30,42].

In comparison, the other variant that is compatible with the findings, in which self-regulation is always equally intense across situations, would have disadvantages. If the foci were constantly only moderately or less activated, they would deprive the individual of the advantages associated with focus-specific higher intensities [22], and would therefore be less able to meet occasionally higher environmental demands or developmental goals. Conversely, constantly highly stimulated foci should make the individual more susceptible to developing excessive self-regulation in one of the foci if circumstances require their stimulation over numerous subsequent situations.

These considerations would therefore lead to an addition to the previous assumptions of researchers regarding the focus intensity in mental health [40,41]: mentally healthy people should not only have a high overall *intensity* and a *balance* of foci, but there should also be *fluctuations in intensity* in order to maintain this balance in the long term. However, this assumption has yet to be verified, and further research is required.

4.4. Implications for the Understanding of and Future Research on Mental Disorders

With regard to the understanding of mental disorders, the findings of the present study have various further implications that should also be further investigated in future research. First, the finding of cubic correlations between EEs and BI in each of the need foci conceptualized here indicates a general process of change in the influence of these two variables on each other, which could also occur at the onset of disorders beyond the disorders investigated here. It is in line with this that the three needs can be satisfied in different ways in their survival and growth orientations, depending on predisposition and environment, of which only a few selected variants were examined here. For example, in addition to the approximation to ideal standards, drugs also trigger the positive emotional reactions of the VProm in the brain associated with further development [37]. Therefore, various researchers (e.g., [13,133]) have already assumed excessive VProm self-regulatory intensity in addiction, but with regard to the addictive substance instead of ideal standards (excessive procurement and consumption as well as excessive EEs with regard to its effects are typical) [134,135].

Secondly, the finding that all of the constructed foci, including their extreme manifestations, represent valid, related constructs, which are associated with mental health or illness depending on their manifestation, indicating *quantitative* changes in self-regulation at the onset of mental disorders. However, the EEs—BI correlational changes, and the cross-loadings of some extreme items provide equally strong evidence of *qualitative* changes

in self-regulation at the onset of mental disorders. Similarly, research on self-determination theory also finds a continuum of motivation (e.g., an overarching g-factor, [136]) that equally encompasses the different regulatory styles, although these, in themselves, differentially predict psychopathology and various other outcomes ([136,137]). The coexistence of qualitative and quantitative changes is also assumed in some recent approaches to disorder conceptualization (e.g., [90]) and should accordingly also be incorporated into future research approaches.

Thirdly, the approach presented here represents a concept of disorder that differs in part from the currently widespread disorder models and could be worth investigating further in the future. According to this approach, the transition to mental disorders occurs through changes in self-regulatory processes that are stimulated due to the evolutionary purposes of survival and growth rather than through changes in symptoms, as has often been assumed recently (e.g., [6]). These self-regulatory changes, therefore, precede the symptom changes, which could be important for the early detection of disorder development. The disorder-triggering tipping point of the relationship between the two influential self-regulatory constructs, EEs and BI, postulated here could possibly be suitable for such early detection but needs to be critically examined in further research.

4.5. Limitations and Conclusions

Even though the results presented here generally support the suitability of the item pool and the presented procedure for selecting items to extract group-specific scales, some limitations should be noted. Firstly, various results indicate a possible need for revision of the CPrev and CProm items, which still requires confirmation in further studies (see section "Indications of a need to revise items of the CPrev and CProm scales"). Furthermore, subsequent studies should also examine the adequacy of the criteria used here for item compositions within the scales (e.g., whether two different content areas of the items adequately cover the content breadth needed to address the behavioral changes of specific groups). Moreover, the current item pool with its 105 items, especially with regard to the BI items, is primarily oriented towards those experiences and behaviors that are most frequently mentioned in studies with predominantly Western, American populations in relation to disorders (e.g., [97]). However, it seems likely that a significantly higher specificity of disorder-related behaviors between groups would require a larger overall item pool. Moreover, the predictive quality of the scales for the development of disorders should be determined in longitudinal studies with the specific groups. Regarding the characteristics that groups with similar transition profiles into mental disorders should show, further research is also needed. Here, a more differentiated consideration of individual personality aspects and the sociocultural microenvironment (family, friends, etc.) appears to be important [98].

Overall, the item pool developed here, as well as the proposed procedure for selecting group-specific scales, nevertheless represent an important first step toward improving the identification of at-risk groups and finding more suitable, theoretically plausible cut-offs for the development of mental disorders. Future studies can build on this and optimize the procedure as well as the item pool and its specific applications. The potential advantages and disadvantages of this approach compared to, for example, the assessment of individual symptoms and the formation of complex causal networks that are currently often used in research should also be critically examined further. In recent years, criticism of traditional disorder models, their poor ability to predict disorders, and their great vagueness with regard to specific trigger mechanisms on the one hand [138], and criticism of the often inadequate theoretical justification of modern approaches such as complex causal networks on the other, has rightly continued to grow [7]. We believe that the proposed derivation of mental disorders from self-regulatory changes based on evolutionary considerations could be a promising approach to address this criticism.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/psychiatryint5040048/s1, Table S1: Items of the Truth, Control and Value Promotion and Prevention Focus Efficacy Expectation and Behavior Intensity Scales.

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Data Availability Statement: The data presented in this study are available on request from the corresponding author due to privacy and ethical reasons.

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Appendix A. Loadings and Cross-Loadings

Table A1. Loadings and cross-loadings of the measurement model of the Truth scales.

Item	TProm EE	TProm BI	TPrev EE	TPrev BI
TR2	**0.64**	0.33	−0.20	−0.06
TR3	**0.59**	0.27	−0.48	−0.256
TR5	**0.80**	−0.21	**0.36**	0.09
TR6	**0.77**	−0.26	0.16	0.15
TR13	0.012	**0.63**	0.06	0.26
TR14	0.11	**0.62**	−0.04	0.14
TR8	0.39	**0.44**	**−0.34**	−0.43
TR9	0.08	**0.44**	−0.29	**−0.54**
TR10	0.27	**0.49**	−0.32	**−0.49**
TR11	−0.35	**0.73**	0.35	0.30
TR12	−0.21	**0.78**	0.21	0.26
TR16	0.29	−0.15	**0.74**	0.12
TR20	0.13	0.13	**0.76**	0.03
TR23	−0.27	0.09	**0.77**	−0.07
TR24	**−0.40**	0.18	**0.65**	−0.13
TR25	0.20	−0.10	**0.60**	0.11
TR18	0.05	−0.14	**0.74**	−0.05
TR29	−0.05	0.09	−0.03	**0.88**
TR33	−0.11	0.02	0.08	**0.89**
TR34	0.05	−0.02	−0.02	**0.89**
TR35	0.19	−0.12	−0.034	**0.55**

Notes. Factor loadings greater than 0.3 are shown in bold. All loadings were significant at $p < 0.001$.

Table A2. Loadings and cross-loadings of the measurement model of the Control scales.

Item	CProm EE	CProm BI	CPrev EE	CPrev BI
CO1	**0.78**	−0.08	**0.46**	0.04
CO4	**0.73**	0.19	**−0.41**	0.10
CO7	**0.69**	−0.11	−0.08	−0.15
CO11	0.08	**0.83**	−0.15	0.12

Table A2. *Cont.*

Item	CProm EE	CProm BI	CPrev EE	CPrev BI
CO8	−0.10	**0.70**	**0.32**	0.04
CO14	0.11	**0.57**	−0.18	−0.22
CO16	0.07	−0.11	**0.87**	0.11
CO25	0.15	0.11	**0.70**	−0.13
CO17	−0.19	0.02	**0.87**	0.00
CO27	−0.26	−0.22	**0.32**	**0.69**
CO29	0.27	0.07	−0.22	**0.81**
CO32	−0.13	0.278	−0.13	**0.33**

Notes. Factor loadings greater than 0.3 are shown in bold. All loadings were significant at $p < 0.001$.

Table A3. Loadings and cross-loadings of the measurement model of the Value scales.

Item	VProm EE	VProm BI	VPrev EE	VPrev BI
VA1	**0.66**	0.090	0.29	0.22
VA3	**0.67**	0.16	**0.39**	0.12
VA7	**0.65**	0.02	**−0.31**	−0.11
VA8	**0.81**	0.02	−0.07	−0.02
VA10	**0.68**	−0.28	−0.28	−0.20
VA11	−0.26	**0.43**	0.26	0.11
VA12	−0.28	**0.51**	**0.37**	0.29
VA19	0.21	**0.77**	−0.27	−0.12
VA21	0.19	**0.83**	−0.11	−0.12
VA25	−0.20	0.03	**0.85**	0.02
VA26	−0.04	−0.11	**0.85**	0.16
VA29	**0.39**	0.13	**0.54**	−0.29
VA32	−0.17	0.02	0.21	**0.70**
VA33	−0.02	−0.09	−0.04	**0.69**
VA34	0.06	−0.10	0.12	**0.65**
VA36	0.14	0.17	**−0.31**	**0.64**

Note. Factor loadings greater than 0.3 are shown in bold. All loadings were significant at $p < 0.001$.

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